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**Financial Stability Review**

November 1999

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## 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

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

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

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# The financial stability conjuncture and outlook

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## Introduction

This is the second survey of the financial stability conjuncture and outlook to be published in the *Financial Stability Review*. It focuses mainly on events in the six months up to the beginning of November 1999. It opens with a discussion of the potential risks arising in the international environment: the emerging market economies, the major industrialised countries, and the imbalances amongst them. The survey then considers the major financial markets and what they might reveal about the assessment of risks by market participants. One issue with particular prominence in recent months has been the possible impact of the millennium bug – Y2K. That is considered in Section IV. The survey then focuses more closely on the United Kingdom: first, aspects of the real economy relevant to financial stability and then developments in the UK financial sector, particularly banks. Finally, Section VII reviews changes in the infrastructure of financial systems which have had, or are likely to have, a marked effect on behaviour and/or risks. Finally, the Summary reviews the main points of the survey.

## I. Emerging market economies

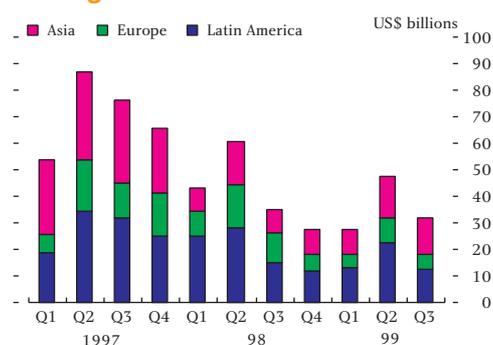
Solvency and liquidity problems in emerging market economies have been the main triggers of the turbulence in global financial markets during the past three years, and a major source of losses to banks and other financial institutions in industrialised countries. The exposure of the international financial system to individual countries may appear small in most cases, but the size of some country-specific shocks and the possibility that they may be highly correlated across countries, make the economic prospects and debt servicing capacity of emerging markets a major concern for financial stability analysis.

**Chart 1:**  
**Emerging market sovereign bond spread**



Source: J P Morgan; EMBI+ measure.

**Chart 2:**  
**Emerging market gross foreign currency financing<sup>(a)</sup>**



Source: Capital Data.

(a) Excludes official financing. Includes bonds, equities and syndicated loans.

### Capital markets

Two main features have characterised capital markets during 1999 as far as emerging market economies are concerned: continued tight external credit conditions; and increasing evidence of country risk differentiation.

First, as highlighted in the June Review, external credit conditions generally remain tight. That is reflected in both financial prices and quantities. Spreads over US Treasuries on emerging-market dollar debt, have remained in the 900-1200 basis point range over the past six months (see Chart 1). That is roughly twice the level prior to August 1998. Meanwhile, yields on dollar debt, at around 16 per cent, are at similar levels to the start of the year. Gross foreign currency financing of the emerging market economies is estimated to have fallen to around US\$32 billion in 1999 Q3, compared with quarterly averages of US\$39 billion in 1999 H1 and US\$41 billion in 1998 (see Chart 2). Within this, bank lending has fallen sharply from a peak of over US\$100 billion in 1996, and has shown little sign of recovery during the year.

What explains this continuing tightness in external credit conditions? Deteriorating aggregate credit risk seems unlikely to be the main explanation. It is true that, on a GDP-weighted basis, emerging market economy credit ratings have continued to deteriorate over the past twelve months. But some significant borrowers, such as Korea and Mexico, have been upgraded by the rating agencies and there has been a significant upward revision of emerging market economies' growth prospects during 1999. Table 1 compares growth projections for 1999 from the IMF's latest World Economic Outlook, published in September 1999, with those from December 1998. Upward revisions have been particularly significant in Asia. However, that may also have increased demand for external funds, by raising expected current-account deficits or reducing surpluses.

Changes in the supply of funds by creditors are a more likely explanation for the continuing tightness of credit conditions. Several factors may be involved and their impact is likely to depend on the extent to which they are perceived by creditors to

be temporary or persistent. First, actual and expected rises in US interest rates have been judged to have had a negative impact on emerging market prospects. In particular, the 'bias to tighten' announced by the FOMC in May triggered a significant rise in emerging market yields and spreads. This persisted into the second half of 1999, but has now largely unwound (see Chart 3).

A second possible factor has been a fall in institutional demand for emerging-market assets. The IMF recently suggested that 'cross-over' investors (who previously held emerging-market assets as part of a diversified global portfolio) may have deserted the emerging-market asset class, leaving a smaller investor base of dedicated emerging-market funds<sup>1</sup>. That may reflect the lasting effects of the market turbulence last autumn and possibly concerns about official attempts to involve the private sector in crisis resolution (discussed further below).

A third possible factor is Y2K. According to data from the Emerging Market Traders Association, turnover in emerging-market debt was around 50 per cent lower in both 1999 Q2 and 1993 Q3 compared with a year earlier, and is likely to remain subdued in the run up to the year-end. The difficulty of judging Y2K compliance in some emerging-market economies may have reduced investor appetite for emerging market assets over the year-end. In addition, firms may be preferring lower risk, higher liquidity assets to emerging-market exposures on the grounds that they would want strong balance sheets if, against expectations, there were to be a dislocation. Any such Y2K-related effects should be temporary. In the meantime, they make it difficult to assess the scale and persistence of the other possible factors affecting capital flows to emerging-market economies, in particular whether there has been an underlying shift in demand for emerging-market assets following the 1997-98 crises. That should start to become clearer next year.

**Table 2: Emerging market net external financing**

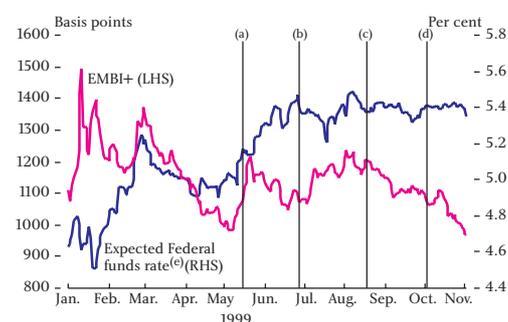
US\$ billions	1997	1998	1999 <sup>f</sup>	2000 <sup>f</sup>
Direct investment	113.1	120.2	117.3	107.4
Portfolio investment	28.7	6.6	24.6	23.5
Other private creditors	124.1	9.3	-6.4	24.1
Total private finance	265.9	136.1	135.5	155.0
Net official flows	35.9	53.0	22.1	14.7
Net external financing	301.8	189.1	157.6	169.7

Source: Institute of International Finance.

<sup>f</sup> denotes forecast.

<sup>1</sup> IMF, September 1999, 'International Capital Markets – Developments, Prospects and Policy Issues'.

**Chart 3:**  
**US interest rates and the EMBI+ spread**



Sources: J P Morgan and Chicago Board of Trade.

(a) 18 May, FOMC 'bias to tighten'.

(b) 30 June, 25 basis point US rate rise.

(c) 24 August, 25 basis point US rate rise.

(d) 5 October, 'bias to tighten'.

(e) Based on December 1999 US Federal funds futures rate, 30-day contract.

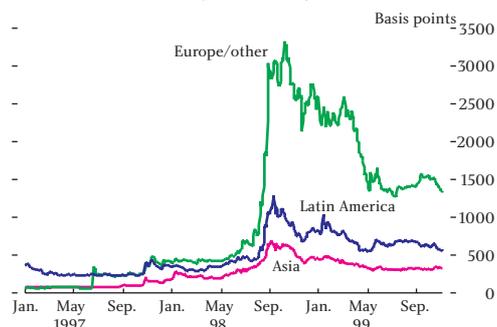
**Table 1: IMF emerging market growth projections for 1999**

Date of forecast	Dec 98	Sep 99
Annual percentage growth rate		
Emerging Asia <sup>(a)</sup>	4.2	5.2
China	6.6	6.6
India	4.8	5.7
Indonesia	-3.4	-0.8
Malaysia	-2.0	2.4
Pakistan	3.0	3.1
Philippines	2.5	2.2
Korea	0.0	6.5
Thailand	1.0	2.5
Central and Eastern Europe <sup>(a)</sup>	-1.2	0.6
Hungary	4.8	3.7
Poland	5.1	4.0
Russia	-8.3	-2.0
Turkey	2.9	1.2
Latin America <sup>(a)</sup>	1.1	-0.3
Argentina	3.0	-3.0
Brazil	-1.0	-1.0
Chile	2.0	0.5
Colombia	1.9	0.0
Mexico	3.0	3.0
Venezuela	0.1	-7.6

Source: Bank calculations based on IMF WEO forecasts.

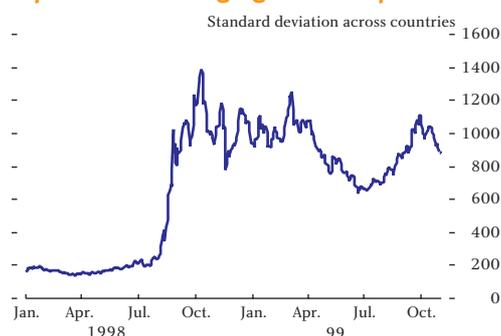
(a) Regional aggregates are based on GDP weights using purchasing power parity. They are derived from the countries listed in the table.

**Chart 4:**  
**Sovereign bond spreads by region**



Source: Bank of England.

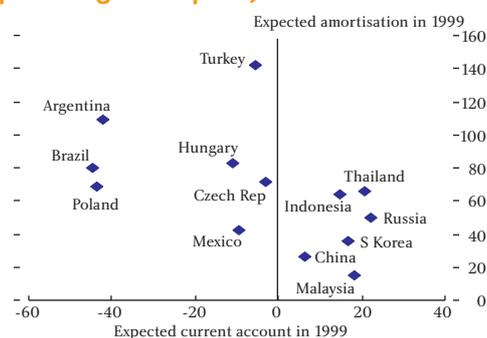
**Chart 5:**  
**Dispersion of emerging market spreads<sup>(a)</sup>**



Source: J P Morgan and Bank calculations.

(a) Standard deviation of spreads across the 24 emerging economies in J P Morgan's EMBI (global constrained). It does not show spreads themselves.

**Chart 6:**  
**Expected current account and debt amortisation positions for 1999 (as a percentage of exports)**



Source: Based on Goldman Sachs estimates and forecasts. Goldman Sachs Emerging Markets Quarterly, 1999 (July and November).

Forecasts suggest that capital flows to emerging markets may pick up in 2000, but only modestly. As Table 2 shows, the Institute of International Finance forecasts aggregate net private external financing of US\$135.5 billion in 1999, picking up to US\$155 billion in 2000. That is still only around half the peak level seen in 1996. The IMF is also forecasting a moderate increase in private capital inflows to emerging markets during 1999 and into 2000. This suggests that, while some of the tightening in credit conditions may be temporary, emerging markets are expected to continue to face a difficult external financing environment. But the assumptions that underpin such forecasts are susceptible to change. It is also difficult to gauge what net capital flow to emerging markets is warranted. In retrospect, the high level of capital inflow recorded in 1996 could well be regarded as excessive. Moreover, the resumption of capital flows to emerging markets during the early nineties was associated with imprudent debt structures. This, together with an increasing overall level of debt, contributed to the vulnerability of some countries to debt-servicing crises during 1997 and 1998.

A second feature of 1999 has been the evidence that markets are differentiating more amongst different emerging-market borrowers. As Chart 4 shows, there has been much greater differentiation in the regional and cross-country pattern of bond spreads since August 1998. For example, the yield difference between Latin American and Asian dollar bonds was less than 100 basis points at the start of August 1998; it was around 250 basis points at the start of November. The cross-country standard deviation of the bond spreads making up the J P Morgan emerging-market index was around 200 basis points prior to last autumn, but was around 1000 basis points at the end of October and has increased since the June Review (see Chart 5).

This differentiation in spreads can be explained, in part, by differences in the demand for external funds. Most of the Asian economies are now running current-account surpluses, which has reduced their demand for external funds. By contrast, most Latin American countries are still running current-account deficits, despite many of them being in recession, and are expected to do so for 1999 as a whole (Chart 6). Export/GDP ratios help to explain this configuration of current-account positions. Those in Latin America – at around ten per cent in both Argentina and Brazil – are considerably lower than those in Asia – for example, between 30-40 per cent in Thailand and Korea and 70 per cent in Malaysia. The actual and prospective amortisation burden of Latin American countries is also somewhat greater in relation to their foreign currency earnings (see Chart 6), which further raises their demand for new external funds. Table 3 indicates the potential bond refinancing needs of different regions to the end of 2000.

Greater risk differentiation is also evident in the pattern of debt issuance. Lower-rated borrowers found it difficult to access international debt markets after the Russian crisis. For example, the fall in international bond issuance over the past year has been manifested more clearly for private sector than sovereign borrowers. Private bond issuance was around a third of total issuance prior to autumn 1998, but has fallen to around ten per cent in recent quarters. Recent events appear to have cut off the lower tail of the credit risk spectrum.

What are the implications of tighter credit conditions and greater risk differentiation for the emerging markets? To the extent that credit risk is now being more accurately priced, these developments would be positive. Inevitably, however, there will be losers as well as winners. Over recent quarters, the clearest losers have been those countries which continue to be heavily reliant on external funds or those judged to present the highest credit risk (sometimes because of their reliance on external borrowing).

### Other general emerging-market issues

There have been three other important general influences on the emerging markets during 1999. Two of these – oil and other commodity prices, and the effects of various public policy measures – are considered below. A third factor, the outlook in the major industrial economies, is discussed in Section II, as well as in the November *Bank of England Quarterly Bulletin*.

#### Oil

Having fallen 56 per cent since the beginning of 1997, oil prices reached a trough in March 1999, with Brent crude prices falling to US\$10 per barrel (p/b). Since then, prices have recovered sharply to over US\$20 p/b (see Chart 7). World demand for oil is generally expected to increase, reflecting a pick-up in activity in Asia and continued growth in the G7. And an OPEC agreement in March on production quotas, together with high compliance rates on the agreed limits, has helped curtail supply. Some other commodity prices have also benefited from the demand recovery. As noted in the November *Inflation Report*, there has been a sharp rise in the prices of hard commodities such as base metals and fuels.

The oil price fall and subsequent recovery have been important terms-of-trade shocks for many emerging market economies, with the impact depending on their exposure to the natural resource sector. Table 4 shows the estimated impact on the fiscal and current-account balance of a change in oil prices for selected emerging economies.

The effects of an oil price movement tend to be more important for oil exporters than for importers. Oil imports typically represent less than ten per cent of total imports. But for many oil exporters, oil accounts for 80 per cent or more of total exports

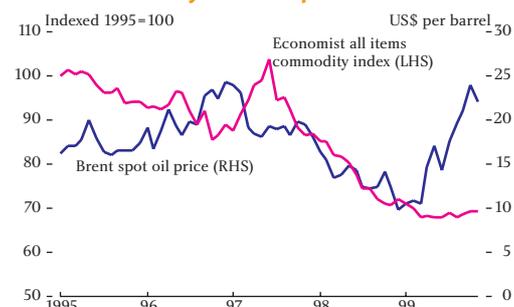
**Table 3: Emerging market economies' scheduled bond redemptions in 2000<sup>(a)</sup>**

	US\$ billions
Asia	23.3
Europe/other	10.2
Latin America	15.8
Total	49.3

Source: Capital Data.

(a) Figures based on bond issues coming due between 5 November 1999 and 31 December 2000 (syndicated loans are excluded).

**Chart 7: World commodity and oil prices**



Sources: Primark Datastream and Economist Intelligence Unit (EIU excludes oil prices).

**Table 4 Estimated aggregate economic impact of oil price changes<sup>(a)</sup>**

	Fiscal balance (percentage of GDP)		Export earnings (percentage of GDP)	
	1998	1999	1998	1999
<i>Oil exporters</i>				
Middle East				
Saudi Arabia	-5.1	3.4	-8.3	5.6
Iran	-4.5	3.0	-5.8	3.9
United Arab Emirates	-5.8	3.9	-9.0	6.0
Oman	-6.4	4.3	-7.7	5.1
Qatar	-5.8	3.9	-8.3	5.6
Others				
Russia	-0.3	0.2	-1.3	0.9
Venezuela	-3.2	2.1	-4.5	3.0
Mexico	-2.6	1.7	-1.1	0.8
Indonesia	-1.3	0.9	-1.5	1.0
<i>Oil importers</i>	Import cost savings (percentage of GDP)			
Asia			1998	1999
Korea			0.8	-0.5
Singapore			3.1	-2.1
Thailand			0.6	-0.4
Europe/Africa				
Hungary			0.7	-0.5
South Africa			0.2	-0.1
Turkey			0.5	-0.3
Latin America				
Argentina			0.1	-0.0
Brazil			0.2	-0.1
Chile			0.4	-0.3
<i>Annual oil price change</i>			-\$6.40	+\$4.28

Sources: BP Energy Statistics, IMF, International Energy Agency and Bank estimates.

(a) Annual average oil price change assumes 1999 average of US\$17.

and a high proportion of fiscal revenues. The key emerging-market beneficiaries from the recent oil price rise are the Middle Eastern economies, Mexico, Russia and Venezuela. Oil-importing countries, such as Turkey and Korea, have been adversely affected.

#### *Public policy*

Three public policy issues have had potentially important implications for the emerging-market external financing. First, Ecuador recently became the first country to default on its Brady bonds. So far, that does not appear to have had systemic implications (see Box 1). Second, the official sector's approach to involving the private sector in crisis prevention and resolution has been evolving over the past six months, in particular in

Pakistan, Ukraine, Romania and Ecuador<sup>2</sup>. These country cases are described in more detail in Box 2. Third, a consultative paper on reform of the 1988 Basel Capital Accord was published in June this year; it proposes making capital charges on banks' credit exposures more closely related to risk (see Box 1). All three of these public policy developments are likely to have increased the degree to which risks are believed to differ across countries, in particular among the lower-rated borrowers.

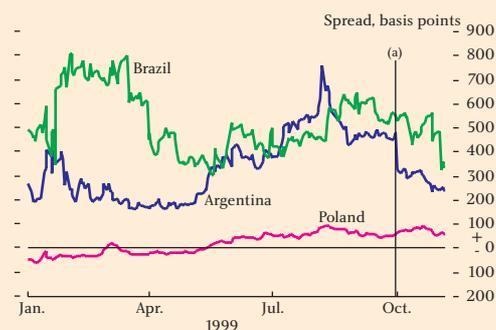
## Box 1: Brady bonds

Brady bonds were first issued in 1989 by developing countries, in exchange for restructured bank loans, as part of a debt relief plan initiated by former US Treasury Secretary Nicholas Brady. Latin American countries account for almost 85 per cent of a total Brady bond market of US\$121 billion, some 40 per cent of all emerging market bonded debt. The biggest single issuers have been Brazil (US\$35 billion), Argentina (US\$20 billion) and Mexico (US\$24 billion). Most Brady bonds are collateralised by both principal collateral held in the form of zero-coupon US Treasury bonds (payable only upon maturity) and interest collateral (sufficient for two or three coupon payments).

Despite having the same credit rating as eurobonds and cross-default clauses existing between the two assets, Brady bonds have historically carried a slightly higher yield, stripped of collateral, than eurobonds. But recently there has been a growing market perception that Brady bonds are a worse credit risk than eurobonds, perhaps because emerging economies are unlikely to issue more of them in the near future, unlike eurobonds. The spread of Brady bond yields over eurobond yields widened over the summer in some Latin American markets (see Chart A). Ecuador's default in September appears to have had only a modest impact on other countries' Brady bond spreads. It had been widely anticipated and was not perceived to have implications for other Brady bond issuers.

Since the default, a number of countries including Brazil, Mexico, Peru and the Philippines have announced their intention either to buy back some Brady bonds or swap existing ones for new securities. Debtors may benefit from releasing collateral and extending duration, and both debtors and creditors can benefit if the new issue is more liquid. The latter seems to have been one of the aims of recently announced buyback schemes.

**Chart A:**  
Yield spreads of Brady bonds over eurobonds



Source: Bloomberg.

(a) Ecuador defaulted on its Brady bond debt on 30 September.

<sup>2</sup> A detailed analysis of private sector involvement and the role played by the official sector is offered in the articles by Haldane, A 'Private Sector Involvement in Financial Crises – Analytics & Public Policy Approaches', and King, M, 'Reforming the International Financial System: The Middle Way' in this issue.

## Box 2: Cases of private sector involvement

At the Köln heads of government summit in June this year, the G7 set out a framework of principles and tools for private sector involvement in crisis resolution<sup>1</sup>. How does this relate to private sector involvement in practice? This Box summarises developments during the past six months, and Table A indicates which of the principles and tools have so far been the most relevant in each case.

**Table A: G7 principles and tools relevant to current private sector involvement cases**

PRINCIPLES	Pakistan	Ecuador	Ukraine	Romania
Allow to meet debts in full and on time				✓
Private creditors not protected				
Reduce net payments to private sector		✓		
Bonds not viewed as senior to bank loans	✓			
Co-operative solution between debtor and creditor			✓	
TOOLS	Pakistan	Ecuador	Ukraine	Romania
Official support if debtor initiates discussions with creditors to explain policy				
Official support if new funds from private sector				✓
Official support if private sector maintains exposure				
Official support if restructure or refinance		✓	✓	
Paris Club comparability using flexibility	✓			
Reserves floor				
IMF lending into arrears				
Capital controls as part of payments standstills				

Source: Bank of England.

*Pakistan:* During the Paris Club discussions on 28-30 January 1999, Pakistan committed itself to seek treatment from its other external creditors, including bondholders, on terms no more favourable than that afforded by the Paris Club. Pakistan's eurobonds include clauses providing for collective representation and majority voting provisions in the event of modifications to bond terms, and are governed by English law<sup>2</sup>. Pakistan has subsequently put forward a bond restructuring plan.

<sup>1</sup> 'Strengthening the International Financial Architecture – Report of G7 Finance Ministers to the Köln Economic Summit', 18-20 June 1999.

<sup>2</sup> For a detailed discussion of collective action clauses and legal documentary structures in international bond markets, see Drage, J and Mann, F, 'Improving the Stability of the International Financial System', *Financial Stability Review*, June 1999, pp. 40-77 and, Yianni, A 'Resolution of Sovereign Financial Crisis – Evolution of the Private Sector Restructuring Process', *Financial Stability Review*, June 1999, pp. 78-84.

*Romania:* During May and June, Romania faced private sector bond repayments of US\$750 million. The IMF and the Romanian authorities eventually agreed that Romania would refinance the bonds by raising new money in the market. By the time of the IMF Board meeting on 5 August, Romania had been able to raise US\$130 million. The IMF has since allowed further flexibility about the amount of new money to be raised.

*Ukraine:* Ahead of the third review of its current IMF programme, Ukraine tried to restructure a debt that fell due on 9 June. After protracted negotiation, Ukraine agreed to repay creditors the full US\$163 million on 20 August, and refinanced around 60 per cent of this through a combination of reinvestment in a Deutschmark eurobond issue and new money arising from an exchange offer extended to holders of a zero-coupon bond, lead-managed by Merrill Lynch. Through the exchange, Ukraine was able to reduce the face value of its debt, extend maturity and raise new money. Creditors were able to exchange into a more liquid debt instrument.

*Ecuador:* On 30 September, Ecuador became the first country to default on a Brady bond when it failed to pay a US\$44.5 million coupon to discount bond holders. Ecuador distinguished between its collateralised and non-collateralised Brady bonds, asking holders of the collateralised bonds to request their coupon payment from interest collateral, whilst paying its uncollateralised PDI (past-due-interest) bonds. That required a minimum of 25 per cent of bondholders to request payment from interest collateral. In the event, bondholders demanded full and immediate repayment of principal and interest. Ecuador's bonds are governed by American-style bond documentation, which gives individual bondholders the right to sue and keep the proceeds from litigation. To date, no bondholder has launched proceedings. Ecuador failed to meet its eurobond coupon payments on 25 October and is seeking to restructure its private sector external debt. It signed a Letter of Intent with the IMF on 30 September, but no programme had been agreed by early November 1999.

### Box 3: Proposed revisions to the Basel Accord – effects on emerging markets

On 3 June, the Basel Committee on Banking Supervision (BCBS) announced proposals to modify the existing 1988 Basel Accord's capital adequacy rules<sup>1</sup>. The proposals aim to make the system of capital risk weights more sensitive to risk. Two methods are contemplated, one based on banks' internal ratings, the other on external categorisations of risks such as those made by rating agencies. For sovereigns, under the external-ratings-based approach, five bands based on ratings would replace the current two-fold distinction based on OECD membership. While the direct effect of the proposed new Accord would be on the terms of bank lending, bond yield spreads might increase for countries for which the risk weight rises. This effect could come via a number of channels. First, there could be a direct effect to the extent that sovereign bonds are held in the 'banking' book. Second, higher bank borrowing costs could raise a debtor's debt servicing burden, increasing perceptions of risk on other exposures, including bonds. But the overall impact will also depend on a wide range of other factors, including the extent to which banks have economic capital in excess of regulatory requirements, the extent to which sovereign bonds are held in the trading book rather than the banking book (the former having a different capital treatment which is unaffected by the proposals), and the extent to which banks will be able to use their own internal-ratings-based approaches to determine sovereign risk. It is also important to distinguish between transitional and steady-state effects. For example, it is possible that the new capital weights will, over time, affect the structure – and perhaps the level – of a country's external debt; the proposal to remove, or at least significantly reduce, the sharp difference between the risk weight on short-maturity and long-maturity lending to non-OECD banks could also assist this (see Drage and Mann (1999)).

The initial, direct impact of the proposal on a range of emerging market countries is shown in Table A (using Standard & Poor's current ratings). Some of the changes in the regulatory capital that will be required against exposures might be large. For example, regulatory capital would jump from zero per cent to 100 per cent for both Mexico and Turkey, while it would fall from 100 per cent to 20 per cent for Israel and Chile. There have not yet been any marked changes in the long-term bond yields of any of these countries, but the volatility in the spreads on their bonds means that any effect might be difficult to identify.

<sup>1</sup>: For a more detailed discussion of the Committee's work, see Drage, J W and Mann, F C, 'Improving the Stability of the International Financial System', *Financial Stability Review*, June 1999, pp. 40-77.

The BCBS propose that if a country is to be awarded a risk weight of less than 100 per cent, it must subscribe to the IMF's Special Data Dissemination Standard (SDDS). If this proposal is accepted, Greece (proposed risk weighting 50 per cent) will have to subscribe to the SDDS or see its risk weight raised to 100 per cent. And this proposal could mean that the risk weightings on banks with exposures to Brazil and Russia would not fall below 100 per cent even if their credit ratings improve.

**Table A: Implications of the Basel Accord**

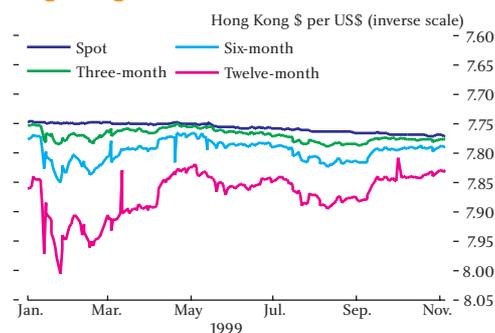
Country	Risk weight (Per cent)		Potential implication for bond yields
	Current	Proposed	
Argentina	100	100	No change
Brazil	100	100	No change
Chile	100	20	Down
Colombia	100	100	No change
Czech Republic	0	20	Up
Greece	0	50	Up
Hungary	0	50	Up
Israel	100	20	Down
Korea	0	50	Up
Mexico	0	100	Up
Poland	0	50	Up
Russia	100	150	Up
Singapore	100	0	Down
South Africa	100	100	No change
Turkey	0	100	Up

Source: Bank of England. Based on current Standard & Poor's credit ratings.

## Main regional financial stability risks

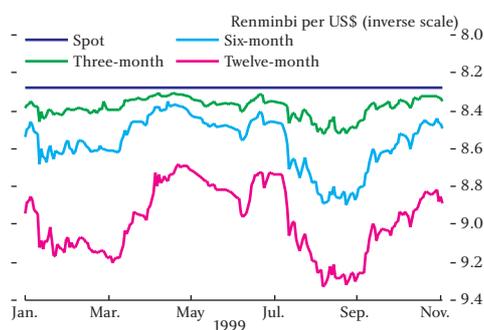
Risks to financial stability from the emerging markets as a whole have, on balance, declined somewhat since the *June Review*. Nonetheless, a number of country-specific vulnerabilities remain in countries as seemingly disparate as China, Turkey and Argentina. Often, the source of the risk to financial stability stems from problems with the size and structure of national and sectoral balance sheets. Box 4 explains why it is very important for national authorities to monitor country balance sheets, and for the risks to be managed. This section examines macroeconomic and financial developments in a number of emerging market economies that are important to UK financial stability.

**Chart 8:**  
**Hong Kong forward rates**



Source: Bloomberg.

**Chart 9:**  
**Chinese non-deliverable forward rates**



Source: Standard Chartered Bank.

### *China and Hong Kong*

China and Hong Kong have displayed similar macroeconomic symptoms during 1999: slowing or contracting growth, price deflation, and high real interest rates. In response to this, devaluation expectations in both countries, measured by currency forward rates, rose between May and September this year (see Charts 8 and 9), suggesting that their currency pegs might be under pressure. Even at their peak, however, forward discounts remained below the levels of October 1998, significantly so in the case of Hong Kong. And forward discounts have now fallen back in both countries, partly reflecting better export prospects, stimulated by the recoveries in south-east Asia and, more recently, Japan. In Hong Kong, the economy began to grow again in the second quarter of 1999. And in China, growth appears to be stabilising at around seven per cent.

What are the potential risks to financial stability? For China, the risks seem to be from internal rather than external conditions. Capital controls help insulate the economy from significant external financial shocks. Gross external debt in China, at US\$145 billion, is currently only around 15 per cent of GDP, of which only around US\$35 billion is short term (less than one year residual maturity). And gross external debt is more than covered by foreign exchange reserves, which were around US\$150 billion in September.

There is a potential risk in China stemming from the interaction between the state-owned enterprises (SOEs) and the banking system, with a prospectively significant fiscal cost. Historically, finance for the SOEs has largely been provided by the four main state-owned banks. Low profitability among the SOEs has resulted in a significant overhang of non-performing loans in these banks, estimated by the Chinese authorities to be some 20 per cent of total lending. Market estimates are much higher. Asset management companies have recently been set up to remove bad debts from the four main banks' balance sheets and facilitate debt recovery. The build-up of bad debts has been contained by the closure of a number of troubled financial

institutions. One of these, GITIC, an investment company set up by the Guangdong provincial government to attract foreign investment, was closed in late 1998, as discussed in the June Review. Bankruptcy proceedings have yet to be finalised, and foreign investors are now more conscious of the risks on non-sovereign lending to entities which had previously been perceived as carrying a sovereign guarantee.

The eventual costs of banking-sector reform – write-offs of bad loans and recapitalisation – is likely to fall to the government. Standard & Poor's recently estimated the costs to be between 40-80 per cent of GDP<sup>3</sup>. This would add significantly to China's domestic debt burden. The ratio of China's public sector domestic debt to GDP (16.4 per cent in 1998) is low by international standards. And China is currently running only a moderate budget deficit of around three per cent of GDP. Nevertheless, World Bank reports suggest that revenue-raising capacity is relatively weak, and there are other significant contingent liabilities, such as pensions, to be met in the future<sup>4</sup>. If fiscal and monetary expansion prove insufficient to stimulate domestic demand, there is some risk that slowing growth, high real interest rates and weak fiscal balances could pose problems for public debt sustainability in the medium to longer term.

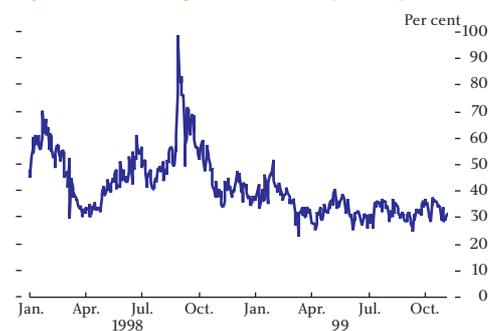
By contrast, shocks to financial stability in Hong Kong are more likely to be external than internal. The banking system seems to be well capitalised, with average capital adequacy ratios of 19.5 per cent reported at end-June for locally incorporated institutions.

A major external uncertainty is, of course, the possibility of devaluation in China. But because of Hong Kong's role as an entrepot for Chinese goods and services, it is possible that the impact of any Chinese devaluation on trade would be positive in Hong Kong, especially if it boosted Chinese growth.

The structure of Hong Kong's external balance sheet is also a source of some comfort. As Table 5 illustrates, the public sector has foreign exchange reserves of around US\$90 billion. That is more than three and a half times the monetary base, and nearly 25 per cent of the domestic liabilities of the banking system. The on-balance sheet positions of the Hong Kong banking system are broadly matched in foreign currency terms and a significant proportion of foreign currency assets are liquid.

Speculative pressures in Hong Kong financial markets have also dissipated over recent months. As Chart 10 shows, the implied volatility of equity prices, which rose sharply during the 'double

**Chart 10:**  
**Implied volatility of the Hang Seng index<sup>(a)</sup>**



Source: Bloomberg.

(a) Implied volatility on an 'at the money' put option on the nearest futures contract. Implied volatility is the *ex ante* expectation of an underlying asset's return volatility over the remaining life of an option on that asset.

<sup>3</sup>: Standard & Poor's, September 1999.

<sup>4</sup>: 'China: Weathering the Storm and Learning the Lessons', Country Economic Memorandum, World Bank Report, Number 18768, May 1999.

play<sup>5</sup> episodes last year, has returned to lower and more normal levels. Given the currency board arrangement and already high real interest rates, any further rises in US interest rates would impede recovery.

**Table 5: Hong Kong external balance sheets<sup>(a)</sup>**

US\$ billions - March 1999	Assets	Liabilities	Net
Public sector - consolidated	120.0	32.7	87.3
<i>of which foreign currency</i>	90.5	0.0	90.5
<i>of which domestic currency</i>	29.5	32.7	-3.2
Financial institutions	880.2	880.2	0.0
<i>of which foreign currency</i>	526.3	511.8	14.5
<i>of which domestic currency</i>	353.9	368.4	-14.5

Sources: HKMA monthly statistical bulletin (June 1999) and HKSAR website (1998-99 annual accounts).

(a) Based on an exchange rate of 7.8 Hong Kong dollars to the US dollar.

### Box 4: Risk management and country balance sheet monitoring

One of the key lessons from the recent financial crises has been the importance of countries monitoring the risk exposures in their national, and key sectoral, balance sheets. The problems in Asia and Latin America have demonstrated that a country's vulnerability to instability can be increased by the presence of significant external and/or foreign currency mismatches.

Borrowers face liquidity risk when they have liabilities of shorter maturity than their assets, and when the consequent mismatch is not adequately covered by assets which can be sold in liquid markets. Rollover risk can affect banks, firms, and sovereign governments, forcing them to sell assets at 'fire sale' prices if suddenly liabilities falling due cannot be rolled over. The maturity and interest rate structure of public sector debt posed particular difficulty for Mexico in 1994, Russia in 1998, and Brazil into early 1999. Liquidity mismatches in the banking sector were a problem for Korea in 1997. Such mismatches *vis-à-vis* the external sector expose a country to the risk of sharp changes in sentiment.

Foreign currency exposures carry a risk of loss from sharp changes in exchange rates. It is important to look not only at the currencies of financial assets and liabilities, but also at the nature of the cash flows that underpin them. Prior to the south-east Asian crisis, some countries had built up substantial amounts of short-term borrowing denominated in US dollars, to provide

5: Simultaneous shorting of the Hong Kong dollar and the Hang Seng index.

long-term finance for activities that did not directly generate foreign currency earnings to service the loans.

To maintain financial stability, a country's authorities need to monitor the state of the country's external balance sheet and of key sectoral balance sheets, most particularly the sovereign and banking sectors. That points to a number of policy measures, amongst which are the following. First, a high level of transparency should be promoted, enhancing data sources where necessary. Second, governments need to adopt prudent strategies and practices in managing their debt liabilities and foreign exchange reserves, placing special emphasis on liquidity and the nature of any risks to which the economy is particularly exposed (for example, to commodity prices in the case of a commodity exporter, or to a change in the exchange rate regime). Related to that, the financing sources of many emerging market economies could usefully be diversified by the development of domestic capital markets. The World Bank is working on this. And the G10 central bank Committee on the Global Financial System recently published a report 'How should we design deep and liquid markets? The case of government securities'<sup>1</sup>. Third, bank regulators need to set prudent standards for bank liquidity management and foreign exchange exposures. Fourth, bankers need to assess the financial exposures of their corporate sector customers. And fifth, there is also a case for encouraging corporates to be transparent about their liquidity and foreign exchange risks, perhaps through their balance sheets. That could aid market discipline on individual firms and help the authorities in their monitoring task.

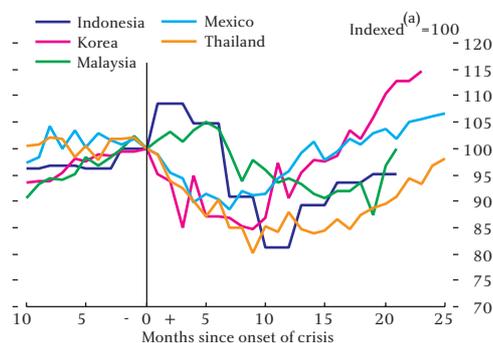
These issues were identified by the G22 Working Group on Strengthening Financial Systems in 1998<sup>2</sup>, are being addressed by the Financial Stability Forum Working Group on Capital Flows in collaboration with the IMF and the World Bank, and are emphasised in the G7 Finance Ministers' report on strengthening the international financial architecture submitted to the Köln Economic Summit last June.

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<sup>1</sup>: Available from <http://www.bis.org/pub/index.htm>

<sup>2</sup>: A website for the G22 Working Group reports can be found at [www.imf.org/external/np/g22](http://www.imf.org/external/np/g22).

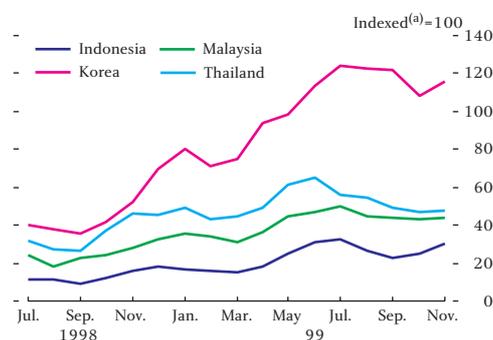
**Chart 11:**  
**Asian industrial production**



Source: Primark Datastream.

(a) Indexed to June 1997 = 100 (Indonesia, Malaysia, Thailand) October 1997 = 100 (Korea) December 1994 = 100 (Mexico).

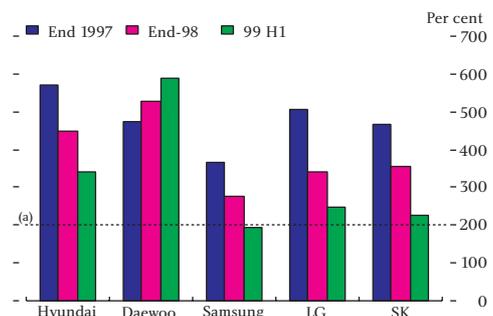
**Chart 12:**  
**Asian equity prices**



Source: Primark Datastream.

(a) Indexed to June 1997 = 100 (Indonesia, Malaysia, Thailand) October 1997 = 100 (Korea).

**Chart 13:**  
**Debt/equity ratios of the five big chaebol**



Source: Korean Financial Supervisory Commission.

(a) 1999 government debt/equity target.

### Asian crisis countries

The main Asian crisis countries – Indonesia, Korea, Malaysia and Thailand – have all experienced a marked recovery in growth prospects during 1999 as a whole, and since the June Review. The recovery in output and industrial production has been sharper than expected (see Chart 11). Indeed, in some cases, for example in Korea, the recovery has had similarities with the Mexican recovery after the crisis in 1994-95. The locomotive behind growth has been improved net trade, with this year's merchandise trade surpluses expected to be in excess of ten per cent of 1998 GDP across the Asian crisis countries.

Until recently, asset prices in the crisis countries had recovered sharply. In the first half of 1999, equity prices rose throughout the region in US dollar terms: in Indonesia by 91 per cent, Korea 63 per cent, Malaysia 38 per cent and Thailand 46 per cent. Moving into the second half of 1999, however, equity prices have fallen back slightly (see Chart 12). An important contributory factor has been uncertainty about the pace and scale of restructuring – corporate and financial – in several Asian countries. Rising asset prices and growth prospects may have reduced incentives to restructure corporate and financial balance sheets.

The situation in Korea is illustrative. The conglomerate Daewoo's debt-financing problems came to a head during July. Its debt/equity ratio based on book value, at 588 per cent at the end of 1999 H1, has not fallen as far as that of other Korean chaebol and is not in line with the government's announced targets (Chart 13). Domestic creditors are implementing a restructuring plan, including widespread asset disposals. Due diligence on Daewoo affiliates revealed substantial debts, most of which are domestic. A small group of foreign creditors have yet to agree restructuring terms, and any legal action by them would complicate the debt workout.

The debt/equity ratios of the other Korean chaebol have fallen recently and are much lower. In most cases, however, the improvement in debt/equity ratios has been driven largely by the issue of equity, rather than by any significant fall in gross indebtedness (see Chart 14), raising questions about the durability of corporate restructuring and recovery if, for example, the equity market were to fall further or if debt-rollover problems arose.

Daewoo's problem caused corporate bond yields in Korea to rise by 250 basis points between the end of June and mid-September. Uncertainties about corporates have also spilled over to some Korean financial institutions, in particular the investment trusts (ITCs) that hold around half of Korean corporate bonds<sup>6</sup>. On

<sup>6</sup> Korean investment trusts resemble mutual funds in that they pool investors' money to purchase stocks or bonds, and investments are redeemable at short notice. If ITCs fail to offer significantly higher yields than bank deposits, investors can quickly switch to instruments with lower risk profiles. See OECD Economic Survey of Korea, 1999, for a detailed discussion of ITCs.

18 September, the Korean government established a bond market stabilisation fund to purchase corporate bonds to limit the rise in corporate yields and prevent a run on the investment trusts (see Chart 15). The stabilisation fund is largely paid for by banks and insurance companies. This, together with supplementary policy measures in November, has so far proved successful in forestalling large-scale redemptions by investors in ITCs.

Problems with financial restructuring have also been encountered elsewhere in Asia. In Indonesia, the Bank Bali affair prompted the international financial institutions to halt loan disbursements in September. In Malaysia, the government has agreed to allow more than six lead banks in its plans to consolidate the financial system and delayed their execution until end-2000. And in Thailand, the level of non-performing loans remains high at 52 per cent of GDP. Nevertheless, some significant progress has been made in recapitalising the banking sector and removing non-performing loans, from the banks' balance sheets (Table 6).

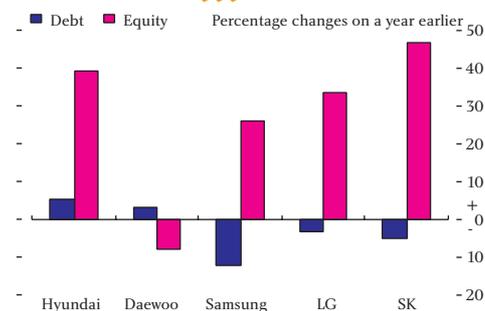
**Table 6: Financial sector restructuring in Asia**

	NPLs/total loans (Per cent)	NPLs/GDP (Per cent)	Recapitalisation/ GDP
Indonesia	55	22	35
Korea	16	23	8
Malaysia	24	35	2
Thailand	52	53	14

Source: IMF World Economic Outlook (October 1999).

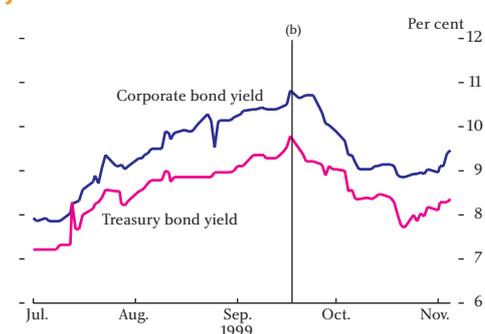
The vulnerability of the Asian crisis economies to a further shift in investor sentiment depends, in part, on the state of their external balance sheets. Table 7 compares the most recent estimates of the external debt stock of the five Asian crisis countries with estimates of the stock prior to the crisis. Between June 1997 and December 1998, the aggregate external debt of the affected countries fell by over US\$50 billion (primarily because of falls in Thailand and Korea) with all but the Philippines having taken steps to reduce their short-term debt to reserve ratios. Malaysia has also removed its exit tax on the repatriation of capital, but introduced a flat rate tax on profits. External-debt-to-GDP ratio have risen across the region, reflecting the significant weakening of nominal exchange rates and nominal US dollar GDP. This has been particularly marked in Indonesia. The regional ratio of banks' short-term debt to reserves has, however, fallen. It was 0.7 according to the most recent BIS data (Dec 98), compared with 1.4 at the time of the Asian crisis in June 1997.

**Chart 14:**  
Change in debt stock and equity during the first half of 1999



Source: Korean Financial Supervisory Commission.

**Chart 15:**  
Korean corporate and treasury bond yields<sup>(a)</sup>



Source: Bloomberg.

(a) Maturity three years.

(b) Introduction of bond market stabilisation fund, 18 September.

**Table 7: External debt in Asia**

June 97	External debt US\$ billions <sup>(a)</sup>	Percentage of GDP	Short-term debt to banks/reserves <sup>(b)</sup>	Short-term liabilities to banks US\$ billions
Indonesia	117	51	1.7	35
Korea	156	31	2.1	71
Malaysia	46	43	0.6	16
Philippines	47	54	0.9	9
Thailand	126	69	1.5	46
Aggregate	491	44	1.4	176

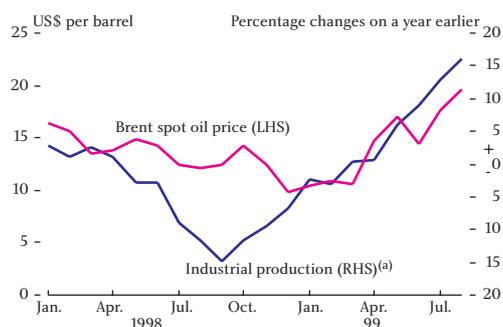
June 98	External debt US\$ billions	Percentage of GDP	Short-term debt to banks/reserves <sup>(b)</sup>	Short-term liabilities to banks US\$ billions
Indonesia	116	117	1.1	24
Korea	146	45	0.6	30
Malaysia	38	52	0.4	9
Philippines	48	73	1.0	9
Thailand	91	80	0.8	24
Aggregate	439	65	0.7	95

Source: BIS – IMF – OECD – World Bank database.

(a) Uses December 1996 data for official debt component because January 1997 unavailable.

(b) Short-term liabilities to banks as a proportion of total liabilities to banks (consolidated).

**Chart 16:  
Russian industrial production and oil  
prices**



Sources: Primark Datastream and Russian Economic Trends.

(a) Data are seasonally adjusted.

### Russia

Russia's economic outlook has improved significantly since the start of the year. Industrial production has risen sharply, growing at annual rates in excess of 15 per cent. The 40 per cent devaluation of the real exchange rate and rise in oil prices have facilitated this recovery, as fuel exports account for almost 40 per cent of total Russian exports (see Chart 16). At the time of the *June Review*, consensus forecasts (collected by Consensus Economics) for GDP growth in 1999 and 2000 were -3.4 per cent and -0.6 per cent respectively, but rose to -0.2 per cent and 1.4 per cent respectively in September. Meanwhile, agreement was reached in July on the conditions for a resumption of an IMF programme, as well as on debt rescheduling terms with the Paris Club. This helped further boost asset prices, with equity prices rising over 100 per cent in the first half of this year.

But recent events have underlined the precarious nature of the Russian recovery. Uncertainties about future IMF lending have contributed to a 26 per cent fall in equity prices since the beginning of July. Some US\$10 billion is due in post-Soviet era external debt service payments next year, and the external debt/GDP ratio (64.5 per cent) is high compared with other emerging market economies. Much of this debt is owed to official lenders (see Table 8). The restoration of official and private sector financing to meet these repayments will depend on Russia's ability to satisfy IMF programme conditions.

**Table 8: Russian external debt position**

US\$ billions	1998	1999
Public foreign currency debt	158.2	155.7
of which post Soviet debt	51.9	45.1
of which multilateral creditors	26.0	20.6
of which eurobonds	16.0	16.0
Soviet-era debt	95.2	99.5
of which official (including Paris Club)	59.4	62.6
of which London Club	31.2	32.3
MinFins (domestic US\$ denominated debt)	11.1	11.1
Memo: gross external debt <sup>(a)</sup>	184.6	181.3
External debt service	8.1	15.8
of which post Soviet debt service	5.5	8.7
of which multilaterals	2.1	5.1
of which eurobonds	0.7	1.7
Soviet-era debt	2.3	5.4
of which official (including Paris Club)	1.3	3.8
of which London Club	0.8	1.1

Source: Fitch IBCA.

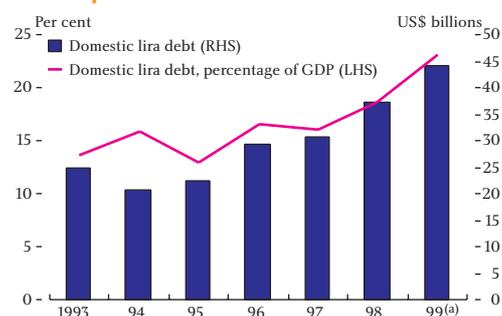
(a) Gross external debt defined on a residency basis and includes the liabilities to non-residents of Russian banks and corporations.

### Turkey

In contrast to Russia's external debt vulnerabilities, financial stress in Turkey derives principally from the domestic debt situation. The Turkish economy has been contracting during 1999, reflecting weakness in both domestic and external demand following the Russian crisis last year. The widespread disruption to the country's physical infrastructure caused by the recent earthquakes has further set back prospects of an early recovery. This year's fiscal deficit is expected to be around 12.5 per cent of GDP linked, in part, to high interest rates. *Ex post* real interest rates on short-maturity T-bills have been around 50 per cent for the first half of 1999 and only started to fall – to around 30 per cent – during 1999 Q3. These factors have led to a substantial rise in Turkey's lira-denominated public domestic debt stock from US\$31 billion in 1997 to US\$44.2 billion in August 1999 (see Chart 17), much of which is likely to be short-term (the average debt maturity between January and June was 11 months). Dollar-dominated public debt has declined slightly from US\$53 billion in 1998 to US\$49 billion in June 1999 (see Table 9). This debt structure exposes the public sector to considerable roll-over, exchange-rate and real interest-rate risk. The government has made important progress on structural reforms, but further substantial fiscal adjustment seems necessary if the public debt/GDP ratio is to be stabilised.

A large proportion of Turkish public domestic debt is held by domestic banks (between 70 per cent and 80 per cent). Retail deposits with Turkish banks benefit from a 100 per cent deposit

**Chart 17:**  
Turkish public lira-denominated debt



Source: Turkish Treasury.

(a) Actual data as of August 1999.

**Table 9: Turkey – key fiscal indicators**

Public sector Turkish lira debt	1997	1998	Aug 99
US\$ billions	30.7	37.0	44.2
Percentage of GNP	16.1	18.7	23.1 <sup>(a)</sup>
Average maturity (days)	349.0	233.0	348 (H1)
Average Treasury bill yield	105.1	115.4	115.1 (H1)
External debt (public and private)	1997	1998	Jun 99
US\$ billions	91.1	104.0	100.1
Percentage of GNP	47.8	52.4	52.2 <sup>(a)</sup>
Of which			
Short-term	22.6	27.2	27.9
Public sector	50.9	53.5	49.3

Sources: Turkish Treasury, Turkish Central Bank, IIF, IMF and Bank calculations.

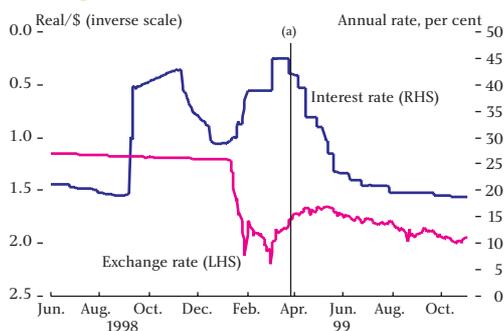
(a) Figure uses 1999 GNP estimate from IMF World Economic Outlook, September 1999.

**Table 10: Turkey – foreign-currency denominated financial assets and liabilities – June 1999**

US\$ billions	Assets	Liabilities	Net position
Public sector	30.8	49.8	-19.0
Banking sector	45.3	55.4	-10.1

Sources: Turkish Central Bank and Turkish Bankers' Association.

guarantee by the government. The banks also rely on short-term international borrowing to fund their domestic debt purchases, because of attractive interest rate differentials. Turkish banks' balance sheets show an on-balance-sheet open foreign currency position of US\$10.1 billion (see Table 10). At the start of 1999, some 65 per cent of this position was covered by off-balance sheet hedges, albeit of uncertain quality<sup>7</sup>. So roll-over and exchange rate risks also raise a potential financial stability risk in Turkey. To the extent that this risk affects banks' willingness or ability to hold government debt, then banking sector and public finance risks could be intertwined.

**Chart 18: Brazilian overnight interest rate and spot exchange rate**

Sources: IMF and Bloomberg.

(a) Second IMF programme, 30 March 1999.

### Brazil

Since the second IMF programme in March 1999, Brazil has experienced a return of capital inflows, rising asset prices and falling interest rates. Since end-February, official short-term interest rates in Brazil have fallen from 39 per cent to 19 per cent (see Chart 18). Spreads on sovereign dollar debt have fallen from 1380 basis points to 810 basis points. The outlook for growth in 1999 has been revised upwards repeatedly this year. And, over the first nine months of 1999, inflation has been lower than expected at the time of the depreciation in January. Brazil has been assisted in this recovery by IMF loan disbursements, a voluntary agreement reached with banks to rollover their exposures to Brazil, and successful efforts to hit IMF's fiscal deficit targets.

What financial stability risks remain in Brazil? Two are worth noting. First, there is a continuing risk that Brazil may fail to tackle its structural fiscal problems. This risk was highlighted recently by the decision of the Supreme Court to veto Congressional attempts to alter the pension system, though compensatory measures have since been announced.

7: Source: Institute of International Finance.

Second, there is a continuing risk emanating from Brazil's debt structure. Brazil's recent crisis was rooted in a domestic rather than external debt problem. Public sector domestic-currency debt is around 40 per cent of 1998 GDP in Brazil, compared with a total external debt/GDP ratio of around 30 per cent (see Table 11). More important, however, and despite efforts to increase maturity, the average maturity of domestic debt remains short (nine months for federal securities) and the debt is largely floating rate (65 per cent at end-June) or dollar-indexed (25 per cent)<sup>8</sup>. This composition makes domestic debt dynamics in Brazil particularly sensitive to shifts in investor sentiment, which can put upward pressure on interest rates or downward pressure on the exchange rate. As long as this debt structure persists, financial-stability risks in Brazil are unlikely to disappear. The authorities have recently sought to improve debt structure by announcing measures to lengthen the maturity of fixed-rate debt, and increase secondary market liquidity for real-denominated debt.

#### Argentina

Argentina has continued to experience high and rising real interest rates, against a backdrop of contracting real output, a sizeable current account deficit, and still significant external financing needs. GDP fell by 4.9 per cent in the year to 1999 Q2, and is forecast by the IMF to contract by three per cent in 1999. Real interest rates, measured on an *ex post* basis, have risen to around 13 per cent, compared with an average of eight per cent in 1997. And Argentina has US\$15.8 billion in medium and long-term debts maturing in 2000 (around five per cent of GDP).

Reflecting these developments, expectations of a devaluation in Argentina, measured by the yield difference between peso and dollar loans in the Argentine money market, have risen significantly since the previous *Review*. Devaluation expectations and measures of sovereign credit risk, as proxied by the yield spread between Argentine dollar bonds and US Treasuries, rose during the summer (see Chart 19). But while currency risk has continued to increase since August, measures of country risk have declined.

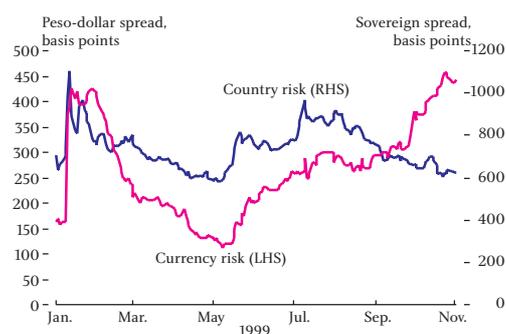
There is a connection between foreign-currency risk and country creditworthiness on account of the size of Argentina's foreign currency indebtedness and its distribution – in short, the structure of Argentina's external balance sheet. Total external debt in Argentina is around US\$140 billion or 47 per cent of GDP. Table 12 breaks this down into the foreign-currency asset/liability positions of the public sector, and of private-sector banks and non-banks. The largest net foreign-currency liability

**Table 11: Brazil's debt position**

	End-98	July 99
Public sector domestic debt		
US\$ billions	392.0	315.8
Percentage of GDP (1998)	50.5	40.6
of which		
Floating rate (%)	69.1	61.3
Dollar indexed (%)	21.0	24.3
External debt (public and private)		
US\$ billions	233.9	229.6
Percentage of GDP	30.1	29.6
of which		
Public sector	94.0	102.6
Short term	23.2	22.7

Source: Banco Central do Brasil.

**Chart 19: Argentina – country<sup>(a)</sup> and currency risk<sup>(b)</sup>**



Source: Bloomberg.

(a) Country risk is measured by the spread on sovereign bonds, as recorded by J P Morgan's EMBI (Global constrained).

(b) Currency risk is measured by the difference between 90 day peso and dollar loans on the Buenos Aires interbank market.

<sup>8</sup>: The Brazilian authorities have recently increased the issuance of dollar-indexed paper, so this vulnerability will have increased.

positions are held by the public sector (US\$73 billion) and the non-bank private sector (US\$34 billion). These sectors would stand to lose most from a devaluation. Argentine banks are more or less currency matched. Whether they would be immune from the effect of any devaluation is, however, doubtful. It is thought that over 25 per cent of banks' foreign-currency assets could be liquidated easily if there were a run on foreign-currency deposits. Banks may, however, be exposed to credit risk if any unhedged corporates were to default on their foreign-currency loans. Given this structure of external indebtedness, any market pressures on the currency board are likely to continue to raise financial-stability risks in Argentina.

**Table 12: Argentina – foreign currency denominated financial assets and liabilities as at August 1999**

US\$ billions	Assets	Liabilities	Net position
Public	31.8	105.1	-73.3
Private	126.2	143.3	-17.1
<i>of which</i>			
non-bank private	44.9	78.6	-33.7
banking	81.3	64.7	16.6
<i>memo: banking sector</i>			
<i>liquid foreign currency assets</i>	22.6	<i>n.a.</i>	<i>n.a.</i>

Sources: Argentine Ministry of Economics and Public Works and Services, Bank estimates.

### Mexico

The financial stability risks posed by Mexico appear less significant than those emanating from either Argentina or Brazil. This is reflected in secondary market spreads, which are low by Latin American standards. Nevertheless, the Mexican banking sector remains weak following the crisis of 1994-95, and there is a possibility that next year's presidential election could be accompanied by a liquidity squeeze due to political uncertainty.

## II. Major industrial economies

Financial institutions in the major industrial economies retain significant exposures to emerging market economies and may be vulnerable to shocks arising from them. But they may also be vulnerable to sharp changes in capital flows between the major countries and to and from the emerging markets as a bloc. This section reviews exposures to emerging market economies and then global imbalances before considering some of the potential risks arising within the major industrial economies themselves.

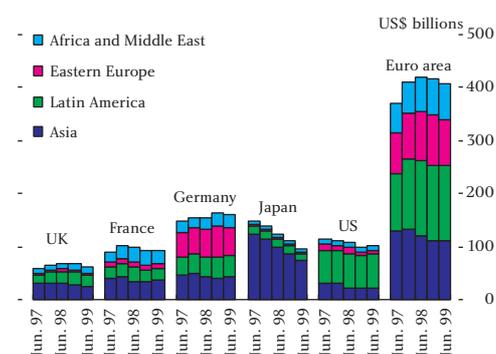
### Exposures to emerging market economies

The Bank for International Settlements produces data on the international banking exposures of 18 major industrial economies<sup>9</sup>. Bank lending from these economies to emerging-market economies stood at US\$689 billion in June 1999, about four per cent lower than in December 1998. Within this total, German, US and Japanese banks have the greatest stocks of outstanding lending; Germany's emerging market lending is greater than that of the USA. Latin America and Asia are the two regions that receive the most lending, around US\$250 billion each in June 1999. BIS-area bank lending to Eastern Europe was around US\$100 billion and lending to Africa and the Middle East was around US\$50 billion each.

Chart 20 shows the changes in the geographical composition of banking exposures to emerging-market regions since June 1997. Lending by Japanese banks has continued to fall the most rapidly of all BIS-area countries; in dollar terms, Japanese lending to Asia declined by around US\$24 million, or nearly 25 per cent, over the year to June 1999. In contrast to the lending by many other BIS-area countries, German banks' lending to emerging markets expanded during 1998 and remained broadly stable in the first half of 1999. Eastern Europe received the greater share of these new funds.

The lending portfolios of the UK-owned banks and most euro-area countries are fairly well diversified across the emerging market regions, whereas US and Japanese banks have tended to lend primarily to Latin America and Asia respectively. Some creditor economies have disproportionate exposures to individual emerging market countries. For example, Russia accounts for 55 per cent of Germany's lending to Eastern Europe and 17 per cent of Germany's lending to emerging markets, compared with 46 per cent and six per cent respectively for lending to Russia by all BIS-area economies. Capital market lending to emerging markets by industrial countries was discussed in Section I.

**Chart 20:**  
**Stock of bank lending to emerging economies<sup>(a)</sup>**



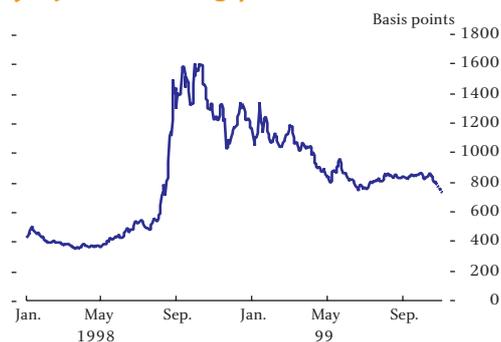
Source: BIS.

(a) Lending from banks owned within BIS-area countries.

Note: Portugal does not report to BIS and is not included in the euro area figures.

<sup>9</sup> The BIS-area economies comprise: Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Luxembourg, Netherlands, Norway, Spain, Sweden, Switzerland, United Kingdom and the United States.

**Chart 21:**  
**Emerging economy bond spreads weighted by G9 bank lending pattern<sup>(a)</sup>**



Sources: J P Morgan, BIS and Bank calculations.

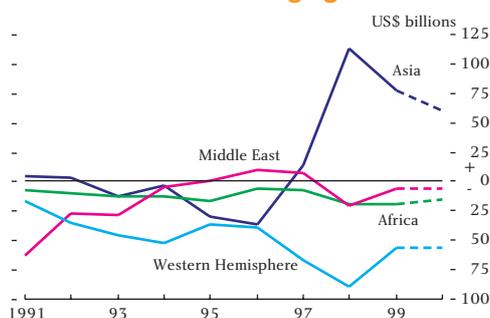
(a) Excludes the UK. Also excludes Switzerland and Sweden, for which disaggregated data are not published.

Chart 21 shows spreads on bonds issued by emerging economies, weighted by the pattern of bank lending by the G9 (the Group of Ten major economies excluding the UK as well as Sweden and Switzerland). They have declined in recent weeks, having previously stabilised over the summer at a higher level than prior to the Russian moratorium in August 1998. This measure of spreads has persistently been lower than that in Chart 3 in Section I because Latin America borrowing is weighted less heavily than it is in the J P Morgan EMBI+ index.

## Global imbalances

The emerging market economies are traditionally net importers of capital. When capital flows to Asia reversed during the crises of 1997-98, a dramatic turnaround in the current-account position of the affected countries was required, with Malaysia, South Korea and Thailand recording surpluses of over ten per cent of GDP in 1998 after running substantial deficits during most of the 1990s. That transformed the overall current-account position of Asia (excluding Japan) from a deficit of US\$37 billion in 1996 into a surplus of US\$113 billion in 1998 (see Chart 22).

**Chart 22:**  
**Current accounts of emerging economies<sup>(a)</sup>**

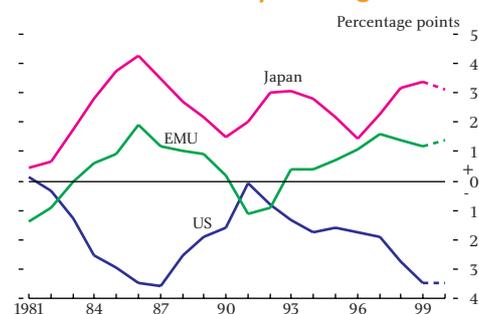


Source: IMF World Economic Outlook.

(a) 1999-2000 observations are IMF projections.

The position of other emerging markets worsened between 1996 and 1998, largely as a result of the deterioration in the terms of trade following the fall in oil and commodity prices. Latin American countries' combined current-account deficit increased from US\$39 billion to US\$89 billion; African countries' deficit increased from US\$6 billion to US\$19 billion; and Middle Eastern countries saw a surplus of US\$10 billion transformed into a deficit of US\$20 billion.

**Chart 23:**  
**Current accounts as a percentage of GDP<sup>(a)</sup>**



Sources: IFS, OECD Economic Outlook and IMF World Economic Outlook.

(a) 1999-2000 observations are IMF projections.

Smaller deficits and larger surpluses amongst the emerging market economies entail larger deficits and smaller surpluses in the industrialised world as a whole. This adjustment has not been evenly spread across industrial countries. In fact, the imbalances amongst the USA, Japan, and the euro area have persisted, judging by data published since the previous *Review* (see Chart 23). In 1998, the current-account deficit in the US stood at 2.7 per cent of GDP, while the surpluses in Japan and in the euro area were 3.2 and 1.1 per cent of GDP respectively. The latest data show that the US current-account deficit reached 3.3 per cent in the first half of 1999, with the Japanese surplus declining to 2.7 per cent and that of the euro area to 0.9 per cent.

The IMF's World Economic Outlook forecast published in October 1999 is consistent with a gradual rebalancing of world growth, with a slowdown in the USA, a pick-up in the euro area and a recovery in Japan. These developments were projected to stabilise the imbalance amongst the three regions at their 1998 levels. Faster growth was expected to reduce Asia's current-account surplus, while the recovery in oil and commodity prices

was thought likely to reduce current-account deficits in Latin America and Africa.

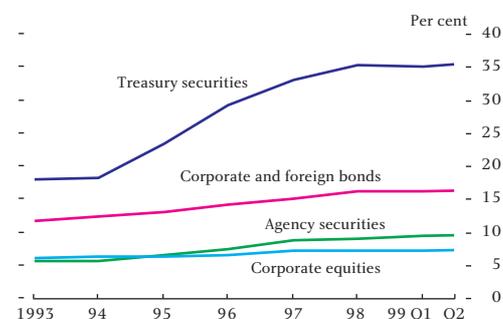
Even allowing for such rebalancing, and taking it as the central expectation, it is important from a financial stability point of view to assess what the risks would be if the pattern of surpluses and deficits evolved differently. In doing so, it is helpful to review the domestic counterparts to the balance of payments. The US features a large private sector deficit and a smaller public sector surplus. Japan has a considerable public sector deficit which is more than offset by a large private sector surplus. The euro area probably has a small public sector deficit, and a relatively small private sector surplus.

A number of these domestic sectoral imbalances may indeed adjust smoothly as growth patterns change, thus tending to correct any external imbalances. For example, a slowdown in the USA might be associated with an increase in private sector saving, although the public sector surplus would probably diminish. But even allowing for temporary output gaps and the lagged effect of past exchange-rate movements, the IMF estimates that in 1998 the USA had an underlying current-account deficit of 3.3 per cent of GDP, while Japan had an underlying surplus of 3.0 per cent of GDP and the euro area an underlying surplus of 1.4 per cent of GDP.

These numbers by themselves do not indicate that the pattern of current-account balances is unsustainable. Some elements of the saving/investment pattern and the associated current-account positions reflect the different demographic profiles of the G3. For example, the high level of Japanese household saving is related to the large size of the age group in which saving rates tend to be highest. Accordingly, Japanese household saving would be likely to exceed US household saving even if the countries' business cycles were synchronised. But other elements may change more rapidly. The scale of the US current-account deficit and the way in which it is being financed may make the dollar vulnerable to a turnaround in capital flows, and hence to the possibility of mutually reinforcing declines in the price of US securities. In the first half of 1999, there was a decline in net foreign purchases of US debt securities, while net equity purchases remained close to zero. The US deficit was financed by an unusually high volume of foreign direct investment, which tends to be erratic (quarter by quarter), as well as a rise in net interbank borrowing by US banks, which is predominantly short term.

Net liabilities have accumulated quickly but, until 1985, external assets exceeded external liabilities (see Chart 25). As at end-June 1999, US net external liabilities amounted to 19 per cent of GDP. Foreign investors are holding a historically large proportion of US securities, owning for example 36 per cent of

**Chart 24:**  
Foreign percentage holdings<sup>(a)</sup> of  
US assets<sup>(b)</sup>



Source: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States', 1999 Q2.

(a) Foreign holdings as a percentage of the total outstanding for each instrument.

(b) Data to 1998 annual, thereafter quarterly observations to 1999 Q2.

**Chart 25:**  
US net foreign assets (as percentage of  
GDP)<sup>(a)</sup>



Source: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States', 1999 Q2.

(a) Latest observation is end-June 1999.

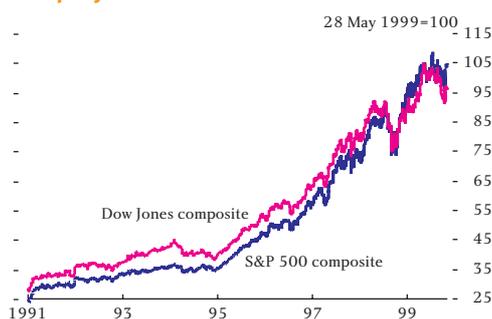
**Table 13: Consensus forecasts for annual US GDP growth**

Per cent	1999 <sup>(a)</sup>	2000 <sup>(a)</sup>
January 99	2.4	2.2
June 99	3.8	2.5
November 99	3.8	3.1

Source: Consensus Economics

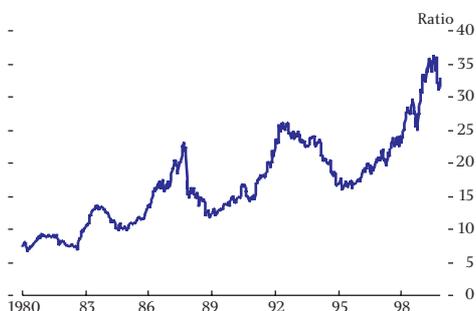
(a) Year for which forecast is made.

**Chart 26: US equity market indices**



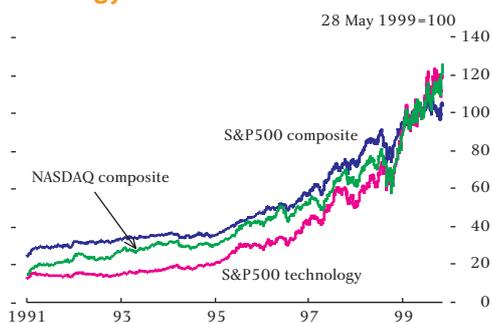
Source: Primark Datastream.

**Chart 27: S&P 500 price-earnings ratio**



Source: Primark Datastream.

**Chart 28: Technology stocks**



Sources: Primark Datastream and Bloomberg.

the stock of US Treasuries, compared to 23 per cent in 1995 (see Chart 24). The current-account deficit was last at its current size in 1986-87.

## USA

Despite the risks noted above, the US economy is generally expected to continue to perform strongly, though slowing a little next year. Forecasts for US growth in the year 2000 have yet again been revised upwards and growth this year is still expected to be rapid (see Table 13). But there are some potential downside risks to the outlook, and thus to world financial markets, stemming from the strength of the US equity market, the scale of indebtedness in some sectors, and a few signs of deteriorating loan quality.

### *The equity market*

The *Review* assessment in June explained why equity prices at that time might embody either unrealistic expectations of future dividend growth, or an unusually low equity risk premium, or both. Since then, the S&P 500 and Dow Jones indices have fluctuated, but the upward trend of the past few years has not been so evident (see Chart 26). Nevertheless, price-earnings ratios remain very high by historical standards (see Chart 27), and technology stocks in particular continue to reflect great optimism about the prospects for that sector (see Chart 28).

None of this establishes that the US equity market is definitely overvalued. But it does suggest that there is still scope for a significant fall in equity indices if market participants were to revise their expectations about future dividend growth or return to past assessments of the relative riskiness of equity investments. Nevertheless, the market was not materially affected by the Federal Open Market Committee's quarter-point increases in its target for the Federal funds rate, on 30 June, 24 August, and 16 November.

If there were to be a fall in equity prices, the most important effect would probably be to reduce US GDP growth, although there is some debate about the precise impact of changes in equity prices on the components of demand. That could frustrate the expectations underlying borrowing by firms and individuals, leading to both further adjustments of spending and heightened default risk. The impact of any equity-market correction would, therefore, depend on the resilience of sectors of the US economy.

### *The household and corporate sectors' resilience*

High gearing tends to increase financial fragility, other things being equal. Mortgage borrowing in the USA relative to the value of household real estate increased from 34 per cent in 1988 to 44 per cent in 1998. In the household sector, the ratio of liabilities to GDP rose to 73 per cent in 1999 Q2 (see Chart 29).

Household sector income gearing (gross interest payments divided by income) has been rising since 1994 (see Chart 30). The household sector had a financial deficit of 2.4 per cent of GDP in 1999 Q2 (see Table 14). The number of household bankruptcies and the net charge-off rate on consumer credit are close to record levels, according to the FDIC, although the latter fell back a little in the first two quarters of this year. Share ownership is more widely spread now than it was in 1987, at the time of the most recent big fall in equity markets. Table 15 indicates how the value of equity holdings has increased since the mid-90s. Margin lending has risen over the 1990s to around two per cent of GDP (Chart 31). Moreover, besides borrowing on margin, households may have diverted funds from other sources such as home equity loans to finance share purchases. And defined-contribution pension funds are more important than they were then, so that the lifetime wealth of more individuals is directly affected by falls in share prices.

**Table 14: US sectoral net financial investment**

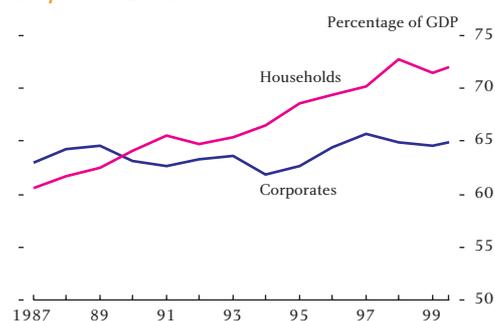
As a percentage of US GDP	1997	1998	1999	
			Q1	Q2
Households	-0.1	-0.2	-3.3	-2.4
Corporations	-0.6	-0.6	-1.0	-0.5
Federal government	-0.8	0.2	1.1	1.6
State and local government	-0.4	0.4	0.0	0.7
Rest of the world	3.5	2.5	3.4	5.3

Source: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States', 1999 Q2.

Note: Quarterly figures based on seasonally adjusted annual rates.

In contrast, the ratio of corporate liabilities to GDP, which at end-June stood at 65 per cent (excluding trade credit and foreign direct investment) has risen less in the 1990s (see Chart 29). Income gearing fell during most of the 1990s (Chart 32). Corporations had a financial deficit of 0.5 per cent in 1999 Q2 (Table 14). In aggregate, the corporate sector seems to have a relatively strong balance sheet and high profitability, but some firms are not in the same position. A number of firms have been swapping equity for junior debt, as at times in the 1980s, and equity retirements were running at a seasonally adjusted annual rate of US\$354 billion – four per cent of GDP – in 1999 Q2 (up from a rate of US\$267 billion – 3.1 per cent of GDP – in 1998, itself the highest rate for five years). The growing use of high-yield debt to finance lower-rated companies may have increased financial fragility. Defaults on US corporate 'junk bonds' have been at a record level so far in 1999, although that may reflect past increases in the proportion of companies using high-yield debt, making it hard to draw inferences about

**Chart 29: US corporate<sup>(a)</sup> and household<sup>(b)</sup> sector debt/GDP ratios<sup>(c)</sup>**



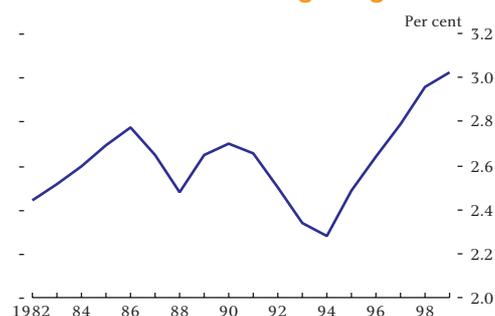
Source: Board of Governors of the Federal Reserve System: 'Flow of Funds Accounts of the United States', 1999 Q2.

(a) Corporate liabilities excluding trade credit and foreign direct investment.

(b) Household sector liabilities/GDP.

(c) Data to 1998 annual, thereafter quarterly observations to 1999 Q2.

**Chart 30: Household sector income gearing<sup>(a)</sup>**



Source: Primark Datastream.

(a) Interest paid by US household sector/disposable personal income.

Note: Data are seasonally adjusted except for 1999 H1.

**Chart 31: Volume of margin lending<sup>(a)</sup> as a percentage of GDP**



Sources: New York Stock Exchange and Primark Datastream.

(a) Securities market credit as reported by member organisations to the NYSE.

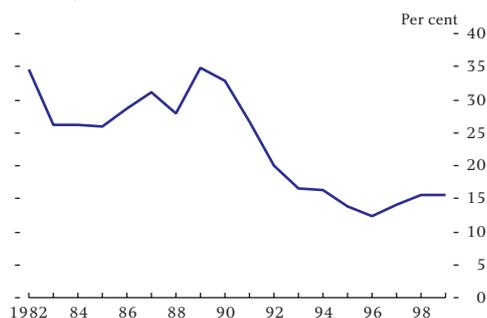
**Table 15: Equity holdings as a percentage of GDP**

	1994	1998	1999 Q2
Households	42	72	77
Mutual funds	10	30	32
Pension funds	22	47	48

Source: Board of Governors of the Federal Reserve System 'Flow of Funds Accounts of the United States', 1999 Q2.

Note: Quarterly figures based on seasonally adjusted annual rates.

**Chart 32: US corporate income gearing<sup>(a)</sup>**

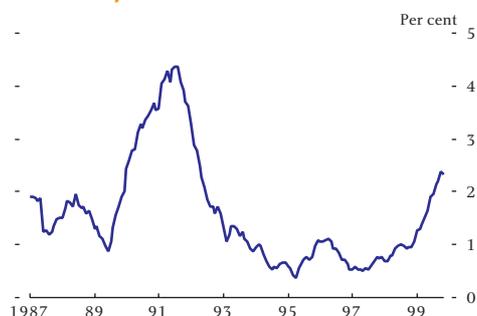


Source: Primark Datastream.

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

Note: Data are seasonally adjusted except for 1999 H1.

**Chart 33: Global corporate default rates<sup>(a)</sup>**



Source: Moody's Investor Services.

(a) Moody's all-corporate default rate calculated over previous 12 months.

underlying corporate sector robustness (Chart 33 shows how global default rates have been rising since 1997).

### The US banking sector

The Chairman of the Federal Reserve has suggested<sup>10</sup> that, "risk managers need to...set aside somewhat higher contingency resources – reserves or capital – to cover the losses that will inevitably emerge from time to time when investors suffer a loss of confidence." Would US banks be in a strong position to absorb any increased losses triggered by a sharp equity market correction? The main bank regulators – the Federal Reserve, OCC and FDIC - have reported this year that the overall position of the banking sector is good. Virtually all banks meet the regulatory capital adequacy criteria. Cost-to-income ratios are low and returns on equity high. But, despite that, several concerns were flagged, including:

- A narrowing of net interest margins, linked to heightened competition. That has particularly hit the profits of smaller banks.
- Increased volatility of trading income.
- A desire of banks to offset narrower margins by taking on greater maturity mismatches, giving rise to interest rate risks.
- A general shift in the loan book down the credit spectrum, including to construction and real estate (at a time of rising vacancy rates), consumer lending to less creditworthy borrowers, and highly leveraged mortgage lending.

There may also be risks linked to securitised bank lending, given that the risk of defaults on securitised assets might prompt banks to intervene to protect their reputations even where no formal provisions for recourse exist.

In the event of any sudden or marked fall in equity prices, banks could be affected by exposures to brokers and dealers as well as by direct exposures via their 'Section 20' affiliates<sup>11</sup>. While lending exposures to brokers and dealers are probably smaller than in 1987, banks remain exposed via committed credit lines. And US equity mutual funds, which are less liquid than they used to be, are using back-up credit lines from banks more. The proportion of their portfolios held in liquid form<sup>12</sup> has declined from around ten per cent up to the early 1990s to slightly below five per cent in February 1999. There is little publicly available information on exposures to highly leveraged institutions, such as hedge funds.

<sup>10</sup>: In a speech at the OCC in Washington on 14 October 1999.

<sup>11</sup>: Section 20 affiliates are bank affiliates which are engaged, but not principally engaged, in securities activities not permitted for banks (that is, underwriting and dealing in equities, corporate bonds and municipal securities).

<sup>12</sup>: That is, in the form of cash and Treasury securities.

## The euro area

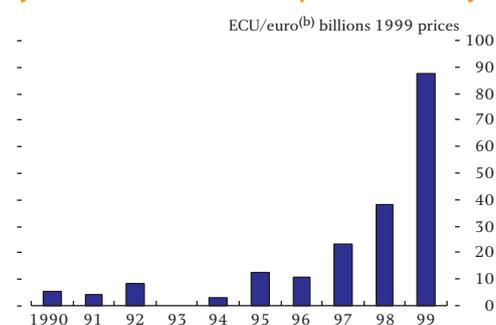
Quarterly output growth in the euro area was a little higher in 1999 Q2 than in the previous quarter and surveys generally point to stronger growth in the second half of the year. Business and consumer confidence have increased. However, some downside risks remain. First, the rate of credit expansion in the euro area has been well in excess of nominal GDP growth. The issue for financial stability is whether this is associated with a deterioration in credit quality, or with any concentrations of lending to high-risk sectors. Second, some smaller countries in the euro area are experiencing rapid output growth and high rates of increase of asset prices and credit which may not be sustainable in the longer run; the question is whether any reversal could precipitate problems for lenders. These developments present a challenge to banking systems at a time when they are experiencing intensified competition, narrowing margins, and increasing structural change.

### *The growth of credit*

Growth in bank credit to the private sector in the eleven euro-area countries was 10.5 per cent in the year to September. In its November *Monthly Bulletin*, the European Central Bank suggested that this reflected, amongst other factors, the low interest rates on bank lending in the euro area, improvements in economic activity, M&A activity and rises in real estate prices in some euro area countries (discussed below). Short-term consumer credit grew by 14 per cent in the year to June<sup>13</sup>, faster than any other component of household credit.

The annual growth rate in bank credit to non-financial corporations (8.3 per cent in June, according to the latest data) has been lower than the average for the private sector as a whole, but corporate bond issuance in euros has expanded rapidly (see Table 16). Issues by euro-area firms in the first three quarters of 1999 amounted to €75 billion, compared to €14.7 billion in the corresponding period of 1998. The largest bond issues have been used mainly for financing mergers and take-overs, some of it refinancing bank borrowing. Syndicated lending for acquisition financing has risen substantially in recent years (see Chart 34). Overall, these developments are consistent with an increase in the leverage of the euro-area corporate sector, although some of the factors behind them may be temporary (see Section III).

**Chart 34:**  
**Syndicated loans<sup>(a)</sup> for acquisition activity**



Sources: Capital Data and OECD *Economic Outlook*, June 1999.

(a) In all currencies to companies incorporated in the euro area.

(b) Converted from US dollars into ECUs/euros, deflated by the euro-area GDP deflator.

<sup>13</sup>: The latest date for which a sectoral breakdown is available.

**Table 16: Euro-denominated bond issues**

	1996	1997	1998	1999 Q1-Q3
€ billions <sup>(a)</sup>				
Central government	20.5	25.4	43.3	41.0
Private bank	96.8	161.3	238.7	279.0
Public bank	37.8	89.1	164.8	131.2
Private corporate	19.2	18.3	33.1	109.5
<i>of which euro area</i>	12.2	11.2	18.9	74.8
Other	103.0	122.0	160.0	103.2
<i>Total</i>	262.0	381.1	599.3	677.7

Source: Capital Data.

(a) Excludes auction issuance, which implies an under-estimate of bond issuance by national governments.

**Table 17: European bank margins<sup>(a)</sup>  
(Percentage points)**

Percentage points	1993	1997	1998
France	1.61	1.18	1.23
Germany	2.03	1.60	1.63
Italy	2.86	2.40	2.31
EU 11	2.20	1.66	1.71

Sources: Fitch IBCA and Bank calculations.

(a) Net interest income as a proportion of assets.

#### *The euro-area banking sector*

Banks in the euro area have been facing increased pressure on margins in recent years (see Table 17). On the funding side, there has been increased competition for savings from mutual funds and money market funds, which have both grown rapidly, possibly because of the low interest rates available on bank deposits. Wholesale funding, including issuing of long-term paper, has risen (see Table 18). The impact of lower net interest income on profitability has contributed to many banks establishing their own mutual funds or merging with insurance companies to increase alternative sources of income. The banking sector's net external assets (i.e. net lending outside the euro area) fell in the twelve months to September 1999 by €239 billion (around four per cent of euro-area GDP).

**Table 18: Euro-area monetary developments**

	September 1999 (€ billions)	Percentage change since September 1998
M3	4604	6.1
Loans to general government	830	-0.2
Loans to private sector	5369	9.7
Securities of general government	1230	2.3
Securities of private sector other than shares	221	4.4
Shares and other equities	357	27.4
External assets	2080	-4.5
External liabilities	1780	9.5
Long-term liabilities	3496	5.6

Source: ECB press release (27 October 1999).

On the asset side, there are also signs of increased competition, for example from the sale of relatively homogeneous banking products such as standard savings products and mortgages, and the establishment of telephone and internet banks which are not tied to existing country-specific branch networks.

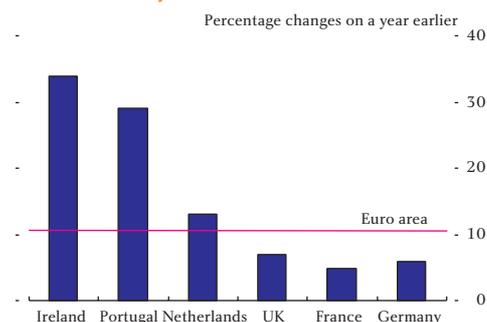
Increased competitive pressures may be part of the explanation for the consolidation of banking activity<sup>14</sup>. In the short run, consolidation may entail heightened operational risk as managers attempt to integrate disparate organisations. There may also be longer run implications. On the one hand, consolidation may strengthen the banking sector if it enables firms to diversify their risks to a greater extent and reap economies of scale. On the other hand, it may conceivably encourage perceptions of banks being 'too big to fail'. That remains a challenge for bank regulators, and for financial stability authorities more generally. On the whole, European banks do not yet appear to have taken full advantage of the potential for geographic diversification.

#### Divergences within the euro area

Aggregate figures on credit growth in the euro area mask important variations among countries. Relatively sluggish growth in, for example, France and Germany contrasts with that in some of the smaller euro-area countries (see Chart 35). House prices have increased more rapidly in some of them too (Chart 36).

One such country is the Netherlands. The annual increase in Dutch house prices to the third quarter of 1999 was 17 per cent (see Chart 37), despite the rise in long-term interest rates in the euro area in 1999, which was reflected in Dutch mortgage rates. The total debt of the personal sector grew from 67 per cent of annual personal disposable income (pdi) in 1990 to 112 per cent in 1998, mostly accounted for by mortgage lending. Lending to the Dutch private sector is growing at around 15 per cent, while mortgage lending has been rising at annual rates of 15-20 per cent since the end of 1995 (see Chart 38). The annual rate of growth of corporate borrowing has also risen to 15 per cent. Investment mortgages, linked to the performance of the stock or bond market, were introduced in the mid-1990s, and now account for over 50 per cent of new mortgages, thus leaving many households exposed to the changes in prices on the Dutch stock market. According to the September *Quarterly Bulletin* of the Dutch central bank, many house owners have realised capital gains on housing by taking out second mortgages to finance home improvements, investments in securities and consumption of durables. Anecdotal evidence suggests that loan-to-value ratios are high, reaching as much as 110 per cent (the average is 85 per

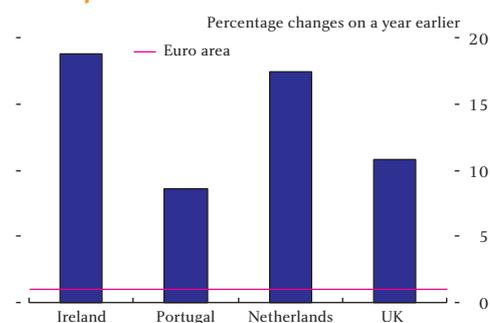
**Chart 35:**  
**Credit to the private sector**



Sources: De Nederlandsche Bank, Central Bank of Ireland, Central bank of Portugal, ECB, Bank of England, Deutsche Bundesbank and Bank of France.

Note: Portuguese, French and German data are for August 1999, Dutch, Euro-area, Irish and UK for September 1999.

**Chart 36:**  
**House prices<sup>(a)</sup>**



Source: National data.

(a) Portugal June 1999; the Netherlands Q3 1999; the UK October 1999 and the eurozone weighted average refers to BIS data for 1998.

**Chart 37:**  
**Dutch asset price changes**



Sources: Bloomberg and De Nederlandsche Bank.

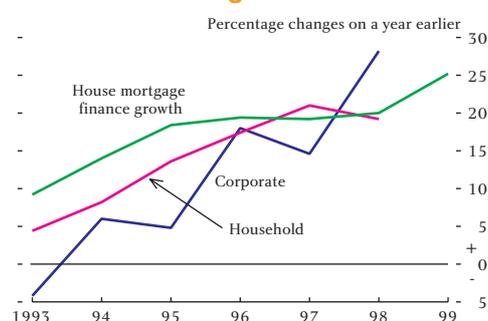
14: Most of the merger deals so far have taken place within euro-area countries rather than across borders, for example, BCH-Santander in Spain, Paribas-BNP in France and Banca Intesa – Banca Commerciale Italiana in Italy. One exception was that the ING Group, the Dutch banking and insurance conglomerate, took full control of the German bank, BHF-Bank.

**Chart 38:**  
**Lending to the Dutch private sector**



Source: De Nederlandsche Bank.

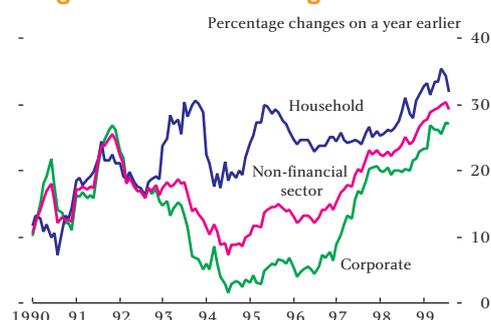
**Chart 39:**  
**Irish sectoral credit growth<sup>(a)</sup>**



Source: Central Bank of Ireland.

(a) Data to 1998 annual, latest observation is annual growth in September 1999.

**Chart 40:**  
**Portuguese sectoral credit growth**



Source: Bank of Portugal.

cent), with income multiples of up to six for each partner in the household having been agreed in some cases.

Two other, and somewhat different, examples are Ireland, discussed briefly in the *June Review*, and Portugal. In Ireland, national house prices have continued to increase month-on-month, growing by some 70 per cent in the past three years. After very strong growth at the end of 1998 and the beginning of 1999, there are now some signs of a deceleration in prices, with the annual rate of increase dropping from 29 per cent in January to 19 per cent in September. Underlying buoyant house prices, private-sector lending continued to grow strongly in 1999, with a 34 per cent year-on-year increase recorded in September. Growth in residential mortgage lending, although slowing slightly at the beginning of the year, picked up in March, reaching an annual rate of 25 per cent in September (see Chart 39). In August, the Bank of Scotland entered the Irish housing market, selling mortgages through brokers and by post and apparently, initially, undercutting most Irish lenders by one percentage point; the Irish lenders then followed suit.

In Portugal, credit to the private sector grew at around 30 per cent in the twelve months to August 1999 (see Chart 40). Personal sector debt accounted for around 70 per cent of personal disposable income – around the EU average – up from around 50 per cent in 1997. Corporate borrowing has also grown recently. As loans have built up, banks having been substituting out of government bonds, and increasing interbank exposures. Retail deposits have risen more slowly. House prices rose 8.6 per cent in the year to June 1999 (13.3 per cent in Lisbon).

The circumstances of Ireland and Portugal are rather different from the Netherlands. It is plausible that both are ‘catching up’ with the higher productivity, high income-per-head European countries. If so, a period of fast credit growth and an adjustment in some asset prices might be expected. But the same process might make it difficult for households, firms and lenders to judge where the new steady state was, and how quickly it could be attained, creating a risk of overheating if they overestimated the sustainable rate of growth. The same process of ‘catching up’ would tend to be accompanied by relatively higher inflation in non-traded goods and services, and thus in overall consumer price inflation, bringing about a real exchange rate appreciation reflecting the economy’s higher productivity growth. Again, there would be a risk of a shock to competitiveness – and thus to credit risk – if this process were to overshoot.

## Japan

Over the past six months, progress on financial-sector reform and restructuring, and better-than-expected economic data, have boosted confidence in both Japan’s financial system and its

nascent economic recovery. Uncertainty nevertheless remains about the pace and sustainability of the economic recovery, given the build-up of sizeable macroeconomic imbalances. And significant policy challenges remain in the area of financial sector reform.

#### The macroeconomic outlook

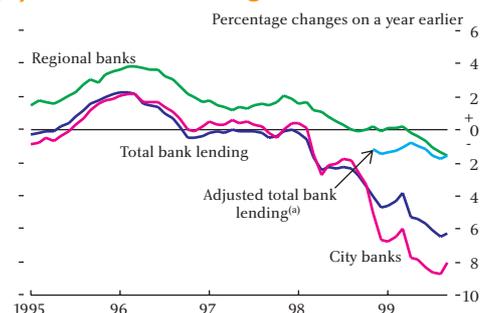
Real GDP growth has turned out to be stronger than most prior forecasts, with quarterly increases of two per cent in Q1 and 0.1 per cent in Q2 this year (seasonally adjusted). These growth rates took GDP to its highest level since the fourth quarter of 1997 – when Japan’s banking crisis became apparent – and led to upward revisions of most forecasts.

Bank lending has fallen at an increasing rate despite the government’s efforts to recapitalise the banking system (see Chart 41). As pointed out by Hoggarth and Thomas (in the *June Review*), bank lending may not recover, notwithstanding recapitalisation, if it is constrained by factors other than bank capital. Such constraints could include: banks’ funding (deposits and money market liquidity); banks’ appetite for credit risk; the underlying credit quality of firms in the corporate sector; and corporate and personal sector demand for bank lending. The combination of continued growth of bank deposits, zero short-term interest rates, and relatively high levels of excess reserves, suggests that bank lending is not constrained by lack of funding. This year’s marked increase in banks’ reported willingness to lend – as measured by the Bank of Japan’s Tankan business sentiment survey (see Chart 42) – suggests that banks’ aversion to credit risk has lessened over the past year. A more plausible explanation is low demand by companies for loans as they restructure and reduce their leverage, actions which may have improved the financial position of firms and resulted in positive corporate-sector saving (see below).

The decline in bank lending has coincided with a further decline in Japan’s money multiplier. The ratio of broad liquidity to monetary base (roughly equivalent to the UK’s M4 and M0 respectively) has declined to 21 times from over 24 times in 1995, when the official discount rate was cut to 0.5 per cent (see Chart 43). One possible explanation for this decline in the money multiplier is that households may have decided to hold a higher proportion of their money balances in cash and demand deposits, because the interest rates available on time deposits are negligible and reflecting concerns about future banking sector creditworthiness.

Japan’s economic recovery is still heavily reliant on deficit spending by the public sector. The general government deficit reached 13.7 per cent of GDP in the four quarters to June 1999. Even this record deficit was insufficient to offset continued high saving by public corporations (4.3 per cent of GDP), private

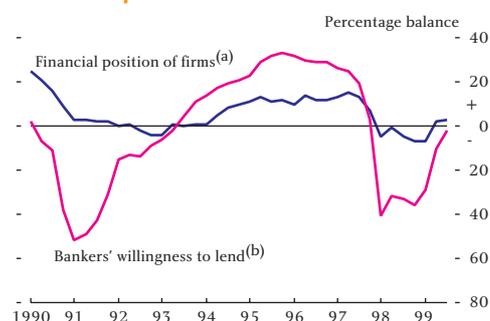
**Chart 41:**  
**Japanese bank lending**



Source: Bank of Japan.

(a) Adjusted for debt write-offs.

**Chart 42:**  
**Tankan corporate finance indicators**

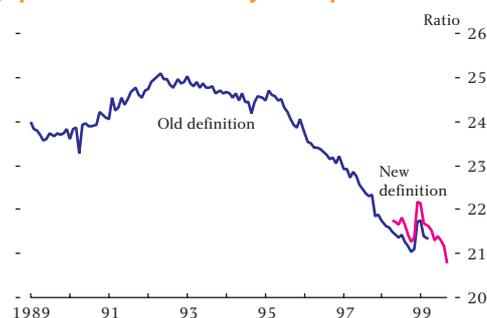


Source: Bank of Japan quarterly ‘Tankan’ survey of business sentiment, diffusion indices for principal enterprises.

(a) Percentage balance of respondents answering ‘easy’ minus ‘tight’.

(b) Percentage balance of respondents answering ‘accommodative’ minus ‘severe’.

**Chart 43:**  
**Japanese broad money multiplier<sup>(a)</sup>**



Source: Bank of Japan.

(a) Broad money multiplier is broad liquidity/monetary base, both seasonally adjusted.

N.B. Latest observation is based on our Bank approximation.

corporations (5.1 per cent), households (3.1 per cent) and financial firms (3.9 per cent), as reflected in a Japanese current-account surplus of 2.5 per cent of GDP.

#### *Government debt dynamics*

Net debt (on the standardised OECD basis), excluding the social-security fund, is forecast to exceed 85 per cent of GDP by the end of 1999. This figure excludes underfunded future pension liabilities, exacerbated by the demographic challenge of a rapidly ageing population, which an OECD working paper has estimated at 70 per cent of GDP<sup>15</sup>.

Japan's high private-sector saving rate has allowed the government deficit to be financed domestically, at record low nominal yields. That suggests that fiscal policy does not yet appear to be constrained, at least in the short term, by the high level of government debt. Even if the domestic saving rate were to fall and government-bond yields were to rise sharply, the average interest rate on government debt outstanding could still remain on a declining trend, as long as high-coupon ten-year bonds from the late 1980s and early 1990s (issued at four to eight per cent interest rates) could be refinanced at lower nominal interest rates.

Analysis of Japan's government-debt dynamics is complicated by the role of the government-owned Postal Savings scheme, which recycles saving via the Ministry of Finance's Trust Fund Bureau (TFB) to finance the Fiscal Investment and Loan Programme and purchase government bonds. The Post and Telecommunications Ministry recently estimated that net outflows of Postal-Savings deposits will total ¥27 trillion in the fiscal year to March 2001 and ¥22 trillion in the following fiscal year - about five per cent and four per cent of GDP respectively. Fears that this could force the TFB to become a net seller of Japanese government bonds (JGBs) have added to nervousness in the bond market. To allay these fears, it was announced on 5 November that the Bank of Japan had agreed to provide liquidity to the TFB through three-month JGB repo agreements (whereby the Bank of Japan buys the JGBs and the TFB agrees to buy them back at the same price plus interest three months later).

#### *Financial restructuring*

Significant progress has been made in restructuring Japan's financial sector with the recapitalisation of the banks, inspections of banks' bad loan assessments by the Japan Financial Supervisory Agency (JFSA), and moves towards banking-sector consolidation. That has been reflected in the strong stock-market performance of financial companies,

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<sup>15</sup>: Roseveare, D *et al* (1996) 'Ageing Populations, Pension Systems and Government: Simulations for 20 OECD Countries', OECD Economics Department Working Paper. The calculations were very sensitive to productivity growth and discount rate assumptions, and a lower discount rate of three per cent would increase the pension shortfall to 151-237 per cent of 1994 GDP.

including banks (see Chart 44). The announcement on 19 August of the plan to merge Fuji Bank, Daiichi Kangyo Bank and the Industrial Bank of Japan into the world's largest bank ranked by assets, helped raise the Tokyo Stock Exchange banking sector share price index by 29 per cent within three trading days<sup>16</sup>. That returned the index to levels last seen in October 1997, before the closure of Hokkaido-Takushoku Bank. Banking-sector share prices received another boost on 14 October when Sumitomo Bank and Sakura Bank announced plans to merge to form the world's second largest bank.

The state of bad debts in Japan should have become somewhat clearer following the completion of JFSA inspections of all banks. The latest JFSA inspections results covered Japan's 56 second-tier regional banks, whose problem loans (categories II to IV) totalled ¥6.6 trillion, 22 per cent higher than earlier self-assessments, and equal to 14 per cent of total loans. That completes the JFSA inspections of licensed banks, the total problem loans of which it now estimates at ¥73.4 trillion in 1998<sup>17</sup>, equal to 12.6 per cent of total loans at the time, and ¥7.8 trillion higher than banks' own published data at the time. Banks have, since the inspections, disclosed bad debt levels of ¥64 trillion or 11.7 per cent of total credit exposure, as at March 1999.

The scope of the JFSA audit data understates the full extent of Japan's bad-debt problems. First, the data exclude bad debts at now-nationalised problem banks (Long Term Credit Bank of Japan (LTCB), Nippon Credit Bank and five regional banks), where bad debts have escalated beyond earlier estimates. The latest estimates suggest that disposal of bad loans at LTCB alone will have cost the Japanese tax-payer ¥4 trillion, or 0.8 per cent of GDP. Second, the data exclude the ¥25 trillion of bad debts already disposed of through direct write-offs (see Chart 45). Third, the data exclude bad debts held by public sector banks and by firms outside the banking sector, many of which have yet to be recognised. In all, significant uncertainty remains regarding bad debt recognition; credit-rating analysts have in the past estimated that bad debts could exceed ¥150 trillion (or 30 per cent of GDP).

There have, however, been some positive signs of bad-debt and collateral disposal. Japan's Resolution and Collection Corporation recently purchased bad-debt collateral at an unprecedentedly large 95 per cent discount to book value, and has been allowed (under new rules) to purchase bad debts from solvent banks (rather than just from insolvent banks). Deregulation of debt collection has also allowed private sector collection companies to be established, and foreign interest in

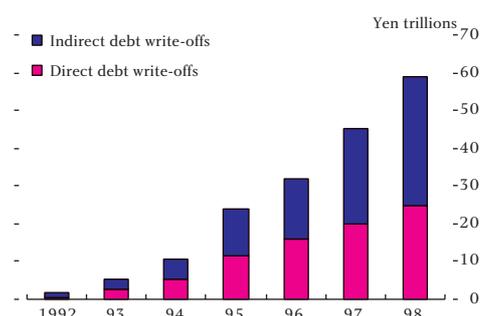
**Chart 44:**  
**Japanese equity market**



Source: Bloomberg.

(a) Banking sector index rebased to equal the Nikkei 225 on 28 May 1999.

**Chart 45:**  
**Japanese banks' cumulative bad debt write-offs**



Source: Japanese Financial Supervisory Agency.

<sup>16</sup>: Measured between intraday troughs and peaks.

<sup>17</sup>: Levels of loans in categories II to IV at end-March 1998 for major banks and first-tier regional banks, and at end-September 1998 for second-tier regional banks.

buying Japanese distressed-debt assets has been evident in the (so far) successful attempt by Ripplewood Holdings to acquire LTCB.

The financial sector reforms and bank restructuring have been spurred partly by the scheduled reintroduction of the 'pay-off system' of partial deposit protection in April 2001<sup>18</sup>. The pay-off system, if introduced as planned, will replace the current unlimited guarantees on all Japanese banks' deposits and protect bank deposits only up to ¥10 million (approximately £50,000), leaving deposits in excess of this level recoverable through normal liquidation procedure. However, with ¥702 trillion of Japan's ¥1,333 trillion personal-sector financial assets held in the form of bank deposits, the regime change could result in significant movements of customers' funds. Japan's financial-sector rehabilitation law (passed in October 1998, authorising the 'bridge bank' scheme and the use of public funds for re-capitalising banks) is also due to lapse in April 2001.

While the authorities have rejected calls for a postponement of this date, the debate over the planned regime change has intensified. Finance Minister Miyazawa's advisory panel, the Financial System Council, published two interim reports, on 6 July and on 19 October, highlighting some practical issues that need to be resolved. The latter report urged that the authorities should seek to deal with any future crisis by aiding troubled institutions first, rather than immediately imposing the ¥10 million 'pay-off' limit on deposits. The report also put greater emphasis on applying the American 'Purchase and Assumption' arrangements to failing banks, whereby a healthy bank acquires both assets and liabilities of a failing institution<sup>19</sup>. If no buyer is at hand, the report recommends that the government should use a 'bridge bank' to administer and restructure the failing institution prior to resale to a healthy private-sector bank. That approach would appear to mark a shift of priorities, away from minimising moral hazard and fiscal costs towards minimising uncertainty and possible disruption to banking services leading up to the regime change.

#### *The Japanese insurance sector*

Beyond the banking system, significant concern surrounds the life insurance sector. This year saw the closure of Toho Mutual Life, a small troubled life insurer with reported negative equity of ¥200 billion. The existing policyholder-protection fund is funded by contributions from the industry up to a maximum liability of ¥400 billion (guaranteeing the insurance benefits but not the

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<sup>18</sup>: For an overview, see H. Nakaso 'Recent Banking Sector Reforms in Japan', *FRBNY Economic Policy Review*, July 1999.

<sup>19</sup>: 'Purchase and Assumption' is only one of several methods the US Federal Deposit Insurance Corporation (FDIC) can use to reduce potential banking failures. For details of actual arrangements used in bank failures in the 1990s, see FDIC website on <http://www.fdic.gov/bank/historical/index.htm>.

policy premiums of failing insurance firms) so a further failure could possibly exhaust the fund.

Less prominently reported were the poor results for Japan's major life insurers for the financial year to March 1999. In aggregate, premium income fell by 6.5 per cent over the previous financial year, whilst the number of new individual life insurance and annuity contracts fell by 17.4 per cent. The falls seem largely to reflect consumers' reluctance to purchase high-commission products during the current recession, and heightened awareness of the risk that insurers may not be able to honour their policies in the long run.

Poor past investment performance and current low yields on investments make it unlikely that life insurers' asset holdings will produce sufficient returns to allow them to meet all of their future liabilities (although those factors are partially offset by the use of conservative mortality assumptions). Guaranteed policy dividends remain between 3.8 per cent and 4.1 per cent, significantly above investment returns. At the end of the financial year to March 1999, this 'yield gap' entailed a shortfall of ¥1.32 trillion (an increase of almost ten per cent year-on-year and equivalent to 0.7 per cent of total assets). The major eight life insurers also reported total non-performing loans of ¥1.11 trillion. That is, however, only 0.6 per cent of total assets, and, on a cash-flow basis, Japanese life insurers should, in the view of the government, be able to meet their liabilities for several years. The eight major life insurance companies' solvency margins are, on the basis of published results, all well above the 200 per cent minimum. On 17 August, the JFSA announced plans to audit six life insurance companies (Dai-Ichi, Asahi, Tokyo, Kyoei, Taisho and Daihyaku) to assess their financial strength.

There have been reports (for example, in Japan's Nikkei newspaper) that in order to encourage life insurers to recapitalise, the authorities have started drawing up plans to allow mutual life insurers to become stock-holder-owned companies with shares allocated to policyholders on the basis of their contributions to net asset formation. The new companies would be allowed to issue new shares directly after demutualisation.

In summary, the past six months have seen a pick-up in economic growth and progress on financial-sector restructuring. However, both have come at the cost of a deteriorating fiscal position. Meanwhile, significant uncertainties remain over the level of bad debts, capital shortfalls in the life-insurance sector and underfunded pension liabilities. Planned moves towards more transparent international standards of accounting (eg consolidated accounting, and mark-to-market valuations of assets) over the next year-and-a-half may help to clarify the scale of these challenges facing Japan.

### III. International financial markets

Market conditions in recent months have remained relatively calm compared with the turbulence of a year ago. Most equity markets have not been as buoyant as earlier in the year, but remain high. Since June, bond market spreads have been broadly unchanged. They are wider than before autumn 1998, but that is not necessarily a worrying sign – they may have been excessively compressed at that time. Liquidity in most developed markets remains better than a year ago. But it is probably worse than before the crises, and bond and swap spreads have been unusually volatile. Some contacts have attributed this to a withdrawal of risk capital following the LTCM/Russian-related turbulence and the consequent tightening up of credit terms for funds and some proprietary trading desks. It is difficult to assess whether that will persist, as the market's appetite for risk might also have been affected by the run-up to the millennial date change, which is discussed in Section IV.

#### Equity market developments

While equity prices in many of the major world markets are broadly at the same levels as they were six months ago, the US (and, to a lesser extent, European) market is still high by historical valuation standards.

The rises in world equity markets seen in the first half of 1999 continued until early July, when markets in the USA, UK and France all hit record highs. Since then, a number of the major markets have been weaker, and have lost some of the gains made since the start of the year (see Chart 46). At the beginning of November, the FTSE 100 in the UK and the S&P 500 in the USA were at around the same level as at the end of May. Technology stocks have, however, continued to perform strongly. Equity markets in continental Europe and Japan have increased as near-term growth prospects have recovered.

Price-to-earnings (P/E) ratios in the UK and France, as well as the USA, are high, and above those in the first half of 1998 (see Chart 47). As noted in Section II, the *Review* in June asked whether equity prices at that time in the UK and (particularly) the USA embodied either unrealistic expectations of future dividend growth, or an unusually low equity risk premium, or both. Judged by the dividend discount model used in that analysis, that question remains apt; it is unclear whether it can be pressed with more or less force as time passes without a market correction.

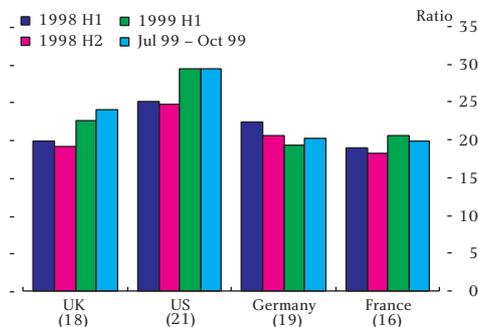
According to the dividend-discount model, equities in France and Germany are also valued highly by historical standards, though less so than in the USA. In the UK, equity prices would be broadly in line with values implied by the dividend-discount model on the assumption of an equity premium of about three per cent (compared with *ex post* returns on equities, which have

**Chart 46:**  
Equity indices in selected countries



Source: Primark Datastream.

**Chart 47:**  
Average price-to-earnings ratios<sup>(a)</sup>



Source: Primark Datastream.

(a) Datastream broad market index. Historical averages calculated from January 1994 to October 1999 are given in parentheses.

been about eight per cent higher than on government bonds on average since the second world war).

Options prices can be used to derive a probability distribution for market expectations about the future level of equity indices (see Chart 48). Option price data for the S&P 500 and the FTSE 100 suggest that the market still attaches a higher probability to a large fall in the indices than to a large rise; the implied distributions remain skewed towards the downside.

Chart 49 illustrates the high degree of co-movement between the major equity indices since the previous *Review*. Calculations for selected pairs show how correlations increased during the second half of 1998, fell in the immediate aftermath of the asset-market turmoil, but have since increased again.

Periods of market turbulence are usually associated with sharp increases in the variability of market prices. That could be the result of increased uncertainty about the true value of assets, reduced market liquidity – so that actual trades have a larger effect on prices – or both. Chart 50 shows how equity price volatility rose sharply in all markets following the Russia/LTCM crises and fell back at the beginning of 1999. More recently, however, equity price volatility has risen in the US and the UK. In continental European markets, price volatility continues to fall, but remains close to or above the levels observed in early 1998.

## Capital market activity

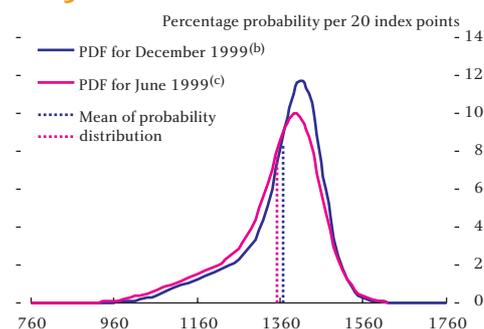
Over the past six months, long-term yields on government bonds have risen in most markets, largely reflecting news about the economic outlook in Japan and continental Europe, and the continued growth of the US economy (Chart 51).

Issuance conditions, both since the June *Review* and during the year as a whole, have been significantly better than those prevailing during the market turbulence last year.

Non-government international bond issuance in the first nine months of 1999 totalled US\$900 billion<sup>20</sup> – already greater than the total reached in any previous full year (see Chart 52). This recovery in non-government bond issuance is apparent across all rating categories, and reflects the renewed willingness of investors to take on credit risk to major industrial country borrowers, contrasting with the position in emerging-market economies described in Section I. Whilst some of the increase may well reflect a continuation of the upward trend in international bond issuance apparent since 1990, three ‘one-off’ factors may also have contributed. First, following the introduction of the euro, a large volume of debt was issued by borrowers who wanted to establish a presence in the euro-denominated markets. Second, borrowers who had delayed

<sup>20</sup> Source: Capital Data.

**Chart 48:**  
Implied probability distribution<sup>(a)</sup> for the S&P 500 Index



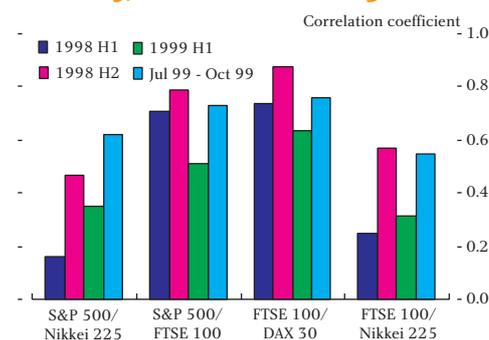
Sources: Bank of England and Chicago Mercantile Exchange.

(a) Under certain assumptions, these are the distributions of expectation in the markets about what the level of the S&P 500 Index will be at the expiration date of the options from which they are derived.

(b) Derived from option prices on 4 November 1999.

(c) Derived from option prices on 7 May 1999.

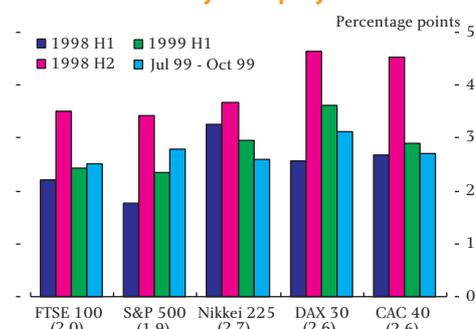
**Chart 49:**  
Correlations between the S&P 500, Nikkei 225, FTSE 100 and DAX 30<sup>(a)</sup>



Source: Bank of England.

(a) Correlation between weekly changes, over a six-month period.

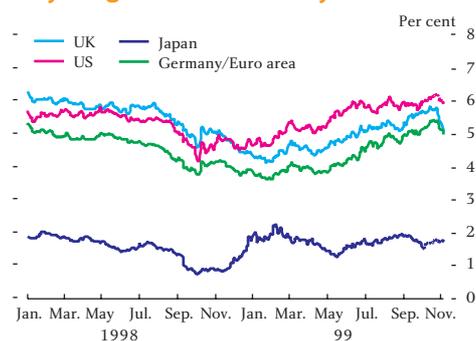
**Chart 50:**  
Historical volatility of equity indices<sup>(a)</sup>



Source: Primark Datastream.

(a) Volatility calculated as standard deviation of percentage weekly price changes. Historical averages calculated from January 1994 to October 1999 are given in parentheses.

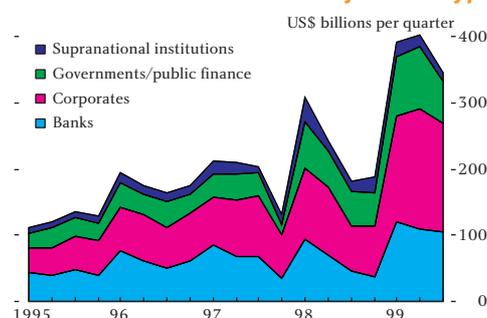
**Chart 51:**  
**Ten-year government bond yields<sup>(a)</sup>**



Source: Primark Datastream.

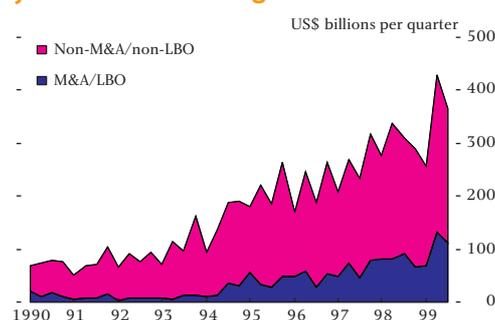
(a) Datastream ten-year government benchmark bonds.

**Chart 52:**  
**International bond issuance by issuer type**



Source: Capital Data.

**Chart 53:**  
**Syndicated loan arrangements<sup>(a)</sup>**



Source: Capital Data.

(a) Only includes loans for which the purpose of the borrowed funds is stated. M&A: merger and acquisitions; LBO: leveraged buyouts.

issuance from the final quarter of 1998, because of illiquid conditions, returned to the market. And finally, some borrowers have issued bonds earlier in the year than they would otherwise have done to avoid any problems with possible market illiquidity ahead of the millennium (see Section IV).

Syndicated lending facilities also recovered in the early part of 1999. In the first three quarters of 1999, syndicated lending to borrowers of all nationalities totalled US\$1,166 billion, compared with US\$1,108 billion over the same period in 1998. Syndicated loans related to merger and acquisition activity, and to leveraged buyouts, have continued to rise (see Chart 53).

## Credit markets

The stability of credit markets is a key concern from a financial stability perspective. These markets play an important role in the provision of finance to 'end-users' and affect the portfolios of many financial intermediaries. The spread between corporate and government-bond yields is frequently used as an indicator of the level of corporate credit risk, and similarly swap spreads for bank credit risk. These spreads are also affected, however, by the appetite of lenders for risk, the liquidity of the instrument and the value placed on liquidity. Changes in spreads can therefore occur in the absence of a change in perceived credit risk if one or more of those factors changes.

The three most important features of the period since the June Review have been the persistence of corporate bond spreads in the USA and UK at materially higher levels than before the 1998 crises (see Charts 54 and 55); greater tiering; and an apparent increase in the volatility of spreads (Chart 56).

Notwithstanding much calmer conditions than a year ago, spreads on lower-rated UK corporate bonds are higher now than then. Swap spreads have also been higher and more volatile (see Charts 56 and 57). Swap spreads in all markets rose sharply in the late summer, in the USA to levels exceeding – and in the UK close to – those in 1998.

There are various possible explanations for these developments. The so far persistent rise in the general level of spreads and the increased credit tiering were triggered by the LTCM/Russia events. Whereas a part of the rise in emerging-market spreads can probably be explained by changed perceptions, induced by the crises themselves, of the probabilities of default and of losses in the event of default, it seems unlikely that the probabilities of defaults amongst the US or UK corporate sectors have been fundamentally reappraised; for example, few corporate ratings were changed. The prospective lower issuance of public debt in the major industrial countries – apart from Japan – may go some way to explain higher spreads on corporate bonds; but much the same story is evident even if, in the calculation of spreads, yields

on government bonds are replaced by those on AAA bonds issued by supranational bodies.

That the price of credit risk in general has changed could potentially be attributable to a higher value being placed on liquidity, or to a fall in the amount of risk capital committed to the market. Both seem plausible. The events of autumn 1998 reminded market participants that liquidity in the markets for many lower-quality credit instruments cannot always be relied upon when it is most needed. And one effect of those events seems to have been a tightening in the terms of credit for highly leveraged institutions. That, together with losses incurred then and since, has affected such institutions' demand. It may also help to explain the apparent rise in market volatility; actual volatility would tend to rise if there was less arbitrage in a market (see Chart 56).

Reductions in the capacity of a market are also offered as an explanation for the rise in syndicated loan spreads over the past few years (see Chart 58)<sup>21</sup>. In particular, Japanese banks have generally withdrawn, and apparently some other banks have done so since the autumn 1998 events.

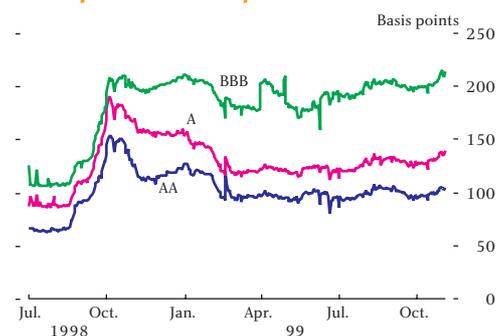
As well as changes in capacity and in the value placed on liquidity, it seems likely that an overbuoyant market simply underpriced default risk. Markets which may have appeared to many at the time to be efficiently arbitrated, turned out to be trading at levels which were in fact out of line with fundamentals. The marked increase in credit tiering lends some support to that. As such, the rise in spreads is welcome. But greater volatility would not be so welcome. There now seems to be less trading in a number of markets, which are subject to larger price changes. While the pre-1998 state of affairs was ultimately more dangerous, less actively traded and liquid markets could complicate risk management.

## Liquidity

The change that has taken place in credit markets illustrates why liquidity is so important for financial stability. Financial institutions expect to be able to sell or buy assets in core markets quickly and without undue impact on market prices, so that they can manage their risks. If the liquidity of markets deteriorates sharply and unexpectedly, participants may be unable to observe reliable prices; trades may occur with delays; and participants may find it difficult to transfer risks, or to undertake effective risk management, especially in the face of shocks. In closely related financial markets, the impairment of the trading mechanism in one market can result in distortions in others, which may in turn lead to wider systemic problems. That is why

<sup>21</sup> While measures of such spreads, as shown in Chart 58, for example, are imperfect because they do not control for changes over time in the average credit quality of borrowers, market contacts confirm that there has been a rise.

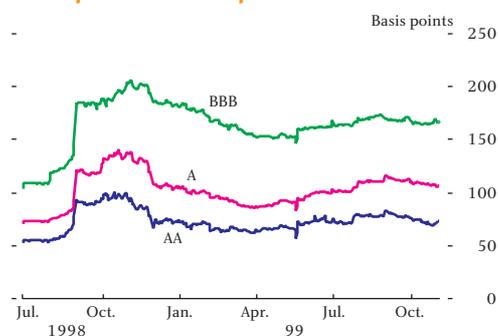
**Chart 54:**  
**UK corporate bond spreads<sup>(a)</sup>**



Sources: Bloomberg and Merrill Lynch.

(a) Seven to ten-year maturity.

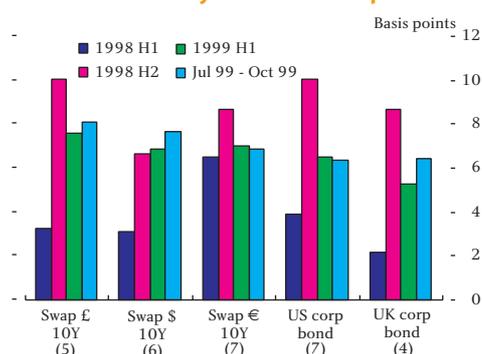
**Chart 55:**  
**US corporate bond spreads<sup>(a)</sup>**



Sources: Bloomberg and Merrill Lynch.

(a) Seven to ten-year maturity.

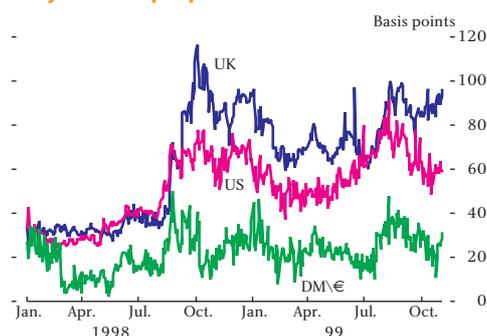
**Chart 56:**  
**Historical volatility of selected spreads<sup>(a)</sup>**



Source: Primark Datastream.

(a) Volatility calculated as standard deviation of weekly spread changes. Historical averages are given in parentheses. Historical averages calculated from January 1995 (DM/€ and £-denominated swaps), January 1996 (UK corporate bonds), January 1997 (\$-denominated swaps) and January 1998 (US corporate bonds) to October 1999.

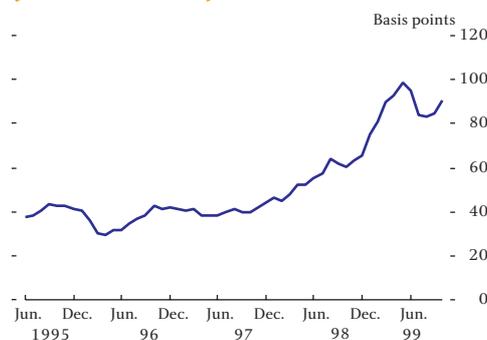
**Chart 57:**  
**Ten-year swap spreads<sup>(a)</sup>**



Sources: Bloomberg and Bank of England.

(a) Difference between the zero coupon swap rate and the Svensson zero coupon ten-year government rate.

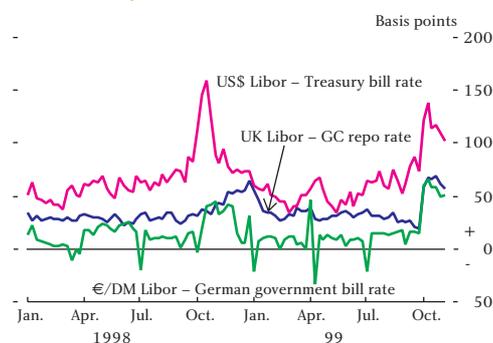
**Chart 58:**  
**Syndicated loan spread<sup>(a)</sup>**



Sources: Capital Data and Bank of England.

(a) Spread of five-year loans over Libor. Six-month moving average.

**Chart 59:**  
**Interbank spreads<sup>(a)</sup>**



Source: Bloomberg.

(a) Three-month maturity.

efficient market pricing is an important aspect of financial stability, as argued in the assessment in June's *Review*.

Liquidity in financial markets generally remains better than a year ago. In corporate bond markets, liquidity improved during the turbulent conditions of the first half of this year but is said by market participants to have deteriorated somewhat since July. In the money markets, liquidity premia started to increase around May (see Chart 59) and market contacts have expressed concerns that liquidity conditions, in general, may deteriorate more than usual toward the year-end (see also Section IV).

There are several reasons from a financial-stability perspective to focus particularly on the liquidity of government bond markets. Public debt usually plays a key role in secured wholesale money markets (notably in repo transactions); in commercial banks' liquidity management; in providing at least some of the key benchmark interest rates for debt markets; and, in many countries, in the provision of collateral within high-value, real-time payment systems.

A measure of liquidity typically used in government bond markets is the yield difference between actively traded 'on-the-run' bonds and less actively traded 'off-the-run' bonds. This yield differential, or liquidity premium, reflects the price market participants are willing to pay for liquidity – although the liquidity of on-the-run bonds is not necessarily perfect, and may vary through time. Chart 60 indicates that this premium increased in the US government bond market during the financial-market turbulence in autumn 1998 and has fallen back only slightly since then. Estimates of this premium for the UK government bond market show a similar time profile.

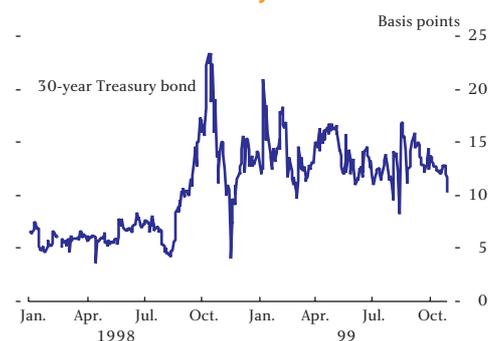
A second aspect of liquidity is 'resilience,' namely the amount by which a given transaction affects the market price and the speed at which the price returns to a level determined by economic fundamentals after a transaction takes place: the less liquid and efficient the market, the larger the price impact of a given transaction, even if the trade did not contain any new information. There are some signs of a deterioration in gilt market resilience. For example, long gilt yields 'gapped' in the first week of November, falling considerably more than yields on other major government bonds without any obvious explanation for the sharper movement in UK yields in terms of fundamentals. Some of the structural influences on the gilt market are discussed in the November 1999 *Bank of England Quarterly Bulletin*, and in Section VI below. The gilt repo market does not seem to have been affected.

It is difficult to measure the liquidity premium on risky debt because, as already discussed, the yield spread over risk-free debt will reflect both liquidity and credit risks. This is less of an issue

for highly rated firms, for which credit risk can be judged as low. Chart 61 shows the yield spreads for AAA-rated corporate bonds over government debt and suggests that liquidity in the secondary corporate bond markets might have deteriorated from July to August, but recovered somewhat during September before deteriorating again in October. Chart 62 focuses on the short-term debt market in the USA and shows the liquidity premium for one-month high-quality commercial paper and US dollar Libor. Both spreads peaked in 1998 Q4, fell during the early months of 1999, but rose again more recently.

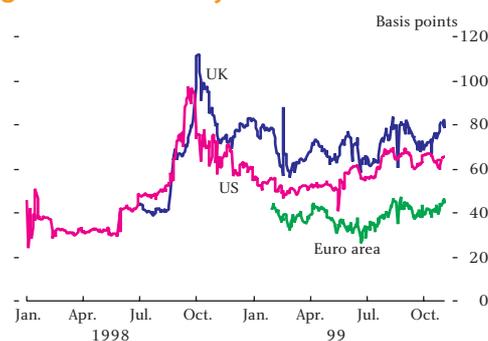
The bid-ask spread is a further measure of liquidity. While in principle bid-ask spreads should provide a straightforward indication of the availability of liquidity that can be applied to a wide range of instruments, in practice data on bid-ask spreads are not always easily available and are often unreliable (for example reported bid-ask spreads are often indicative quotes rather than firm market prices). In addition, the bid-ask spread typically varies with transaction size: a sudden deterioration in liquidity may be reflected first in the spreads quoted for larger size deals and may not be discernible from average quoted spreads. Anecdotal evidence from market participants points to little change in bid-ask spreads for UK gilts since last May, but suggests that bid-ask spreads of sterling swaps have widened in the past two months. No appreciable changes are reported on bid-ask spreads in US government bond markets or dollar swap markets.

**Chart 60:**  
Yield spread between off-the-run and on-the-run US Treasury securities<sup>(a)</sup>



Source: Federal Reserve Bank of New York.  
(a) Data to end-October 1999.

**Chart 61:**  
Spreads of AAA-rated corporates over government bond yields<sup>(a)</sup>



Sources: Bloomberg and Merrill Lynch.  
(a) Seven to ten-year maturity.

**Chart 62:**  
US one-month money market spreads<sup>(a)</sup>



Source: Bloomberg.  
(a) Spread over maturity-matched Treasury bill.  
(b) A+ rated commercial paper.

## Box 5: Measuring leverage<sup>1</sup>

Leverage can be defined in different ways. Traditional measures are based on the relationship between the size of the balance sheet and equity capital. More recently, various related measures of risk in relation to capital and access to funding have been emphasised.

The simplest measure of leverage in individual institutions, the ratio of on-balance-sheet assets to equity, reveals the extent to which non-equity funding has been used to purchase assets, thus scaling up the impact of a given proportionate movement in asset returns on a firm's equity base. That is inadequate as a measure of risk to the extent that it takes no account of the degree of market, credit and other risks inherent in different portfolios of assets: for example, a portfolio consisting largely of short-dated G7 government paper entails much lower risk than one containing high-yielding emerging-market instruments. In addition, no account is taken of off-balance-sheet positions. Various adjustments can be made to address these problems. For instance, it has been suggested that cash and 'matched books' (typically repo/reverse repo) – which have little market risk – should be deducted from the figure for assets which enters into the calculation.

Two simple suggested indicators of the leverage that arises from off-balance-sheet instruments are the ratio of the gross notional value of derivative positions either to equity or to the gross mark-to-market value of derivative positions. The notional value acts as a broad proxy for the potential exposure created by derivative positions. Comparing this to equity is analogous to the standard on-balance-sheet measure. The mark-to-market value of a derivative is a proxy for the resources needed to acquire and hold the derivative instrument (that is typically smaller than the investment required for a similar return in the market from the underlying instrument). So comparing the notional to the mark-to-market value might help to assess the scale of the potential loss (due, for example, to changes in the price of the underlying instrument) relative to resources employed.

None of the measures discussed above provides an exact indication of the extent of market risk in an institution, because so much depends on the degree to which particular positions tend to offset others. Value-at-risk (VaR) models attempt to address this problem at the level of the individual firm by modelling the correlations between different market prices

<sup>1</sup>: The discussion is based on that in Appendix 1 of the report on 'Improving counterparty risk management practices' by the Counterparty Risk Management Policy Group (CRMPG), June 1999 and IMF 'International capital markets: developments, prospects and key policy issues', September 1999, pp 84 - 88.

explicitly<sup>2</sup>. The difficulty, though, is that these correlations are not stable through time, and especially not during crises. Further, it is generally assumed that firms are able to close out positions in a relatively short period of time, but during market turbulence they may not be able to do so.

Further difficulties arise in attempting to measure *aggregate* leverage for a group of institutions. For example, separate institutions may have positions with negatively correlated risk profiles. If such factors are not taken into account, simple leverage measures will overstate the risk exposure of a sector as a whole. VaR type models could in principle capture such correlations, although different institutions employ different models and this would make aggregation extremely problematic.

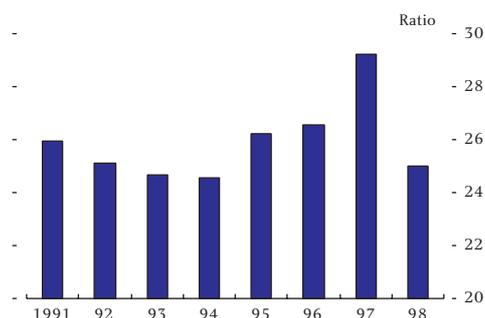
<sup>2</sup>: Jackson P, Maude D & Perraudin W. 'Testing Value-at-risk Approaches to Capital Adequacy', *Bank of England Quarterly Bulletin*, August 1998.

## Leverage

Excessive leverage has been a factor in many major market crises, for example the 1929 stock market crash, and the market corrections in 1987 in the US and Hong Kong. As noted in the previous *Review*, the near collapse of LTCM last autumn re-emphasised the risks inherent in excessive leverage. Leverage is relevant to financial stability for a number of reasons. First, holding portfolio risk constant, institutions which are highly leveraged are more susceptible to material loss of equity, and possibly default, as a result of market (or other) risks. In turn, this means that such institutions may need to close out positions quickly, possibly with a major impact on markets. One factor which can lie behind that is the potential scale of margin calls on leveraged positions as prices change: such calls can give rise to liquidity problems and may eat further into firms' equity. Second, high leverage may allow particular market participants to grow to a very large size and thereby acquire an excessively large share of particular markets. Third, bank and other exposures to leveraged institutions may be significant. Finally, such institutions may have a disproportionate impact on markets even if they are not large, if other participants think that they have superior information, and follow their lead (although that is unlikely to result from leverage as such).

Hedge funds and proprietary trading desks of banks and securities firms are the major entities which in recent years have adopted strategies involving high leverage. Since the market turbulence last year, most proprietary trading operations are thought to have been scaled back, perhaps radically so in some cases (although there have been reports of some established firms setting up new leveraged operations at arm's length). Some market commentators have suggested that the resulting

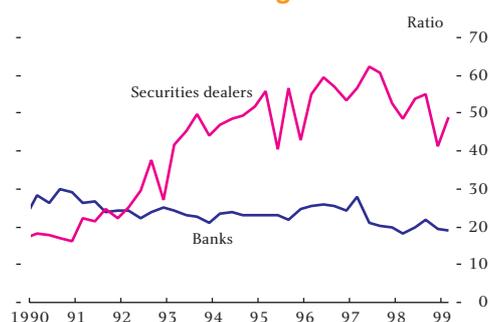
**Chart 63:**  
Gross leverage of participants in the London derivatives market<sup>(a)</sup>



Sources: Fitch-IBCA and Bank of England.

(a) Gross leverage = on-balance-sheet assets/equity.

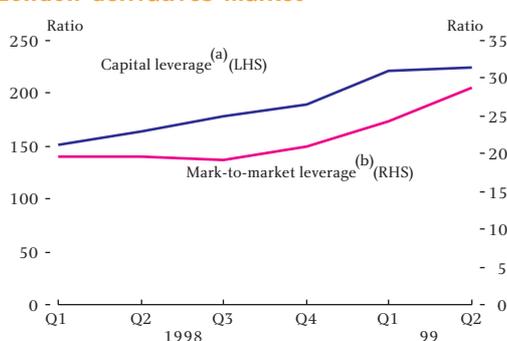
**Chart 64:**  
On-balance-sheet leverage<sup>(a)</sup>



Source: ONS Financial Statistics.

(a) Assets/equity.

**Chart 65:**  
Off-balance-sheet leverage of banks in the London derivatives market



Source: Bank of England.

(a) Gross notional value of derivative contracts over banks' capital.

(b) Gross notional value of derivative contracts over gross mark-to-market value of those contracts.

reduction in aggregate leverage, and hence exposure, in the global financial system may explain why financial shocks in 1999, such as the Brazilian devaluation in January, were less disruptive than those of 1998, although, as noted above, that may have been an important factor explaining lower market liquidity this year than in the first half of 1998.

There have been reports recently that a few large hedge funds faced redemptions during June following poor performance in the first half of the year. That could have increased leverage at these firms, at least in the short term. But there is little publicly available information on the exact level of leverage of hedge funds. Anecdotal evidence suggests that, in most cases, they are much less leveraged than they were prior to the Russian default/LTCM crises in 1998.

Measuring leverage is difficult at an aggregate level, and thus a series of potentially suggestive measures need to be monitored. For example, as large-scale trading activities are concentrated among a relatively small number of institutions, simple measures of aggregated on-balance-sheet leverage can in principle be constructed from annual accounts data. As such, Chart 63 shows gross leverage (total assets over equity) of firms active within the London derivatives market from 1991 to 1998 and confirms market anecdote that leverage increased during 1996 and 1997<sup>22</sup>. By this simple measure, market leverage had fallen by end-1998, although it remained around the levels of the early 1990s.

Chart 64 focuses on an indicator of leverage in UK banks and securities houses based on national accounts figures, and using the traditional leverage ratio of assets to equity; banks and securities houses tend to be far more highly leveraged, on-balance-sheet, than other financial institutions. The high level of banks' leverage is inherent in their business, reflecting their ability to extend loans and purchase assets against their deposit base, as well as against their equity and other borrowings. The on-balance-sheet leverage of securities dealers has been higher than that of banks since 1993. That may reflect their tendency to borrow extensively in the wholesale markets (in part through repo) to fund assets.

It is possible to estimate both of the off-balance-sheet leverage measures explained in Box 5 using recently introduced Bank of England data on the derivative positions of the major banks active in the London market<sup>23</sup>. They have risen steadily since 1998 Q3 (see Chart 65). The Russian debt and LTCM crises do

**22:** The sample of firms used to construct this measure was as far as possible consistent with that described in footnote 23.

**23:** For a full description of these data see Grice, A 'New Data on Financial Derivatives', in Bank of England *Monetary and Financial Statistics*, July 1999. Institutions authorised as banks in the UK account for around three-quarters of positions in the London derivatives markets. 'Major banks' refers to a sample of 47 banks which represents approximately 90 per cent of those positions.

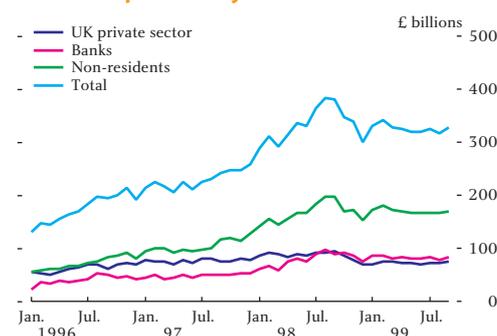
not appear to have reduced banks' off-balance-sheet leverage in 1998 H2. That is largely due to the increased size of notional positions, possibly reflecting attempts by banks to hedge or speculate under changed market conditions. Also, banks' aggregate mark-to-market derivative positions in the London market fell following the near-failure of LTCM, raising the mark-to-market leverage measure.

Another possible indicator is provided by volumes of outstandings in instruments particularly conducive to leverage, notably most OTC and exchange-traded derivatives, as well as the size of repo markets and lending to non-bank financial institutions. Data from a recently introduced BIS survey of the OTC derivatives markets<sup>24</sup> show that the total notional value of contracts outstanding was higher in December 1998, at US\$80.3 trillion, than it was six months earlier, when it stood at US\$72.1 trillion – though, for the reasons explained in Box 5, that does not necessarily mean that derivative dealers or their counterparties were more exposed to market risk than before.

Repo markets facilitate leverage because firms will generally be able to obtain greater funding on a secured, as opposed to unsecured, basis. Some indication of developments in the scale of repo and reverse-repo activity in global markets is provided by the returns that banking institutions operating in the UK provide to the Bank of England (see Chart 66). These data show that between mid-1997 and the onset of significant market turbulence in the late summer of last year, banks' reverse repo business – ie the provision of finance against collateral such as government bonds – grew rapidly. However, since then the rate of growth has slowed sharply; the stock of reverse repo fell in the fourth quarter and has remained broadly flat in 1999. Part of the slowdown could reflect the unwinding of convergence trades built up ahead of the introduction of the European single currency in January 1999. But the figures are also consistent with market anecdote that repo-based funding of highly leveraged activity, often by overseas institutions, including hedge funds, has fallen compared with last year. Repo funding for overseas institutions fell from a peak of £197 billion in September 1998 to £170 billion in September 1999.

Finally, bank and building society lending to other financial corporates (OFCs) has slowed sharply over the past two years. In the year to 1999 Q3, M4 lending (in sterling) to OFCs rose by 5.4 per cent compared with four-quarter growth of 22.9 per cent in 1997 Q4 and 10.5 per cent in 1998 Q4. And in foreign currency, OFCs actually repaid £21.9 billion of debt in the year to 1999 Q3, equivalent to around 20 per cent of their stock of foreign-currency borrowing (see Chart 67).

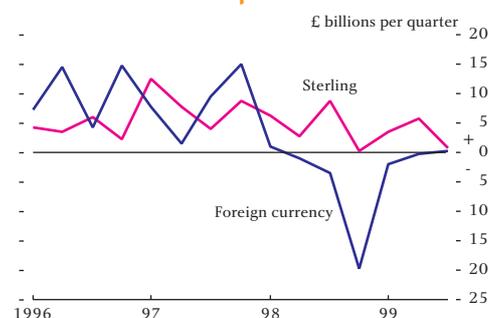
**Chart 66:**  
**Reverse repo activity of UK banks<sup>(a)</sup>**



Source: Bank of England.

(a) In all currencies.

**Chart 67:**  
**Flows of bank and building society lending to other financial corporations**



Source: Bank of England.

<sup>24</sup> BIS, 'The global OTC derivatives markets at end-December 1998,' 2 June 1999, <http://www.bis.org/press/p990602.htm>.

While not conclusive, most of the above measures are suggestive of lower leverage in London markets than a year ago. This kind of analysis would, however, need to be extended to other major markets, and build up a track record, before much weight could be placed on it.

## IV. Year 2000

An uncertainty about the short-term outlook for financial market conditions, and a preoccupation over recent months for the authorities and market participants alike, is the effect of the millennium date-change. As described in previous sections, this has also made it more difficult to discern potentially more persistent developments.

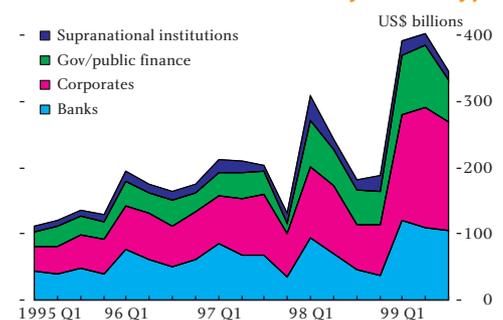
### Financial market behaviour

The Bank's contacts with market participants suggest that confidence is increasing that the Year 2000 period<sup>25</sup> will pass without major problems in financial markets. Market participants remain cautious, however, and seem likely to adapt their trading activities and balance sheets, partly in the expectation of similar behaviour by others. These 'shadow effects' on financial markets can be distinguished from any direct consequences of computer problems. The picture is complicated because the end of the year is in any case a time when financial market activity is normally lower than usual, with many institutions tending to scale back their balance sheets ahead of their financial year-end (which for many coincides with the calendar year-end).

Turnover in primary and secondary markets is expected to decrease over the Year 2000 period. As shown in Chart 68, international bond issuance reached historical highs in the first half of 1999. One explanation, though probably not the only one, is that issuers brought forward issuance in the expectation of less liquid markets later in the year. Levels of issuance fell somewhat in the third quarter, but remained high. In secondary markets, market participants say that turnover is likely to reach a low in the last week of December or first weeks of January. Some banks are planning a 'no deal' window during which they will minimise numbers of new and maturing trades, except on behalf of customers. It is unclear at what point activity will contract: some market participants suggest that money, bond and OTC derivative market turnover began to decline from November or even earlier. In the gilt market, for example, secondary-market turnover in the third quarter was lower than in the two previous years (see Chart 69), with the influence of the year-end among several possible reasons offered by market participants. Market sources suggest that some securities houses and leveraged funds began to reduce their balance sheets as early as September.

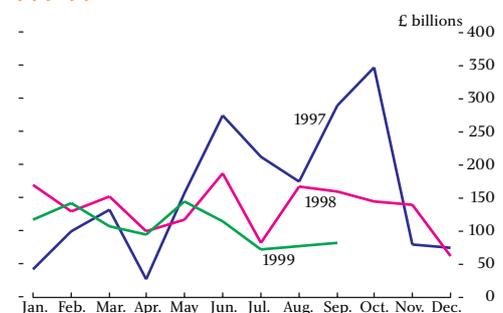
Quoted and derived unsecured forward interest rates for periods spanning the turn of the year give an indication of expected money market conditions over the Year 2000 period compared to periods ending before December and beginning after January. Chart 70 shows the so-called millennium 'spikes' seen in

**Chart 68:**  
International bond issuance by issuer type



Source: Capital Data.

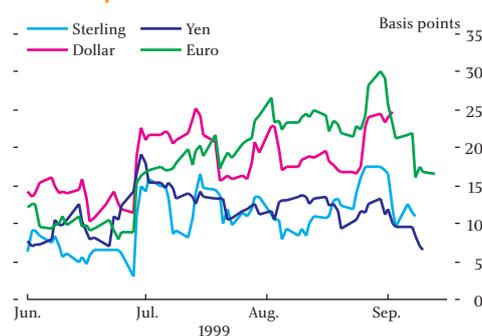
**Chart 69:**  
Monthly turnover in conventional gilts  
1997-99



Source: London Stock Exchange.

<sup>25</sup> In this section, the 'Year 2000 period' refers to the period from late-December 1999 until the end of January 2000.

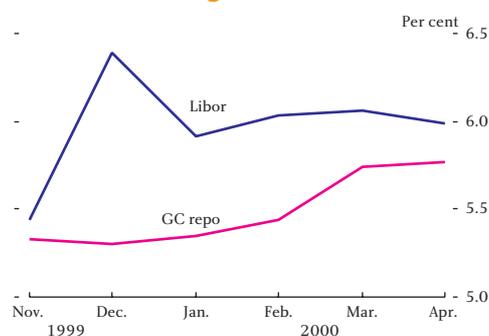
**Chart 70:**  
**Futures spike<sup>(a)</sup>**



Source: Bloomberg.

(a) Three-month interest rate futures; December 1999 less average of March 2000 and September 1999 contracts.

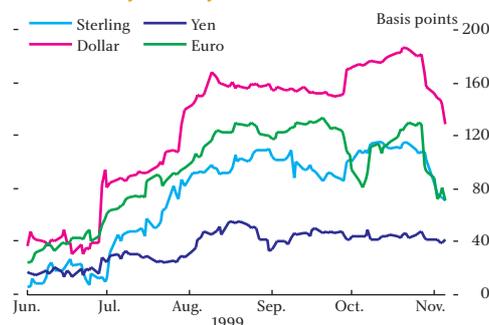
**Chart 71:**  
**One-month sterling forward curves<sup>(a)</sup>**



Source: Bloomberg.

(a) As at 5 November. Derived from sterling Libor fixings and GC bid repo rates.

**Chart 72:**  
**Forward implied spike<sup>(a)</sup>**



Source: Bloomberg.

(a) Measured as the difference between the one-month forward rate beginning in December and the average of one-month forward rates beginning in November and January; as derived from Libor rates or equivalent.

short-term interest-rate futures markets until September<sup>26</sup>. The chart illustrates that there were spikes of varying magnitudes in sterling, dollar, yen and euro futures markets, which increased at the end of June. The differences are difficult to interpret, although it is normal for year-end effects to vary across money markets.

Chart 71 shows the term structure of one-month forward rates based on sterling Libor fixings for unsecured interbank funds reported to the British Bankers' Association at 11 am on 5 November. Unlike futures, these forward rates are not directly observed, but rather are derived from one to six-month cash-market rates using a 'no arbitrage' condition. The chart shows a clear spike in derived one-month unsecured rates for the period 6 December to 5 January. As shown in Chart 72, similar spikes of different magnitudes exist in other major unsecured money markets.

Chart 71 also shows one-month forward rates for reverse repo of cash against a basket of gilts (general collateral). Again, these rates are derived from observed market rates for term gilt repo on 5 November. Unlike the unsecured market, there is no spike in forward rates for gilt reverse repo. The most likely explanation is that a lender of cash in reverse repo has full title to the gilts received until the maturity of the transaction; gilts are liquid securities, which can be used to raise funds if needed; and so the liquidity position of a cash lender in term gilt reverse repo is not impaired. Indeed, derived forward gilt-repo rates have occasionally shown a slight dip in recent months, suggesting market participants have at times been willing to pay a slightly larger premium than at other times to lend cash via reverse repo over the year-end. Market participants certainly do not appear concerned that it will be difficult or expensive to raise funds against gilt collateral during the Year 2000 period.

The return of implied forward rates to the previous trend for periods beginning after January 2000 also suggests that market participants are not anticipating any prolonged increase in the cost of borrowing to banks. So it would be difficult to interpret 'spikes' as indicating that the central expectation of market participants is that Year 2000 problems will affect the ongoing creditworthiness of banks. More plausibly, perhaps, they reflect a reluctance to lend for term into the New Year by banks which are seeking to preserve their own liquidity or to limit the size of their balance sheets over the Year 2000 period. Put another way, for a bank customer the spread between the cost of term borrowing into 2000 and the return on demand deposits has increased.

<sup>26</sup> The spike is the rate for the December contract (i.e. expected three-month Libor at expiry) less the average of the September 1999 and March 2000 contracts. For this reason, data are only available until the expiry of the September contract.

The Bank's regular discussions with corporate treasurers indicate that some large companies have nonetheless been willing to pay these high spreads and typically they have placed the funds raised on shorter-term or demand deposit with major banks, either to meet expected cash payments early in 2000 (eg tax payments) or as a contingency. The fluctuations in 'spikes' are consistent with this interpretation (see Chart 72). Demand to roll-over three month corporate loans is greater than demand for two and four month maturities. In part, this may help to explain the increase in US dollar and sterling one-month spikes after 28 September and the subsequent decrease after 28 October<sup>27</sup>. (Increasing confidence about market liquidity is also likely to be a factor as explained below.)

Most banks cannot predict their potential outflow of funds precisely because their business involves taking deposits, which can be withdrawn on demand, and providing committed credit facilities, which can be drawn down at short notice. Uncertainty over the scale of these outflows is likely to be greater over the Year 2000 period. At the same time, banks may perceive a higher risk of delays to payment receipts if counterparties were to experience system or liquidity problems. Sensible contingency planning for these added uncertainties should mean that banks and other market participants increase their liquidity by, for example, holding additional high-quality liquid securities and/or placing funds or confirming lines with other banks.

Because banks are reluctant to enter into transactions that will reduce their liquidity over the Year 2000 period, it may be wrong to interpret the derived forward rates shown in Charts 71 and 72 as central expectations of market rates at that time. Market participants may be unwilling to lend long and borrow short because of uncertainty about their cost of borrowing over the period, even if their central expectation is that this will be a profitable trade.

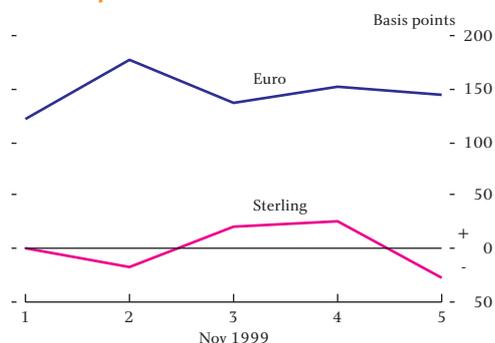
Rates in the sterling overnight interest rate swap market provide some evidence that the spikes should be interpreted as reflecting greater uncertainty about the cost of borrowing rather than a central expectation of higher rates. In an overnight interest rate swap, one party pays the average of overnight inter-bank rates<sup>28</sup> over a period and the other pays a pre-agreed fixed rate. The

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**27:** A further reason for fluctuations in the spike is that the derived 'December' forward rate relates to a changing future period over the course of each month. For example, on 29 October, two-month Libor related to funds maturing on 29 December and three-month to 29 January; so the 'December' forward ran from 29 December to 29 January. But on 1 November, one-month Libor related to funds maturing on 1 December and two-month to 4 January; so the 'December' forward ran from 1 December to 4 January. If banks are most concerned about their liquidity in the first couple of weeks of January, they may be more willing to lend to 4 January than 29 January. That may also help to explain the decline in spikes in the US dollar market on 28 October and the sterling market on 1 November when, respectively, two-month lending began to mature in January.

**28:** The sterling overnight Index Average (Sonia) and Euro Overnight Index Average (Eonia) are both volume-weighted means of rates for actual overnight inter-bank unsecured deposits, calculated *ex post*.

**Chart 73:**  
**Implied spikes from the overnight interest rate swaps market<sup>(a)</sup>**



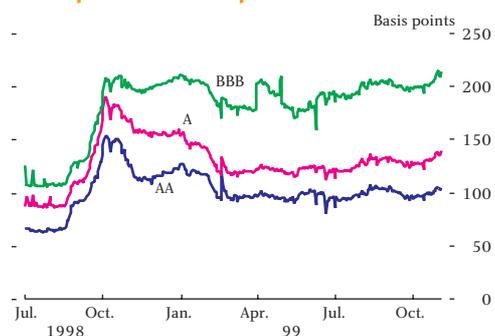
Source: Bloomberg.

(a) Derived from Sonia and Eonia swap rates.

swaps are settled with a net payment, so there is no financing requirement over the life of the transaction. Unlike spikes derived from cash market rates, spikes derived from swap rates should be unaffected by uncertainties about the risk of financing the transaction and should therefore be a better indicator of any expected increase in overnight rates. They are also based on expected rates relating to actual transactions, whereas Libor is based on the rates at which banks are prepared to offer loans. So Libor rates would tend to increase relative to overnight swap rates if bid-offer spreads widened because banks were less willing to lend. Chart 73 shows that there has been no consistent spike in rates derived from sterling overnight interest rates (Sonia) swaps, although there has been a spike in the equivalent euro (Eonia) swaps.

In the securities loan and special repo markets, traders borrow specific securities: for example, to cover short positions<sup>29</sup>. Most securities loans can be recalled on demand in order to give the institutional lender (typically an insurance company or a pension fund) the flexibility to sell the security from its underlying portfolio. Stock borrowers are therefore exposed to a liquidity risk if the loaned securities are recalled and the short position cannot be closed out, or an alternative lender found, except at a cost. Demand to borrow stock is thought likely to fall towards the end of the year as trading activity and leverage decline. The International Securities Lenders' Association (ISLA), with which the Bank remains in close contact, is encouraging institutions that lend stock to inform counterparties at an early stage of any plans to reduce activity over the Year 2000 period.

**Chart 74:**  
**UK corporate bond spreads<sup>(a)</sup>**



Sources: Bloomberg and Merrill Lynch.

(a) Seven to ten-year maturity.

If financial institutions seek to hold more liquid, high-quality assets and to scale back balance sheets, the cost of funds to borrowers of differing creditworthiness may diverge. Likewise, yield spreads between securities of varying liquidity or quality may widen. There is no clear indication yet that corporate bond spreads for borrowers of different credit ratings have increased (see Chart 74). But there is anecdotal evidence that some investors are decreasing holdings of, for example, emerging-market securities and increasing their bank deposits. Some large banks in the United Kingdom and United States have said that they may offer no interest on wholesale deposits at the year-end if there is a significant movement of funds towards them.

If other banks and financial institutions need to raise liquidity, they will either look to sell or repo liquid securities, or draw down lines from other banks. The large UK banks have carefully reviewed the Year 2000 preparations of their counterparties in the financial markets and maintained interbank credit lines in

<sup>29</sup> See, for example, 'The First Year of the Gilt Repo Market' *Bank of England Quarterly Bulletin*, May 1997.

most cases. Market prices should make it attractive for them to 'recycle' any deposits that do move towards them by lending in the money market, provided they are willing to take on the additional credit risk. A few market participants have said that they regard the Year 2000 period as a possible opportunity to purchase less liquid securities at relatively cheap prices.

### **Institutional responses**

Market participants have anticipated the likely state of markets in the Year 2000 period for some time. They have had ample opportunity to adjust their balance sheets in an orderly way, and to inform counterparties of any planned changes in their behaviour. The Bank's (and, as reported to the Bank, the FSA's) discussions with market participants indicate that most have been preparing for the Year 2000 period in a sensible fashion and will endeavour to avoid behaviour that will surprise or impose costs on other market participants. Importantly, when their plans are taken together, there is no evidence that dislocation in the market is likely.

Preparations for the Year 2000 date change began early in the UK. The Bank's 'Blue Book' series<sup>30</sup> began in February 1998 to describe initiatives being taken by the financial sector and many institutions were well into their Year 2000 programme even then. Work to test computer systems and remedy any problems found was largely completed by the middle of 1999. Much work has also gone into contingency planning and arrangements for the millennium weekend.

The central expectation is that financial infrastructure providers and market participants have both prepared and tested their systems thoroughly and will be ready to react quickly and appropriately if, nonetheless, problems arise. The Financial Services Authority reported to the Action 2000 National Infrastructure Forum on 20 October that 98 per cent of the high and medium impact financial groups that it supervises are now rated 'Blue' ('no identified risks of material disruption')<sup>31</sup>. The remaining two per cent (seven firms) are rated 'Amber' ('some risk of material disruption but an agreed containment plan to rectify shortcomings'). No groups remain in the FSA's 'Red' category ('a severe risk of material disruption'). Beyond the financial sector, Action 2000 have reported that the organisations responsible for the UK's essential services are ready to deliver 'business as usual' over the millennium period. The likelihood of significant disruption to the operation of markets is judged to be small, although the Bank, Financial Services Authority and other authorities continue to monitor developments carefully.

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<sup>30</sup>: *Financial Sector Preparations for the Year 2000*, Issues 1-6 (available at [www.bankofengland.co.uk](http://www.bankofengland.co.uk)).

<sup>31</sup>: See 'Financial services industry well prepared for business as usual', Financial Services Authority, 20 October 1999 ([www.fsa.gov.uk/press/1999/october/fsao107.htm](http://www.fsa.gov.uk/press/1999/october/fsao107.htm)).

Central banks have taken a number of measures to address issues raised by market participants. The Bank, for example, has widened the range of collateral that can be used in its open-market operations and for intra-day liquidity in RTGS to include around £2 trillion of euro-denominated bonds issued by other EU governments and major international organisations; that is an increase by a factor of more than six. The Financial Services Authority has added these securities to those that major UK banks can hold in order to meet their stock liquidity requirement. This is a permanent change, which should help to ease any strains on the availability of collateral in the sterling money markets in the Year 2000 period.

The Bank has also provided a temporary facility for longer term repos, in parallel with its normal daily open market operations at a two week maturity. The Bank offered £3 billion for three months initially on 13 October and has repeated the offer for maturities in the early months of 2000 each week thereafter. Providing longer-term funding has a number of benefits. First, it should make banks more willing to offer term loans into the New Year by giving them matched funding of the position, so that they are not left exposed to roll-over risk in early January. Second, it smoothes the recycling of the expected increase in the Bank's balance sheet over the Year 2000 period as a result of an increase in notes in circulation. Third, it makes it easier for the Bank's counterparties to distribute funds through the market to those institutions that need them.

Other central banks have also taken action designed to provide additional liquidity to the market or to ease possible pressures in collateral markets. The decline in the size of spikes in forward rates in late October and early November in part reflects this central bank action (see Chart 72). The US Federal Reserve, for example, has temporarily expanded the collateral eligible for discount-window purposes. It has also increased the maximum term of the repos it undertakes in its open market operations. The Bank of Canada has temporarily added asset-backed securities, commercial paper, corporate debt and assignments of parts of the loan portfolio of borrowing institutions. The ESCB already accepts a wide range of private and public sector euro collateral in its operations. Both the US Federal Reserve and the Bank of Canada have introduced special liquidity facilities enabling banks to borrow term funds against collateral between October 1999 and March 2000 at an interest rate premium. The US Federal Reserve has also sold options to its counterparties entitling them to do overnight repurchase transactions over seven day periods in December and January at 150 basis points or more over the then target Federal funds rate.

At an international level, the IMF has taken steps to address the risk that some emerging market economies may experience outflows of external portfolio investment: for example, because of

concerns about the preparedness of local institutions and/or infrastructure, or because investors seek to substitute into holdings of more liquid securities. In particular, the IMF put in place a facility, available from October 1999 to March 2000, that will extend rapid short-term financing to any countries that experience balance-of-payments difficulties arising from loss of confidence or other problems associated with potential or actual failures of computer systems<sup>32</sup>. Drawings will be expected to be repaid within six months but with the possibility of another six-month extension. The facility will be subject to a 300 basis points surcharge over standard IMF charges, increasing to 350 basis points for the six-month extension.

It is likely that sensible behaviour by market participants, backed by the commitment of central banks to supply adequate liquidity to the market and take action in case of disruption, will ensure that no significant problems occur. Nonetheless, risks remain. In particular, it may be more difficult for market participants to adjust their portfolios in thin markets if there were to be an unexpected shock. Markets may also be more vulnerable than normal to an increase in uncertainty. Central banks will be particularly vigilant over the Year 2000 period in case of such strains. For its part, the Bank of England has made contingency plans to enable it to respond rapidly, in a variety of ways as necessary. These include discussions with other central banks to ensure that any cross-border developments can also be addressed quickly.

The Bank of England will continue to act as a clearing house for reliable information about preparations for the Year 2000 in the UK financial sector, through its *Blue Book* series (Issue No. 7 will be published in early December) and through the Bank's 'Blue Room', which will operate as an information clearing house from 29 December to 7 January. The Financial Services Authority will also have a Millennium Event Office operating over the same period, which will be the first point of contact for the institutions that it regulates.

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<sup>32</sup>: 'IMF creates facility to counter Y2K strains', IMF Press Release No. 99/45, 24 September 1999, ([www.imf.org/external/np/sec/pr/1999/PR9945.htm](http://www.imf.org/external/np/sec/pr/1999/PR9945.htm)).

## V. The UK household and corporate sectors

Domestic risks to the financial sector arise if economic outturns are worse than lenders and borrowers expected at the time when financial commitments were made and priced. Vulnerability to risk may arise at an aggregate level if there are adverse surprises in the evolution of the business cycle, or at a sectoral level if financial institutions are exposed to concentrations of risk in markets which experience specific shocks. It may also arise if lending into expanding markets is premised on returns which are not sustainable in the longer term.

Output growth is now projected to be slightly stronger than anticipated earlier in the year, as explained in the November *Inflation Report*. That reflects the impact of both upward revisions to estimates of domestic demand growth and an improving economic outlook abroad. The central projection in the *Report's* 'fan' chart for GDP (based on the usual assumption that the Bank's repo rate remains constant, this time at 5.5 per cent) shows growth rising to a little under three per cent towards the end of 2001<sup>33</sup>. The balance of risks was thought to be on the downside, mainly on account of the risks to the outlook for the world economy.

Against that background, this section considers the positions of the personal and corporate sectors, including the commercial property market, and their implications for financial stability. It also presents some data on the general shape of the UK's external balance sheet.

### The household sector

Over the past six months, there has been a recovery in consumer confidence, strong household consumption spending and an increasingly buoyant housing market. At a time of favourable economic growth, low unemployment and rising house prices, the rate of credit growth to the household sector has continued to rise, reaching an annual rate of 8.6 per cent in September, the highest since monthly data were first collected in 1993.

The evidence available since the previous *Review* was published suggests that the financial health of the household sector, as a whole, has remained fairly strong, judging by its aggregate balance sheet. Both total and mortgage income gearing declined in the first half of 1999, reflecting lower interest rates (see Chart 75). Mortgage income gearing fell in the first two quarters. Measures of capital gearing have also fallen this year (see Chart 76). Net financial wealth increased by 4.9 per cent in Q1, on a quarter earlier, and by 3.7 per cent in Q2. The increases have reflected capital appreciation in assets held directly by the household sector, and in the value of their claims

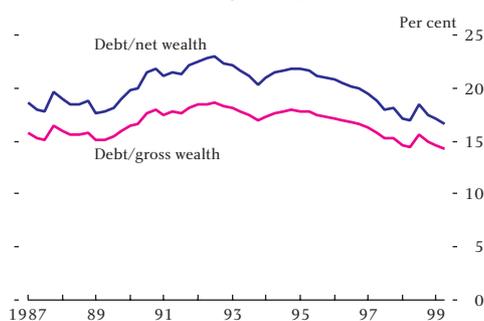
**Chart 75:**  
**Household sector income gearing<sup>(a)</sup>**



Sources: Bank of England and ONS.

(a) Gross interest payments as a proportion of personal disposable income. Data are seasonally adjusted.

**Chart 76:**  
**Household sector capital gearing<sup>(a)</sup>**



Sources: Bank of England and ONS.

(a) Total lending to the household sector as a proportion of residential and financial wealth (at market values).

<sup>33</sup>: Chart 6.1, p 53, *Inflation Report*, November 1999.

on life assurance and pension funds (see Table 19 for the most recent balance sheet of the household sector). Real household post-tax income increased strongly, by 3.1 per cent, in Q2. Despite strong quarterly consumption growth of 1.1 per cent, the saving ratio increased from 4.9 per cent to 6.7 per cent in Q2. Consumers' confidence about their financial situation has been rising (see Chart 77). Personal bankruptcies declined in Q3, although they have remained at a higher level in the 1990s than in the previous decade (see Chart 78).

Overall, in the second half of 1999, the household sector appears to be in a reasonable position to service its debt, and new borrowers, who perhaps are more likely to be credit constrained, are benefiting from low nominal interest rates. While neither the conjuncture nor the above measures of robustness – income gearing and capital gearing – raise concerns, household sector debt, both secured and unsecured, is now at historically high levels relative to income. For example, unsecured debt – on which higher interest rates are charged – has risen from around 11 per cent to about 18 per cent of income over the past five years or so. That makes it important to investigate further the sensitivity of the household sector balance sheet to changes in interest rates and asset values.

**Table 19: Aggregate balance sheet of the household sector<sup>(a)</sup>**

£ billions	1999 Q2
Total assets <sup>(b)</sup>	4558.8
<i>of which:</i>	
Housing wealth <sup>(b)</sup>	1653.3
Total financial assets	2905.5
<i>of which:</i>	
Deposits	589.1
Bonds and long term loans	52.5
Equities	595.9
Indirect wealth <sup>(c)</sup>	1575.7
Total liabilities <sup>(d)</sup>	651.5
<i>of which:</i>	
Total loans secured on dwellings	471.7
Consumer credit	108.2
Net worth	3907.3

Source: ONS.

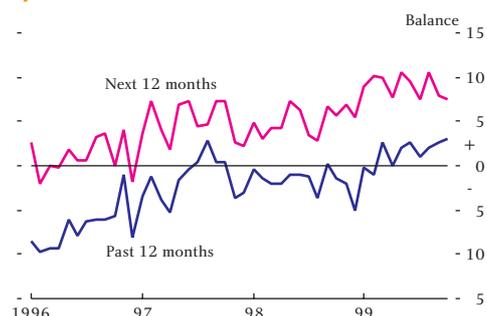
(a) Data include non-profit institutions.

(b) Uses Bank of England's estimate of housing wealth.

(c) Indirect holdings of households' net equity in life assurance and pension funds.

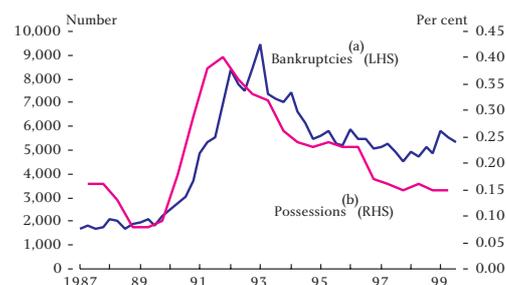
(d) Excludes other accounts receivable/payable, prepayments of insurance premia and other long-term loans.

**Chart 77: Household financial situation reported and expected over 12 months**



Source: GfK.

**Chart 78: House possessions and individual bankruptcies**

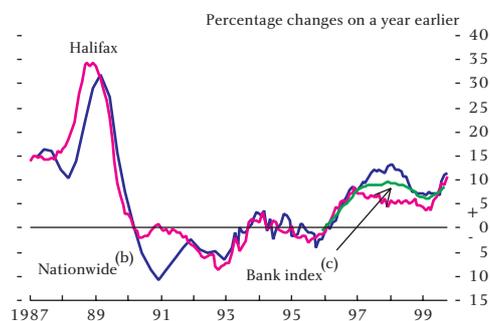


Sources: ONS and Council of Mortgage Lenders.

(a) Includes self employed and other individuals.

(b) Percentage of outstanding stock of mortgages.

**Chart 79: House price changes<sup>(a)</sup>**



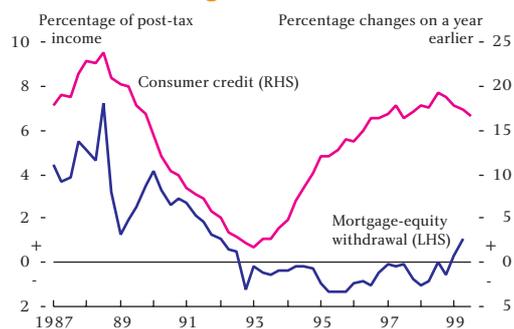
Sources: Halifax, Nationwide, and Land Registry.

(a) Data are seasonally adjusted.

(b) Nationwide data are quarterly until 1993 Q1, thereafter they are monthly.

(c) Land Registry index lagged two months because it is recorded at the stamp duty stage of transactions, whereas Halifax and Nationwide indices are recorded at the approvals stage.

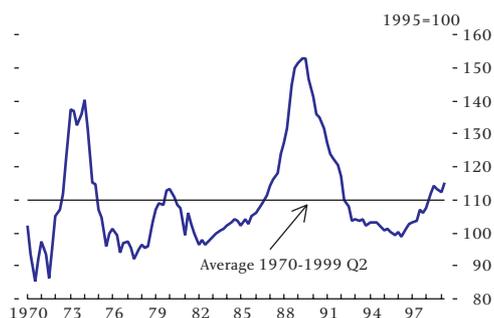
**Chart 80:**  
**Mortgage equity withdrawal<sup>(a)</sup> and  
 consumer credit<sup>(b)</sup> growth**



Sources: Bank of England and ONS.

- (a) Mortgage equity withdrawal is new borrowing secured on housing that is not invested in the housing stock.
- (b) Data are seasonally adjusted.

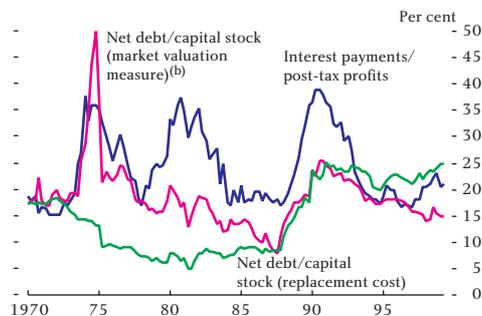
**Chart 81:**  
**House price to earnings ratio<sup>(a)</sup>**



Sources: DETR and ONS.

- (a) Wages and salaries (pre-tax) per head, and DETR house price index. Data are seasonally adjusted.

**Chart 82:**  
**PNFCs' income and capital gearing<sup>(a)</sup>**



Source: ONS.

- (a) Data are seasonally adjusted.
- (b) Private non-financial corporations' net debt divided by the sum of the net debt and market value of equity.

*The housing market*

Since May 1999, house prices have risen sharply. Their annual rate of increase rose to 10.8 per cent in October according to the Halifax, and 11.6 per cent according to the Nationwide (see Chart 79). Activity in the housing market was also higher. 'Particulars delivered' were higher in 1999 Q3 than at any time since 1990 Q2. The value of net new lending secured on dwellings has increased by almost a half this year. For the first time since 1992, there has been mortgage equity withdrawal during the year, amounting to 1.1 per cent of post-tax income in Q2 (see the Box on p6 of the November *Inflation Report*). That remains far below the late 1980s experience, when it peaked at over seven per cent. It has probably been used to finance both consumption and to restructure household debt. In contrast, the growth rate of (unsecured) consumer credit has fallen a little in the past few months, after the pick-up in March (see Chart 80), although it remains considerably higher than the growth rate of post-tax nominal income.

In the past, changes in the rate at which lenders have taken possession of properties have tended to be negatively correlated with the rate of house price increases<sup>34</sup>; fragility in the housing market tends to show up when prices fall. The possessions rate has generally been falling since the problems of the early 1990s (see Chart 78). But the increase in house prices and sharp growth in housing market activity raise the question of whether an asset-price bubble could develop in the housing market. At the moment, the ratio of house prices to earnings is only slightly above its underlying historical average (see Chart 81), which has been a useful long-run benchmark in the UK in the past. The Royal Institution of Chartered Surveyors (RICS<sup>35</sup>) has suggested that the current upswing in house prices may have restored a more normal ratio of house prices to disposable income after a period when house prices were below that benchmark. It is likely to rise further in the short run, reflecting upward pressure on house prices from a combination of high consumer confidence and strong growth in household income and employment.

There are, though, some structural changes, such as the abolition of mortgage interest tax relief and the increase in stamp duty rates, which may moderate the fast pace of house price increases temporarily. But they also imply that the historical average of the ratio of house prices to earnings may not be such a good guide to the balance of supply and demand in the market.

34: Muellbauer, J and Cameron, G (1997), 'A Regional Analysis of Mortgage Possessions: Causes, Trends and Future Prospects'; Council of Mortgage Lenders, Discussion Paper No.2.

35: RICS UK economic brief, August 1999.

Other structural changes are probably more important. There is now more mortgage lending at fixed and capped interest rates, which should help to shield the household sector from potential interest-rate shocks. And, to the extent that people now expect consumer price inflation to remain low, they are likely to have a lower demand for housing as a hedge against inflation. The medium-term risks to stability from the housing market will, therefore, depend to a significant extent on inflation expectations being anchored by monetary policy.

## The corporate sector

Gearing and liquidity ratios offer indications of the ability of companies to withstand financial shocks (see Chart 82). Income gearing in the first half of 1999 was lower than in 1998, but is likely to rise in the second half, given the recent interest rate increases. The impact will depend on the structure and maturity of corporate debt, but in the recent past, a one percentage point change in short-term interest rates, for example, has changed the income gearing ratio by three to four percentage points.

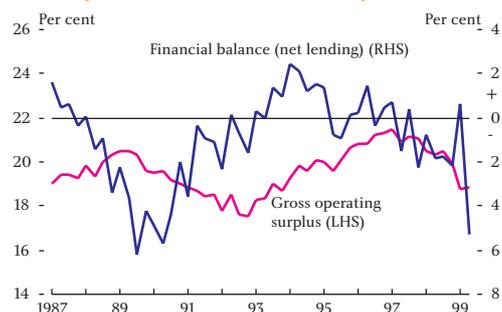
The picture for capital gearing depends on the measure of assets used. Using a replacement-cost measure, capital gearing has increased over the past two years. However, on a market-valuation measure, which ought to incorporate investors' future profits expectations, capital gearing has fallen. The former may be more relevant from a financial stability perspective, because the value of assets at replacement cost is a better (though hardly perfect) guide to the value that firms could realise if they got into financial distress.

Table 20 sets out the liabilities of the corporate sector. The stocks of both loans and non-equity securities (including commercial paper, eurobonds, medium-term notes, debentures and preference shares) grew during the first half of the year.

Dividend payments by the corporate sector were distorted in the quarters before and after 6 April 1999, on account of companies anticipating the abolition of the Advance Corporation Tax regime. Dividend payments in Q2 were some £14 billion greater than the average of the preceding two quarters, and this short-term impact is evident in the pattern of the private non-financial corporations' (PNFCs') financial surplus (see Chart 83). This phenomenon is simply a timing effect, unlikely to have significant permanent implications, but it complicates assessment of the corporate sector's underlying financial position.

Insolvency data reveal the extent of corporate distress in the lower tail of the distribution of corporate performance. Insolvency rates tend to lag changes in corporate income gearing (see Chart 84). The DTI's data show that the number of company insolvencies remained stable in 1999 Q2 compared to Q1,

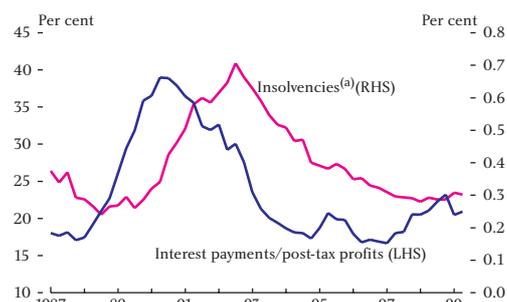
**Chart 83:**  
PNFCs' profits and financial surplus<sup>(a)</sup>



Source: ONS.

(a) Figures for private non-financial corporations sector as a percentage of GDP. Data are quarterly, and seasonally adjusted.

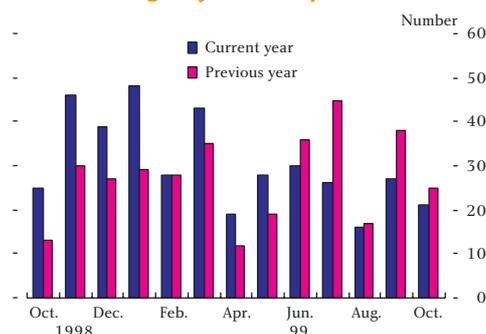
**Chart 84:**  
Company insolvencies



Sources: ONS and Bank of England.

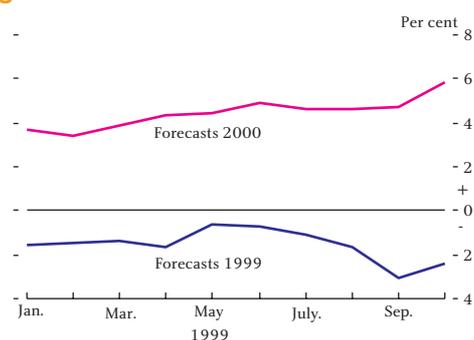
(a) As a percentage of active companies.

**Chart 85:**  
Profit warnings by UK companies



Sources: Reuters and Bank of England.

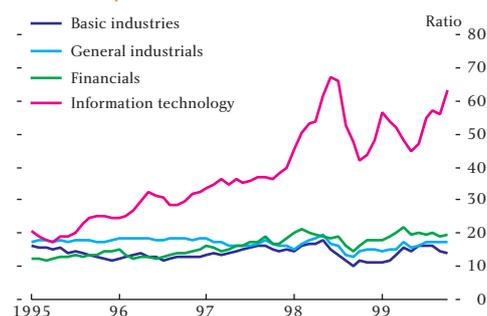
**Chart 86:**  
Changes during 1999 in forecasts of profit growth<sup>(a)</sup>



Source: Consensus Economics.

(a) Constant forecast horizon. Average percentage change on previous calendar year.

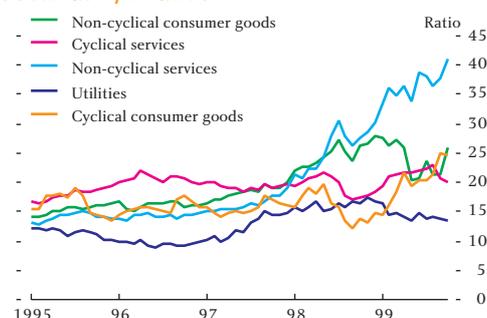
**Chart 87:**  
Sectoral P/E ratios<sup>(a)</sup>



Source: Primark Datastream.

(a) End-month data.

**Chart 88:**  
Sectoral P/E ratios<sup>(a)</sup>



Source: Primark Datastream.

(a) End-month data.

although in both quarters the level was over ten per cent up on the previous year. A broader indicator of possible corporate financial problems is provided by a count of profit warnings issued by UK companies; those for the current year have tended to be rather lower since March (see Chart 85).

**Table 20: PNFCs' financial balance sheet**

£ billions	1999 Q2
PNFCs' liabilities	
Shares (at market value)	1670
Securities other than shares	145
Loans	453
<i>of which:</i>	
£ loans by UK monetary and financial institutions and building societies	174
Foreign currency loans by	
UK monetary and financial institutions	47
Finance leasing	18
Loans by non-UK monetary and financial institutions	73
Other loans	140

Sources: Bank of England and ONS.

Business activity in both services and manufacturing has risen steadily since the June *Review*, according to recent survey evidence from the Chartered Institute of Purchasing and Supply and the CBI. Business optimism and export orders have increased too, and stock-market valuations remain high. According to the less timely ONS data, however, profits do not appear to be as buoyant. The gross operating surplus of PNFCs increased by 0.7 per cent in 1999 Q2 but remained 4.3 per cent lower than in the corresponding quarter of 1998. During 1999, forecasts of profit growth in 1999 have declined, while those for 2000 have increased (see Chart 86).

Changes in sectoral P/E ratios give some indication of how stock market participants assess changes in the prospects for different industries; that may also give some indication of changes in likely credit quality in these industries. At the moment, they suggest that the market is distinguishing between services and cyclical consumer goods (for example, motor vehicles and components) on the one hand, and non-cyclical consumer goods (for example, foodstuffs and beverages) and utilities on the other (see Charts 87 and 88). Utility sector valuations have declined since 1998, which may be attributable in part to perceptions that the regulatory environment is now more stringent. There is no direct evidence, however, of deteriorating financial health in this sector. The IT sector is in a category of its own, reflecting expectations of rapid earnings growth from a low base.

More generally, surveys and ONS data suggest that the services sector has continued to perform more strongly than the manufacturing sector. Reports from the Bank's regional Agents also suggest that export demand is recovering, indicating improved prospects for some manufacturing industries facing international competition. Demand in the construction sector has been underpinned by the buoyancy of both the commercial and residential property markets. The agriculture sector remains depressed, faced with regulatory challenges and falling food prices.

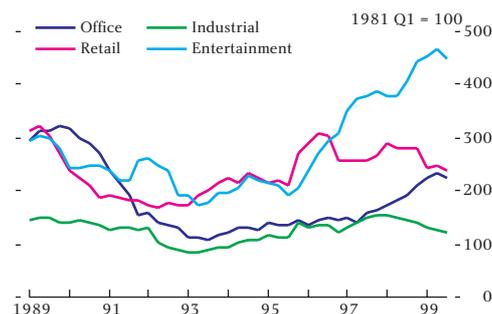
The picture emerging since the June *Review* has been one of a recovery of sales volumes against a background of faster GDP growth, increased export orders, and the spread of optimism across sectors. But ONS data on profitability have yet to reflect the pick-up. Income and capital gearing, while currently not at worrying levels, may be increasing.

### Commercial property

Lending to the commercial property sector has been a source of difficulties for banks in past recessions. The CIPS construction survey for October suggests that a majority of companies are optimistic about future expansion. Construction activity remains reasonably stable, with the exception of rapid expansion of new orders for property for the entertainment and leisure sector (see Chart 89). Since the previous *Review*, central London office vacancy rates have remained broadly stable at low levels (see Chart 90). In 1999 Q3, the average London office vacancy rate was 4.5 per cent, according to provisional data collected by Richard Ellis St Quintin. Industry comment (some of it from the Property Forum – see Box 6) suggests a similar picture in other property sectors as well as in other regions, especially those close to transport corridors. In general, occupier demand remains fairly strong. Responding to suggestions that speculative development might increase, several banks have said that they are being cautious, particularly if a prospective borrower does not have a track record or a strong balance sheet.

Increasing demand and relatively inelastic supply (in the short run) have contributed to pushing up commercial property rents and purchase prices, with a rise in the annual rate of increase of the total returns index (see Chart 91) to 11.7 per cent in September from 10.8 per cent in April (the latest data available for the June *Review*). This rise was due to higher rates of increase of both rental-value and capital-value indices. Low nominal interest rates may have had some effect, too, by reducing the 'front-end loading' of real interest costs for new borrowers which might otherwise be credit-constrained. The consensus of investors' and analysts' forecasts for annual increases in the total returns index has risen. In July 1999, the Investment Property Forum/Estates Gazette Investor Intentions Survey forecast that

**Chart 89:**  
**Construction new orders**



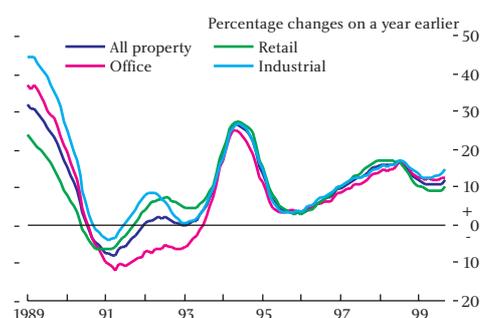
Source: DETR, adapted by GVA Grimley.

**Chart 90:**  
**Office vacancy rates (London)**



Source: Richard Ellis St. Quintin.

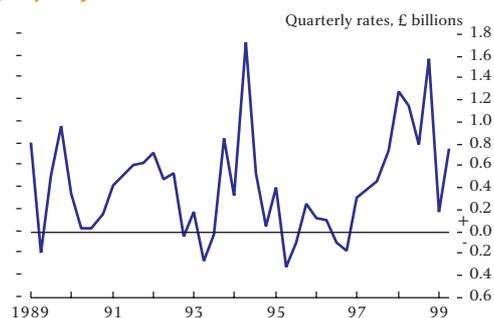
**Chart 91:**  
**Total returns index<sup>(a)</sup>**



Source: Investment Property Databank.

(a) Investment Property Databank definition of total returns is the sum of capital growth and income return.

**Chart 92:**  
**Net investment by UK institutions in UK property<sup>(a)(b)</sup>**

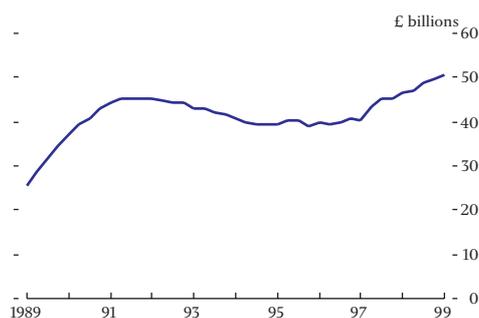


Source: ONS.

(a) Data are seasonally adjusted.

(b) Total investment includes insurance companies, pension funds and property unit trusts.

**Chart 93:**  
**Total lending to the commercial property sector<sup>(a)(b)</sup>**

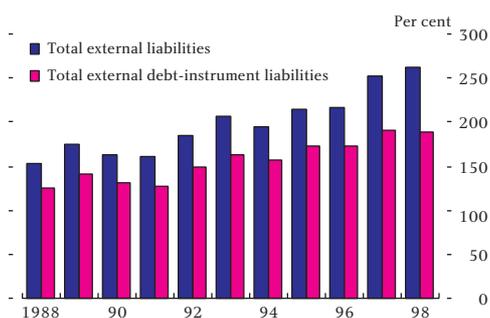


Sources: Bank of England, German Bankers' Association and ONS.

(a) Data are stocks and seasonally adjusted.

(b) Includes lending by banks that report to the Bank of England, building societies, insurance companies and German banks' representative offices operating in the UK and reporting to the German Bankers' Association. The latter have only been included from 1991 Q4 to 1998 Q4.

**Chart 94:**  
**UK external liabilities as a percentage of annual GDP**



Source: ONS.

the total returns index would increase by 14.8 per cent in 1999, compared with a forecast of 8.5 per cent in February.

Institutional investment in the sector rose to £0.8 billion in 1999 Q2, after a low first-quarter figure, according to the ONS (see Chart 92). Some investors have apparently not yet invested fully the funds that they have earmarked for property investment in 1999, and so some observers expect a more active second half, consistent with forecasts of property returns.

Lending to commercial property was estimated to have stood at £51.4 billion (see Chart 93) in 1999 Q3. Bank lending to commercial property, which accounts for approximately 80 per cent of total borrowing by the sector, is discussed further in Section VI.

## External balance sheets

In assessing the capacity of the household and corporate sectors to absorb shocks, the analysis above has placed emphasis on the structure of sectoral balance sheets, picking out a few summary statistics, such as capital gearing, which may be useful indicators. That mirrors the emphasis in Section I on the importance to financial stability analysis of monitoring country balance sheets, particularly foreign currency or external maturity mismatches (see Box 4 in Section I). As well as looking at emerging market economies' own balance sheets, some preliminary findings for the UK are reported here<sup>36</sup>.

The external assets and liabilities of the UK economy are very large, totalling some £2.2 trillion at end-1998, around 260 per cent of annual GDP (see Chart 94). Gross debt-instrument liabilities (the nominal value and maturity of which are fixed) amount to nearly 200 per cent of GDP. That is relatively large amongst industrial countries (see Chart 95), and reflects the scale of international banking activity in London relative to the size of the economy as a whole (see Section VI for more on the banking sector).

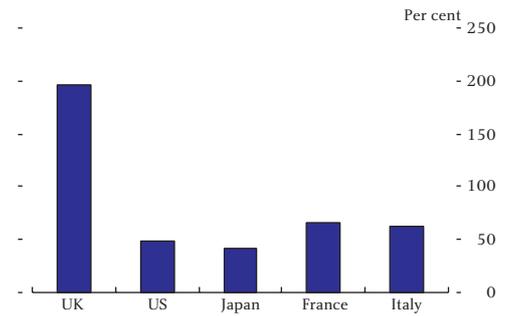
The net position is, of course, a lot smaller. At the end of 1998, external liabilities exceeded assets by around £70 billion (which is – as the difference between two very large numbers – within the range of measurement error of these data; see Chart 96). The net liability position for debt instruments was a little larger at about £110 billion. Net liabilities via debt instruments with maturities under one year were also around £110 billion. Again, the UK's position is large relative to some other industrial countries (see Chart 97). These data cannot, however, provide a robust picture of liquidity risk, as UK residents hold other

<sup>36</sup> The Bank has for many years published in its *Quarterly Bulletin* an annual article reporting some basic data on UK external liabilities and claims; the latest appeared in the November 1999 issue.

external assets, such as equities, which could if necessary be borrowed against or sold, but perhaps at 'fire sale' prices.

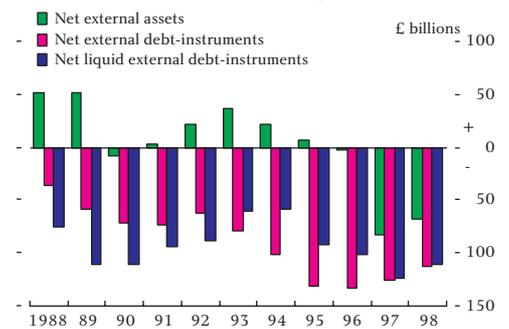
The UK non-financial corporate sector is estimated to have gross external assets of approximately £400 billion. That includes some £236 billion of direct investment abroad, compared with £155 billion of direct investment in the UK corporate sector by the rest of the world.

**Chart 95:**  
Gross external debt liabilities as a percentage of annual GDP (end 1998)



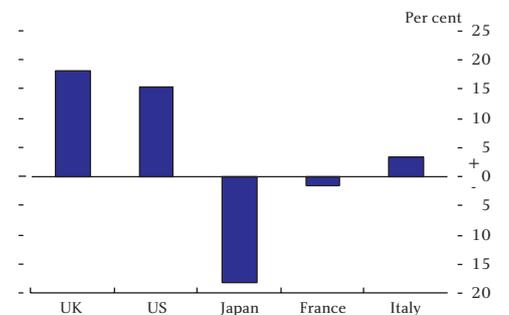
Source: Fitch IBCA.

**Chart 96:**  
UK external balance sheet position



Source: ONS.

**Chart 97:**  
Average net external debt liabilities as a percentage of annual GDP (1994 - 1998)



Source: Fitch IBCA.

## Box 6: The Property Forum

Anecdotal evidence can be an important source of information supplementing statistical data and formal surveys. One such source for the Bank is the Property Forum, which was established in mid-1993. It is a quarterly discussion among a range of participants in the commercial property market, including landlords, occupiers, investors, lenders and researchers. As well as the Bank of England, official sector observers attend from the Financial Services Authority, the Department of the Environment, Transport and the Regions, and HM Treasury. By improving general knowledge of the market, it is hoped that potential difficulties may be spotted earlier than sometimes in the past.

The most recent discussion was held on 28 October 1999. Participants noted that occupier demand in Central London remained strong, reflecting improving macroeconomic prospects and business confidence. Supply was described as limited: there was scepticism about recent reports suggesting that there was a significant increase in speculative development underway. Participants reported that, outside London and the south-east, the relative price of property let to tenants of good credit standing with long leases was rising, while that of other property, including all short leases, was falling. Institutional investment was increasing: institutions were said to be looking for the higher yields offered by property compared with other asset classes, and for diversification of their portfolios.

Demand for bank lending for investment property was reported to be strong. There was little perceived pressure on loan margins, and banks established in the market were generally described as conservative in their lending criteria. Some participants reported, however, that new lenders were bidding aggressively, in terms of loan-to-value ratios, covenants, required amortisation schedules and exit values, in order to gain market share. Bank finance for speculative development remained limited, as no new lenders were thought to have entered this market, and current lenders were thought to be up to loan book limits for this sector.

A number of other areas of potential concern were identified. These included the impact of the millennium in restraining investment and lending activity in the last quarter of 1999, displacing transactions to what was expected to be an uncharacteristically busy first quarter of 2000. Further ahead, if there were a significant correction to world equity prices, it could affect the property market via changing collateral values, weakening business confidence and changing the relative attractiveness of different asset classes. Finally, it was thought that, over the long run, e-commerce might increase the demand for warehousing at the expense of retail property, but with an uncertain aggregate effect.

## VI. The UK financial sector

Over the six months since the previous *Review*, both the international and domestic environments within which UK financial institutions operate have proved relatively stable, and this has been reflected in the performance of the sector. This section reviews recent developments and associated risks, focusing on trends in UK banking and issues relating to life insurance companies and pension funds.

### UK banks

The larger banks have continued to return strong growth in profits and remain well capitalised. The immediate position regarding domestic loan quality appears satisfactory on the whole. As shown in Chart 98, optimism in the banking sector has improved sharply since last year. While it was slightly lower in Q3 than when the previous *Review* was produced, it remains positive and compares well with the position of the financial-services sector in general.

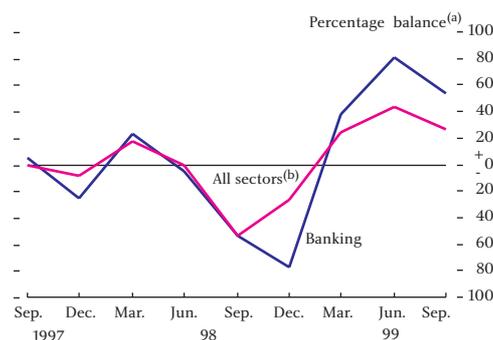
As always, there are risks to this position. In the short term, the reduction of the turbulence in international financial markets over the past year may not be sustained. On the domestic front, the recent buoyancy of the domestic property market (both residential and commercial) and strong growth in unsecured personal lending (within a much more competitive market) raise questions about loan quality. These are discussed below, but as yet there is little evidence that the mistakes made during the boom of the late 1980s are being repeated. Moreover, judging from published data, the major banks should be in a strong position to absorb any unfavourable shocks, given recent profit performance and capitalisation.

### International risks

Earlier sections of this assessment considered the risks to regional and global financial stability originating outside the UK. For UK banks, one potential concern is their exposures to emerging-market economy debt problems. How significant are these exposures and how has the position changed over recent months?

The exposure of UK-owned banks<sup>37</sup> to emerging-market economies stood at US\$62.6 billion in 1999 Q2<sup>38</sup>. That is around 15 per cent of UK-owned banks' total external exposures and around 32 per cent of their capital. The distribution of UK banks' exposures to the emerging markets is, on the whole, somewhat different from that of BIS-area banks as a group. For example, while UK banks' exposure to China is greater than the

**Chart 98:**  
Business optimism, financial services



Source: CBI/PricewaterhouseCoopers, Financial Services Survey.

**(a)** The difference between the percentage of respondents replying 'more', 'above normal', or 'up' minus the percentage replying 'less', 'below normal', or 'down', about the overall business situation in the sector.

**(b)** Banking, Finance Houses, Building Societies, General and Life Insurance, Securities Trading/Stockbroking Insurance Brokers, Fund Management, Commodity Brokers, Venture Capital and other financial institutions.

<sup>37</sup>: UK-incorporated authorised institutions.

<sup>38</sup>: Figures are on a consolidated basis and therefore include exposures of UK-owned banks' international operations.

**Table 21: Consolidated bank-lending figures<sup>(a)</sup>**

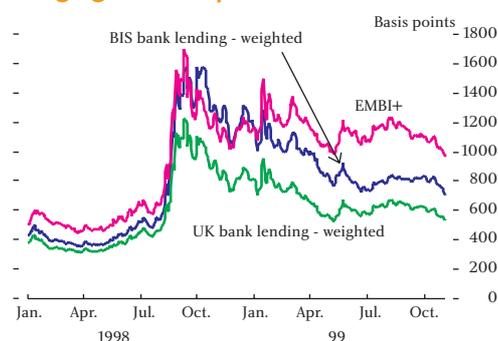
	UK, end-June 99		All BIS reporting banks, end-June 99	
	US\$ billions	Percentage of emerging markets	US\$ billions	Percentage of emerging markets
All emerging economies	62.6	100	851.8	100
China	5.8	9.3	51.8	6.1
Hong Kong <sup>(b)</sup>	26.0	n.a.	120.9	n.a.
Malaysia	2.1	3.3	18.6	2.2
Thailand	1.5	2.4	34.7	4.1
Indonesia	3.4	5.5	43.8	5.1
Korea	4.7	7.5	63.5	7.5
Brazil	4.2	6.7	62.3	7.3
Argentina	6.2	9.9	66.7	7.8
Russia	1.0	1.5	52.0	6.1
Turkey	1.8	2.8	34.1	4.0

Source: BIS consolidated international banking statistics June 1999.

(a) Contractual obligations of banks owned in the UK and BIS.

(b) Hong Kong is an offshore centre, and is excluded from the emerging economy classification used here.

**Chart 99: Emerging-market spreads**



Sources: J P Morgan, BIS and Bank calculations.

average, their exposure to Russia is lower: around 1.5 per cent of their total emerging-market exposure, compared with 6.1 per cent for all BIS-area banks (see Table 21).

This can be illustrated by a summary statistic, developed by the Bank, of credit spreads on emerging market-debt instruments, weighted by the exposures of UK banks to various emerging-market countries<sup>39</sup>. As Chart 99 shows, the UK-weighted measure of credit spreads has been consistently lower than J P Morgan's EMBI+ measure (see Section I, Chart 3) and also lower than measures which weight countries by the exposures of BIS-reporting banks in aggregate (see Section II, Chart 21). The UK-weighted proxy suggests that the credit risk facing UK banks from the emerging markets may be somewhat less than suggested by the alternative indices (although the difference between UK and BIS bank-lending-weighted measures has narrowed over the past six months).

Data for the first half of this year confirm that UK banks' exposures to emerging-market economies have fallen, reflecting a declining share of lending to Asian countries (see Charts 100 and 101). Provisions against loans to these countries have remained low, except at those banks, such as HSBC and Standard Chartered, most affected by the crises in Asia in the past

<sup>39</sup>: See the article by Alastair Cunningham, 'Emerging Economy Spread Indices and Financial Stability' in this issue of the *Review*.

two years. The impact on these banks' balance sheets will take time to unwind.

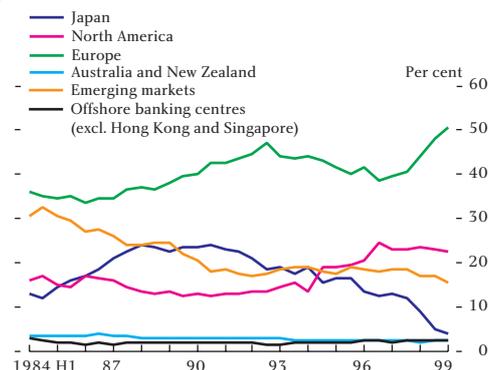
Emerging-market economies are not the only source of risk to the UK financial sector. In its November *Inflation Report*, the Monetary Policy Committee concluded that, while the central expectation of the outlook for world economic activity had improved slightly since its August *Report*, the balance of risks was on the downside. In particular, as discussed in Sections II and III earlier, a sharp correction to current account balances or to the US equity market cannot be ruled out. If either were to occur, they might be accompanied by greater volatility in securities markets in general. That would certainly affect UK banks, although the *direct* effects of a stock-market fall would probably be modest, since the major banks' equity holdings are relatively small<sup>40</sup>. A general increase in market volatility could, however, increase the risk associated with banks' proprietary trading operations, given both their on and off-balance-sheet exposures.

As far as aggregate derivatives positions are concerned, recently introduced Bank of England data<sup>41</sup> indicate that the Russian debt default/LTCM event had little impact on the major British banking groups (MBBG)<sup>42</sup>. Overall, Chart 102 suggests that the MBBG's off-balance-sheet leverage, as proxied by the notional relative to marked-to-market value of their aggregate derivative positions, has been broadly stable since the beginning of 1998. In contrast, on this measure, the off-balance-sheet leverage of the other EEA, US and Swiss banks in the UK banking sector picked-up in the final quarter of last year, while 'other' banks' leverage fell. These movements generally reflected changes in the notional value of derivatives positions (see Box 5, Section III for an explanation of these leverage measures).

Without knowledge of individual firms' trading strategies, it is difficult to assess the implications of such leverage movements for risk exposure. The increase in notional positions could be consistent with reports that firms attempted to hedge their positions in the period of extreme market turbulence last autumn. But a decline in notional positions could also be consistent with a desire to reduce their derivative exposures.

In practice, the major UK banks benefited over the past six months from improved trading conditions. Dealing income at Barclays, HSBC and NatWest was on average around 30 per cent

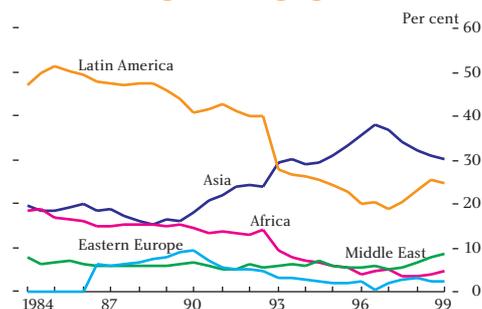
**Chart 100:**  
UK banks' cross-border lending<sup>(a)</sup> as a percentage of total cross-border lending



Source: Bank of England.

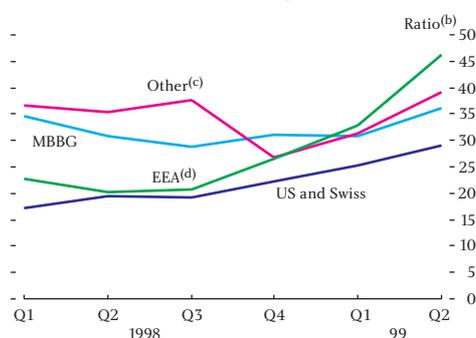
(a) Not risk-adjusted.

**Chart 101:**  
UK banks' cross-border lending to emerging-market regions (as a percentage of total lending to emerging markets)



Source: Bank of England.

**Chart 102:**  
Off-balance-sheet leverage<sup>(a)</sup>



Source: Bank of England.

(a) Major banks in the London derivatives markets.

(b) Gross notional values of derivative contracts over mark-to-market value of those contracts.

(c) Other = Japan, Canada and Australia.

(d) EEA = European Economic Area excluding UK.

<sup>40</sup>: Published data suggest equity holdings at Lloyds TSB, HSBC and NatWest average less than one per cent.

<sup>41</sup>: Chart 102 utilises data on aggregate derivative positions introduced as part of the new system of European national accounts (ESA 95).

<sup>42</sup>: The 'MBBG' are the British Bankers Association's major British banking groups and includes both the banks more dependent on mortgage business (Abbey National, Alliance and Leicester, Halifax, Northern Rock and Woolwich) and the large commercial banks (Barclays, Lloyds TSB, HSBC/Midland, NatWest, Bank of Scotland and Royal Bank of Scotland).

higher in the first half of the year than in the same period in 1998. But it still represented a relatively small share (nine per cent) of these banks' total income.

Even if the direct impact on UK banks of any future increase in market volatility were modest, they could be affected via exposures to other market participants such as securities dealers. Some such institutions can be highly leveraged and, as such, may be particularly vulnerable to sharp falls in the value of their assets. On the basis of ONS data, the total on-balance-sheet assets of UK-registered securities dealers<sup>43</sup> appear to have fallen sharply in the second half of 1998. In the four quarters to 1998 Q4, their total assets fell by around 23 per cent. That could reflect balance-sheet adjustment ahead of the introduction of the euro, but securities dealers might also have wanted to reduce the degree of leverage in their balance sheets following the financial-market turbulence last autumn. So far this year, total assets have recovered a little but were still nearly ten per cent lower in 1999 Q2, the latest period for which data are available, than a year earlier.

A sharp fall in global equity prices could also affect financial institutions via the impact on the wider economy, operating through reduced wealth and deteriorating balance sheets<sup>44</sup>. It is difficult to estimate the precise effect of any given change in equity prices, but, as discussed below, on the basis of published information the major UK banks currently appear well positioned to absorb such shocks.

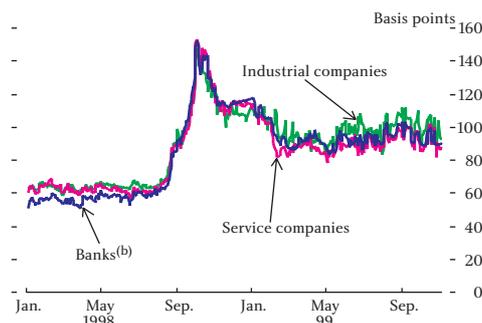
The spread of the yield on bank bonds over the yield on otherwise similar gilts can in principle provide some information on market perceptions of credit risk (although there will also be a liquidity premium). Average bond spreads are illustrated in Chart 103 for some of the major banks, together with those for firms from other industrial sectors. In practice, bank bond spreads have moved broadly in line with those for other industries in recent months; spreads remain at levels similar to those seen at the time of the *June Review*, and are still higher than prior to last autumn's market turbulence.

## The external balance sheet of the UK banking sector

Another aspect of the resilience of the UK banking sector is the state of its external balance sheet, which the Bank has analysed as part of the exercise described in Section V. Because banks may

**Chart 103:**

### UK corporate bond spreads by industry<sup>(a)</sup>



Source: Reuters.

**(a)** Average duration 5.3 years, spread over duration-matched gilts. Representative bonds selected to be of similar duration and maturity.

**(b)** Lloyds TSB, Barclays, NatWest and Royal Bank of Scotland.

**43:** The data refer to a sample of those institutions registered as securities dealers with the FSA. The data are collected quarterly as part of the ONS Institutional Investment Survey, although at present they are unpublished.

**44:** For a general discussion of the transmission mechanisms involved, see Bernanke, B and Gertler, M, 'Monetary Policy and Asset Price Volatility' presented at the Federal Reserve Bank of Kansas City Conference on 'New Challenges for Monetary Policy', Jackson Hole, Wyoming, 26-29 August 1999.

have assets denominated in one currency and liabilities in another, they are exposed to sharp movements in the exchange rate. Banks can also face liquidity risk if their liabilities have a shorter maturity than their assets, whether in sterling or foreign currency.

Generally, banks in the UK do not take large open positions in foreign currency. In aggregate, the banking sector's on-balance-sheet foreign-currency assets have usually roughly matched foreign-currency liabilities over the past decade; at end-1998, the UK banking sector had net total foreign-currency assets of £23 billion.

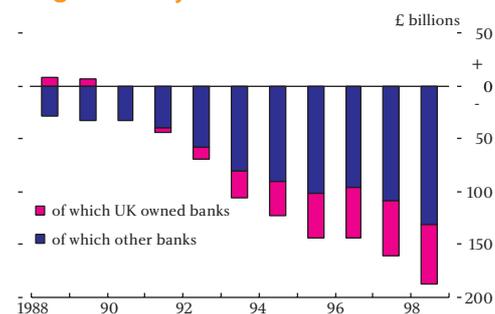
A key issue from a financial-stability perspective concerns the extent of maturity transformation in foreign currency. Over the past ten years, considering maturities of less than one year, the UK banking sector's foreign-currency liabilities have consistently exceeded foreign-currency assets, and by increasing amounts (see Chart 104). Banks in the UK are using deposits from non-residents with terms of less than a year to make longer-term loans and investments. Much of this maturity transformation is carried out by international banks located in the UK, reflecting the City's role as a major international banking centre, although UK-owned banks also run a mismatch. An estimate of this deficit (based on an approximate measure of assets and liabilities with residual maturity of less than one year) stood at over £150 billion at end-1998, of which UK-owned banks accounted for a third. (These figures only represent the banks' business which is booked in the UK, and are not on a consolidated global-entity basis.)

At one level, these data underline the vital importance of prudent liquidity management by banks, in foreign currencies as well as in sterling. But data on on-balance-sheet maturity mismatches in UK operations do not take account of offsetting positions in overseas branches and subsidiaries; or of off-balance-sheet hedging strategies; or in the case of non-UK banks, of the capacity of head offices to provide foreign-currency liquidity. Nevertheless, Chart 104 suggests that examination of the sector in aggregate can be illuminating.

## Domestic risks

Total provisions at the more diversified commercial banks<sup>45</sup> rose only slightly in 1999 H1 (year-on-year) as a percentage of profits, and were well down on the second half of 1998. (As Chart 105 shows, that was not the case at the mortgage banks<sup>46</sup>, although the increase seen since the first half of 1998 was from a much lower base.) Similarly, according to the

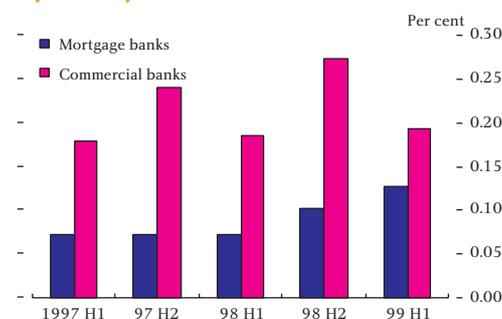
**Chart 104:**  
UK banking sector – net liquid foreign-currency assets<sup>(a)</sup>



Source: Bank of England.

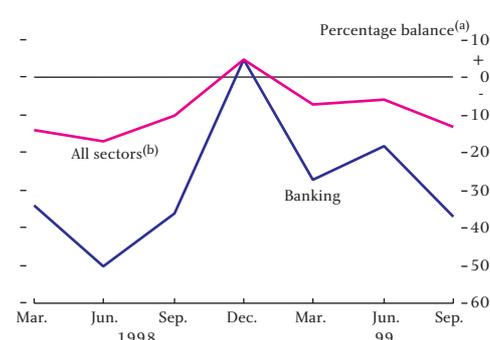
(a) Assets and liabilities of less than one year's maturity.

**Chart 105:**  
Average bad-debt charges as a percentage of pre-tax profits



Source: Published accounts.

**Chart 106:**  
Changes in the value of non-performing loans



Source: CBI/PricewaterhouseCoopers, Financial Services Survey.

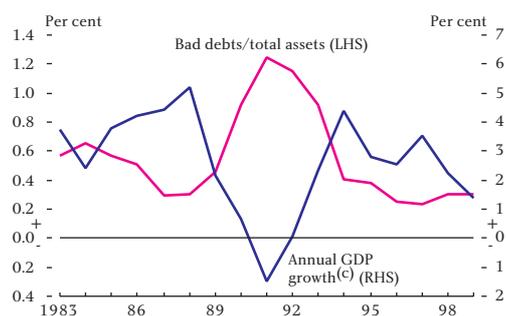
(a) Number of respondents who recorded an increase in the value of non-performing loans minus those recording a reduction or no change in the value of non-performing loans.

(b) Banking, Finance Houses, Building Societies, General and Life Insurance, Securities Trading/Stockbroking Insurance Brokers, Fund Management, Commodity Brokers, Venture Capital and other financial institutions.

45: See footnote 42.

46: See footnote 42.

**Chart 107:**  
**Bad-debt charges as a percentage of total assets<sup>(a)(b)</sup>**



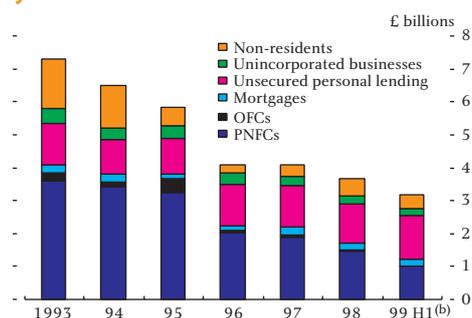
Sources: BBA and published accounts.

(a) Bank of Scotland, Royal Bank of Scotland, Midland, Lloyds TSB, Barclays and NatWest. Adjusted for special country debt provisions in 1987 and 1989.

(b) Data are yearly up to 1998, thereafter half-yearly.

(c) 1999 H1 growth figures are as percentage changes on a year earlier.

**Chart 108:**  
**Write-offs and other revaluation of loans by banks<sup>(a)</sup>**

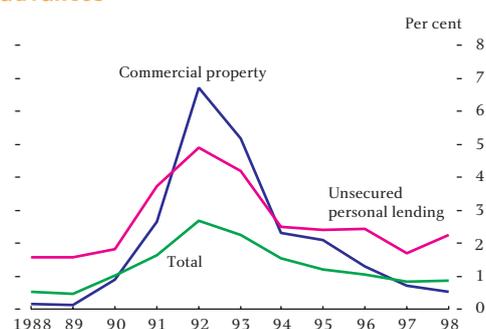


Source: Bank of England.

(a) Sector write-offs as a percentage of total write-offs.

(b) Annualised.

**Chart 109:**  
**Write-offs as a percentage of loans and advances<sup>(a)</sup>**



Source: Published accounts.

(a) Published data available only for Barclays and NatWest.

CBI/PricewaterhouseCoopers survey of the sector, the value of non-performing loans fell substantially in the three months to September and a more marked fall is expected in the three months ahead (see Chart 106).

Provisions have in the past been highly cyclical, and to some extent the favourable picture simply reflects the mildness of last year's downturn in the economy (see Chart 107). Improvements in credit-risk management, including the introduction of quantitative modelling techniques to assess underlying risk, may also have played a part, although such techniques have their limitations. In particular, they may draw on data from too short a period to be robust in the face of macroeconomic shocks. And changes in the way in which risk is managed – and in the monetary policy regime – mean that models based on past behaviour may no longer be appropriate.

Nevertheless, although industry-specific problems remain, there appears to be little evidence of a general deterioration in the credit quality of banks' corporate portfolios, and the worst of the problems resulting from last year's slowdown may now have passed (see the assessment of the corporate sector in Section V). Write-offs, which have been declining over recent years (see Chart 108), seem likely to remain at low levels given a central expectation of robust output growth (see the November *Report*).

But the past year has seen continued strong growth in banks' consumer-credit lending (up 15.9 per cent in the year to 1999 Q3) and a sharp increase in the growth of lending to the commercial-property sector (12.0 per cent in the year to 1999 Q3). Both of these sectors were associated with high levels of write-offs in the recession of the early 1990s (as illustrated in Chart 109). For the MBBG, growth in commercial-property lending was somewhat higher at 14 per cent, with unsecured lending increasing by 13 per cent. Growth in MBBG mortgage lending, on the other hand, grew by less than five per cent, reflecting, in part, loss of market share. However, mortgages continue to dominate the largest banks' stock of loans outstanding to UK residents (see Chart 110).

Charts 111 and 112 illustrate recent trends in commercial-property lending, which remains buoyant despite some recent evidence of a slowdown (see Section V). Within the non-MBBG banks, UK-operating branches and subsidiaries of German banks have been particularly active, with loans outstanding increasing by an estimated 55 per cent in the year to 1999 Q2. These banks accounted for 12.3 per cent of the UK banking sector's sterling lending outstanding to the sector, compared with nine per cent a year earlier.

At a more disaggregated level, there are signs that lending to commercial property is becoming more concentrated. The largest

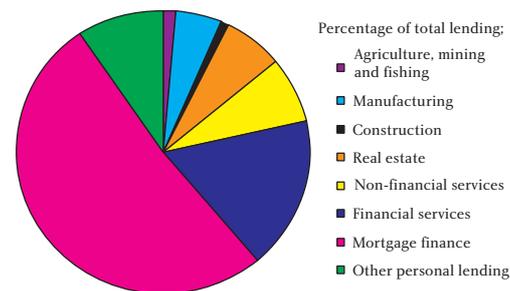
ten per cent of banks in the market (by property loans outstanding) accounted for 73 per cent of all sterling lending to commercial-property companies by 1999 Q2, compared with 64 per cent at the beginning of 1996 (see Chart 113). The increase in concentration reflects, in part, the withdrawal from the market of some smaller banks, coupled with the emergence of new large-scale lenders, for example, several German banks. It also reflects strong lending growth at some of the more established large-scale lenders. The traditional 'big six' UK clearing banks as a group<sup>47</sup>, for example, had a greater proportion of their loan books allocated to the sector in 1999 Q2 than in 1996, reflecting strong growth in lending over the past year.

But that need not in itself automatically give cause for concern. Annual growth in lending to the property sector remains modest compared with its peak of around 55 per cent in the late 1980s, although that could hardly be a benchmark of prudence. UK operating banks' exposure to this market as a proportion of total lending to UK residents remained significantly lower (5.4 per cent) at the end of 1999 Q2 than at the peak of over nine per cent in the early 1990s. Loan-to-value (LTV) ratios seem to have increased over the course of this year. A survey by De Montfort University, which is confirmed by the Bank's contacts, indicates that LTVs for investment property<sup>48</sup> average between 80 and 85 per cent and are often higher than 90 per cent. However, it is possible that this may reflect a move towards cash-flow-based lending, in which LTVs are not the primary criterion, making interpretation less straightforward than otherwise.

The growth rate of consumer credit remains near its post-recession peak, as pointed out in Section V. Growth in credit-card lending has been particularly strong (see Chart 114) and now accounts for almost 23 per cent of the stock of consumer loans. Data from the British Bankers' Association show that the number of cards in circulation increased by 7.6 per cent in the year to June (compared with almost ten per cent over the previous twelve-month period). Average balances rose by over 14 per cent (a similar rate of increase to the previous twelve months), and the percentage of balances bearing interest has been rising as customers have made greater use of extended credit facilities.

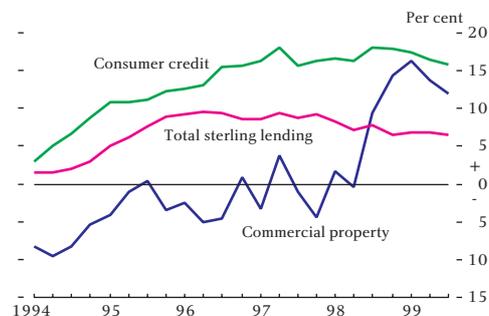
Notwithstanding a background of increased competition, spreads on unsecured loans remain well above those on secured lending (as to some extent they should be, given higher expected losses). Banks and building societies have tried to expand their lending in this area both to diversify income and support margins.

**Chart 110:**  
MBBG banks' lending to UK residents (in all currencies) 1999 Q3



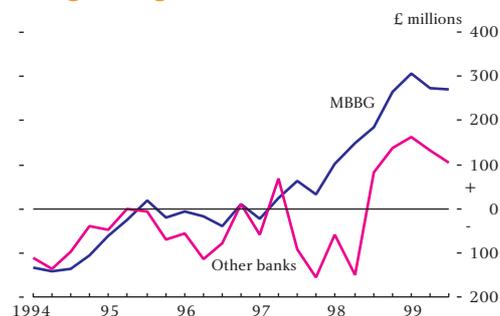
Source: Bank of England.

**Chart 111:**  
Banks' sterling lending to UK residents, four-quarter growth rates



Source: Bank of England.

**Chart 112:**  
Flows of sterling lending to the UK commercial-property sector, 12-month moving averages

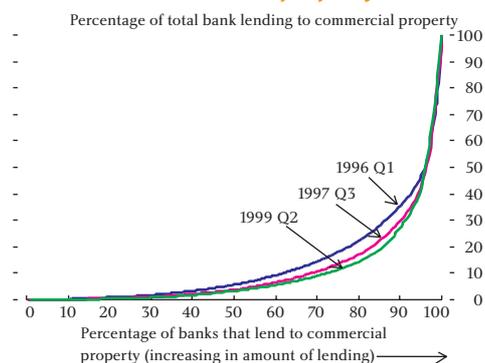


Sources: BBA and Bank of England.

<sup>47</sup>: Bank of Scotland, Barclays, Lloyds TSB, Midland, NatWest and Royal Bank of Scotland.

<sup>48</sup>: Property already occupied by tenants.

**Chart 113:**  
**Distribution of bank lending to the UK-resident commercial-property sector<sup>(a)</sup>**



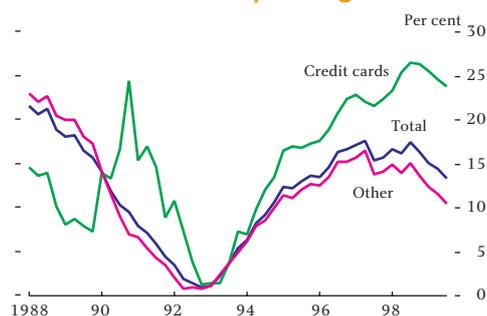
Source: Bank of England.

(a) Includes those banks with a stock of outstanding commercial-property lending of over £5 million in at least one quarter from 1996 Q1 to 1999 Q2.

Results for the first half of 1999 suggest that this effort has led to increased provisions, particularly at the mortgage banks, where provisions totalled £274 million compared with £157 million in 1998 H1. This increase appears to be largely driven by higher lending volumes, but there is also anecdotal evidence of some deterioration in the quality of some of the major banks' portfolios (and increased delinquencies). That in itself need not be a concern, however, provided increased exposure to credit risk is reflected in loan pricing.

As shown in Chart 115, credit-card losses have gradually been rising as a proportion of lending since 1995. Moreover, margins have come under pressure with the entry of new competitors to the market. However, this is one of the areas in which the credit-risk management techniques used by most lenders may have become more sophisticated over recent years. And while new entrants are operating on narrower margins, they may also be 'cherry-picking' the best quality customers. If so, although consumer credit has been growing strongly, it is also possible that loan pricing more accurately reflects credit risk in what has become a more competitive market.

**Chart 114:**  
**Consumer credit four-quarter growth rates**



Source: Bank of England.

Finally, turning to banks' mortgage lending, the near-term risks appear manageable, given the relatively favourable state of the household sector's balance sheet and a central expectation of near trend output growth and low unemployment, as noted in Section V. Long-term arrears have declined sharply since the 1992-1993 recessionary peak (see Chart 116), and the rate at which lenders have taken possession of properties has remained low.

**Chart 115:**  
**VISA UK credit cards: annualised net credit losses relative to amount outstanding<sup>(a)</sup>**



Source: VISA.

(a) From 1998 Q4, data are affected by a change in the number of days before which banks are able to recover money.

It is possible that, in an environment of generally low inflation, the risk of a fall in nominal house prices at some point in the economic cycle might be greater than in the higher inflation 1970s and 1980s (even if successful control of inflation moderates domestic asset-market volatility, reducing fluctuations in real house prices). If so, confidence that the collateral value of property is sufficient to meet obligations fixed in nominal terms may be reduced. But LTVs for existing homeowners have so far remained relatively stable during the present housing market upturn (at about 65 per cent) and have fallen from a peak of over 90 per cent in 1997 to 80 per cent in the second quarter of this year for first time buyers<sup>49</sup>. That provides some cushion for lenders should recent price rises be reversed at some stage. In addition, bankers suggest that the importance of LTVs as a risk-management tool has significantly diminished since the early 1990s recession, with the main lenders adopting risk-management techniques focused more directly on borrowers'

<sup>49</sup>: Council of Mortgage Lenders.

ability to service debt, rather than relying on the protection provided by underlying collateral.

Of course, it needs to be stressed again that the relatively favourable picture presented above for domestic credit risks reflects an unusually benign economic environment characterised by low inflation, rising asset prices and sustained economic growth. Given strong competition for business and with last year's modest downturn in the economy having been less severe than generally expected by bankers and others, it remains to be seen whether lenders choose to relax lending criteria, with an increased risk of repeating some of the mistakes of earlier business cycles.

### The profitability and capital adequacy of UK banks

The financial position of the major UK banks, and hence the sector's ability to absorb adverse shocks, appears to remain strong. On the basis of annual accounts data, the major banks as a group remain well capitalised; all have regulatory capital ratios of over ten per cent, (see Table 22). Similarly, tier-one ratios are well in excess of the Basel minimum of four per cent (see Chart 117), and banks have been seeking ways of using capital more efficiently on behalf of their shareholders. Five institutions have recently bought back shares. Such transactions may total over £3 billion in 1999, eight per cent of the relevant banks' regulatory capital.

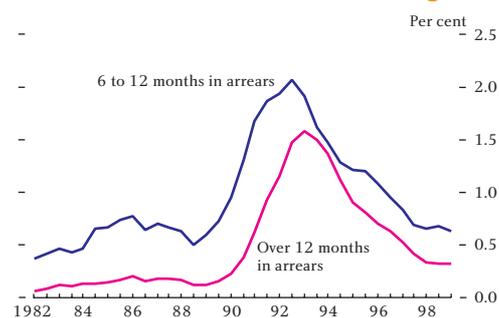
**Table 22: Major UK banks' capital positions – 1999 H1**

Per cent	Risk asset ratio	Tier 1 Capital ratio
Bank of Scotland	11.3	6.8
Barclays	10.9	7.4
HSBC/Midland	11.6	9.9
Lloyds TSB	12.2	9.9
NatWest	13.8	8.6
Royal Bank of Scotland	12.0	7.1
Abbey National	11.0	7.6
Alliance & Leicester	14.3	12.7
Halifax	11.7	8.8
Northern Rock	14.4	8.9
Woolwich	14.3	10.8
Average	12.5	8.6

Source: Published accounts.

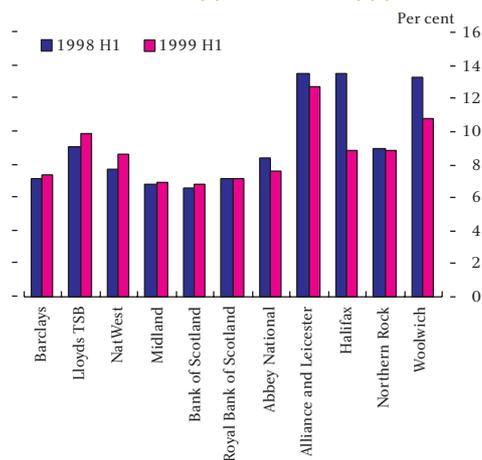
A build-up in capital in part reflects the major UK banks' strong profitability. Reported pre-tax profits for the first half of 1999 were up an average ten per cent on the first half of 1998, and

**Chart 116: Mortgages in arrears as a percentage of the total number of loans outstanding**



Source: Council of Mortgage Lenders.

**Chart 117: Tier 1 ratios for 1998 H1 and 1999 H1**



Source: Published accounts.

**Table 23: Profits of the major British banking groups**

MBBG <sup>(a)</sup> banks' profit and costs (£ billions)	1997 H1	1997 H2	1998 H1	1998 H2	1999 H1
Net interest income	11.0	11.7	11.8	12.2	12.6
Total income	19.0	19.1	20.1	19.4	21.3
Total operating costs	-10.8	-11.6	-10.8	-11.5	-11.5
Operating profit	8.2	7.4	9.2	7.9	9.8
Charges for bad and doubtful debts	-1.0	-1.0	-1.1	-1.6	-1.4
Profit/(loss) before tax	6.7	6.1	7.3	7.5	8.0
Average interest earning assets <sup>(b)</sup>	901.1	870.5	971.3	917.3	958.2
Total assets	1070.8	1087.4	1134.3	1129.8	1196.2
Cost to income ratio (per cent)	56.8	61.1	54.0	59.5	54.0
Net interest margin <sup>(c)</sup> (per cent)	2.4	2.7	2.4	2.7	2.62

Source: Published accounts.

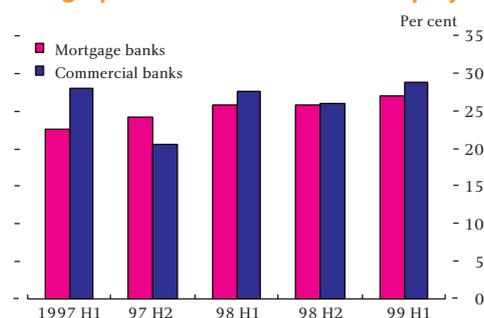
(a) Abbey National, Barclays, Bank of Scotland, Midland, NatWest, Royal Bank of Scotland, Alliance & Leicester, Lloyds TSB, Halifax and Woolwich.

(b) 1998 H1 Lloyds TSB and continuing year basis, as published. Approximate for Bank of Scotland 1997 H1 and 1998 H1. Derived from net interest margin for Midland 1998 H1 and H2 and for Bank of Scotland 1997 H2 and 1998 H2.

(c) 1998 H1 Lloyds TSB continuing year basis as published.

**Chart 118:**

**Average pre-tax rate of return on equity<sup>(a)</sup>**



Source: Published accounts.

(a) Book value of equity.

results were generally ahead of market expectations. Return on equity averaged 30 per cent and return on assets 1.3 per cent (see Chart 118).

Table 23 shows profit and loss data for the major UK banks and Table 24 puts this performance in a wider context by comparing these figures with a representative sample of banks in continental Europe and the USA. The major UK banks appear highly profitable both historically and against international benchmarks, with performance comparing particularly favourably with other European banks.

**Table 24: Bank profitability and capital adequacy, 1998**

Per cent	Return on equity	Return on assets	Total capital ratio
UK MBBG <sup>(a)</sup>	30.0	1.33	12.5
US <sup>(b)</sup>	15.7	1.24	11.3
Germany <sup>(b)</sup>	10.5	0.31	10.0
France <sup>(b)</sup>	9.2	0.37	11.0

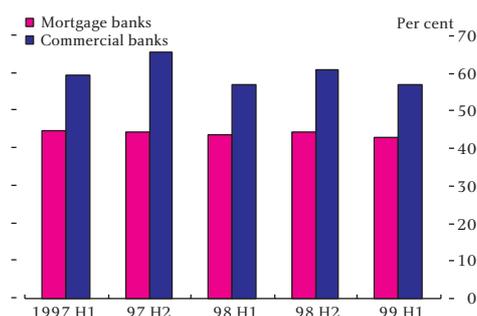
Sources: IBCA and published accounts.

(a) Data for 1999 H1.

(b) Average of top five banks by total assets.

**Chart 119:**

**Cost-to-income ratios**



Source: Published accounts.

The continued strong performance of the sector reflects a number of factors. The relatively benign economic environment and management of credit risk have helped to keep provisions low. Also, with one or two exceptions, cost control in the banks' core operations has been good; cost-to-income ratios have been generally flat or declining (see Chart 119). Several banks have

highlighted the potential for further cost rationalisation in the years ahead, particularly in retail banking, where technology and direct distribution are thought to offer the most scope for savings.

Finally, despite competitive pressures, margins and spreads, for the commercial banks at least, have held up over the past year (see Table 25). That can be attributed to three main factors. First, while competition has been intense for new business, there remains a large stock of business on balance sheets which is less interest-rate sensitive. While the new-entrant banks have gained a significant share of new business flows, their shares of the outstanding stocks of loans and deposits is still relatively small. Second, the clearing banks, in particular, possess a large current-account base and as a result may have been less exposed to pressure on retail-savings margins, which have been subject to particularly intense competition. Third, as noted above, there has been a move towards diversifying income streams, especially towards higher-margin business such as consumer credit. At the same time, the major banks have divested themselves of some of their less profitable investment-banking activities.

**Table 25: Margins and spreads<sup>(a)</sup>**

Per cent	Margins		Domestic Spread <sup>(b)</sup>	
	1998 H1	1999 H1	1998 H1	1999 H1
Mortgage banks	2.09	2.01	2.20	2.10
Commercial banks	2.92	2.96	2.64	2.96
MBBG average	2.54	2.53	2.40	2.47

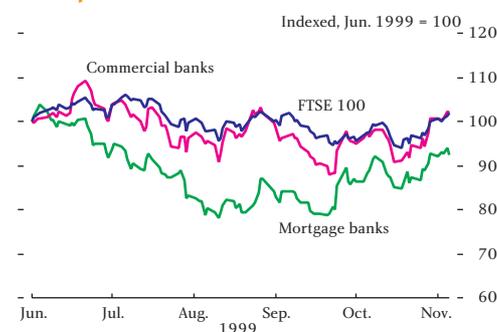
Source: Published accounts.

(a) Margins are net interest income as a percentage of average interest earning assets. Spreads are the difference between the interest rate earned on average interest earning assets and the interest rate paid on average interest bearing liabilities (for domestic business).

(b) Excluding Bank of Scotland.

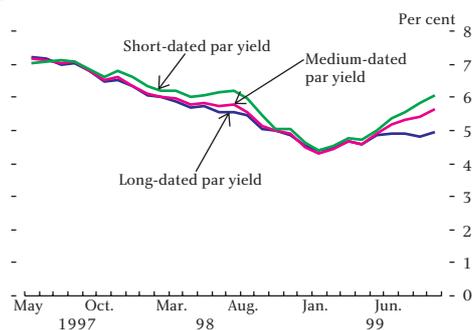
These favourable factors cannot be relied upon to sustain profits in the longer term. Results for the first half of 1999 showed that the mortgage banks in particular had seen some pressure on lending spreads (see Table 25). Where they have sought to protect margins, competition has tended to result in loss of market share on both sides of the balance sheet. Recognition of these underlying pressures may be one factor accounting for the recent underperformance of these banks' share prices against both the rest of the banking sector and the market as a whole (see Chart 120). Although possession of a large stock of existing business can for a while protect the margins of banks well-established in the market (reflecting their so-called 'retail franchise'), increased competition does seem to be beginning to have an influence. That could in time affect profitability and may be encouraging continued restructuring and consolidation in the industry, in order to diversify income streams and eliminate

**Chart 120: Share-price indices**



Source: Bloomberg.

**Chart 121:**  
**Short, medium, and long-maturity par gilt yields<sup>(a)(b)</sup>**

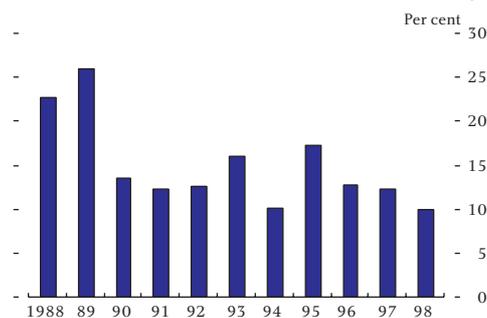


Source: Bank of England.

(a) Daily data.

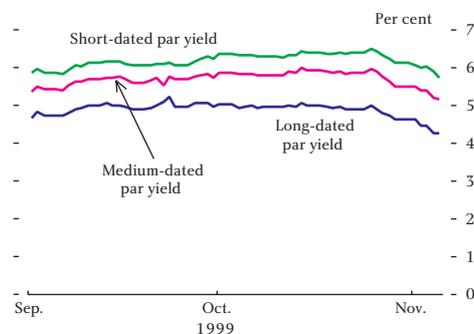
(b) Short-dated five year par yield, medium-dated ten year par yield and long-dated 20 year par yield.

**Chart 122:**  
**Free-asset ratio for life-insurance industry**



Source: HM Treasury.

**Chart 123:**  
**Short, medium, and long maturity par gilt yields<sup>(a)(b)</sup>**



Source: Bank of England.

(a) Daily data.

(b) Short-dated five year par yield, medium-dated ten year par yield and long-dated 20 year par yield.

costs. But a weakening in the established banks' 'retail franchise' may also make income streams from traditional business more difficult to manage, so that it may be somewhat less easy for retail banks, in particular, to absorb shocks to profitability than in the past.

## Life insurance

Survey evidence<sup>50</sup> suggests that the improvement in business confidence amongst life insurance companies seen in 1999 Q2 was sustained in the third quarter. But this comes after a difficult time for the industry. A sustained period of low gilt yields (see Chart 121), the problem of guaranteed annuities and pension mis-selling liabilities all contributed to a considerable fall in solvency ratios last year (see Box 7 for details). A number of life-insurance companies' free-asset ratios<sup>51</sup> fell in 1998<sup>52</sup>.

The solvency position of the sector as a whole is probably still fairly comfortable; the free-asset ratio stood at an average of 9.9 per cent for year-end 1998 (see Chart 122). Nevertheless, concerns remain about the effect that low long-term bond yields could have on life-insurance companies' financial position, particularly if falling yields were to occur at the same time as a sharp decline in equity-market values. These concerns have been reinforced by the sharp fall in long-maturing gilt yields seen recently (see Chart 123). For example, the yield on Treasury 6 per cent 2028 fell to a record low of 4.02 per cent on 5 November 1999, before profit-taking emerged, taking the closing yield to 4.13 per cent. As discussed in Section III, these recent movements seem out of proportion to news about fundamentals. It has been suggested that the UK regulatory arrangements for life companies can have a similar effect to portfolio insurance strategies: when prices go up, the industry 'has to' buy (or is expected by traders to do so), adding to the upwards pressure on prices. That might help to explain why long-dated gilt yields 'gapped' on 5 November.

More generally, if solvency ratios were to deteriorate because of an equity market correction, life-insurance companies might attempt to buy long-dated bonds and sell equities to reduce the reserves they have to hold to meet the so-called resilience test (see the assessment in the June Review). That could put added downward pressure on long-dated bond yields and on equity values, causing further desired changes in asset allocation, which might exacerbate price volatility and potentially test market liquidity. Partly in recognition of that, and anticipating the possibility of thin markets around the year-end (see Section IV),

50: CBI/PricewaterhouseCoopers Financial Services Survey.

51: The free asset ratio is a measure of financial strength calculated on a conservative basis using relatively cautious economic and demographic assumptions.

52: Ernst and Young; Insurance Executive 2.1999.

the Government Actuaries' Department (GAD), with the agreement of the FSA, issued revised guidance to Appointed Actuaries on 30 September modifying the resilience test so as to take account of the possible interrelationship between gilt yields and movements in the value of equities in certain market conditions<sup>53</sup>.

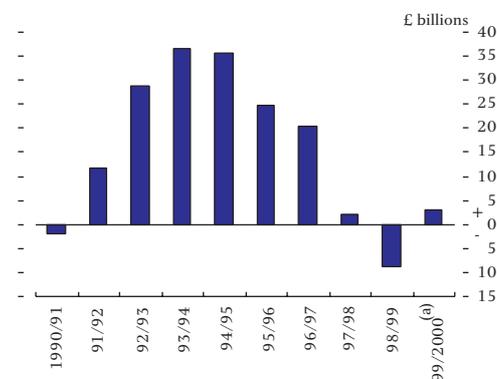
## Pension funds

Declining yields over the past three years have affected the funding position of UK pension funds, which are required by the Pensions Act (1995) to perform a minimum funding requirement (MFR) valuation on a triennial basis. This pressure was maintained by the early November fall in longer-maturity yields, which reversed the rise over the previous few months. As a result the 'FTSE Actuaries Government Securities 15-year yield index' (used as the basis for the MFR valuation for non-indexed pensions) stood at 4.7 per cent on 5 November, little changed from six months ago. Similarly, the 'FTSE Actuaries Government Securities index-linked real yield over five years (five per cent inflation) index' (used as the basis of the MFR valuation for price-indexed pensions) was at only 1.8 per cent on 5 November, again close to its level six months ago.

The MFR is one of several factors which may have increased pension-fund demand for conventional and index-linked gilts in recent years, as widely expected on its introduction (see Box 8). There has also been a fall in net supply resulting from a reduction in the government's net cash requirement (see Chart 124). Together these developments may have contributed to downward pressure on long-dated gilt yields, raising the question of whether the market is efficiently arbitrated at longer maturities. The fall in yields has, in turn, affected the solvency position, as measured by regulatory ratios, of life-insurance companies and the MFR funding position of pension funds themselves.

A review of the MFR is under way. The Faculty and Institute of Actuaries' Pensions Board is expected to make recommendations to the Department of Social Security in Spring 2000, but it is unclear what effect any of the proposed changes are likely to have on the gilt market<sup>54</sup>.

**Chart 124:**  
**Net gilt issuance**



Source: HM Treasury.

(a) Estimate.

<sup>53</sup>: Last year, on 24 November, the GAD wrote to all Appointed Actuaries informing them that there could be a relaxation of the resilience test determining required reserves if the FTSE 100 fell below 4,500 before the end of 1998. In the event, that proved unnecessary.

<sup>54</sup>: See, for example, the UK Debt Management Office *Annual Gilt Review 1998/9*.

## Box 7: Issues affecting life-insurance solvency

Low bond yields can affect the measured solvency of life-insurance companies because the duration of their liabilities is often longer than that of their assets. Furthermore, fixed-interest assets are not always held to match fixed-interest liabilities. Thus, when long-dated bond yields fall, the value of life-insurance companies' liabilities can increase by more than the value of their assets.

Other factors have added to pressures on regulatory solvency. During the 1960-80s, the life-insurance industry wrote pensions business that guaranteed annuity rates at retirement (see the *June Review*). These products allowed policyholders to take the better of the guaranteed annuity terms or the annuity rates available in the market on retirement. It seems that, at the time they were written, firms did not expect the options to be exercised; nor did they hedge against the risk of exercise, which would have been difficult during the 1960-70s as markets were less developed. However, as bond yields have fallen and longevity increased, annuity prices have risen sharply, so that the options have become more valuable to policyholders. Insurance companies are now having to reserve to cover guaranteed annuity obligations, the cost of which increases as gilt yields fall.

The effect of the High Court's ruling in the *Equitable Life Assurance Society (vs. Hyman)* case is that the Equitable is permitted, when allocating final bonuses among its participating policy holders, to award reduced bonuses, or none, to those whose policies have made provision for guaranteed annuity rates. That would reduce the need to hedge guaranteed annuity risk and the increased cost of these options as yields fall. To the extent that it influences other life-insurance companies' hedging strategies, the judgment could in principle ease the pressure arising from guaranteed annuity liabilities more generally. However, the judgment is under appeal, and related to only one type of policy.

The life-insurance industry has also been affected by the review of personal pensions mis-selling. Industry estimates put the total cost of compensation for pensions mis-selling at £11 billion.

## Box 8: Pension fund behaviour and bond yields

A pension fund is likely to hold a larger proportion of assets in bonds as the age profile of its members matures. However, the Minimum Funding Requirement<sup>1</sup> may have amplified any such shift and may have led pension funds to demand gilts rather than fixed-interest bonds in general. If liabilities in respect of pensioner members are not matched by conventional or index-linked gilts (depending on whether the pension obligations are fixed in nominal terms or linked to the RPI), the MFR position of the fund is likely to worsen when gilt yields fall by more than the yields on the actual portfolio of assets held by the fund<sup>2</sup>. Experience of the Basel Accord suggests that, other things being equal, banks may, over time, optimise their portfolios to minimise their 'regulatory risk' rather than perceived economic risk. If UK pension funds were to react similarly to the imposition of the MFR, they might attempt to reduce their MFR asset/liability mismatch, perhaps leading to higher gilt holdings.

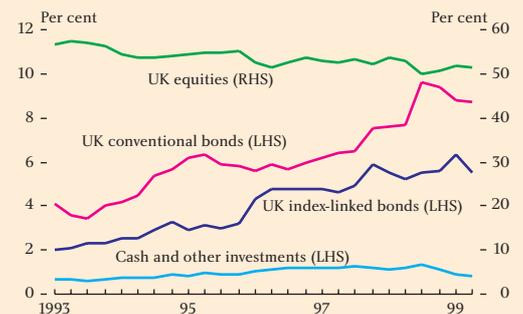
In addition, in the July 1997 Budget the UK government ended the ability of UK pension funds to reclaim dividend tax credits. That has reduced the value of UK equity dividends to pension funds by around 20 per cent. Thus, the tax benefits pension funds previously enjoyed have been reduced for this asset class, increasing the relative attractiveness of other asset classes, especially bonds. Chart A shows the trend in pension funds' asset allocation over the past five years.

The review of the MFR initiated by the Government and undertaken by the Faculty and Institute of Actuaries' Pension Board is understood to be considering two broad categories of reform: adapting or revising the present MFR or replacing it by an alternative. Any proposed change to the MFR might take into account proposed changes in accounting standards. SSAP 24 is under review. The Financial Reporting Exposure Draft was published on 4 November and proposes a discount rate equivalent to the yield on corporate bonds deemed equivalent to the credit risk of a defined benefit pension liability. The Accounting Standards Board decided that this means AA-rated bonds for a funded scheme, identical to the US and international rules. That would lead to the funding standard being more 'bond based', but with the emphasis widened to include corporate bonds, probably leading to increased bond investment generally.

<sup>1</sup>: The Minimum Funding Requirement (MFR), introduced by the Pensions Act (1995) and effective from 6 April 1997, is designed to provide security of benefits for the members of defined-benefit schemes. A formal valuation of assets and liabilities is undertaken every three years, using a benchmark portfolio comprising UK gilts and UK equities, to assess the solvency of a scheme.

<sup>2</sup>: See The UK Debt Management Office *Annual Gilt Review 1998/9*.

**Chart A:**  
**Pension funds' asset allocation**



Source: WM Company.

## VII. Risk-reducing developments in the financial infrastructure

This section reviews some recent developments in the infrastructure of financial markets which are designed to help to reduce risks in the system – whether credit, settlement, legal or operational risks – or make them easier to manage. It considers improvements in transparency; initiatives by the Basel Committee of Bank Supervisors in setting and encouraging standards of best practice; the extension of central-counterparty clearing services to European repo and swap markets; the development of standard documentation for the credit derivatives markets; and the recent Financial Modernisation Act passed in the USA. (Other recent developments in the important ongoing programme for minimising counterparty credit risk in payment and settlement systems are discussed in the accompanying article by Bob Hills and David Rule.)

### Transparency in monetary and financial policies

Greater transparency can improve the information set on which investment and lending decisions are based, which should in turn improve the terms of credit decisions, and so contribute to the achievement of greater financial stability. What progress has been made recently?

First, on 26 September, the IMF's Interim Committee (now the International Monetary and Financial Committee), adopted the 'Code of Good Practices on Transparency in Monetary and Financial Policies' (see pp. 44-45 of the *June Review*). In consultation with monetary and financial authorities, the IMF staff is now preparing a supporting document to the Code to guide members in its implementation.

Second, in March, the IMF Board agreed that, by April 2000, all countries that subscribe to the Special Data Dissemination Standard should provide detailed information on their foreign-currency reserves and foreign-currency liquid liabilities (see pp. 75-77 of the *June Review*). So far, six countries – Canada, France, Germany, the Netherlands, Switzerland and the UK – have started to disseminate data in the form prescribed by the enhanced Special Data Dissemination Standard reserves template. It is very important that a larger group, including emerging market countries, does so.

Third, the IMF has now carried out and published a second round of Experimental Transparency Reports (see page 49 of the *June Review*) on the following countries – Bulgaria, Cameroon, Czech Republic, Hong Kong, Tunisia, Uganda and Ukraine. There has also been progress with putting the IMF's regular surveillance reports on its member countries (Article IV reports) into the public domain. A policy calling for a presumption that selected IMF documents will be released, including a pilot scheme for the release of Article IVs, has been agreed by the IMF board and

45 countries have agreed to participate. As at 15 November, 21 reports have been approved for publication.

Overall, there has been considerable progress so far on this front. If over time this is built upon successfully, it should contribute to better pricing of risks and, by providing incentives, to greater adoption of best practices in a range of fields.

### **Bank risk management**

In addition to consulting widely on its proposals for reforming the 1988 Capital Accord, the Basel Committee of Bank Supervisors has continued to develop its work as a global standard setter on other fronts, launching two important initiatives in the past six months. In July, it published a package of papers on credit risk management, aimed at banks and supervisors worldwide. The package covers sound practices for Loan Accounting and Disclosure, Best Practices for Credit Risk Disclosure, Principles for the Management of Credit Risk, and Supervisory Guidance for Managing Settlement in foreign exchange transactions<sup>55</sup>. The last paper is an important complement to the infrastructural developments that are taking place to reduce exchange settlement risk (see the accompanying article by Hills and Rule).

Second, in October the Committee published a 'Core Principles Methodology' document designed to establish an objective and harmonised basis for assessing compliance with the Committee's 25 'Core Principles for Effective Banking Supervision'. This was drafted by an ad hoc group of Basel committee members and the IMF and World Bank, with input also from the Core Principles Liaison group. For each principle, relevant conditions and features are identified, divided into 'essential criteria' and 'additional criteria'. To be considered fully compliant with a principle, the essential criteria must generally be met without any significant deficiencies. This approach will be put to use by the IMF and World Bank in their assessments of banking sector soundness around the world.

### **Central counterparties for the repo and swap markets**

The London Clearing House (LCH) launched two potentially important new initiatives in late summer which extend the provision of central counterparty clearing services to the European government bond repo (RepoClear) and OTC interest-rate derivative (SwapClear) markets. Central counterparties replace the bilateral exposures that arise in a decentralised market with centralised exposures to and from the clearing house, which becomes seller to every buyer and buyer to every seller among its members. An article by Rule, Hills, Parkinson and Young in the June issue of the *Review* discussed

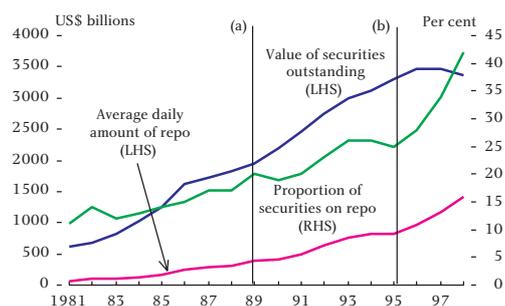
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<sup>55</sup>: Available at [www.bis.org](http://www.bis.org)

the potential implications of central clearing for financial stability. Central counterparties can in principle have a number of positive effects but it is vital that the clearing house is well managed, it has adequate financial resources, and incentives for market participants to control risk are preserved as far as possible.

The experience of the Government Securities Clearing Corporation (GSCC) in the US repo market suggests that a central counterparty can provide a stimulus to growth in market volumes (see Chart 125). Provided sound risk management procedures and controls are in place, growth in repo market volumes should help to improve market efficiency and produce deeper, more liquid markets for those seeking to finance securities positions or to lend cash, which should in turn help firms to manage liquidity in the face of shocks. But repo markets also enable market participants to take leveraged positions. Central banks and other financial agencies need to monitor the development of the markets carefully for any signs of over-extension, excessive risk concentration or declining risk management standards.

**Chart 125:**  
**Growth of the US repo market**



Source: The Bond Market Association.

- (a) 1989: GSCC introduces netting for Treasury securities.
- (b) 1995: GSCC introduces netting for repos.

RepoClear, which provides central counterparty services for government bond repo transactions, opened on 20 August. It currently provides clearing only for Bund repos, although LCH hopes to introduce clearing of repos of Belgian government bonds later this year, and Italian BTPs and UK gilts early next year. RepoClear is open to wholesale market participants that meet specific membership requirements. Settlement takes place through each market's preferred Central Securities Depository or International Central Securities Depository (more than one option may be available for particular markets). LCH's default fund has been extended by up to £50 million to cover RepoClear. LCH plans to offer cross-margining with swaps and futures.

LCH's other facility, SwapClear, which was launched on 24 September, is a central counterparty for the over-the-counter interbank swaps market. In the first instance, it will clear 'plain vanilla' interest-rate swaps of up to ten years' maturity and forward rate agreements of up to one year's maturity, denominated in sterling, euro, yen and US dollars. LCH plans to extend the service to cover more complex instruments and other currencies in due course. LCH's default fund has been increased by a further £100 million to cover SwapClear. SwapClear offers margin offsets with LIFFE short-term interest rate and bond contracts.

### Documentation of credit derivatives

The market in credit derivatives has the potential to enable more active management and hedging of credit risk by banks. The development of the market has, however, been impeded by two issues – the difficulty in pricing some of the derivatives,

because they are only approximate hedges of risks; and the lack of availability of standard definitions to be used in documentation. There has been some progress on both, but particularly the latter.

The potential hazards from an absence of standard definitions were highlighted during the market turbulence of autumn 1998. There was uncertainty over whether certain borrowers' restructuring of their debt obligations constituted a 'credit event' under the terms of some agreements. The existence of such ambiguity is a concern to the extent that firms may be trading on the basis of different beliefs about their potential positions if 'default' or other similar events occur. Firms may also be at risk if they believe that a position has been hedged using a credit derivative but it proves to be legally unenforceable. In response, the International Swaps and Derivatives Association (ISDA)<sup>56</sup> has developed a standard set of definitions to be used for the legal documentation of privately negotiated credit-derivative transactions. These are intended to be used primarily for contracts between credit-default swap parties written under the ISDA master agreement.

The new definitions explicitly cover both sovereign and non-sovereign reference entities, but only single-loan or bond-reference instruments. The definition of a 'restructuring credit event' is placed on a more objective footing, and a minimum grace period of three days is included in certain cases in order to minimise the possibility that a default could be triggered by a 'technicality', such as a systems failure. A relatively narrow dispute-resolution clause is included although ISDA is in the process of developing a more formal and extensive dispute-resolution mechanism.

## **US financial sector reforms**

The US financial modernisation (Gramm-Leach-Bliley) Act was signed by the President on 12 November; its provisions take effect 120 days after this date. This is probably the most significant piece of financial legislation in the USA for more than 50 years. Its successful enactment follows many ill-fated attempts over recent years at reforming a legislative framework that was widely viewed within the United States as impairing the competitive position of US financial institutions.

There are two main features of the Act. First, it repeals the long-standing restrictions preventing banks from affiliating with securities houses (contained in the Glass-Steagall Act 1933). Second, it amends the Bank Holding Company Act to create a new 'financial holding company' that permits links to be established between banks and insurance, venture capital and insurance company investment management businesses. The

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<sup>56</sup>: The ISDA website is <http://www.isda.org>

Federal Reserve will be the 'umbrella' regulator even if the predominant affiliate of the holding company is a broker-dealer. The state and other Federal regulators will continue to regulate the various affiliates along functional lines.

Nationally chartered banks, which are supervised by the OCC, are denied most of the freedoms in the Act; of the list of activities above, only securities business *strictu sensu* is permitted, and this via operating subsidiaries whose size is limited relative to the parent institution (to 45 per cent of assets or US\$50 billion, whichever is less). Any bank wishing to have an operating subsidiary, and which is in the top 50 banks in terms of assets, must have at least one issue of long-term debt outstanding, rated within the highest three categories. Banks ranked 51-100 will have comparable conditions imposed on them.

Reflecting concerns about the emergence of institutions that are 'too big to fail', the Act requires the Federal Reserve Board and the Treasury to study the feasibility and appropriateness of requiring systemically important institutions to maintain some portion of their capital in subordinated debt (as a means of strengthening market discipline on such institutions). The study must be presented to Congress 18 months after the enactment of the Act.

Seeking to avoid a repeat of the debate on loan-loss provisions earlier this year, the Act requires the SEC to consult with the Federal Reserve before taking action or expressing an opinion on reserves of individual institutions. Moreover, following the Federal Reserve's concerns over the extension of the safety net, the FDIC will not be permitted to assist non-bank affiliates and subsidiaries of banks and thrifts.

The Act is expected to give rise to considerable merger and acquisition activity, and indeed there has been evidence of a bid premium in the share prices of certain insurance and securities firms. Looking ahead, the Act also raises important issues regarding pressures for consolidated supervision and common capital treatment of the different types of financial entity now permitted to affiliate.

## Summary

This survey updates the Bank's assessment of risks to financial stability, globally and in the UK, published for the first time in the *June Review*. The risks depend both on the nature of the potential shocks and the robustness of financial systems to them. If financial systems are resilient, they will contain and absorb shocks; but if fragile, they can increase the impact of shocks on the real and financial economy.

Financial systems have not been subjected to such severe stresses over the past six months as they were last autumn. However, market indicators suggest a heightened perception of risk, or a lower appetite for risk, than was the case before crises started to break in south-east Asia in spring 1997. This may be welcome, to the extent that it reflects more realistic and more sustainable behaviour. But it may also reflect some continuing and more specific threats to stability.

For the emerging market economies, partly for these reasons, external credit conditions have remained tight. There is evidence that creditors are preferring sovereign to corporate exposures, and continuing to differentiate to a greater extent amongst different debtor countries, a development noted in last June's *Review*. One reason is that the economic performances of emerging market economies have differed. The Asian countries, for example, have in general seen a faster improvement in their growth prospects than many expected, while the picture is not so clear for Latin American countries, several of which are still struggling with considerable fiscal and external balance problems.

Recent history teaches the value of improved monitoring of risks stemming from countries' external balance sheets, and of effectively managing those risks at a sectoral level, particularly in the government and banking sectors. Work is under way in various official bodies to encourage and aid just that. The difficulties of managing external liabilities once there has been a loss of investor confidence have again been evident in the past six months – in a variety of countries from Pakistan to Ecuador. How best to involve the private sector in crisis prevention, and in crisis resolution when problems do erupt, is one of the important continuing but as yet unresolved themes of the public policy debate (see the articles by Haldane and King in this *Review*).

Many emerging market economies suffered substantial deterioration in their terms of trade in 1997 and 1998. In most cases, that reflected the marked depreciation in exchange rates which accompanied the sharp reversal of capital flows – which for the oil exporters was compounded by a significant fall in the dollar price of oil. The outlook has now improved, with commodity export prices recovering and current-account adjustments materially achieved. That should reduce the risk that

region-specific shocks will be propagated to other regions by the sudden rebalancing of world trade and capital flows, although the possibility of future losses of confidence cannot be ruled out – reflecting, for example, debt structures which will take time to repair and the continuing fragility of some countries' financial sectors. And, if any such problems were to develop, some risk of contagion to countries perceived to be similar would remain. Outside the emerging market economies, a sharp change in the global pattern of current and capital accounts, and an attendant adjustment in exchange rates, could still be triggered by other features of the current environment, such as the build-up of externally held US debt, reflecting its saving-investment imbalances.

In the industrial countries, the past six months have generally seen some improvement in the economic outlook, so the likelihood of a threat to financial stability emerging from their domestic conjunctures has probably fallen. Some of the downside risks noted in last June's *Review* are nevertheless still present, amongst them the possibility of an equity market correction in the USA and macroeconomic reverses in Japan. Prices in the world's major stock markets are similar to their levels of six months ago. The risk that equity markets may be overvalued is probably much the same; but the magnitude of the risk is difficult to assess, as stock prices embody expectations about future dividend growth and discount rates which cannot be observed directly.

The US equity market is the greatest source of concern, but has nevertheless proved resilient so far in the face of the tightening of US monetary conditions since the summer. On the other hand, the danger remains that firms and individuals might borrow imprudently – or banks lend imprudently – if they become over-confident about US growth prospects in the medium term; household indebtedness, in particular, is already high, which would tend to magnify the knock-on effects of any equity market correction. In Japan, recent economic data have been more encouraging than for some time. Also, significant progress seems to have been made in tackling the problems of the banking sector and hence in removing the threat to recovery posed by a financial system weighed down by bad debts. But a sustained economic recovery is still far from assured, and there is some uncertainty about what will happen when the temporary blanket guarantee of bank deposits is replaced. In the euro area, one possible cloud on the horizon is the rapid expansion of credit, particularly in some of the smaller members of EMU where house prices have already been increasing sharply.

Yield spreads in some corporate bond and swap markets have been more volatile since the previous *Review*, although the level of bond spreads at the beginning of November was not much different from those six months earlier. Just as with lending to

emerging market economies, there are some signs that less risk capital is committed to these markets, at least currently – another possible aftershock of last autumn’s turbulence. Although changing perceptions of corporate or bank credit risk cannot be ruled out, it seems more likely that a reduction in the supply of risk capital is responsible for greater price volatility, reduced liquidity, and the increase – particularly marked in the late summer – in many corporate bond and swap spreads. Some factors such as prospective low rates of issuance may be depressing the yields on government bonds, but they are unlikely to explain all of the increases in spreads during the summer. It may be that, running up to last year’s financial turbulence, markets were being actively arbitrated, but around price levels that proved to be inappropriate; whereas levels may now generally be more appropriate, but possibly with markets being less arbitrated, which if persistent could impair liquidity and complicate risk management.

The assessment in the June *Review* emphasised the importance of business with highly leveraged institutions – whether hedge funds, securities houses or banks – being conducted prudently, because of their vulnerability to shocks. One aspect of prudent conduct which is more widely appreciated since the temporary drying-up of liquidity in October 1998 is the need to consider liquidity risk carefully when pricing lending and managing collateral. Leverage is difficult to measure, particularly at an aggregate level, but the experience of last autumn seems to have discouraged further increases, at least for the moment; for example, repo-based funding by London-based banks of highly leveraged activity appears to be lower now than a year ago.

Some of the developments in financial markets, such as the concerns about liquidity, appear to be partly related to precautionary behaviour by market participants ahead of the Year 2000; it is not that they necessarily expect millennium bug problems, but rather that they may think the downside risks of doing business over the Year 2000 period will be higher than is usual over a year end and that uncertainty about those risks makes pricing them especially difficult. However, confidence that the Year 2000 period will pass without crisis does seem to have increased over recent months, and central banks, with other authorities, have announced a range of measures to help contain potential pressures on money and collateral markets over the period, standing ready to take further remedial action if necessary. (The Bank’s next ‘*Blue Book*’ about Y2K preparations will be published early in December.) It also appears that market participants do not expect any prolonged increase in the cost of borrowing. It remains to be seen how much liquidity conditions generally will improve after the Year 2000 period has passed; until then, it will be difficult to evaluate the longer run impact of any reduction in financial firms’ appetite for risk more generally.

Domestic risks to the financial sector in the UK appear to have fallen over the past six months, in that consumer and business confidence have risen. Several banks have reported that loan performance has been better than expected, although there is some anecdotal evidence of a slight deterioration in the quality of portfolios of loans to the personal sector. In assessing risks to financial stability, it is important to monitor variables which in the past appear to have signalled increased risks of asset-price bubbles or imprudent lending. Both for that reason and reflecting recent increases, future developments in house prices, consumer lending, and lending to the commercial property sector are amongst the variables that will merit close attention. But UK banks' mid-year results and apparent exposures suggest that, so far, they continue to be well placed to face any unexpected deterioration in the quality of lending. And the improvement in the general macroeconomic climate is likely to have strengthened their balance sheets over the past six months. Outside the banking sector, life insurance and pension funds face some challenges because of the decline in long gilt yields, but at present any difficulties seem unlikely seriously to affect the wider financial sector. However, the apparent developments in gilt market volatility and liquidity, if persistent, could complicate risk management.

In June, it was possible to report that a greater degree of financial stability prevailed than a year earlier. The assessment of the position now compared with six months ago must be more nuanced, and, like private investors, the authorities are learning to differentiate more amongst the risks facing the financial system. Many initiatives are under way to improve the 'plumbing' of the international financial system and make it more resilient (see Drage and Mann in the *June Review*; and Hills and Rule, Brierley and Vlieghe, Haldane, and King in this issue). Amongst these initiatives, the promotion of transparency in financial – and monetary – policies by the IMF and many of its member countries has made progress over the past six months. That promises to help to provide more of the information necessary for both private and public sectors to assess threats to financial stability better. But more needs to be done. It is important that these efforts – in particular, the implementation of standards of good practice and the adoption of prudent debt structures – do not lose momentum as stable conditions become re-established.

# Counterparty credit risk

## in wholesale payment and settlement systems

Bob Hills; David Rule

Ten years ago, in his 1989 Sykes lecture (Leigh-Pemberton 1989), the then Governor of the Bank of England explained the systemic importance of payment, clearing and settlement systems:

“...it is essential that our wholesale payment and settlement systems should not have weaknesses which, if they were put under stress, might spread from one institution to another, or possibly even from one market to another, and thus threaten the stability of financial markets”.

**IN THE DISCUSSION** paper accompanying the Governor’s speech (Bank of England 1989), the Bank analysed the risks inherent in payment, clearing and settlement mechanisms. Over the past decade, there have been a number of changes to market infrastructure in the United Kingdom and internationally, intended to reduce these risks without damaging efficiency. Nonetheless many of the risks identified in the 1989 paper remain, to varying extents in different markets.

The first part of this article describes how counterparty credit exposures can arise in payments and settlement, distinguishing principal risk from replacement cost risk. It also explains the role of central banks in taking action to address these risks. The second part examines measures to reduce or eliminate principal risk: real-time gross settlement in large-value payment systems; payment-versus-payment in foreign exchange settlement; and delivery-versus-payment in securities settlement. The third part looks at ways of minimising or managing replacement cost risk: shortening settlement cycles, and the use of central counterparty clearing houses. The article concludes that further progress to tackle these risks should be a high and pressing priority in the United Kingdom and abroad. The achievement of further risk reduction in this area is a central part of the Bank’s financial stability work<sup>1</sup>.

### Sources of counterparty credit risk

Payment and settlement systems allow banks and their customers to transfer funds, securities and commodities in settlement of transactions (see Box 1). Counterparty credit risk is the risk that another party will not complete their part of a transaction, leading to financial loss for the first party. A bank and its customers can be exposed to two types of counterparty risk arising from the payment and settlement process<sup>2</sup>:

- Its counterparty might fail during the period between the time the trade is agreed and the time of final settlement (the ‘settlement lag’), in which case the first party has to enter into a replacement transaction which may be on less favourable terms if market prices have moved in the meantime (‘replacement cost risk’).
- If the first party is required to deliver its side of the transaction irrevocably before it has received value from its counterparty, it is exposed to loss of the full value of the transaction if the counterparty fails (‘principal risk’). Banks, in particular, can be exposed to principal risk where they credit their customers with funds or securities in advance of settlement, or if they guarantee their customers’ settlement obligations.

<sup>1</sup>: The Memorandum of Understanding between HM Treasury, the Bank of England and the Financial Services Authority refers to the Bank’s “responsibility for the overall stability of the financial system as a whole... As the banker’s bank, the Bank will stand at the heart of the system. It will fall to the Bank to advise the Chancellor, and answer for its advice, on any major problem inherent in payment systems. The Bank will also be closely involved in developing and improving the infrastructure, and strengthening the system to help reduce systemic risk.”

<sup>2</sup>: This article does not consider forward transactions in which parties seek future settlement deliberately.



**Bob Hills**



**David Rule**

The magnitude of exposures to replacement cost risk depends on the volatility of asset prices and the length of the settlement lag. In normal market conditions, exposures may be relatively small in relation to the scale of transactions. But they increase when market prices move sharply, whether upwards or downwards. Because replacement cost risk is greatest in times of volatile prices, it can add to systemic risk: for example, if market participants are reluctant to trade following a large change in market prices because of concerns about counterparty risk.

By their nature, exposures to principal risk are larger because the whole value of the transaction is at risk. Principal risk in a variety of financial markets has been the focus of central bank attention (eg BIS (1992) (1995)). Exposures vary mainly with the

level of trading activity rather than with changes in market prices.

Counterparty credit risk becomes a problem when the payment and settlement activities of banks and their customers lead them to take exposures which they would not otherwise want. If the counterparty credit risk cannot be ‘unbundled’ or reallocated to a party more willing and able to manage the risk, the only choices open to them are to limit their payment and settlement activities or to tolerate these excessive levels of risk.

#### **Principal risk in payment systems**

Payment systems involve a series of fund transfers between banks, and between banks and their customers. Principal exposures can arise from the

### **Box 1: Payment and Settlement Systems**

*Payment systems* allow funds to be transferred from an account with one bank to an account with another. This may be to settle transactions between the banks or on behalf of customers. If both banks are direct participants in a payment system (‘settlement banks’), they have agreed to settle the transfer using a common ‘settlement asset’, which normally means transfers across accounts with a central bank.

*Securities settlement systems* are a means of transferring ownership of securities, which in most G10 wholesale markets are now recorded as book entries in a securities depository. Unlike payments, securities transfers can occur directly between the buyer and seller. In practice, however, intermediaries, such as custodians and brokers, often hold securities on behalf of the underlying owners, especially where they are overseas residents.

These intermediaries will usually act as agents only, but, in some cases, they do guarantee timely settlement to their customer.

Transactions in wholesale financial markets are rarely as straightforward as a one-way payment (a ‘clean payment’) or transfer of securities. More commonly transactions involve an exchange of financial assets: for example, in a foreign exchange transaction, a payment in one currency is exchanged for a payment in another; and in a securities purchase, securities are exchanged for a payment or an equivalent value of other securities. In the simplest case of a sale of securities against a payment, most securities settlement systems will also provide a means to settle the transfer of funds. In effect, a payment system is embedded within the securities settlement system. Often, however, transactions cannot be settled within one system: for example, foreign exchange transactions entail the use of separate payment systems for the currencies involved.

## Box 2: Principal risk in payment systems



The payment system allows customer X to transfer funds from its account at bank A to customer Y's account at bank B. In order to isolate the exposures that can arise as a consequence of the payment, assume that none of the parties involved has deposited funds with another before the transaction. (In practice, this is unlikely to be the case.) The payment then involves the following steps:

- (i) Customer X deposits funds with bank A;
- (ii) Bank A deposits funds with the central bank;
- (iii) Bank A debits customer X's deposit and sends a payment message through the payment system instructing the transfer of funds to customer Y at bank B;
- (iv) The central bank debits bank A's account and credits bank B's account;
- (v) Bank B credits customer Y with funds to its account.

This series of steps can give rise to principal exposures either because the sequencing is ordered

differently or because there are delays between the completion of different stages.

### Sequencing

- a) If bank B credits customer Y (step v) before interbank settlement (step iv), it has an exposure to bank A.
- b) If the central bank credits bank B (step iv) before bank A has deposited funds on its settlement account (step ii), it has an exposure to bank A.
- c) If bank A transfers funds to its settlement account (step ii) before customer X has deposited funds with it (step i), it has an exposure to customer X.

### Delays

- d) If customer X is required to deposit funds with bank A (step i) in advance of the transfer of funds to customer Y, it has an exposure to bank A.
- e) If bank A is required to deposit funds with the central bank (step ii) in advance of interbank settlement, it has an exposure to the central bank.

timing and sequencing of these transfers (see Box 2). Recipients of payments in wholesale financial markets typically need ready funds, which they can reuse to make payments out on the same day. So when settlement banks<sup>3</sup> receive information about an incoming payment, they want to be able to credit their customer's account immediately. But if they do this before interbank settlement, the customer's settlement bank is left with a principal exposure to the settlement bank making the payment (the sending bank). In large-value payment systems, this creates the risk that a settlement bank with very

large net debts to the other members of the system is closed before interbank settlement occurs. Principal exposures in these systems can be very large because a high proportion of payments are routed through particular settlement banks. In addition, settlement banks may be unable to control to which other settlement banks they are exposed as this will depend on the settlement banks used by their customers' counterparties<sup>4</sup>. These two factors mean inter-settlement bank exposures may be far larger than the banks would otherwise seek voluntarily.

<sup>3</sup>: A 'settlement bank' is a direct participant in a payment system and has a settlement account, which is usually with a central bank (see Box 1).

<sup>4</sup>: Unless the system includes limits on net interbank exposures.

If there is any uncertainty about whether interbank settlement is final, irrevocable and unconditional<sup>5</sup>, the size of interbank exposures can grow cumulatively. In order to eliminate this legal risk, the system must provide for settlement of interbank transfers to be final, and these rules must be legally enforceable. Uncertainty about the legal basis of payment and settlement can be particularly dangerous as banks and market participants are left unsure of their true exposures and possibly with a false sense of security. In the EU, the Settlement Finality Directive resolves many of these legal risks by making it clear that the rules of 'designated' systems relating to irrevocability and finality will be legally enforceable.

Principal exposures can arise at other stages of the payment process too (Box 2). In most cases, these are smaller and arise as part of an existing banking relationship. For example, where exposures arise between the settlement bank and its customer, both parties are typically willing to take on this risk. However, the exposures may be larger if the customer is itself a bank, which in turn has customers that want to re-use funds immediately when they receive payments. Banks may be able to reduce this risk by spreading their exposure across different settlement banks. But if the bank has a large wholesale payment business, a better option may be to become a settlement bank itself. This highlights one reason why it is important for large-value payment systems to admit new members on the basis of fair and open criteria.

Settlement banks will also be exposed to the bank that provides the accounts used for interbank settlement ('the settlement asset'). Unlike their customers, settlement banks do not have a choice of settlement asset since the system requires there to be only one. Most large-value payments systems settle across accounts at the central bank, which eliminates any counterparty credit risk in holding the settlement asset. Securities settlement systems more commonly involve settlement of payments across accounts at a commercial bank<sup>6</sup>.

### Simultaneous exchange of value

Where financial transactions involve an exchange of financial assets, any party to the transaction can be

exposed to principal risk if the two legs do not settle at the same time. Diagram 1 illustrates how this problem can arise in both securities and foreign exchange settlement. In the case of a securities transaction, the seller of securities is exposed if the securities are transferred before final and irrevocable payment has been made; and the buyer is exposed if payment is made before final and irrevocable delivery of the securities has occurred. Achieving simultaneity of these transfers is known as delivery-versus-payment.

From the point of view of the seller, final payment means ready funds at its bankers. Principal risk may fall on the seller's bank rather than the seller if it provides its customer with funds at the same time as securities are delivered, but before interbank settlement has occurred. The seller's bank may be exposed to the buyer or to its settlement bank if that bank has guaranteed the payment.

Diagram 1 also illustrates how principal risk can arise in a similar way in foreign exchange markets if settlement of the two legs of the transaction is not synchronised. Customer Y is at risk if it transfers sterling funds to customer X's sterling correspondent bank<sup>7</sup> before it has received final US dollar funds at its US dollar correspondent bank. Again, the risk may fall either on the parties to the transaction or on their correspondent banks. Achieving simultaneous transfers of funds in foreign exchange markets ('payment-versus-payment') is complicated by the involvement of two different payment systems, which may be in different time zones and therefore have different operating hours.

### Supervisory treatment

In securities settlement, UK banks and securities firms are subject to a capital requirement against the counterparty risk where they deliver their side of the transaction (securities or payment) before receiving the counter-value from the counterparty (ie where there is no delivery-versus-payment). In the case of cross-border transactions, however, there is a one day grace period before these capital requirements apply.

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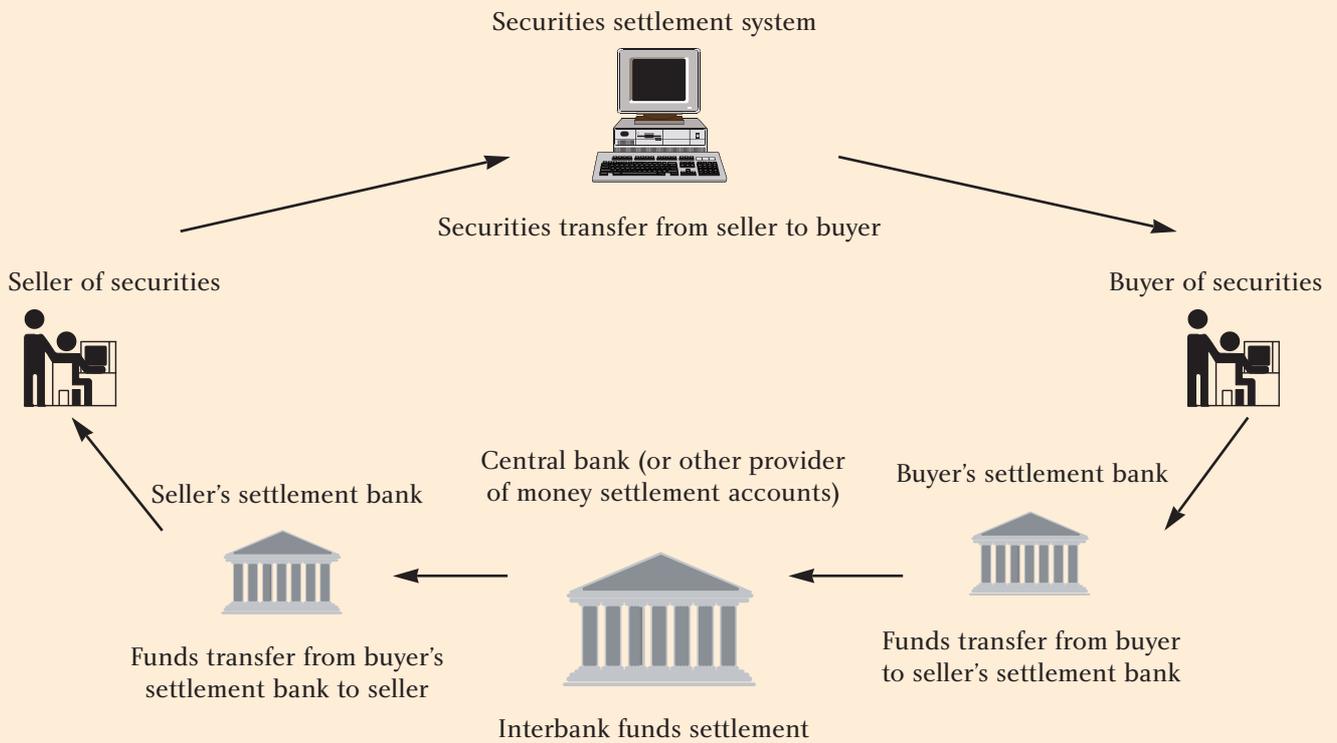
5: For example, if there is a risk that the liquidator of a failed bank would seek to unwind payments that the bank had made prior to its winding up.

6: For example, Cedel settles payments across accounts with Cedelbank and Euroclear currently settles payments across accounts with Morgan Guaranty (although it has announced that this will change).

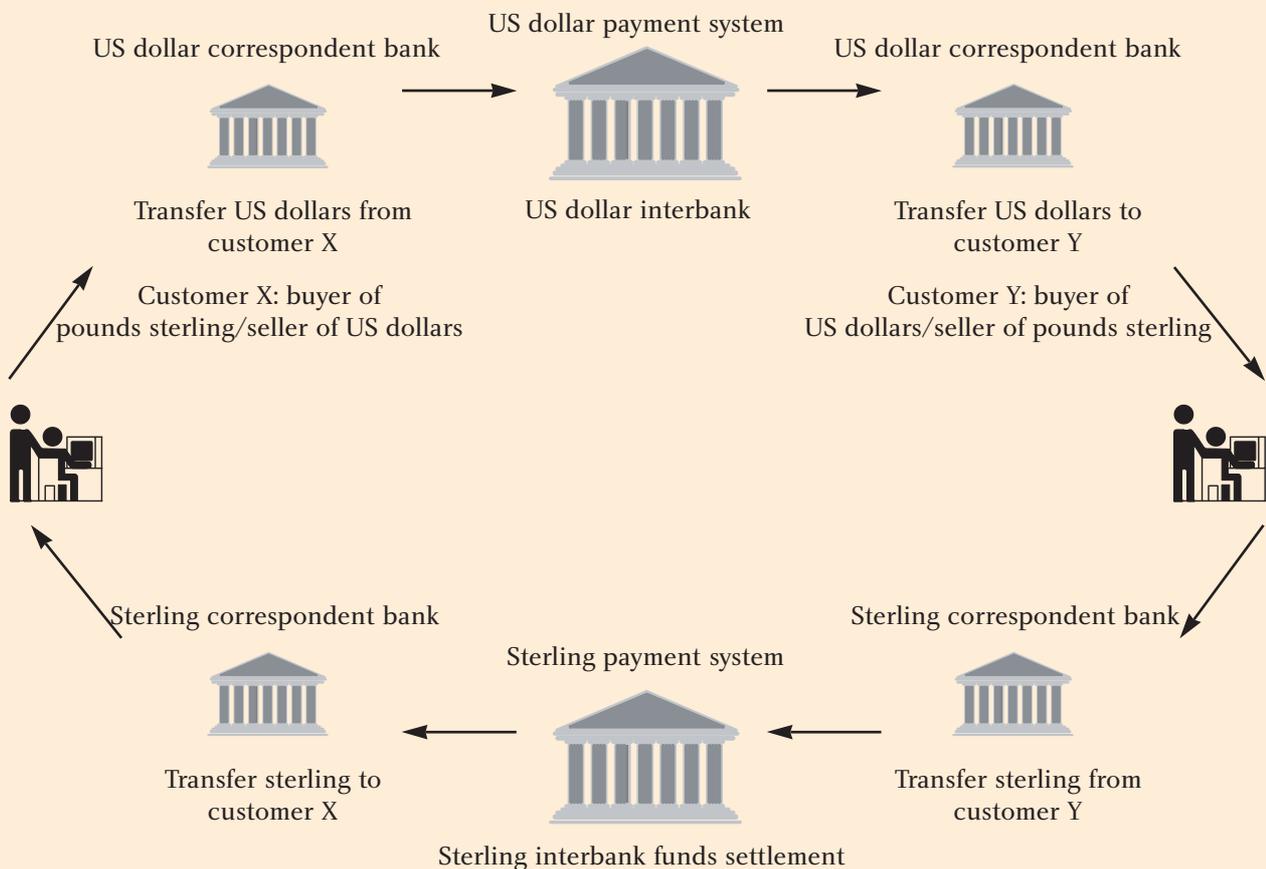
7: A 'correspondent bank' is a settlement bank which makes payments in the local currency on behalf of another bank, typically a foreign bank.

# Diagram 1: Exchanges of value

## (i) Securities settlement



## (ii) Foreign exchange settlement: sterling/dollar example



**Table 1**

This table sets out the main risks faced in payments, foreign exchange and securities settlement, and the principal ways in which they are being addressed.

	Payments	Foreign exchange	Securities
<b>Principal risk</b>	RTGS. Settlement across central bank accounts.	Payment versus payment (Continuous Linked Settlement Bank). Bilateral netting. Settlement across central bank accounts.	Delivery versus payment. Settlement of the payment leg across central bank accounts.
<b>Replacement cost risk</b>	Same-day or intraday real-time settlement.	Reducing the settlement cycle. Bilateral netting.	Reducing the settlement cycle. Central counterparty.

Principal risk in foreign exchange settlement at present is not subject to capital requirements nor are the intraday exposures which settlement banks take on in payment systems.

A bank's payments business can also affect its liquidity position, particularly when it processes large customer flows. If a bank's customers give the bank forecasts of their expected payment flows, this will help the bank to manage its own liquidity position (see also Box 2).

### The role of central banks

Central banks worldwide have led initiatives to understand and reduce, eliminate or better manage counterparty credit risk in wholesale payments and settlement (eg BIS (1990) (1992) (1996) (1997a)). In the United Kingdom, the Bank gave the highest priority to the introduction of real-time gross settlement in the CHAPS payment system and is now working with CRESTCo and the settlement banks to achieve full delivery-versus-payment in CREST (see below). There are a number of reasons why central banks have been proactive.

- The most important is the potential for systemic risk or 'the risk that the inability of one institution to meet its obligations when due will cause other institutions to be unable to meet their obligations when due' (BIS (1992)). Exposures in large-value payment and settlement systems can be very large and arise principally between the settlement banks, which are typically the largest banks in the economy. In addition, wholesale financial markets rely on

efficient payment and settlement. Problems with the systems could have consequences for a wide range of markets and institutions and thus for the real economy. For these reasons, market participants may behave as if central banks had underwritten interbank settlement in the large-value payment and settlement systems, even though central banks will typically not have done so.

- Market participants and their settlement banks may feel obliged to tolerate a higher level of counterparty risk than they would ideally take on, as a consequence of their payment and settlement activities. Banks may not fully take into account the costs that they would impose on other participants if they were to default (negative externalities); and uncertainty about which firms have exposures to each other may itself affect the functioning of the market in a crisis. These factors suggest that the social cost of bearing these risks may be greater than the sum of the costs perceived by individual participants, which would justify public action to introduce safer systems.
- Counterparty credit risk can be reduced, reallocated or even eliminated from the payment and settlement process through changes to the market infrastructure and market practices. No party would be exposed to counterparty credit risk on a transaction if value could be transferred immediately, finally and irrevocably, with all elements of the transaction settling simultaneously. Changes to the payment or settlement process usually require the co-operation of most or all

market participants, however, and there may be problems agreeing which institutions should pay for an investment intended to reduce risks for all ('free rider' problems). Central banks can play an important role in organising collective action to move payment and settlement processes towards risk reduction. They also have a responsibility to analyse and highlight the risks that arise.

The remainder of this article describes measures currently being taken in the United Kingdom and internationally to address principal and replacement cost risk in payment and settlement. Table 1 is a summary.

### Current initiatives to reduce principal risk

#### Large-value payment systems

Over the past decade good progress has been made worldwide in addressing principal risks arising in large value payment systems. Until the late 1980s, most of these systems settled interbank transfers on a net basis, usually at the end of each day. This delayed settlement led to very large principal exposures among the settlement banks for the reasons explained above.

The solution has been the introduction of real-time gross settlement (RTGS). In an RTGS system final interbank settlement can occur on a continuous basis throughout the day. A settlement bank receiving a payment for its own account, or on behalf of a customer, is advised of a credit to its settlement account if and only if funds have actually been credited to that account. Over the past ten years or so, most of the G10 countries<sup>8</sup> have moved to RTGS in their large-value payment systems<sup>9</sup>.

RTGS eliminates the large intraday exposures between settlement banks. But there may be costs in terms of settlement efficiency. Minute-by-minute, payment flows between banks tend to be asymmetric even if they usually net out over the course of a day. There is a temptation for banks to delay making out-payments until they have received in-payments, since the direct cost of a delayed payment falls on the receiving bank, which may not then be able to make a payment itself or have to extend intraday credit to a customer. But if all market participants adopted the same behaviour, the result would be payments gridlock.

To prevent such a payments gridlock, banks need to borrow funds to make initial payments. In effect an explicit need to raise liquidity replaces the implicit credit, which is the counterpart of the principal exposures that arise between settlement banks with deferred settlement.

On the assumption that payment flows will net out over the course of a day, there could, in principle, be scope for an intraday commercial bank market in funds. This solution has two main problems. First, transaction costs (eg for collecting intraday interest) may be high. Existing interbank money markets are based on maturities of overnight or longer. Banks would need to enhance systems to cope with intraday loans. Second, intraday lending might either re-introduce systemic risk if interbank exposures became very large, or fail to address fully the problem of payment delays if banks limited the amount of intraday credit that they were willing to offer to each other. For these reasons, most central banks in countries with RTGS systems have decided to act as intermediaries in the intraday funds market themselves. This can be achieved by keeping the effective spread between the terms on which the central bank remunerates intraday balances on settlement accounts and on which it provides intraday credit, lower than the costs of organising a private market. Central banks have taken one, or a combination of, three main approaches:

- neither paying interest on intraday deposits nor charging interest on intraday credit but requiring full collateralisation (with prudent 'haircuts' – see Box 4) of any credit.
- paying no interest on intraday deposits but making a charge for uncollateralised intraday credit;
- requiring banks to hold reserves with the central bank, which can be drawn down intraday. The counterpart of higher reserve requirements is that banks undertake more term borrowing from central banks through open market operations, so this option in effect replaces intraday central bank credit with term central bank credit.

<sup>8</sup>: The exception is Canada, which has developed instead a sophisticated net settlement system with a central bank guarantee. The Large Value Transfer System (LVTS) was launched in 1999.

<sup>9</sup>: See BIS (1997a) for a more detailed discussion of real-time gross settlement systems.

In each of these cases, a trade-off is required. They all impose costs of some kind on participants, whether actual or opportunity. In collateralised systems, for instance, there may be an opportunity cost to holding the assets accepted by the central bank as collateral rather than those which the bank would freely choose. If the cost of intraday borrowing is high (in other words, the marginal private cost of delaying a payment is less than the marginal cost of borrowing), then banks may still have some incentive to delay making payments.

Central banks in different countries have attempted to resolve this trade-off in different ways. In the United States, the Federal Reserve provides uncollateralised liquidity at a price intended to compensate for the credit risk. In Switzerland, the central bank provides no intraday credit at all. The Bank of England, in common with other EU central banks, provides unlimited central bank credit against high quality collateral, without charge. This protects the central bank's balance sheet while not excessively constraining banks' portfolio choice. (Banks in any case need to hold a stock of high quality securities to meet their own and supervisory liquidity requirements). The ESCB requires banks to hold reserves, which can be drawn down to make payments intraday as well as extending intraday credit against collateral.

The remaining large-value deferred net settlement (DNS) systems have also taken steps to limit or control principal risks. Most if not all high value DNS systems now include real-time monitoring of exposures, caps on the size of exposures that can arise to individual banks, and various degrees of collateralisation so that settlement is still completed if a settlement bank fails to settle. Although these are positive developments, the advantage of RTGS remains that principal risks between settlement banks are eliminated *ex ante*.

Some large-value payment systems are seeking to combine the elimination of intraday principal risk among the settlement banks achieved with RTGS, and the lower explicit demand for liquidity of DNS. Typically this is achieved by organising payments so

that they are matched or offset through the day, whether bilaterally or multilaterally, continuously or in frequent batches. Participating banks pre-deposit liquidity which effectively puts a cap on the excess of out-payments over matched/offset in-payments that the bank can make.

The potential cost savings to individual settlement banks associated with a reduced demand for liquidity need to be evaluated, in particular given the willingness of central banks to supply intraday funds freely against a wide range of collateral. The Bank recently extended the range of securities against which it will provide intraday credit to include some £2 trillion euro-denominated bonds issued by EU governments and certain international organisations, in addition to its existing wide range of sterling collateral<sup>10</sup>.

#### **Foreign exchange settlement – principal versus principal**

Principal risk in foreign exchange settlement arises mainly because the two legs of the transaction do not settle simultaneously. This risk is commonly known as Herstatt risk, after the insolvency of Bankhaus Herstatt, a small German bank, in 1974. Herstatt was forced into liquidation at a point when counterparties had paid Deutschmarks (DEM) irrevocably to Herstatt against anticipated receipt of US dollars. Herstatt's correspondent bank in New York then froze payments from Herstatt's US dollar account, leaving the counterparties that had already released DEM exposed for the principal amount of the transaction<sup>11</sup>.

A quarter of a century after the collapse of Bankhaus Herstatt, the same risk remains and foreign exchange market exposures have increased sharply (see Box 3). The report of the G10 central banks on settlement risk in foreign exchange transactions (BIS (1996)) found that the settlement exposure on a foreign exchange trade typically lasts for one or two days, and often a further one or two days elapses before a bank can establish whether it has received the purchased currency on time. However, many banks' risk management systems assume that the period of exposure is no greater than a day.

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<sup>10</sup>: See 'Bank of England Operations in the Sterling Money Market: Supplement to the Operational Notice issued in June 1999', available at [www.bankofengland.co.uk/markets.htm](http://www.bankofengland.co.uk/markets.htm).

<sup>11</sup>: Those counterparties that had entered into contracts with Herstatt that were due for settlement on a later date, but had not released their DEM payment, were not exposed to principal risk, but were still exposed to replacement cost risk.

## Box 3: Size of principal risk exposures in payment and settlement systems

It is difficult to quantify precisely the level of intraday principal risk to which market participants and their settlement banks are exposed in payment and settlement systems. But it is possible to estimate the order of magnitude of the exposures. Internationally, the largest intraday exposures probably result from the lack of payment-versus-payment in foreign exchange settlement. In the United Kingdom, securities settlement systems give rise to large intraday exposures among the settlement banks.

- Foreign exchange settlement.** The estimated global daily turnover of foreign exchange transactions in 1998 was around US\$1,500 billion (BIS (1999a)). Chart 1 shows how this has increased rapidly. BIS (1998a) suggests that bilateral netting reduced settlement flows among a sample of banks in the G10 countries by around 15 per cent. Thus the total daily interbank exposure could be US\$1,200-1,400 billion. Of course, the exposures that might arise following the failure of any individual bank would be smaller; but the aggregate size of exposures across all banks does give some idea of the increasing scale of the risk.
- UK securities settlement.** Average daily turnover of gilts in the Central Gilts Office (CGO) is of the order of £100 billion, of money market instruments in Central Moneymarkets Office (CMO) £15-20 billion, and of equities and other corporate securities in CREST £30 billion. At any given point during the day, an individual settlement bank might have a multilateral net exposure of up to

Banks can reduce their exposures to some extent simply by understanding the settlement process and the risks entailed, and managing their behaviour accordingly. For instance, a bank (in consultation with its correspondent) can extend the deadlines before which it can still cancel payments unilaterally and bring forward the identification of final and failed receipts, which reduces the length of its settlement exposure. It can agree to net transactions with counterparties bilaterally, so reducing amounts to be paid on settlement. It can also set more prudent trading limits for its counterparties and use more realistic assumptions about the duration of exposures. In July 1999 the Basel Committee on

**Chart 1:**  
Estimated average daily global foreign exchange turnover



Source: BIS.

**Chart 2:**  
Average daily turnover



Source: BIS.

£15-20 billion in CGO, and £5-6 billion in CREST. In CMO, where there is no assured payments mechanism but correspondingly larger direct membership, members might typically face a gross intraday exposure of the order of £180 million.

Banking Supervision issued a consultative paper setting out guidance on the management of foreign exchange settlement risk by individual banks (BIS (1999c)).

The 1996 BIS report set out a strategy for reducing foreign exchange settlement risk involving action by individual banks to control their foreign exchange settlement exposures, by industry groups to provide risk-reducing multi-currency services, and by central banks to encourage rapid private sector progress. A follow-up report (BIS (1998a)) found that many of the major participants in the foreign exchange market had made significant progress individually in managing their foreign exchange settlement

## Box 4: The Continuous Linked Settlement Bank

The CLSB currently expects to launch its service in the last quarter of 2000, settling five currencies (the Canadian dollar, euro, sterling, Swiss franc, US dollar), with the Australian dollar and the yen following in the first quarter of 2001. More currencies are expected to be added subsequently.

### Key features of the Continuous Linked Settlement process

Each settlement member will hold a single multi-currency account at the CLSB, with balances for each currency. FX transactions will be settled over these accounts; as a settlement member's balance in one currency is debited, its balance in another currency will be credited. The CLSB is designed to control postings to settlement members' accounts, checking that their account balances comply with three risk controls at all times:

- (1) The debit balance in any individual currency must not exceed a set limit – the short position limit. The maximum short position limit for any one settlement member in any one currency will be related to the *committed liquidity facilities* available to the CLSB in that currency – see below.
- (2) A settlement member's total short position for all currencies, calculated as an equivalent US dollar value, must not exceed a set limit – the aggregate short position limit. An aggregate short position limit will be set for each settlement member, in relation to that settlement member's capital and credit rating.
- (3) A settlement member's account must retain a net positive value overall. The net account balance will be calculated using the US dollar as base currency. A margin ('haircut') will be added to allow for movements in exchange rates.

The system aims to be efficient in its use of liquidity to the benefit both of settlement members and domestic payment systems. Settlement members will have to fund only their net short positions, and will also receive their long balances net. They will be required to pay the CLSB according to a precise schedule provided each day by the CLSB, specifying

one or a series of payments in each currency in which they have a net short position. The CLSB will use the central bank as its correspondent in each currency it handles; payment to and from its correspondent accounts will be made through local payment systems. The CLSB aims to hold only small amounts of cash on its accounts with central banks; it will pay out long balances to members as they become available, thus returning cash to the national payment systems as quickly as possible.

The CLS process is designed to contain the adverse effects of a pay-in failure by one of its settlement members, minimising the number of members affected and the size of the impact. The CLSB plans to arrange committed liquidity facilities which it can call on (protected against exposure by that settlement member's long balances), in order to pay out long balances to its other members. In these circumstances, some transactions that have not yet settled may remain unsettled, but the CLSB's simulation tests show that it should be able to settle the majority of transactions even if there is a major pay-in problem.

### Ownership, participation and regulation

The CLSB is designed to be a market utility providing risk-reducing services. Its parent company CLS Services Limited is owned and controlled by over 60 large banks from some 14 countries. The CLSB will settle transactions for its settlement members and for other institutions – user members or third parties – who use the services of those settlement members. The CLSB will be aimed at the widest possible market: the more widely it is used the greater the benefits of risk reduction. To become a settlement or user member, an institution must be a shareholder of CLS Services Ltd. Settlement members will also have to satisfy a number of other criteria, including capital and credit rating requirements.

The CLSB received its charter as a US bank on 1 November 1999. It will be regulated by the Federal Reserve, which will oversee the design and operation of the system as a whole and will formally consult with other central banks and supervisory authorities that have an interest in the CLSB's prudent operation.

exposures, although the improvements were neither sufficiently thorough nor widespread.

The most significant current development for the reduction of foreign exchange settlement risk is the Continuous Linked Settlement Bank (CLSB). In July 1997 a group of major international commercial banks (the G20), set up CLS Services Ltd to implement plans for a payment-versus-payment settlement service for the global foreign exchange market. The CLSB now plans to launch the service in the final quarter of 2000.

Once operational, the CLSB will eliminate the principal risk associated with foreign exchange settlement on those transactions it settles. The two currency legs of a transaction will be settled simultaneously across the books of the CLSB; both sides of the transaction will be settled, or neither side will be settled.

The CLSB plans to tackle settlement risk by acting as an intermediary in the settlement process. It will have access to an RTGS system in each of the currencies that it settles and hold an account at the relevant central bank. Settlement members will pay in their net position in each of the currencies in which they are short each day and the CLSB will pay out the net proceeds in each of the currencies for which they are long. Users will retain their gross mutual obligations until each transaction is settled; the CLSB will not provide a means of netting obligations prior to settlement. Nor does the CLSB plan to guarantee to settle every transaction in its queue. But users' principal risk will be eliminated on all those transactions that are settled. Box 4 describes the CLSB in more detail.

Payment versus payment can work because the opening hours of large-value payment systems in the different time zones world-wide overlap for a period in the morning of Central European Time. The CLSB will have a 'pay-in schedule' that requires banks to meet demanding intraday payment deadlines. Changes to some countries' market practices may be required so that banks have sufficient liquidity to make payments during this window of time, when the domestic money markets are not normally active.

The Herstatt case also highlighted the further risks that can arise if a correspondent bank does not act in the way that the originating bank expects or desires. During Herstatt's insolvency in 1974, the correspondent bank for Delbrueck bank in the US large-value payment system, CHIPS, had released a payment to Herstatt's CHIPS correspondent bank on the due settlement day, but around 20 minutes after Herstatt was closed. Delbrueck requested that the payment be revoked, and sued their correspondent when this proved impossible. The court upheld that the transfer was final when the payments message was released over the CHIPS system.

### **Securities settlement – delivery versus payment**

Participants in a securities settlement system are exposed to principal risk if securities and funds are not transferred simultaneously. Delivery versus payment (DvP) prevents this by ensuring that delivery occurs if and only if payment occurs.

Ten years ago, an influential report by the Group of Thirty (1989) recommended that all securities transactions should be settled in a DvP system by 1992. But countries have interpreted the principle of DvP in different ways. BIS (1992) outlines the three main models: gross, simultaneous settlements of securities and funds transfers ('Model 1'); gross settlements of securities transfers followed by net, end-of-day settlement of funds transfers ('Model 2'), and simultaneous net settlement of securities and funds transfers ('Model 3')<sup>12</sup>.

In the United Kingdom, CREST operates Model 2 DvP for both equity and gilt settlement (CRESTCo took over the responsibility for providing gilt settlement in May 1999). Securities transfers occur throughout the day. Under the 'assured payment' mechanism, the buyer's settlement bank is obliged to pay the seller's settlement bank at the end of the day. At the point at which the seller delivers the securities, it receives the assurance of the buyer's settlement bank that it will be paid. The seller also receives credit which may be used to make further purchases within the system. Users of the system therefore benefit from effective DvP. The residual principal risks are among the settlement banks. The banks are all highly-rated institutions, and the probability of a failure occurring is low. But its impact could be very significant.

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<sup>12</sup>: In each of these models, payment may be in central bank money or in commercial bank money. As argued above, payment in central bank money eliminates any risk taken on the issuer of the settlement asset.

Inter-settlement bank payments are settled at the end of each day on a net basis and the banks build up large intraday exposures to one another (see Box 3). They are especially large in the Central Gilts Office as a result of the way dealers in the gilt market finance their inventory using overnight repo, which gives rise to large (implicit) transfers of funds between settlement banks at the beginning and end of each day.

The Central Moneymarkets Office (CMO – operated by CRESTCo since September 1999) also currently operates continuous gross settlement of securities transfers combined with net, end-of-day settlement of funds transfers. However, there is no assured payment scheme offered by the settlement banks in CMO, so intraday principal risks remain with the participants. Net sellers of securities are therefore exposed to their counterparties until settlement of funds has occurred at the end of each day.

These exposures between the settlement banks in CGO and CREST, and between the participants in CMO, would be eliminated by moving to a full DvP system in which securities and payments are transferred simultaneously throughout the day. A transfer of final funds from the buyer's settlement bank to the seller's settlement bank would mirror each securities transfer.

In July 1996 a Steering Group, chaired by the Bank of England, and including representatives of the Association for Payment Clearing Services (APACS), CRESTCo, the Gilt-Edged Market Makers Association (GEMMA) and the London Investment Bankers Association (LIBA) identified potential models for full DvP in central bank money in the United Kingdom. The Bank's Settlement Priorities Review in 1998 reiterated the need to implement full DvP as soon as possible but recognised conflicting priorities in the short term such as EMU and Year 2000 preparations, and the market's desire to merge CGO and CMO into CREST.

The Bank of England is now working with CRESTCo, APACS, and industry participants to upgrade the form of DvP currently offered in CREST. Agreement is close on the high-level design of a full DvP mechanism, which will offer settlement in CREST against payment across accounts at the Bank of England in real time. The Bank is currently drawing up the detailed

specifications with CRESTCo. Design and development work will continue throughout 2000 and 2001. The intention is to introduce full DvP in 2001.

Real-time gross settlement of fund transfers in securities settlement systems raises similar liquidity issues to real-time gross settlement in payment systems. Again, payment flows arising from securities transfers between firms are typically asymmetric over the course of a day even if they tend to net out over longer periods. So firms may need to borrow funds in order to pay for securities being purchased before they receive payment for securities being sold; and there may be incentives to delay payments if this liquidity is not freely available. Unless the flows of funds arising from securities settlement can be used to offset those arising from the payments system, overall demand for intraday liquidity is likely to rise. To some extent, banks may be able to alter the scheduling of their payment and settlement flows to minimise this effect. But in a system based on collateralised intraday lending by the central bank, any increase will mean banks have to hold additional collateral.

Additional collateral needs may increase the opportunity cost of intraday liquidity to the banks and it is important that this does not reduce their willingness to settle transactions in a timely way. One option is to enable settlement banks to use the securities<sup>13</sup> that they or their customers are purchasing to collateralise the borrowing needed to finance the transaction. This process is known as 'self-collateralisation'. The Bank has agreed in principle that it will provide liquidity in this way if necessary to support efficient settlement following the introduction of DvP in CREST. Complex operational and legal issues must first be resolved, however.

### Replacement cost risk

Central banks have given a higher priority to the reduction of principal risk than replacement cost risk. Nonetheless replacement cost risk can also be significant, especially in periods of sharp market movements. This section considers a way of reducing replacement cost risk: shorter settlement cycles; and a way of managing replacement cost risk: central counterparty clearing houses.

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<sup>13</sup>: Provided these are acceptable collateral to the central bank and suitable 'haircuts' are applied. (See Box 4 for an explanation of 'haircut'.)

## Shorter settlement cycles

As discussed above, replacement cost risk arises in the period between an initial transaction and final payment or settlement. Shortening this settlement cycle can reduce counterparty risk.

In 1989, the Group of Thirty recommended that:

“A ‘Rolling Settlement’ system should be adopted by all markets. Final settlement should occur on T+3 by 1992. As an interim target, final settlement should occur on T+5 by 1990 at the latest, save only where it hinders the achievement of T+3 by 1992.”

In the United Kingdom, government bonds (gilts) have been settled on T+1 and money market instruments on the trade date for many years. However, equities are settled on T+5 (T+10 for certificated stock). The London Stock Exchange (LSE), in the results of its market harmonisation consultation published in June 1999, indicated that over three-quarters of respondents believed that the market should ultimately move to a shorter cycle, and that it is a high priority to have a standard settlement cycle across Europe<sup>14</sup>. The Bank, CRESTCo, APACS and the LSE, in conjunction with market participants, have been examining the issues involved in reducing the settlement cycle for the UK equity market to T+3. Following these discussions, in November they announced a proposal that a T+3 settlement standard should be adopted with effect from February 2001. Table 2 shows settlement cycles in major equity markets worldwide.

In the United States, equity markets moved from T+5 to T+3 settlement in 1995. But SEC chairman Arthur Levitt has said that he regards the achievement of T+1 settlement as a high priority, and has suggested a date of June 2002 for its adoption (Levitt (1996)).

The main constraints on further reduction in the settlement cycle are delays and inefficiencies in the processing and exchange of trade information by fund managers, broker/dealers, global custodian banks, clearing agents, local sub-custodians and securities settlement systems. As Diagram 2 shows, part of the problem is the number of parties that can be involved, particularly in cross-border trades. The trade process is only as strong as its weakest link. Unless front and back office procedures are changed, shortening the

**Table 2:**  
**Settlement Cycles for Equities in the G10 Countries**

Country	Securities Settlement System	Settlement Cycle
Belgium	CIK	T+3
Canada	CDS	T+3
France	Sicovam	T+3 <sup>1</sup>
Germany	DBC	T+2
Italy	Monte Titoli/LDT	T+5
Japan	JASDEC	T+3
Netherlands	AEX-SCC	T+3
Sweden	VPC	T+3
Switzerland	SEGA-Intersettle	T+3
United Kingdom	CREST	T+5
United States	DTC	T+3

<sup>1</sup> T+3 for cash settlement, and end of month for settlement for the monthly account period – or at any time from same day to T+100 agreed by the parties for off-market trades.

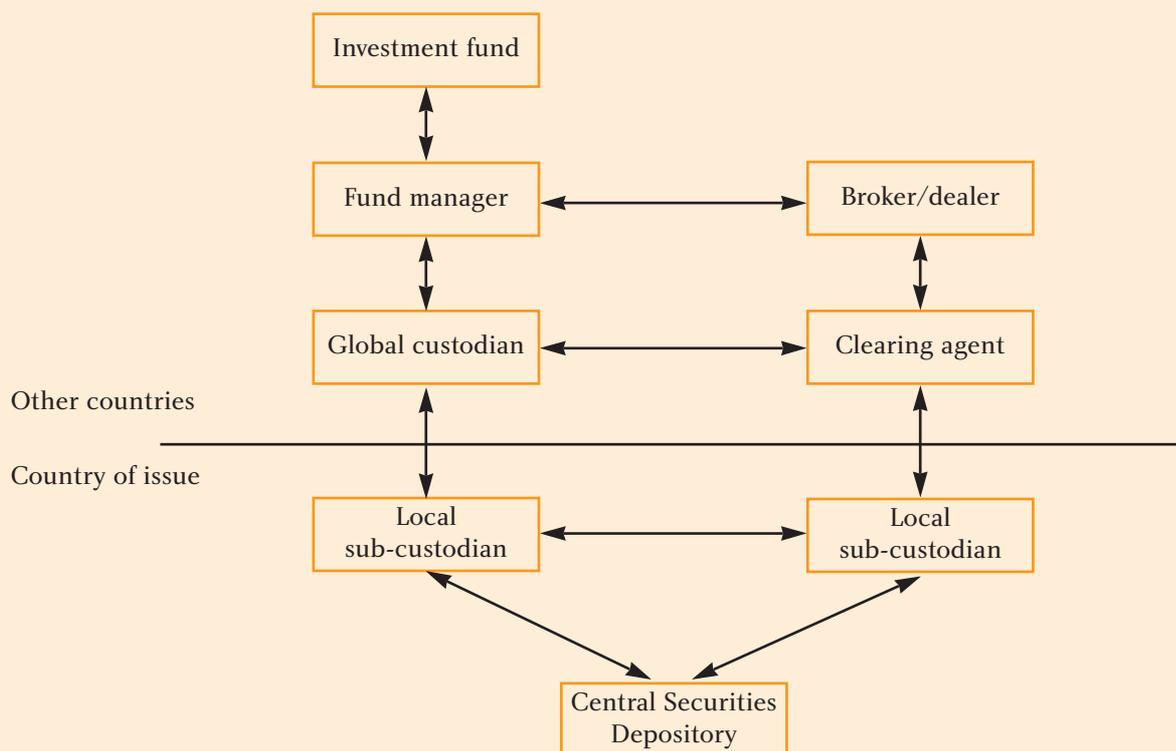
settlement cycle may lead to an increase in operational risk greater than any reduction in counterparty risk. The number of failed settlements might increase sharply, adding to back office costs and creating a risk of chains of consequential failures.

At present, brokers usually notify their clients of execution – one of the first post-trade activities – only at the end of trade date. In order to shorten the settlement cycle to T+1, all confirmation and matching activities would have to be completed on trade date, so that information flows and settlement activities involving custodians and sub-custodians could be completed on the next day.

The process is slowed down and made more vulnerable to error by re-keying of the same information at several different stages. For instance, global custodians often receive settlement information at the same time as the broker-dealer's clearing agent. This has the effect that the global custodian is usually later than the clearing agent in its communication to the local central securities

<sup>14</sup>: 'European Alliance: Results of London Stock Exchange market harmonisation and order book development consultation', June 1999, p. 4

Diagram 2: Typical message flows in a cross border securities transaction



depository, particularly if a sub-custodian is used. So settlement does not take place as soon as it might.

The recent initiatives by industry bodies to create standard formats for straight-through processing (STP) may help<sup>15</sup>. If trade information were posted in a single data pot, to which all parties to the transaction have immediate access, these unnecessary delays could be eliminated. Moreover, there should be fewer repairs (where a custodian re-enters trade details, believing them to be incorrect for some reason) and disputes (most commonly, where the investment manager and the broker-dealer calculate the net amount of the trade, and there is a discrepancy between the two figures). It seems likely that additional market infrastructure will be needed. The Global Straight Through Processing Association (GSTPA) is an initiative to introduce such a 'transaction flow monitor', particularly for cross-border trades.

Finally, securities settlement systems could have an important role in any automated process. Real-time DvP links between securities depositories would

enable participants in one system to settle securities transactions in another system directly using the links between the two systems rather than relying on intermediaries, such as sub-custodians or local settlement agents. This is the objective of the European Central Securities Depositories' Association, currently chaired by CRESTCo. CREST has a direct link to the Swiss system SEGA-Intersettle and plans further links, including to the US Depository Trust Company (DTC) in 2000. Such a simplification of the settlement process for cross-border trades might make shorter settlement cycles easier to achieve without added operational risk.

#### Central counterparty clearing houses

A clearing house acts as a central counterparty when it interposes itself as buyer to each member seller and seller to each member buyer in a defined market. Central counterparties are typically associated with futures and options markets but are also used to clear some cash, bond and equity markets as a means of managing replacement cost risk. The New York, Amsterdam and Paris equity markets all have central

<sup>15</sup>: Industry bodies developing such projects include the Global Straight Through Processing Association (GSTPA), the Industry Standardisation for Institutional Trade Communication (ISITC) and, in the United States, the Operations Committee of the Securities Industry Association (SIA).

counterparty services for cash equity transactions. And in October 1999, the LSE announced that it would be working with the London Clearing House (LCH) and CRESTCo to provide a central counterparty for trades executed on SETS, the LSE's electronic order book. LCH already acts as central counterparty to trades executed on Tradepoint, an electronic exchange for UK equities.

A central counterparty by definition allows the multilateral netting of exposures, since a firm has a relationship with only one counterparty for all trades that have reached the point of novation<sup>16</sup>. The netting of offsetting transactions can significantly reduce counterparty exposures between firms in wholesale markets that are characterised by two-way trading among a group of dealers.

An article in the previous edition of *Financial Stability Review* (Hills, Rule, Parkinson and Young (1999)) discusses central counterparty clearing houses and financial stability more generally. A central counterparty redistributes counterparty credit risk away from those that traded with a failed firm. Instead, any losses are allocated according to the clearing house's rules, usually first against the margin provided by the failed firm, then against a common default fund, the funds of the shareholders of the clearing house or an insurance policy. A central counterparty thus provides a standard credit risk to replace the variable, bilateral risk firms take on each other in a decentralised market.

As far as possible, a central counterparty should be structured so that participants retain incentives to control the risks that they introduce into the system. The allocation of any losses should be transparent, the resources available to the clearing house should be proportionate to the risks to which it is exposed, and management should be accountable to those potentially exposed to loss.

If a central counterparty is well constructed and managed, then it can improve the management of replacement cost risk within a market: for example, through marking to market of unsettled trades and the use of initial margin.

It may also make the functioning of the market more resilient during a crisis, when replacement cost risk may increase sharply. Where firms are highly uncertain about the creditworthiness of counterparties, they may avoid trading because of concerns about counterparty risk. A central counterparty can overcome these problems provided firms have confidence in its solvency.

## Conclusions

In his 1989 Sykes Lecture, Governor Leigh-Pemberton described the principles that should underlie the design of payment and settlement systems: "First, the quality of the payment services provided to users should be high in terms of the availability of intraday funds to payees. This capacity for access to funds would ideally be combined with book-entry transfer systems to enable simultaneous final delivery against payment transfers. But the risks incurred by providers of these services should be clear, measurable and controllable. The risks borne by individual banks should also be proportionate to their capacity to bear them. And any system should be designed to protect against a chain of defaults". The Bank's accompanying paper concluded, "there are features of our present payment and settlement systems which do not meet these criteria".

In the past decade, as discussed above, there have been important changes to the UK and international financial market infrastructure, which have gone a considerable way towards meeting these criteria. But there are still areas where more progress is needed.

In the United Kingdom, the immediate priority is the implementation of full DvP in CREST, with transfers of funds between settlement banks taking place across accounts at the Bank throughout the day and synchronised with the opposite movement of securities in CREST. The Bank and CRESTCo intend full DvP to be up and running in 2001. The integration of gilts and money market instruments into CREST should ensure that all UK securities are settled with full DvP. This will complete the work begun with the introduction of RTGS in CHAPS by extending the elimination of intraday settlement bank risk to the fund transfer system embedded within the UK securities settlement system. It should bring a major structural reduction in systemic risk.

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<sup>16</sup>: Multilateral netting is achieved by taking the sum of a clearing house participant's net positions with each of the other participants.

Internationally, the biggest priority is the successful implementation of the CLSB as planned in the second half of next year. This will make payment-versus-payment possible in foreign exchange settlement, so eliminating principal risk on those transactions which are settled by the CLSB. The world has lived with high and increasing interbank exposures to foreign exchange settlement risk for too long. It is important that CLSB is made to work now that the technology and will exist to address the problem.

Central banks have given less attention to replacement cost risk than principal risk in payments and settlement because of the smaller scale of the exposures involved. Nonetheless, replacement cost risk should not be ignored and exposures can grow large in times of market stress. For this reason, initiatives to shorten settlement cycles are welcome, provided the necessary measures to re-engineer post-trade, pre-settlement processing are also adopted. The use of central counterparties can also improve the management of replacement cost risk and may help to keep markets functioning in periods of sharp price movements. Because they concentrate risk, however, it is vital that central counterparties are properly designed and managed.

The globalisation of financial markets means financial stability in the United Kingdom could be affected by problems in payment and settlement systems not just domestically but throughout the world. For example, UK funds and institutions do a considerable volume of business through securities settlement systems in emerging market economies. They need to be aware of the settlement risks to which they may be exposed. Does the system give final and irrevocable settlement on the day of value? Does it offer DvP? Indeed the levels of intermediation needed to facilitate cross-border payments and settlement, where UK institutions may use one or more local banks or other institutions as agents or principals on their behalf, can add further risks. The Bank is continuing to work at an international level to encourage the adoption of safer payment and settlement practices worldwide, both in the developed world and in emerging market economies. For example, a BIS group, including representatives from a wide range of central banks and chaired by John Trundle of the Bank, is currently developing a set of core principles for systemically-important payment systems that can be applied in all countries worldwide.

Of course, banks and other market participants may react to risk reduction in this area by taking greater risks elsewhere. Importantly, however, these risks will normally be undertaken voluntarily. By contrast, counterparty credit risks arising from the payment and settlement process are typically an unwanted by-product. Moreover, exposures in large-value systems can be very large and concentrated among the biggest banks. Improving large-value payment and settlement systems is thus an unequivocal way that central banks can reduce systemic risk. Other things being equal, the adoption of RTGS in domestic payments, DvP in securities settlement and PvP in foreign exchange settlement will make the financial world a safer place. The scale of the financial flows through these systems, their importance to the functioning of financial markets and the economy as a whole, and the very large size of the intraday exposures which can otherwise arise among the biggest banks, help explain why this is such an important part of the Bank's financial stability work.

## References

- 1:** Association for Payment and Clearing Services (1999) *Key Facts and Figures – 1999*.
- 2:** Bank for International Settlements (1990) 'Report of the Committee on Interbank Netting Schemes of the Central Banks of the Group of Ten Countries', Basel, November.
- 3:** Bank for International Settlements (1992) 'Delivery versus Payment in Securities Settlement Systems', Basel, September.
- 4:** Bank for International Settlements (1995) 'Cross-border Securities Settlements', Basel, March.
- 5:** Bank for International Settlements (1996) 'Settlement Risk in Foreign Exchange Transactions', Basel, March.
- 6:** Bank for International Settlements (1997a) 'Real-Time Gross Settlement Systems, Basel', March.
- 7:** Bank for International Settlements (1997b) 'Clearing Arrangements for Exchange-Traded Derivatives', Basel, March.
- 8:** Bank for International Settlements (1998a) 'Reducing Foreign Exchange Settlement Risk: A Progress Report', Basel, July.
- 9:** Bank for International Settlements (1998b) 'OTC Derivatives: Settlement Procedures and Counterparty Risk Management', Basel, September.
- 10:** Bank for International Settlements (1999a) 'Central Bank Survey of Foreign Exchange and Derivatives Market Activity 1998', Basel, May.
- 11:** Bank for International Settlements (1999b) 'Securities Lending Transactions: Market Development and Implications', Basel, July.
- 12:** Bank for International Settlements (1999c) 'Supervisory Guidance for Managing Settlement Risk in Foreign Exchange Transactions: Consultative Paper', Basel, July.
- 13:** Bank of England (1989) 'Payment and Settlement Systems Risks and Efficiency: A Discussion Paper', London, November.
- 14:** Board of Governors of the Federal Reserve System (1999) 'Federal Reserve Policy Statement on Payment System Risk', Washington DC, January.
- 15:** European Central Bank (1999) 'Payment Systems in the European Union: Addendum incorporating 1997 figures'.
- 16:** Financial Services Authority, 'Guide to Supervisory Policy' ([www.fsa.gov.uk](http://www.fsa.gov.uk)).
- 17:** Group of Thirty (1989) 'Clearance and Settlement in the World's Securities Markets', Washington DC, March.
- 18:** Hills, B, Rule, D, Parkinson, S and Young, C (1999) 'Central Counterparty Clearing Houses and Financial Stability', *Financial Stability Review*, Issue 6, June, pp. 122-134.
- 19:** Leigh-Pemberton, R (1989) 'Challenges facing the Sterling Wholesale Payments Systems: Ernest Sykes Memorial Lecture', *Bank of England Quarterly Bulletin*, August.
- 20:** Levitt, A (1996) 'Speeding up Settlement: The Next Frontier', remarks at the US SEC Symposium on Risk Reduction in Payments, Clearance & Settlement Systems, The Pierre Hotel, New York, 26 January.
- 21:** New York Foreign Exchange Committee (1994) 'Reducing Foreign Exchange Risk', New York, October.

# Emerging economy spread indices and financial stability



Alastair Cunningham

The Bank of England monitors the spread between yields on bonds issued by emerging economies and those on less risky assets as part of its assessment of threats to financial stability arising from the emerging markets. In addition to tracking these spreads for individual countries, the Bank follows aggregate indices, or weighted averages, of these spreads across the emerging economies. J P Morgan publish some widely quoted emerging market bond indices which are often used to assess market perceptions of emerging economy risk. But these indices are designed primarily for portfolio-management purposes. This article considers the construction of alternative indices which can be used to assess financial stability risks in emerging markets – using weights designed to reflect the direct credit risk exposures of UK and global financial institutions. A measure weighted to reflect the direct credit risk exposures of UK-owned banks has been consistently lower than both the published indices and measures weighted to reflect external exposures at a global level. And the UK-based measure has fallen more sharply since the Russian crisis than the other measures.

**SHOCKS TO** emerging economies can affect the stability of the UK financial system. Many UK financial institutions have lent to emerging economies or invested in bonds issued by them. And institutions that do not carry direct exposures could be affected by shocks to those economies because they have lent to other financial institutions with direct exposures to the emerging economies. The Bank therefore monitors risks to the financing capabilities of emerging economies (as well as those of the larger economies). Measures of yield spreads (over ‘safe’ or ‘risk free’ assets which bear minimal credit risk) on emerging market countries’ debt instruments are a key tool used to assess these risks<sup>1</sup>.

The spread is the extra return required to compensate the investor for the additional risks faced when investing in the emerging economies rather than in a ‘safe asset’ (such as a US government bond). They are forward-looking, reflecting investors’ tastes and views of the risks attached to holding the bonds.

## Spreads as an indicator of credit risk

The spread is the difference between yields on two bonds. Comparing yields on bonds denominated in the same currency and with a similar duration, the spread offers some indication of market participants’ perceptions of the probability that the issuer will default and the extent of any recovery in the event of

<sup>1</sup>: Sovereign credit ratings provide an alternative indicator which the Bank also monitors. Christopher Huhne of IBCA discusses these ratings in more detail in ‘Rating Sovereign Risk’ *Financial Stability Review*, Bank of England, Issue 1, 1996.

a default. If the expected recovery rate in the event of default is known, it is possible to extract the markets' perception of the probability of default. However, recovery rates are not known with certainty. Even if they were, the yield-spread on a financial asset may offer a biased indicator of the probability of default, because spreads reflect factors other than credit risk such as risk and liquidity premia.

If two assets offer the same return on average, investors may prefer a less risky outcome to a more risky one. In this case, they will charge a risk premium, requiring a higher yield to hold the risky asset. One reason why investors may be averse to risk is that 'good' and 'bad' outturns have an asymmetric impact on their ability to survive. For example, good outturns may add only marginally to the investors' capital while (relatively rare) bad outturns could wipe out the capital. In this case, the risk premium does contain some information about perceived risks to the stability of the financial system even if it clouds an assessment of the probability of a default by the emerging economy debtor.

Investors may also be concerned about their ability to liquidate their asset holdings if they need to. If they envisage potential 'liquidity problems' they will charge a further 'liquidity premium'. Again, concerns about liquidity may contain information about risks to financial stability while clouding assessment of default probability.

We have no direct evidence of the importance of either of these factors, but both may reduce the usefulness of spreads as an indicator of risks to financial stability. To the extent that liquidity and risk premia do not represent risks to financial institutions' balance sheets, the level of spreads will overstate risk to payments. And changes in spreads may reflect factors other than risk.

### **Indices of emerging economy bond spreads**

While spreads on individual emerging economy instruments tell us about perceptions of risk for an individual asset or market, it is often useful to assess risks to the UK's financial stability from the class of emerging economies as a whole – a summary statistic of emerging economy risks. One possibility is to track some average of spreads on emerging economy instruments. But which instruments and countries should be covered? And how much importance should be attached to

different countries – in other words how should the country spreads be weighted? This article discusses the design of 'indices' of emerging economy spreads.

The most commonly used 'indices' of bond spreads for the emerging economies are constructed by J P Morgan. The indices are constructed using a particular weighting scheme and have a specific instrument and country coverage. Their method reflects the fact that the indices are intended principally for portfolio management purposes. Country spreads are weighted together according to the size of the underlying debt market. So such indices are well-suited to answering the question: "What premium would I expect to earn on a market-size-weighted portfolio of emerging market bonds, relative to US Treasury securities?"

In its financial stability role, the Bank uses bond market indices for addressing slightly different sets of questions. In particular, bond spreads are typically used as an indicator of the market's assessment of the credit risk attaching to the portfolio exposures of UK financial institutions; or, more broadly, the exposures of financial institutions in developed countries. Evaluating risks to financial stability in this way means constructing and assessing indices which address the question: "How much credit risk is attached to the emerging economy exposures of the United Kingdom or of other developed countries' financial systems?". This calls for a different weighting method for the index.

The section after this describes the construction of the J P Morgan emerging market bond indices. The third section describes the construction of indices using alternative weighting schemes designed with financial stability questions in mind. These indices provide a complement to J P Morgan's indices in the Bank's analysis.

The fourth section considers the historical behaviour of these alternative bond indices. Weighting according to global exposures or BIS bank lending patterns does not materially change the picture painted by J P Morgan's broader indices. But weighting spreads according to UK-owned banks' lending patterns suggests both a lower level of perceived credit risk and a sharper fall in perceived credit risk from the height of the Russian/Brazilian crises in 1998.

A final section sets out some potential pitfalls and problems that may limit the usefulness of average spreads as an indicator of emerging economy risk.

### J P Morgan's Emerging Market Bond Indices

For several years, J P Morgan have produced a range of emerging market bond indices. These indices are designed as market benchmarks, reporting the return investors could have made by investing in various portfolios of emerging market assets. By comparing their returns against these indices, investors can assess

their performance against a feasible portfolio alternative which is 'neutral' in the sense that it did not involve any strategic decisions beyond the decision to invest in emerging economies. J P Morgan publish figures for the return and the yield spread on the benchmark portfolio<sup>2</sup>. It is the yield spread that is relevant from the point of view of assessing credit risk, since it measures the yield compensation that investors require over safe (almost zero default) assets<sup>3</sup>. In the J P Morgan measures of spreads on US\$-denominated bonds, the safe assets are taken to be US Treasuries.

### Box 1: Criteria for country and asset inclusion in J P Morgan's Emerging Market Bond Indices

This box sets out the criteria for asset and country inclusion in J P Morgan's Emerging Market Bond Indices. Table A lists the countries covered along with the market capitalisation and face value of each of the notional portfolios.

The EMBI tracks returns and spreads on Brady bonds and some other restructured sovereign debts. It covers most Brady bonds issued by countries rated BBB-/Baa3 or lower by Standard & Poor's and Moody's – one definition of emerging economies. Bonds covered must have a face value of over US\$500 million, at least 2½ years to maturity and be liquid in the sense of having prices that are widely quoted by brokers. At end-August 1999, the EMBI covered assets with a face value of US\$111 billion, in other words the bulk of the total stock of Brady bonds.

The EMBI+ tracks returns on a wider range of instruments – sovereign US\$-denominated bonds. Again, the measure covers bonds issued by countries rated BBB-/Baa3 or lower by Standard & Poor's and Moody's. And again, the measure excludes bonds which are not large enough (face value must be over US\$500 million), mature too soon (minimum of 2½ years to maturity) or are not judged to be sufficiently liquid.

The EMBI(Global) is a newly released index, designed to track returns on a yet-wider range of emerging economy instruments. The definition of emerging economy is broader – covering all countries classified as low or middle income by the World Bank and any others which have restructured sovereign debts over the past ten years. As with the other indices, this measure only covers instruments with a face value of over US\$500 million and at least 2½ years to maturity. Bonds must also pass a liquidity test – there must be a daily price available from either J P Morgan or another source – though the liquidity criteria are less restrictive than for the EMBI or EMBI+.

The EMBI(Global constrained) was released alongside the EMBI(Global). It is based on the same pool of assets, for the same set of emerging economies. It differs from the EMBI(Global) because it excludes a portion of the instruments issued by the largest countries (those whose eligible instruments exceed US\$5 billion in face value). The rationale for restricting exposure to individual countries is to provide a benchmark for those investors who face limitations on the amount of portfolio exposure they can take to individual issuers.

Table A summarises the inclusion criteria for the four indices and lists the countries covered. Further details of all four indices are available on J P Morgan's client website ([www.morganmarkets.com](http://www.morganmarkets.com)).

<sup>2</sup>: J P Morgan report two yield spreads – one that takes no account of any collateral embedded in Brady bonds, and another (the stripped spread) which attempts to strip this collateral from the price of the Brady bonds to give a truer indication of market perceptions of default risk. For the purposes of this article, we focus exclusively on stripped spreads. For more details on the functioning of Brady bonds see, for example, Merrill Lynch 'The 1995 Guide to Brady Bonds'.

<sup>3</sup>: The (*ex post*) return on a portfolio is distinct from its yield. The yield is the promised return if the bond is bought and held until it matures. In other words, it covers the stream of coupon and principal repayments. Return is backward-looking. It is the return that could have been earned had one invested in this portfolio (say) a month earlier. The *ex post* return on holding an asset does not reveal the level of credit risk, because it will be affected by changes in price. These changes may tell us about changing perceptions of credit risk, but do not reveal the level of risk.

**Table A: Comparison of J P Morgan index criteria and coverage**

	EMBI	EMBI <sup>+</sup>	EMBI(Global)	EMBI(Global constrained)
<i>Overview (30/8/99)</i>				
Market capitalisation	US\$72 billion	US\$131 billion	US\$170 billion	US\$99 billion
Face value	US\$111 billion	US\$199 billion	US\$244 billion	US\$136 billion
<i>Instrument coverage</i>				
Class of assets	Brady bonds/other restructured	All sovereign/quasi-sovereign US\$-denominated bonds		
Min face value	US\$500 million	US\$500 million	US\$500 million	US\$500 million
Min maturity	2 <sup>1</sup> / <sub>2</sub> years	2 <sup>1</sup> / <sub>2</sub> years	2 <sup>1</sup> / <sub>2</sub> years	2 <sup>1</sup> / <sub>2</sub> years
Liquidity	Widely quoted prices		Daily price quotes from at least one broker	
<i>Country coverage</i>				
Criteria	Rated BBB-/Baa3 or lower by both Standard & Poor's and Moodys		Classified as low or middle income by World Bank, and/or having restructured sovereign debts within the past ten years or has restructured debts outstanding	
No. countries	11	16	27	27
Countries covered				
<i>Latin America</i>	Argentina Brazil	Argentina Brazil	Argentina Brazil Chile	Argentina Brazil Chile
	Ecuador Mexico Panama Peru Venezuela	Colombia Ecuador Mexico Panama Peru Venezuela	Colombia Ecuador Mexico Panama Peru Venezuela	Colombia Ecuador Mexico Panama Peru Venezuela
<i>Asia</i>		Philippines South Korea	China Malaysia Philippines South Korea Thailand	China Malaysia Philippines South Korea Thailand
<i>Eastern Europe</i>	Bulgaria	Bulgaria	Bulgaria Croatia Hungary	Bulgaria Croatia Hungary
	Poland Russia	Poland Russia	Poland Russia	Poland Russia
<i>Other</i>	Nigeria	Morocco Nigeria Turkey	Algeria Greece Ivory Coast Lebanon Morocco Nigeria South Africa Turkey	Algeria Greece Ivory Coast Lebanon Morocco Nigeria South Africa Turkey

J P Morgan publish four emerging market bond indices. The four measures have similar objectives – they are indicators of benchmark returns – but differ in the class of assets included, the pool of issuing countries and the weights attached to them. The EMBI is the ‘narrowest’ measure, covering only Brady

or other restructured sovereign bonds issued by 11 countries. By focusing on restructured debts (principally Bradys), the EMBI captures only a subset of emerging economy debt. For example, at end-1998, the total stock of Brady bonds had a face value of US\$121 billion, compared with US\$854 billion loans

to emerging economies from BIS banks and total gross external debts of US\$2.3 trillion at end-1997<sup>4</sup>. The other indices cover other classes of sovereign and quasi-sovereign borrowing, in addition to Bradys. The EMBI(Global) is a new measure – released in summer 1999 – and is the broadest, covering 27 countries and a wider class of assets than earlier indices. Box 1 compares the criteria for asset and country inclusion in the four indices.

For each index, the average spread is constructed by comparing the yield promised on a portfolio of emerging economy bonds with the yield on a hypothetical US Treasury (safe asset) that promised the same cashflow. The portfolio yield is a weighted average of the yield spreads on its component assets (spread ‘i’ for each country ‘i’ in the notation below), with weights based on the *face value* of the assets relative to the total face value of the underlying assets:

$$EMBI \text{ spread} = \sum_{i=1}^n \alpha_{it} spread_{it} \quad (1)$$

As the notation suggests, the weights attached to the yields on the various assets ( $\alpha_{it}$ ) are time-varying. If the face value of an asset changes (for example, as a result of a debt buyback) or if the pool of assets changes (for example, because one asset becomes illiquid on the criteria used for inclusion in the index) then the portfolio weights will change. Weights are reviewed once a month, but weight changes are not applied retrospectively. As a result, the average spread may ‘jump’ as a result of a shift in the weights rather than any change in the underlying riskiness of the instruments.

This is most likely to occur following inclusion of a new asset or the deletion of an existing asset.

The weights attached to spreads for different countries vary across the four measures of spreads as a result of differences in the class of assets covered, countries included, and (in the case of the Global constrained index) the proportion of each of the assets included – see Box 1 above. Table 1 compares the weights attached to Latin American, Asian and other emerging economies in the various measures.

The EMBI, which focuses exclusively on Brady bonds, attaches the greatest weight to Latin American economies. Indeed, only four of the countries included are outside Latin America. Broadening the asset eligibility criteria generates lower weights for Latin America, because non-Latin American economies have not issued much Brady debt. The Global constrained – which downwardly adjusts weights for countries with large stocks of eligible bonds – has the lowest Latin American weight. But even here, Latin America accounts for over half the face value of the index.

Chart 1 plots the EMBI from January 1997, and the other indices from January 1998 (longer back-runs are not available). The EMBI measure of spreads shows a much smaller increase in spreads following the Asian crises of 1997 than after the Russian/Brazilian crises of 1998. The rise in spreads as measured by all indices is in line with other evidence of increased credit risk and concerns about risk and liquidity following the Brazilian/Russian crises.

**Table 1: Regional weights of the various J P Morgan indices at end-August 1999<sup>(a)</sup> (per cent)**

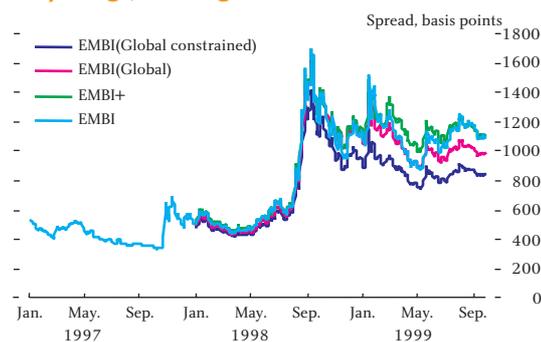
	EMBI	EMBI <sup>+</sup>	EMBI (Global)	EMBI (Global constrained)
Latin America	83.8	70.2	61.5	51.8
Asia	0.0	2.9	10.9	17.5
Other	16.2	27.0	27.6	30.8
o/w Russia	5.8	19.5	16.4	10.8

(a) Face-value weights

Source: J P Morgan

<sup>4</sup> The figures for bank lending and external debt exclude Panama, which is an offshore centre rather than an emerging economy as defined by us in this article (see later discussion of currency coverage) but had a stock of US\$2.1 billion Brady bonds outstanding at end-1998. Panama is included in the EMBI.

**Chart 1:**  
**Comparing J P Morgan bond indices**



Source: J P Morgan.

The various indices behaved similarly until the Latin American crises of end-1998. Thereafter, the indices with a lower Latin American weight have recorded narrower spreads largely reflecting better performance of the Asian economies over this period. Wide spreads in Russia have also driven the EMBI+ above the two EMBI(Global) measures. On 18 October, the average spreads ranged from 833 basis points for the Global constrained to 1106 basis points for the EMBI+. There are significant differences in the implied level of spreads across the four indices.

In theory, differences between the indices are not due solely to country weight, because the assets covered also differ. So the average spreads for each country are not the same under the various indices. Comparing the various measures of the stripped spread for Brazil, however, the differences between EMBI+, EMBI(Global) and EMBI(Global constrained) spreads are small, averaging four basis points since the start of 1998<sup>5</sup>. This suggests that the different country weights, and in particular the higher Latin American weighting of the EMBI and EMBI+ and the high Russian weight in the EMBI+, are the primary reasons behind the significant differences in the level of the spread.

### Constructing alternative indices

The J P Morgan indices are designed for portfolio management purposes. One reason why the Bank of England has a financial stability interest in such indices is as a potential summary statistic of emerging economy credit risk. That may be captured better by a different weighting scheme for individual country spreads, one which reflects the extent of the exposure of UK (or other developed economy) financial

institutions to a country, rather than the market capitalisation of the underlying instruments. It may also call for a different coverage of emerging economy assets, in terms of countries or instruments.

In this section, we discuss these coverage and weighting issues in turn. Our approach is to use J P Morgan's country-level measures of sovereign bond spreads as a proxy for all credit risk emanating from the various emerging economies and to weight these spreads according to some measure of the importance of each country for financial stability.

### (a) Coverage

#### (1) Instruments

UK and global financial institutions are exposed to emerging economies through their holdings of a range of instruments – bond holdings, bank loans, etc – issued by both sovereign and non-sovereign borrowers. Ideally, a measure of credit risk from emerging economies would aim to track market perceptions of risks to payments on all these obligations. In practice, it is possible to cover only those assets for which there is a liquid secondary market, which essentially means confining our attention to the bond market.

The J P Morgan measures cover a wide range of liquid bond issuance, but are restricted to sovereign issues. This means that they reflect sovereign credit risk rather than all emerging economy credit risk. For the purposes of this article, we have used J P Morgan's country-level measures of spreads, and so are similarly restricted to measuring sovereign credit risk. An alternative would have been to track corporate bond spreads as well. This is a potential area for future research.

Restricting attention to sovereigns may not matter from the point of view of assessing portfolio performance, but it is a potential flaw for a measure of perceived credit risk. As it is, the indicator will be useful so long as sovereign bond spreads are a good indicator of perceived credit risk on all classes of asset.

#### (2) Countries

There are two issues in the choice of country coverage. First, what countries would we like to cover

<sup>5</sup> The EMBI spread has diverged more – it includes only Brady's. The average magnitude of the difference between the EMBI and the EMBI(Global) was 39 basis points, with a maximum of 105 basis points.

if data were available – in other words what defines an emerging economy? Second, for which of those countries do liquid secondary markets exist for sovereign bonds?

There is no widely agreed single definition of emerging economies. J P Morgan have used two criteria in the construction of their indices. The EMBI and EMBI+ draw from those countries rated below BBB-/Baa3 by Moody's and Standard & Poor's (sub-investment grade bonds). This is a fairly restrictive definition and would have excluded some significant Asian economies prior to the Asian crisis in 1997. For example, South Korea was rated A1 by Moody's until November 1997.

The EMBI(Global) and Global constrained indices draw from a wider pool, covering all economies classified as low or middle income by the World Bank, plus those whose sovereigns have recently restructured their debts. This classification picks up all the significant Asia/Pacific emerging economies. But these criteria are also so broad that they include economies that might be better regarded as offshore banking centres (for example, Panama) and include one member of the European Union (Greece).

As a working definition, we treat as emerging all those economies classified by the BIS as either 'Developing' or 'Eastern European', plus Turkey and the former Yugoslavian economies (more than 150 countries). This definition excludes offshore centres such as Hong Kong and Singapore. UK banking exposure to offshore centres is significant: for example, at the end of 1998 gross lending to Hong Kong and Singapore by UK-owned banks was equivalent to around a third of all lending to non-BIS economies and 12 per cent of all UK-owned banks' lending outside the United Kingdom.

The Bank also monitors developments in offshore centres from a financial stability perspective. But it is perhaps misleading to monitor them in the same way as other emerging economies, because the risks to UK financial institutions differ. For an offshore centre, risks to the UK financial system operate principally through the potential for the local banking sector to fail rather than default by sovereigns or firms in the country. That is because monies loaned to banks in offshore centres are frequently on-lent to firms in other countries. On a more pragmatic level,

sovereigns in many of these economies do not have outstanding foreign currency debts so that there are no sovereign yields to track.

Ideally, an index would track yield spreads on bonds issued by all of the emerging economies. In practice, the country coverage is restricted because some countries have not issued many foreign currency bonds, while for others the bond markets may not be liquid, so that quoted prices do not reflect actual trades. For the purpose of this article, we have used J P Morgan's country-level measures of spreads, and hence follow their liquidity, size and maturity criteria for asset selection. Using these criteria means excluding some countries that are significant from a UK bank lending or global exposure perspective. Box 3 considers the potential importance of some of these exclusions.

Applying J P Morgan's criteria leaves spreads for 24 emerging economies, according to our definition. We exclude three of the countries that J P Morgan cover because they do not match our classification of emerging economy: Greece (EU), Panama and Lebanon (offshore centres). Otherwise, the set of countries included in our variants are as in the EMBI(Global) – see Table A.

## (b) Weights

The optimal choice of weights will depend on how shocks from emerging economies propagate through to affect financial stability in the United Kingdom and more generally. There are a number of channels – direct and indirect – through which shocks to emerging economies might affect financial stability in the United Kingdom. Two of the more important ones are:

- *Direct:* Non-performing loans to emerging economies weaken UK financial institutions' balance sheets and reduce income.
- *Indirect:* Default by emerging economies affects cashflow outside the UK financial system and this in turn could affect the ability of borrowers from developed economies and offshore centres to meet their obligations to UK institutions. And default by emerging economies may also affect the availability of funding for UK institutions, through its impact on non-UK institutions' cashflow<sup>6</sup>.

6: The indirect channel is of course wider and more complex than the direct route.

The two mechanisms have different implications for the weights to attach to spreads on individual emerging economy instruments. For the direct mechanism, the focus is the relative importance of the various emerging market countries to UK financial institutions' balance sheets. For the indirect channels, however, the interest is the importance of financial institutions' exposures to emerging economies more generally. The two measures might differ significantly. For example, UK-owned banks' lending to Russia was 1.4 per cent of their lending to emerging economies (as defined above) at the end of 1998, while German-owned banks' lending to Russia was 17.8 per cent of their lending to emerging economies.

We construct several measures of emerging economy spreads – one weighted to reflect UK exposures, while the others are weighted to reflect developed country exposures. But at least three limitations of the various weighting schemes need to be borne in mind.

First, they ignore other transmission mechanisms through which shocks to emerging economies may impact on UK financial stability: such as through equity prices, FDI or other types of asset exposure. Second, they ignore any covariance between losses on the various assets held by the financial institutions. It is also clear that the direct and indirect propagation channels might have very different implications for the credit risk faced by UK financial institutions, depending on how well overseas financial institutions can absorb loan losses. Finally, there is no single consensus model of how a direct or indirect shock to financial institutions' balance sheets affects the UK financial system<sup>7</sup>. That is probably beyond the scope of a single summary statistic of emerging economy risk.

All of these are reasons why the Bank of England tracks more than one indicator of emerging economy risk and devotes attention to more direct measures of the strength of financial sector balance sheets. Nevertheless, the emerging economy bond indices will give some indication of the credit risk that attaches to financial institutions' positions in the emerging economies.

### (i) UK institutions' exposures

In principle, when gauging direct links to UK financial institutions, spreads would be weighted according to the total asset exposure of UK institutions. In practice, data are available for only a limited subset of financial institutions' exposure to emerging economies. In particular, the Bank of England has published figures on lending by banks registered/owned within the UK to other economies since 1981<sup>8</sup>. One possible weighting method is to use patterns in lending by UK-owned banks as a proxy for the exposure patterns of all UK financial institutions.

Since the early 1980s, the BIS have published twice-yearly data on lending to non-BIS economies by banks with head offices within the BIS area. BIS banks' lending patterns are another possible proxy for the exposure patterns of all UK-owned financial institutions.

It is quite likely that non-bank institutions have significant credit exposures, but data on them are not readily available and provided the geographical pattern of this lending is not too different from that of banks' lending, a bank-based proxy will be reasonable.

### (ii) Global exposures

In principle, we would weight spreads according to the exposure of all developed countries' financial institutions to emerging economies. There are a variety of potential data-sources, though none of them is ideally suited to the purpose. External debt data – as published in the World Bank's Global Development Finance – measure all lending by non-residents to the emerging economies. This covers the widest range of emerging economy exposures, but includes the exposures of emerging economies to one another. They therefore over-estimate the total exposure of non-emerging economies; and will offer a poor proxy if the lending patterns of emerging and non-emerging economies differ materially. An alternative is to look at the BIS bank lending data. These are an improvement in terms of country coverage, as they only measure the exposure of BIS institutions, but they are partial because they do not cover non-bank lending. Given that neither measure

7: Ian Michael provides a fuller discussion of how shocks may spread through the financial system in 'Financial Interlinkages and Systemic Risk', *Financial Stability Review*, Spring 1998.

8: From December 1995, the figures published by the Bank of England have covered lending by UK-owned institutions. This definition excludes foreign-owned subsidiaries operating in the United Kingdom. Prior to 1995 the Bank published figures for lending by banks registered within the United Kingdom. Data on historical lending by UK-owned banks are now available prior to 1995.

is ideal, we have constructed bond indices based on both sets of weights.

The external debt data have a further problem in that they are not timely. The latest World Bank estimates available are for 1997. Given this lag, some other proxy for external debt may be preferable. Potential proxies for patterns of external debt across countries include:

- *Partial quarterly data on external debt.* The BIS, IMF, OECD and World Bank together publish quarterly data for the various components of external debt, though in general the sum of the components is less than the World Bank's estimate of total external debt<sup>9</sup>. These data are available on a more timely basis than the World Bank's external debt figures (complete data are available to end-1998).
- *Assuming that patterns of bond finance are representative of patterns of external debt in general.* Data on the face value of emerging economy bonds are available on a continuous basis, but bond finance is only one source of emerging economy financing and there is no reason to expect the patterns of exposure to be the same for other sources.

We compared these proxies with the comprehensive external debt figures for 1997 to see which offered the best indication of patterns of external debt across the emerging economies. None of the measures provided a better proxy for external debt *weights* than using the comprehensive external debt figures for a year earlier (1996). This suggests that the World Bank's external debt figures may be the best source of weights, despite the delay before publication<sup>10</sup>.

However, we evaluated the proxies at a time of relative financial stability. Following a significant shock, patterns of exposure could change significantly, in which case a lagged indicator would be flawed.

So to summarise, we construct three weighted averages of emerging economy spreads. In each case, we use spreads on sovereign dollar-denominated bonds as a proxy for market perceptions of credit risk attached to all assets. The first measure – based on UK bank lending patterns – is an indicator of direct risk to UK-owned financial institutions' balance

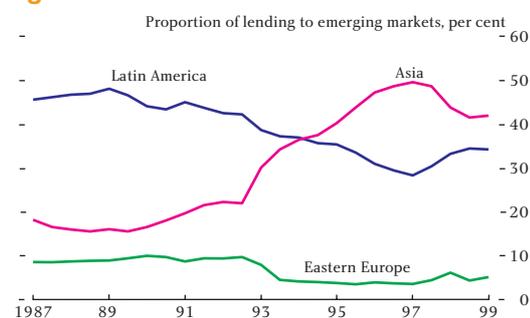
sheets arising from the emerging markets. The second – based on out-of-date external debt data – aims to encompass direct and indirect risks via exposures of all developed economies' financial institutions to emerging economies. The third is based on patterns of bank lending amongst all banks with head offices within the BIS area. This offers an alternative indication of developed economy exposures to the emerging markets. Box 2 compares weights under the various alternative approaches.

### Fixed or varying weights?

Patterns of exposure change over time, as investors shift their portfolios between countries. This is likely to be a particularly important factor at the moment, in the wake of the financial crises across many emerging economies. For example, the Institute of International Finance estimates that during 1998 US\$49.8 billion of net private sector credit flowed out of emerging economies in the Asia/Pacific region while US\$37.1 billion flowed into Latin America.

Chart 2 plots Latin American, Asian and Eastern European weights based on the Bank of England's data on UK-owned banks' lending over the period 1987 to end-1998. The proportion of UK bank-lending to the mainland Asian emerging markets rose markedly during the early 1990s, but has fallen back from a peak of 50 per cent at end-June 1996 to 42 per cent at end-June 1999. Latin American weightings have risen in mirror image of this. Lending to Eastern Europe has been both stable and low relative to lending to Latin America and to Asia.

**Chart 2:**  
**Regional distribution of UK-owned banks' lending<sup>(a)</sup>**



Source: Bank of England.

(a) Figures are on a consolidated basis.

<sup>9</sup>: The two sources are not strictly comparable as one is based mainly on figures reported by debtors (the World Bank estimates) while the other is based on figures reported by creditors.

<sup>10</sup>: To select the best proxy, we compared the weights the proxy generated for the 24 emerging economies in J P Morgan's broader measures with 1997 external debt weights. The 'best' proxy minimised the sum of squared deviations from the external debt weights.

## Box 2: Alternative measures of the importance of emerging economies to financial stability

**Table B: Regional weights under different weighting schemes (per cent)<sup>(a)</sup>**

	Latin America	Asia	E Europe	Other
EMBI (Global)	62	11	22	5
EMBI (Global constrained)	51	18	21	9
UK bank lending (end-June 1999)	48	38	6	8
External debt (US\$, end-1997)	40	32	14	14
BIS area bank lending (end-1998)	42	32	15	12

(a) Rows may not sum, due to rounding. EMBI figures differ from J P Morgan's published weights because we excluded three of the economies covered. J P Morgan's weights are for end-August 1999.

Table B compares the weights of the 24 emerging economies covered by J P Morgan's EMBI(Global) under different weighting schemes, at a regional level.

Ideally, an emerging economy bond index would reflect changing patterns in exposure to emerging economies. But when the weights change, the average spread may jump. Does this matter? If investors shift out of very risky markets then the direct risk to the financial system will have fallen, something that ought to be reflected in the weighting scheme and hence the index. But data on exposures are available only on a discrete basis – annually with a long lag for external debt data and biannually for the bank lending data. So the average spread may jump at the time the new data become available, and changes in the average spread may misrepresent the timing of the changes in risk.

In constructing the various indices, we have allowed weights to vary where possible so as to be able to reflect the potentially important shifts in exposure

The various broad J P Morgan indices attach relatively high weights to Latin American economies. Under the two alternative global measures, Asian and Latin American economies have more equal weights.

At a country level, the most significant differences between the EMBI(Global constrained) weights and the average of the various global lending weights are China (7.3 percentage points lower in the J P Morgan measure), Thailand (5.8 percentage points lower) and Venezuela (5.9 percentage points higher). The external debt and BIS bank-lending weights – the two global exposure proxies – have fairly similar weights at a regional level.

The UK bank lending measure weights Latin America more highly than the external debt and BIS-lending, and gives Eastern Europe a lower weight. Notably, Russia has a weight of 2.3 per cent under the UK measure compared with 9.2 per cent under the BIS bank lending measure. The UK-lending measure also weights Asia more highly, with a weight of 14.1 per cent for China, compared with 2.1 per cent under the EMBI (Global constrained) and 9.2 per cent under the BIS bank lending measure.

patterns evidenced in Chart 2. Over our sample period (January 1998 to present) there are four sets of weights for the UK-owned bank lending indices – each set of weights lasts for six months<sup>11</sup>. We only have external debt figures for 1997, so the issue of time-varying weights is not relevant over the sample that we cover.

How significant an impact do time-varying weights have? We have compared the evolution of average spreads under weights fixed at the latest observation with spreads that vary over time – for both the UK and BIS bank lending variants. The correlation between fixed weight and varying weight measures is high (over 0.99), and the average difference is small, with varying weight measures higher by an average of 13 basis points for the UK measure and 26 for the BIS measure.

<sup>11</sup> This article was finalised before the publication in mid-November 1999 of BIS-area bank-lending figures for June 1999, so that there are only three sets of BIS area weights.

However, at times during the Russian/Brazilian crises, the difference between fixed and varying weight measures was significant, reaching a maximum of 138 basis points on 13 October 1998 for the BIS lending measure. The time-varying measures rose well above the fixed weight measures during the Russian/Brazilian crises. This may have been because banks waited before reducing their exposures to risky countries, or because the data picked up these changes with a lag.

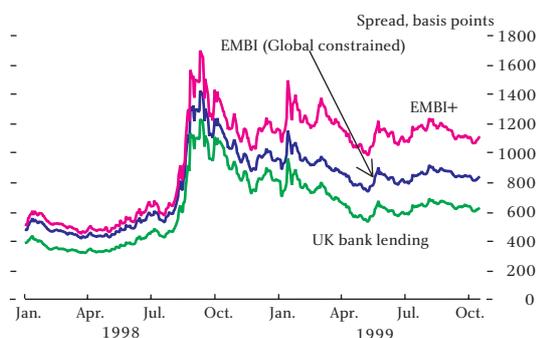
### Comparing the indices

This section compares five measures of average spread:

- J P Morgan's EMBI+ and EMBI (Global constrained),
- a UK exposure-weighted measure,

#### Chart 3:

##### Alternative measures of UK risk



Sources: J P Morgan and Bank calculations.

- the two global exposure measures (one based on external debt and the other on BIS lending data).

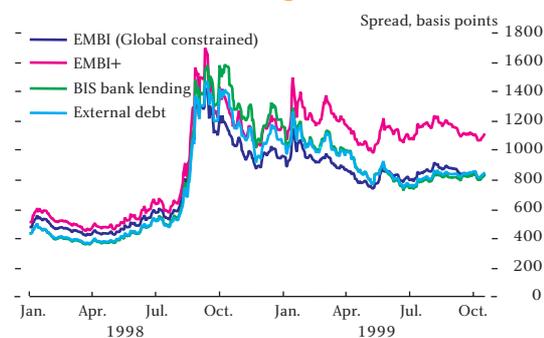
All the variants are derived from J P Morgan's figures for country-level spreads for a sample of 24 emerging economies.

Charts 3 and 4 plot the Bank of England variants alongside two of J P Morgan's measures: the EMBI+ and the (new) EMBI(Global constrained). Table 3 presents some summary statistics on the differences between the indices.

As Table 3 shows, the various Bank of England measures have been highly correlated with both the EMBI(Global constrained) and to a lesser extent the EMBI+. This simply reflects the arithmetic fact that

#### Chart 4:

##### Alternative measures of global credit risk



Sources: J P Morgan, BIS, World Bank and Bank calculations.

**Table 3: Comparison of alternative indicators**

#### A: Comparison with EMBI+

		UK bank lending	BIS bank lending	External debt
Correlation	levels	0.91	0.91	0.95
	changes	0.96	0.88	0.91
Average difference (basis points)	full sample	-346	-144	-167
	since Russian crisis	-442	-163	-199
	before Russian crisis	-166	-109	-108

#### B: Comparison with EMBI (Global constrained)

		UK bank lending	BIS bank lending	External debt
Correlation	levels	0.98	0.97	0.98
	changes	0.97	0.89	0.93
Average difference (basis points)	full sample	-165	+37	+13
	since Russian crisis	-191	+88	+51
	before Russian crisis	-116	-59	-58

period-to-period movements in the indices are dominated by changes in the spreads rather than the weights. However, these high correlations mask differences in the average levels of the indices. The EMBI<sup>+</sup> has been consistently above all three Bank of England variants, reflecting the higher weight it attaches to economies with wide spreads, in particular in Latin America and Russia. The EMBI(Global constrained) has recorded narrower spreads.

The two alternative indicators of global credit risk – weighted by external debt and BIS bank lending – provide very similar spreads. They have also tracked J P Morgan's EMBI(Global constrained) reasonably closely in recent months. The level of the UK bank lending measure has, however, been consistently lower than the other measures. The main reason for this has been the small direct exposure of UK-owned banks to Russia, whose spreads peaked at over 7000 basis points in October 1998. The relatively high weight attached to China has also led to a lower average spread, because Chinese spreads have averaged just 177 basis points over the full sample.

Prior to the Russian crisis, all of the measures offered similar indications of credit risk. Since the Russian crisis (in mid-August 1998) there has been a significant and persistent divergence between the measures. Most notably, by 18 October 1999 the UK bank lending measure was 212 basis points lower than the lowest of the other measures (the BIS bank lending measure). On the UK bank lending measure, spreads are only 154 basis points higher than at end-July 1998 (pre-crisis), compared with 322 basis points higher according to the external debt-weighted measure, 250 basis points according to J P Morgan's EMBI(Global constrained) and 473 basis points according to the EMBI<sup>+</sup>.

The UK bank lending measure therefore suggests that direct risks to UK financial institutions from emerging economies have fallen much more significantly since the Russian crisis than would be suggested by existing published indices. In part, this reflects the relatively low exposures of UK banks to the crisis countries (such as Russia), and in part it reflects UK banks' exposures being more heavily weighted to countries which have so far recovered more quickly from crisis (for example, in Asia).

The Bank of England variants were all constructed using J P Morgan's country-level spreads. Since we

have used J P Morgan's country-level measures of spreads we follow their liquidity, size and maturity criteria for asset selection and hence – like them – we exclude some countries that are significant from a UK bank lending or global exposure perspective: notably Egypt, India, Indonesia, Saudi Arabia, Taiwan and the United Arab Emirates. Box 3 considers the potential importance of some of these exclusions.

### Limitations of average bond spreads as an indicator of riskiness

In principle, average emerging economy spreads can be used to extract market perceptions of the credit risk attaching to emerging economy bonds. But, in addition to the uncertain relationship between spreads and perceived credit risk (discussed in the introduction), there are two potential caveats. First, there are a number of practical problems of coverage and weighting of the indices, as discussed in the section about J P Morgan's indices. Second, the spread indices are informative only about average default risk and do not tell us about dispersion of risk across emerging economies.

### Practical problems of construction

In the previous sections we have outlined a number of potential problems in the construction of the emerging economy bond indices, both over the coverage of the measure and the choice of weights. In summary:

#### (i) Coverage

- The J P Morgan indices that we use as our base are restricted to sovereign and quasi-sovereign entities. This may matter if corporate exposures are significant and the credit risk attached to these exposures differs from that of sovereign exposures.
- Some sovereign exposures are excluded – for example, bank loans and syndicated lending.
- Some important emerging economies are excluded, because there are no liquid sovereign US\$ bonds of sufficient face value, liquidity and maturity.

#### (ii) Weights

- No weighting scheme can fully capture all of the possible propagation mechanisms through which emerging economy shocks might impact on UK financial stability.
- The weights are based on partial data.

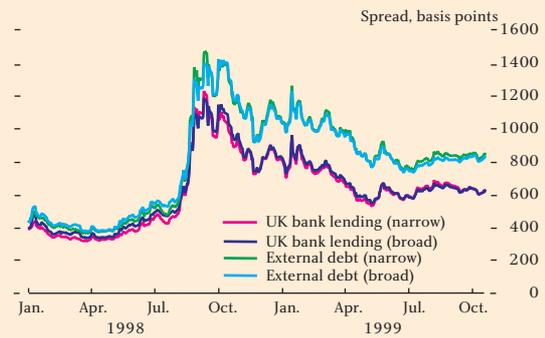
### Box 3: Adding excluded economies

Secondary market prices are available for sovereign US\$ bonds issued by some of the countries excluded from the J P Morgan indices (and hence the Bank of England variants), though these bonds were either of too short a maturity, too low a face value, or did not have a sufficiently liquid market for inclusion in J P Morgan's indices. Would inclusion of these secondary market prices affect the average spreads materially?

We have experimented with inclusion of limited data on spreads charged on instruments from those excluded economies for which we have found sovereign/quasi-sovereign dollar instruments – India, Indonesia and Pakistan. Chart 5 compares the external debt and UK bank lending alternatives with and without those significant excluded countries for which we have been able to find broadly comparable spreads.

The broader measures are very similar to the narrow measures, as higher-than-average spreads on Pakistani bonds are offset by lower-than-average spreads on Indian and Indonesian bonds. The spread on the Pakistani bond included was over 2000 basis points

Chart 5:  
Alternative measures of emerging economy risk



Sources: J P Morgan, BIS, Bloomberg and Bank calculations.

on 18 October, but Pakistan has a low weight in terms of both UK-owned bank lending and external exposures so that its inclusion does not impact materially on the weighted average. The spreads on Indonesian and Indian bonds were closer to the narrow indices, at 614 basis points and 311 basis points respectively. As before, the UK bank lending measure is significantly lower than the external exposure alternatives, suggesting that the direct risks to UK financial institutions from emerging economies have fallen more significantly since the Russian crisis than would be suggested by existing published indices.

### Dispersion of risks

An indicator of average spreads does not tell us anything about the dispersal of risks across the emerging economies. The dispersion of risk may have a bearing on financial stability. This may arise, for example, because one bank's exposure is regionally specialised and that bank is of wider systemic importance. We do not take account of concentration effects here.

These various caveats caution against using an average of emerging economy spreads as a single measure of emerging economy risk. The Bank uses a number of other measures and evidence in its assessment of the risks to financial stability arising from the emerging economies, as discussed in the assessment section of the *Financial Stability Review*.

# The nature of credit risk:

## the effect of maturity, type of obligor, and country of domicile

Patricia Jackson; William Perraudin

Credit is the largest element of risk in the books of most banks and failures in the management of credit risk, by weakening individual banks and in some cases the banking system as a whole, have contributed to many episodes of financial instability (see Kaminsky and Reinhart (1999)). A greater understanding of the nature of credit risk, leading to improved measurement and management, would help to strengthen the international financial system.

**AN INCREASING** amount of research on credit risk is being carried out within financial firms, central banks, regulators, and universities. In the case of firms, the chief aim is to improve pricing of credit exposures and to create better systems for internal capital allocation. The authorities are motivated by the objective of developing regulatory capital requirements for credit books more closely aligned to risk than the arrangements set out in the 1988 Basel Accord. With the present broadbrush requirements the authorities can be less confident that firms are carrying adequate capital to cover their risks, with clear implications for financial stability. Also the closer the capital requirements are to the actual risks entailed in various exposures, the fewer the distortionary effects on behaviour and the less the effect on general economic efficiency.

There is evidence that some banks have been carrying out substantial amounts of regulatory arbitrage, using techniques such as securitisation, in order to use regulatory capital more efficiently, thereby increasing the average riskiness of the book relative to regulatory capital (see Jackson *et al* (1999) and Jones (1999)). In June this year, the Basel Committee on Banking Supervision issued a consultative paper setting out two possible methods for achieving risk-based requirements (see Basel Committee on Banking Supervision (1999a)).

This article summarises the current state of knowledge on several important aspects of credit risk. In this, we draw on the findings of a programme of research on credit risk, which has been pursued by the Financial Stability area of the Bank of England over the past few years. We also refer to the rapidly growing academic literature on credit risk and to research carried out by analysts at other public agencies. The focus throughout is on credit risks associated with large loan and bond exposures to corporate or public sector organisations. Credit risk associated with consumer loans, mortgage credit and lending to small enterprises is also clearly important but is beyond the scope of the present review.

We organise this article by, first, setting out some background discussion of credit risk and the setting of capital requirements, and, second, posing and suggesting preliminary answers to six key questions. These are: (i) What is the relative riskiness of credit exposures across different maturities? (ii) Does the nature of credit risk vary across different countries? (iii) Do credit exposures with the same rating behave differently depending on the type of borrower (sovereign versus non-sovereign, bank versus industrial or utility)? (iv) Do credit risk models successfully track risks associated with credit portfolios? (v) Are ratings by agencies such as Moody's or Standard & Poor's reliable? (vi) Does the credit risk of loans differ from that of bonds<sup>1</sup>?

<sup>1</sup>: An issue we do not discuss because of space constraints is the relationship between credit risk and market risk, most notably the risk of interest rate changes. Recent papers which have considered this issue include Longstaff and Schwartz (1995), Duffee (1999), Jarrow and Turnbull (1999), Morris, Neal and Rolph (1999), Kiesel, Perraudin and Taylor (1999b) and Leake (1999).



Patricia Jackson



William Perraudin

## Background

### What is credit risk?

Banks are increasingly trying to assess not just average or expected losses through default by different types of counterparty but also how large their unexpected (or above average) losses may be. Some banks are looking at this for individual loans while others are attempting to assess risk for whole portfolios, allowing for correlations between different exposures.

The main components of credit risk are (i) the risk that a counterparty will default, and (ii) risks associated with the recovery rate given default. The pricing of loans reflects these risks in that the margin over the bank's funding cost should cover expected loss and remunerate economic capital set aside to cover the unexpected loss. Since credit losses are not evenly spread over the business cycle, a reserve may also be needed to cover expected loss in future years.

Traditionally, banks have assessed risks over the life of the exposure, concentrating on the likelihood of default at some date before the terminal repayment of a loan. But it is also the case that a deterioration in credit quality, even if no defaults have occurred, represents an economic loss since the current worth of the book is lower. In recent years, some banks have started to develop portfolio models to measure possible losses caused by changes in credit standing over a set holding period such as a year (which for most banks corresponds to the maximum period between credit assessments and adjustment of economic capital).

Banks assess risks by looking at past default rates for borrowers with characteristics similar to those of the obligor in question. To varying degrees, they also make use of external ratings issued by ratings agencies such

as Moody's or Standard & Poor's. Many banks have formalised their credit assessments for counterparties by preparing their own internal systems of ratings which, in recent years, have been increasingly based on default probability or expected loss.

### Setting capital requirements

Capital, whether economic or regulatory, should be sufficient to cover unexpected losses on exposures, over a given holding period, with a high probability. More conservative banks or those seeking a higher credit rating would choose a higher probability. Whether capital should also cover expected losses depends on whether banks maintain a separate reserve outside capital for this element of loss. The interest margin on loans should on average cover expected losses but this will not be true in all individual years<sup>2</sup>.

When setting economic capital, banks need to know whether certain broad classes of exposure are riskier than others. For example, do short maturity exposures generally exhibit lower risk than long term? As another example, does the credit standing of certain types of counterparty show more volatility than is the case for others?

Similar issues arise for the authorities when setting the capital requirements for bank credit exposures. If capital requirements are set by the authorities, a central issue is whether particular types of exposure show similar risk characteristics and should therefore be assigned the same capital. If requirements depend on the assessment of risk by in-house models developed by the banks according to parameters set by the authorities, then the authorities need to understand whether or not the models are accurate and to consider how best to base capital requirements

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<sup>2</sup>: There is a debate at present on whether banks should move to fair value accounting on the banking book. There are some difficult measurement issues but fair value accounting should in principle ensure that expected losses are fully recognised and are adjusted as credit quality deteriorates. One difficulty with fair value accounting would be finding a market price for illiquid loans. Any approach would have to reflect a bank's own assessment of expected losses.

on the output of the models. For this too an understanding of the nature of credit risk is essential.

Concerns about the state of development of credit risk models for portfolios of large corporate exposures led the Basel Committee on Banking Supervision to conclude that it was still too early to allow regulatory capital requirements to be based on the output of those models (see Basel Committee on Banking Supervision (1999b)). The Committee is now looking at ways of basing the capital requirements for credit books on internal ratings systems developed within banks. Individual exposures might be slotted by a bank into bands based on some concept of likelihood of loss such as default probability, with capital requirements for the exposures in the bands set according to the relative risks. Such an internal ratings-based approach would be an alternative to a 'standard' approach in which capital requirements for some exposures would be tied to the external ratings of the obligor made by, say, a ratings agency.

Both alternative and standard methods require an understanding of the structure of credit risk – how the risk for single exposures with a given rating varies across different types of borrower, different country of domicile and different maturity.

### Indicators of relative riskiness

There are several possible indicators of the relative riskiness of different classes of exposure. One measure of perceived riskiness is the spread over the default-free interest rate that the market demands of particular categories of obligor. Spreads reflect perceived default probability and expected loss given default.

Spreads are not, however, an ideal measure of relative credit risk because the relative yields on two marketable instruments such as a bond will also be affected by issues such as market liquidity for each bond, risk premia etc.

The way in which spreads can be used as indicators of risk depends on the issue being considered. A comparison of the level of spreads will provide an indication of relative credit risk, subject to the above caveats, but if one wishes to compare risk over say a one-year holding period, it is the relative volatilities in spreads, i.e., the degree to which credit standing fluctuates, which matters. Again, liquidity and risk premia cause problems since they affect spread volatility.

A second measure of credit risk and perhaps the most direct is the default probability for particular types of borrower calculated from long runs of historic data. Drawbacks of this approach include the fact that, until the 1980s, relatively few ratings were sought by obligors other than US corporates. The larger banks are mobilising their own data to improve their loan pricing and capital allocation, but this data remains proprietary and confidential.

Default probabilities do not, however, capture the risk that a bank might experience an economic loss through a deterioration in the quality of the loan book rather than outright default. A more complete picture may be obtained from probabilities of ratings changes, termed ratings transitions. Such transition probabilities constitute the third measure used in the article. Like default probabilities, these probabilities may be calculated from long runs of data supplied by the US ratings agencies. They, therefore, suffer the same disadvantage in that they are a much richer source of information on US obligors than non-US.

In calculations of credit risk for portfolios of exposures, the statistic which has become almost the industry standard measure is the value at risk. Value at risk (VaR) is defined as the loss which will be exceeded on some given fraction of occasions (the confidence level) if a portfolio is held for a particular time (the holding period). In estimation of credit risk, it is common practice amongst banks to employ long holding periods (one year or more) and small confidence levels (1 per cent, 0.1 per cent or even less).

VaRs may in fact be calculated either for individual exposures or, allowing for correlations, for portfolios. Some VaR methodologies (such as J P Morgan's CreditMetrics) are driven by ratings transitions. Market spreads play a role but are assumed to be constant. Other VaR approaches use Merton models based on equity and liability data and are therefore affected by securities market conditions. VaRs are the fourth measure of relative credit risk used in the paper.

The final three measures of relative credit risk are the most satisfactory and reflect direct observation of the evolution of credit standing for particular types of obligor. It is nonetheless necessary to supplement these measures by looking at spreads because of the limited data available on ratings for certain types of borrower.

## Questions on credit risk

### Does the riskiness of credit exposures depend on maturity?

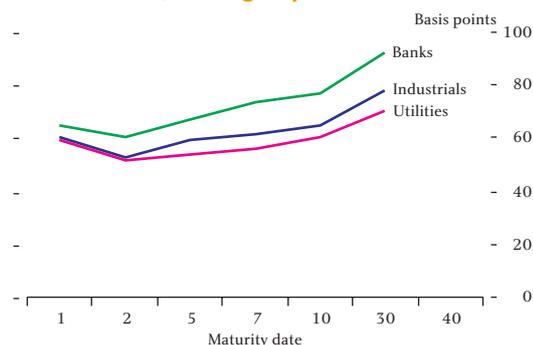
An important question for banks and regulators assigning capital to credit exposures is whether there is a significant maturity structure to credit risk and in particular whether shorter-maturity exposures should carry less capital than longer-maturity exposures. The current Basel Accord has a maturity dimension for interbank exposures but not for other types of exposure.

If the horizon over which one wishes to evaluate risk coincides with the maturity of the debt then a reasonable measure of risk is the credit spread times the maturity of the exposure in question<sup>3</sup>. The fact that the spread is multiplied by maturity means long-maturity exposures are likely to be riskier than short maturity. If the spreads themselves are on average upward (or downward) sloping in maturity, this would accentuate further (or mitigate) the effects of maturity.

Empirical work undertaken by Sarig and Warga (1989) suggest that credit spreads are upward sloping in maturity for investment-quality bonds but negatively sloped for high-yield bonds. Practitioners (see, for example, Litterman and Iben (1991)) often argue that credit spreads are generally upward sloping in maturity. A recent paper, Helwege and Turner (1999), eliminates sample selection problems in the Sarig and Warga study and shows that credit spreads increase with maturity for both high and low credit qualities.

Charts 1 and 2 show spreads over US Treasury yields, taken from Bloomberg (averaged over the period 1991 to 1999), for US industrials, banks and utilities of different credit ratings. For all credit qualities, the term structures are broadly upward sloping although there is a slight downward slope between one and two years. Estimation of defaultable bond term structure is notoriously difficult for short maturities when liquidity effects become important (see Perraudin and Taylor (1999) for a discussion) so the negative slope at the short end is unlikely to be a reliable feature of the data.

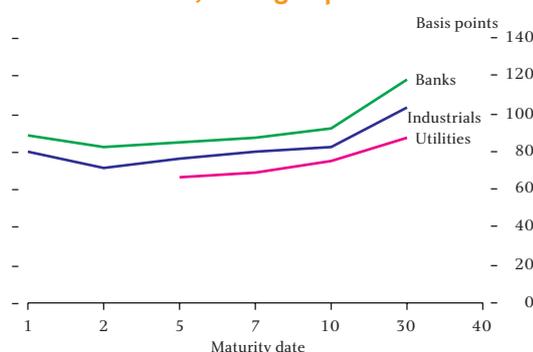
**Chart 1:**  
A rated bonds, average spreads<sup>(a)</sup>



Source: Bloomberg.

(a) Sample period: 26 Sept 1991 to 20 Sept 1999.

**Chart 2:**  
BBB rated bonds, average spreads<sup>(a)</sup>



Source: Bloomberg.

(a) Sample period: 26 Sept 1991 to 20 Sept 1999.

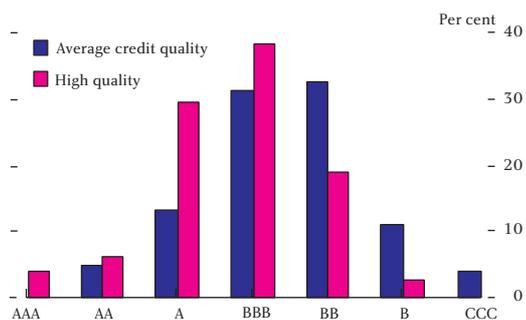
As discussed above, however, spreads are only one indicator of risk and are not ideal. Kiesel, Perraudin and Taylor (1999a) dealt with a number of the drawbacks of spread data by calculating VaR measures for portfolios of exposures. They employ a generalisation of J P Morgan's credit risk model, CreditMetrics, which uses transition probabilities as the main driver of the value at risk. Future spreads and hence future prices given particular ratings are assumed to be known. Correlations between ratings transitions are proxied using correlations between obligors' equity returns.

Kiesel, Perraudin and Taylor generalise CreditMetrics by allowing spreads for different ratings categories to change randomly. VaRs are calculated for a one-year holding period and a confidence level of 99.7% for portfolios of 500 exposures, each of equal face value. They focus particularly on VaRs for an 'Average

<sup>3</sup>: If one assumes for simplicity that the recovery rate in the event of bankruptcy is zero, for a defaultable pure discount bond with time to maturity,  $T$ , the probability of default before maturity,  $p$ , is equal to the spread,  $S$ , times maturity,  $T$ . In the period prior to maturity, the expected loss on the exposure per dollar invested is then  $p$  and the variance of the return due to default is  $p(1-p)$ . As  $ST$  and hence  $p$  increases from a level of zero, the variability of the payoff therefore also increases (as  $p(1-p)$  is initially increasing in  $p$ ).

Portfolio', the credit quality profile of which mimics that of the average portfolio of large US banks surveyed by the Federal Reserve Board (see Gordy (1999)). They also examine VaRs for a 'High Quality Portfolio' which resembles that of more conservative lending institutions included in the same Federal Reserve survey. The breakdown of the two portfolios is shown in Chart 3.

**Chart 3:**  
Ratings profiles for US bank portfolios



Source: Gordy 1999.

Each VaR is divided by the expected value of the portfolio and multiplied by 100 and so is in the same units as a percentage capital requirement. Under reasonably standard assumptions about correlations between different exposures<sup>4</sup>, VaRs for the Average Portfolio are close to the 8% capital charge specified by the 1988 Basel Accord<sup>5</sup> (see Table 1). The VaRs are slightly higher if spread risk is included as well as rating change and recovery risk. For the High Quality portfolio, VaRs are rather lower, being around 5%.

Kiesel, Perraudin and Taylor find that VaRs depend markedly on the average duration of the exposures included in a portfolio. This maturity effect is greater for high credit quality portfolios. For the average-quality portfolios, their calculations yield VaRs for exposures of two and ten-year maturity of 5.4 and 10.0, respectively. For high credit quality portfolios, the corresponding VaRs are 2.7 and 7.6.

An explanation for the somewhat flatter maturity profile of VaRs for lower credit quality exposures is a kind of survivorship bias. If low-rated obligors survive in the near term, their credit standing is likely to have risen in which case the market may believe that they

will remain solvent for a long time. Another reason for the steeper profile for the high-quality exposures may be that the VaRs are an estimate of the likelihood that there will be a change in credit standing during the next year. With a prime-quality credit, it is more likely that information released within the year would point to problems at a later date rather than immediately. This would make a change in value of longer-term exposures more likely than shorter term.

**Table 1: 99.7 per cent VaR**

Portfolio	$\rho$	VaR	
		Total	Excluding spread risk
Average Quality	0.1	6.42	4.98
	0.2	8.51	7.62
	0.3	11.08	10.34
High Quality	0.1	4.06	2.65
	0.2	5.14	4.18
	0.3	6.43	5.75

Calculated using Moody's Data Transition Matrix (Nickell, Perraudin, and Varotto (1998))

Notes: Composition of the portfolios is explained in the text. VaRs are for a one-year horizon, in per cent of the expected portfolio value and are based on five-year maturity exposures. The total column shows VaRs which allow for spread risk, ratings transition risk and recovery rate risk. The right-hand column shows VaRs reflecting only transition risk and recovery risk (like CreditMetrics).  $\rho$  is the correlation coefficient of the latent variables driving transitions.

Our discussion so far has focused on the effect of maturity on the riskiness of individual exposures. There is, however, a more marketwide, systemic, aspect to this issue, which affects the riskiness of lending to both corporates and sovereigns, but is, perhaps, particularly striking in relation to the latter. Although a single lender might experience lower risks if it concentrates its lending at shorter maturities, the same may well not be true of all lenders collectively. For example, in the case of countries, a sovereign borrowing short term and in a foreign currency may leave itself vulnerable to a liquidity crisis if market sentiment changes and lenders are unwilling to roll over short-term loans. The extent of the problem would, of course, depend upon the extent of the foreign-currency borrowing relative to, for example, the size of the country's foreign exchange reserves.

<sup>4</sup>: The calculation assumes that the correlation of equity returns is about 0.2. This figure equals the average of the off-diagonal correlations given in an example correlation matrix in the CreditMetrics technical document.

<sup>5</sup>: This calculation assumes a recovery rate of 51 per cent, which is in line with Moody's estimates of recoveries on senior unsecured bonds. Recovery rates for bank loans may well be higher, which would reduce the VaR in a roughly proportional way. Moody's reports a 71 per cent average recovery rate for bank facilities (for a discussion, see J P Morgan (1997)).

## Does the nature of credit risk vary across different countries?

In designing capital requirements for credit exposures that will apply internationally, the next question is whether the riskiness of exposures to borrowers with a particular rating varies across countries? It is widely believed that the way in which ratings are constructed by the major ratings agencies delivers a comparable measure of the riskiness of obligors across countries. It is natural, however, to expect some difference in ratings transitions because the history of financial stability varies across countries; there are also differences in industrial structure and differences in the protection that insolvency legislation provides to creditors (see Wood (1991)). Empirical evidence on cross-country variation in credit risk is sketchy, largely because most data on credit risk come from the United States.

Nickell, Perraudin and Varotto (1999) examine rating transitions using the universe of Moody's senior, unsecured bond ratings (excluding municipals) from December 1970 to December 1997. Among other questions, they examine whether the ratings of obligors domiciled in the United States behave differently from those domiciled in Japan and the United Kingdom – ie, whether the volatility of ratings changes differs across these countries. Table 2 shows estimated, one-year transition matrices for obligors domiciled in each of these three countries<sup>6</sup>. The results in the table suggest that, broadly speaking, ratings transitions for UK and US obligors are similar but that ratings transitions for Japanese obligors are different. In particular, ratings for prime (AAA) Japanese companies were more volatile in the sample period examined by Nickell, Perraudin and Varotto, than in the United Kingdom and United States, whereas for other companies the ratings are more stable. This finding should be treated with caution, however, as the sample employed extends only to the end of 1997 and since then many Japanese companies

have experienced ratings downgrades; but it does at least suggest that cross-country differences may exist.

Another way to measure whether obligations with a particular rating carry more risk in certain countries than in others is to examine bond-market spreads for obligors from different domiciles. Perraudin and Taylor (1999) extract spreads for different maturities and ratings categories from a large data set of US dollar denominated international bonds using McCulloch-style cubic spline techniques<sup>7</sup>. The spreads they obtain may be regarded as average spreads for obligors from particular ratings categories. By analysing the errors from the spline fits, one may gauge whether the debt of obligors of different types is priced differently from the debt of the average obligor from the same rating category.

Regressing the errors from the spline fits on a range of variables including dummies for different obligor domiciles, Perraudin and Taylor find that, allowing for rating, liquidity, seniority and some tax effects<sup>8</sup>, spreads do appear to be affected by the domicile of the borrower. The effects are small, however. Bonds issued by AA-rated Japanese and European obligors are priced at a 10 basis point discount and a 4 basis point premium respectively compared with those of AA-rated US obligors. AAA-rated European bonds are priced at a 4 basis point premium compared with US AAA's while Japanese AAA-rated bonds are rated at a 4 basis point discount<sup>9</sup>.

To summarise, the research carried out to date indicates that there may be some differences across countries in risks attached to borrowers with a particular rating. In particular, there is some evidence that Japanese ratings changes and spreads for given ratings differ from those of US-domiciled obligors. The magnitude and statistical significance of the differences is not entirely clear, however.

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6: A ratings transition matrix consists of a matrix with as many rows and columns as the number of ratings categories (including default). A given (ijth) element represents the probability of going from the rating category associated with the corresponding row (ith) to the rating category associated with the column (jth) over a given period of time (in our case one year).

7: Bond prices may be expressed as the sum of principal and individual coupon payments each weighted by a discount function of the appropriate maturity. Cubic spline methods estimate the discount function by regressing bond prices on flexible 'spline functions' each of which is a function of time to maturity. This may be done either for a sample of default-free bond prices or for bond prices of a particular credit rating. The ratio of fitted discount functions extracted from defaultable and default-free bonds can be transformed to obtain an estimate of credit spreads.

8: They allow for rating, liquidity, etc by regressing the errors from splines fits for discount functions (see the last footnote) on domicile dummies as well as dummies for different seniority classes and liquidity proxies including the age of the bond and the size of issue. The regression coefficients on the domicile dummies, therefore, give a measure of the effect of domicile, holding the other influences constant.

9: The domicile effects on spreads are highly significant for AA and A-rated bonds but somewhat less significant for AAA-rated issues.

**Table 2: Conditional transition matrix****United States**

Terminal rating

Initial rating	AAA	AA	A	BBB	BB	B	CCC	CC/C	Def	Number of issuer years
AAA	91.9	6.9	1.1	–	0.1	–	–	–	–	1523
AA	1.2	89.3	8.8	0.5	0.2	0.0	–	–	–	4129
A	0.1	2.3	92.0	4.9	0.6	0.2	0.0	–	0.0	11282
BBB	0.0	0.2	5.5	88.9	4.5	0.6	0.1	–	0.1	9277
BB	0.0	0.1	0.5	5.4	85.5	6.9	0.3	0.0	1.4	7452
B	0.0	0.1	0.2	0.7	6.5	82.9	1.9	0.5	7.2	4128
CCC	–	–	–	1.0	2.5	7.6	67.3	3.5	18.1	315
CC/C	–	–	–	–	1.0	5.7	14.3	58.1	21.0	105

**United Kingdom**

Terminal rating

Initial rating	AAA	AA	A	BBB	BB	B	CCC	C/CC	Def	Number of issuer years
AAA	90.4	8.9	0.7	–	–	–	–	–	–	135
AA	0.3	88.2	11.0	0.5	–	–	–	–	–	390
A	–	3.4	94.1	2.5	–	–	–	–	–	444
BBB	–	–	11.9	86.4	1.7	–	–	–	–	59
BB	–	–	–	16.0	76.0	8.0	–	–	–	25
B	–	–	–	11.1	5.6	83.3	–	–	–	18
CCC	–	–	–	–	–	–	–	–	–	0
CC/C	–	–	–	–	–	–	–	–	–	0

**Japan**

Terminal rating

Initial rating	AAA	AA	A	BBB	BB	B	CCC	CC/C	Def	Number of issuer years
AAA	86.9	12.1	1.0	–	–	–	–	–	–	99
AA	0.3	88.9	10.5	0.3	–	–	–	–	–	306
A	–	0.8	95.2	4.0	–	–	–	–	–	396
BBB	–	–	1.2	96.9	1.6	–	0.3	–	–	322
BB	–	–	–	3.5	94.4	2.1	–	–	–	142
B	–	–	–	–	9.5	90.5	–	–	–	21
CCC	–	–	–	–	–	–	–	–	–	0
CC/C	–	–	–	–	–	–	–	–	–	0

Note: Data are notional unsecured Moody's long-term corporate and sovereign bond ratings between 31 December 1970 and 31 December 1997 measured on 31 December each year.

**Do credit risks differ by type of obligor?**

When deciding how to allocate capital to particular types of exposure, it is important to know if certain exposures should be grouped together, while others should be treated separately because of their different characteristics. Distinctions are frequently drawn between exposures to sovereigns, banks and industrials. Of particular interest are the questions:

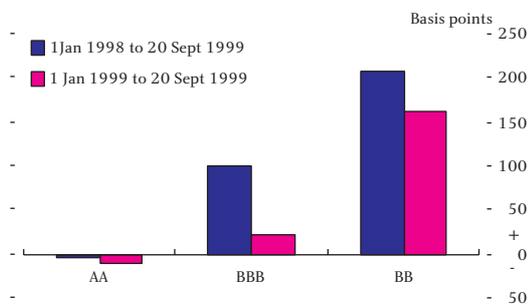
- (i) are exposures to sovereigns less risky than those to non-sovereigns with the same rating, and (ii) are exposures to banks less risky than those to industrials?

The simplest source of information on these issues is data on spreads. Chart 4 shows the amount by which average daily Bloomberg spreads for US dollar denominated sovereign debt exceeded those on

US corporate debt of a similar rating in the past two years. Average credit spreads were significantly wider for BBB- and BB-rated<sup>10</sup> debt issued by governments than for US industrials with the same rating but this period was one of considerable turbulence in emerging markets, with problems in South East Asia and Russia. The chart also shows the difference between spreads on sovereigns and corporates for the rather more stable period of January to September this year. This shows a similar pattern, although the difference in the spreads is less marked, particularly for BBB bonds. However, the relatively small number of sovereigns in the sample (6, 6 and 8 for the categories BB, BBB and AA, respectively) make it difficult to draw firm conclusions.

The higher spreads may in part reflect market concerns about the outcome of problems on sovereign exposures. When a corporate defaults, its assets can be attached and it can be declared bankrupt, enabling legal action to be taken. This may mean that recovery rates on sovereign exposures are typically lower and less timely than those on corporates. Some rating agencies take loss-given default into account in the ratings but not all do so.

**Chart 4:**  
**Excess of average spreads on US\$ sovereign bonds over spreads on US industrials<sup>(a)</sup>**



Source: Bloomberg.

(a) Sample period: 1 Aug. 1998 to 20 Sept. 1999.

Another way to investigate the relative riskiness of different types of obligor is to study the behaviour of ratings transitions. Standard & Poor's one year transition matrices, calculated on ratings data from 1975 to 1998, suggest that exposures to sovereigns and non-sovereigns differ (see Standard & Poor's

(1999a) and (1999b)) but in the opposite way from that indicated by the spread data. No rated sovereigns defaulted in this period although some renegotiated their external debt, or needed emergency IMF packages. And, in general, sovereign ratings appear more stable. One year transition matrices calculated by Bank of England staff from Moody's data covering the period 1970 to end-1997 also indicate that changes in ratings are less frequent for sovereign than for corporate obligors although the difference is less pronounced than in the case of the Standard & Poor's transitions.

These differences in ratings transitions partly reflect the fact that only a few sovereigns were rated in the earlier part of the sample period and all these were high quality. For example, in 1975, Standard & Poor's rated only seven countries: Australia, Austria, Canada, France, Japan, New Zealand and the United States. Even by 1990, there were only thirty one sovereigns rated by Standard & Poor's, of which only nine were from the emerging markets (Hong Kong, India, Israel, Malaysia, Singapore, South Korea, Taiwan, Thailand and Venezuela).

There is some evidence that ratings agencies find sovereign exposures more difficult to rate than industrials, perhaps indicating that there could be more uncertainty surrounding risk assessments for sovereigns and providing some justification for stickiness in ratings. Cantor and Packer (1995) find, when comparing Moody's and Standard & Poor's ratings, that there are greater differences in the ratings given by the two agencies to particular low credit quality sovereigns than is the case for low-quality corporates. This may reflect the short track record in rating lower quality sovereign exposures and the greater subjectivity in sovereign measurement – countries do not fail as such and whether payments are met depends in part on political will. There are also questions over adequacy of information released by some governments<sup>11</sup>.

On the relative riskiness of banks and industrials, Nickell, Perraudin and Varotto (1998) look at the ratings transitions for types of obligor (see Table 3). Data on default probabilities over ten year horizons

<sup>10</sup>: Long-term foreign currency ratings.

<sup>11</sup>: The IMF has taken action to improve information released by governments. The Special Data Dissemination Standard will be strengthened to include more information on reserve assets and liabilities. Two further codes have been developed. A Code of Good Practices on Fiscal Transparency and a Code of Good Practices on Transparency in Monetary and Financial Policies.

**Table 3: Conditional transition matrix****Banking**

Terminal rating

Initial rating	AAA	AA	A	BBB	BB	B	CCC	C/CC	DEF	Number of issuer years
AAA	84.7	15.0	0.3	–	–	–	–	–	–	694
AA	0.4	87.8	11.5	0.3	–	–	–	–	–	1591
A	–	2.7	90.0	6.4	0.7	0.2	–	–	–	1826
BBB	–	0.9	16.4	75.1	5.8	1.8	–	–	–	434
BB	–	–	4.3	10.3	76.2	5.9	0.5	–	2.7	185
B	–	–	–	2.7	13.4	78.6	0.9	–	4.5	112
CCC	–	–	–	–	50.0	–	–	–	50.0	2
CC/C	–	–	–	–	–	–	–	–	–	0

**Industrial**

Terminal rating

Initial rating	AAA	AA	A	BBB	BB	B	CCC	C/CC	DEF	Number of issuer years
AAA	91.6	7.8	0.7	–	–	–	–	–	–	876
AA	1.1	89.3	9.1	0.3	0.2	0.0	–	–	–	2525
A	0.1	1.9	92.4	4.8	0.6	0.2	–	–	0.0	6728
BBB	0.0	0.1	3.9	89.9	4.9	0.8	0.1	–	0.2	5353
BB	0.0	0.1	0.4	3.4	87.0	7.4	0.2	0.0	1.5	5995
B	0.0	0.1	0.2	0.5	6.2	84.0	1.9	0.4	6.8	3751
CCC	–	–	–	0.8	2.1	7.5	68.2	3.8	17.6	239
CC/C	–	–	–	–	1.4	6.8	20.5	56.2	15.1	73

Note: Data are notional unsecured Moody's long-term corporate and sovereign bond ratings between 31 December 1970 and 31 December 1997 measured on 31 December each year.

for US obligors, calculated from the data used in the study, indicate that banks in all ratings categories down to B are significantly less likely to default than non-banks. For AAA-rated obligors the default probabilities are 0.09 per cent for non-banks and 0.02 per cent for banks and for BBB-rated obligors the figures are 9.6 per cent for non-banks and 4.6 per cent for banks.

Nickell, Perraudin and Varotto find that the volatility of ratings changes is higher for banks than for industrials but large movements in ratings are just as likely if not more likely for industrials. When they focus on just US industrials and banks they find that, in a business cycle trough, highly-rated banks (AAA, AA and A) are more subject to downgrades than industrials. However, the opposite is true of banks rated BBB and below. These are more likely to experience an upgrade than would be the case for a corporate of the same rating. This may reflect the influence of regulation. Whereas all obligors face market pressure to deal with problems, banks also

face pressure from regulators. As a bank became weaker, so some kind of regulatory action would become likely. For example in the United States, if a bank had many problem loans, and losses were likely, formal or informal action could be taken including discussions with management over the extent of any problems and following these the bank might be required to increase its provisions against future loan losses. A bank would not be able to pay dividends if that would leave it undercapitalised relative to the regulatory minimum after taking into account any need for higher provisions. This would make it more likely that the decline in the bank would be arrested or turned round.

Data on spreads on bonds issued by US banks, industrials and utilities with particular ratings, taken from Bloomberg, point to a rather different conclusion on the market's assessment of relative riskiness. For all ratings categories average spreads on bonds issued by banks were higher than spreads on industrial bonds or utilities (see Charts 1 and 2 above).

In part this will reflect the fact that many bank bond issues are subordinated. Because subordinated debt can count in Tier 2 capital under the Basel Accord, banks have an incentive to issue this kind of paper. The Bank of England has a large database of bonds put together from Reuters data and this shows a much higher use of subordination by banks than other types of obligor and a much lower use of guarantees for bank-issued bonds. Both factors would tend to imply higher spreads on bank bonds. In their study of US dollar denominated international bonds, Perraudin and Taylor (1999), however, find that bank spreads are slightly higher even when allowance is made for seniority. The spread difference is small (eg 6 basis points for AA), but it does appear to be statistically significant.

This may reflect perceptions about relative recovery rates. Altman and Kishore (1996), in a study of 700 US corporate bonds in default, find that financial institutions have lower recovery rates (36 per cent) than the average (42 per cent). The difference remains even after allowing for subordination. Recovery rates on subordinated debt issued by financial institutions, at 25 per cent, were significantly lower than the average, 31 per cent.

The evidence on whether exposures to banks are less risky than exposures to non-banks is therefore rather mixed. The evidence for the United States is that banks do have lower probabilities of default than non-banks and that in terms of ratings transitions, bank ratings are in a sense mean reverting: highly-rated banks are more likely to be downgraded and low-rated banks are more likely to be upgraded than industrials. The evidence from spreads is, however, that banks are regarded as somewhat more risky than industrials perhaps because of perceived recovery rates.

### **How well do credit risk models track credit portfolio risk?**

A major development in recent years has been the introduction by practitioners of new techniques for measuring credit risk on portfolios of credit-sensitive exposures taking account of correlations between risks and therefore allowing for diversification effects. The most widely known of these models are ratings and equity value based models of J P Morgan (CreditMetrics) and KMV respectively and the more

actuarial model – Creditrisk+ – advocated by Credit Suisse Financial Products (CSFP). These models have obvious weaknesses in that each contains parameters that affect the risk measures produced but which, because of a lack of suitable data, must be set on a judgmental basis. (For more discussion, see Jackson and Perraudin (1999) and Jackson, Nickell and Perraudin (1999).)

Up to now, few studies have systematically analysed credit-risk models from an empirical standpoint. Gordy (1999) compares the output from the CSFP model, Creditrisk+, and a simplified version of CreditMetrics in which obligors either default or do not, but no other ratings changes are considered. Using simulated data, Gordy shows that various risk measures may be obtained using either but that it is possible to parameterise the models so that the levels of these measures are broadly comparable. Crouhy, Galai and Mark (1999) compare four different credit-risk models on a benchmark portfolio of 1800 bonds diversified across 13 currencies and covering a wide range of countries, maturities and credit qualities. The VaR estimates they produce are roughly similar, the highest being 50 per cent larger than the lowest. They draw from this the perhaps questionable conclusion that credit-risk models are correctly measuring risk.

The only paper which so far has looked at credit-risk models on an out-of-sample basis, comparing risk measures with losses which would have been sustained on actual portfolios, is Nickell, Perraudin and Varotto (1998). They examine the degree to which two standard credit-risk models (one resembles CreditMetrics and the other a Merton-style model<sup>12</sup> like that of KMV) accurately estimate Value at Risk for portfolios of US dollar denominated international bonds over rolling twelve month periods between 1988 and 1998. Their study is somewhat negative in its conclusions since the models used in the study yield far more ‘exceptions’ than they would if they were accurately measuring risk.

While the models appear to perform adequately when used on exposures to US industrials, they underestimate the risks associated with exposures to non-US obligors and to banks and financials. Part of the problem is that many of the data inputs to such models are dominated by the experience of

<sup>12</sup>: See Merton (1974).

US industrials, which until recently comprised the vast majority of rated entities. When applied to credit exposures to a broader class of borrowers, Nickell, Perraudin and Varotto (1998) conclude that credit-risk models should be applied cautiously, adopting conservative parameterisations.

In summary, credit-risk models represent a substantial advance in the quantitative analysis of portfolios of credit exposures. Output from such models can help, for example, in identifying inadequate diversification, suggest hedging strategies and provide useful guidance for the allocation of economic capital. Questions remain, however, about the reliability of the risk measures they supply.

### **Are agency ratings reliable?**

A substantial academic literature has examined which publicly observable variables (e.g. accounting ratios) affect ratings, whether stock and bond prices react to changes in ratings, and whether ratings are consistent with bond price yields and are useful in predicting financial distress. The general conclusions of the literature are that ratings can be reasonably well predicted using accounting information (see for example, Kaplan and Urwitz (1979)); that bond and equity values of an issuer move in the expected direction when the issuer's rating changes (see Hand, Holthausen, and Leftwich (1992)); and that ratings do help to predict financial distress and bond spreads (see Ang and Patel (1975) and Kao and Wu (1990)).

Recently, three papers have examined the usefulness of ratings as measures of default risk in a more critical light. First, Blume, Lim and MacKinlay (1998) conduct an analysis similar to that of Kaplan and Urwitz (1979) but lay stress in their conclusions on the finding that, between 1978 and 1995, firms with the same accounting ratios received a significantly lower rating in the mid 1990s than they did in the late 1970s and early 1980s. Second, Delianedis and Geske (1998) construct alternative indicators of credit risk for a large sample of US firms. Their approach employs equity and liability data and calculates probabilities of default using option-theoretic models. Their conclusion is that their equity-based default probabilities change well before ratings when firms fall into financial distress and that there is therefore evidence of 'rating stickiness' – where ratings agencies do not immediately change ratings when news affecting the credit quality of an obligor is revealed.

Third, Perraudin and Taylor (1999) examine how well bonds are priced using average spreads of the same or different ratings. To see whether ratings and bond spreads are consistent, they price the bonds in their sample using average spreads for three different ratings categories, AAA, AA, and A. If an AAA bond's actual price is less than the value calculated with AA or A spreads, the bond-market spreads are inconsistent with the rating. Similarly, if an AA-rated bond price is greater than that implied by AAA spreads or less than that implied by A spreads, or an A-rated bond has a price greater than that implied by AA spreads, then again the bond spreads and the ratings are not consistent. Perraudin and Taylor find that on average about a quarter of bonds are priced inconsistently with bond ratings and on occasion the fraction rises to a third of a particular rating category. It is not possible to say to what extent this reflects risk premia although their results are little changed when allowance is made for tax and liquidity effects.

Concerns have been raised in particular about agencies' treatment of sovereign borrowers (see IMF (1999)). Prior to the recent Asian crisis, emerging market sovereign ratings were extremely stable in comparison to those of similarly rated private sector obligors. The crisis provoked a sharp reduction in emerging market sovereign ratings, especially in Asia. To what extent the rating agencies deserve criticism for their sudden change of view on the credit standing of emerging-market borrowers is open to question, however, if only because bond market spreads just before the crisis struck also failed to foreshadow events.

### **Does the credit risk of bonds differ from that of loans?**

So far, little is known about differences between the credit risk of relatively liquid exposures (bonds) and illiquid exposures (loans). Altman and Suggitt (1999) examine ratings transitions for US-syndicated loans and conclude that they behave very like bonds issued by similarly rated obligors. Their finding is not surprising, however, since the loan ratings are generally identical to those of bonds issued by the same companies; and in cases where Altman and Suggitt cannot obtain a rating for the loan, they actually infer it from the same obligor's bond rating.

An interesting study by Carey (1998) examines default histories of a large sample of US privately-placed bonds over the period 1986 to 1992, arguing that

such private placements resemble loans in that they are monitored quite actively by lenders as is bank debt. He finds that default rates are lower for private debt placements than for publicly issued debt especially in the sub-investment grade categories.

Finally, Carey (1994) examines the consistency of pricing in the bond and loan markets by comparing the new issue terms of loans with spreads on bonds issued by the same obligor. He finds that, adjusting for the fact that loans are generally floating rate whereas bonds are generally fixed-rate obligations, differences between bond and loan pricing are not larger than could plausibly be attributed to contractual features of the debt. Nevertheless, he stresses that the standard errors associated with his estimates are too large for confident statements to be made about loan and bond market consistency.

The evidence reviewed above suggests that the pricing of exposures and the probability of changes in credit standing are broadly similar in the bond and loan markets. However, there have been too few comparative studies of liquid and illiquid exposures for one to be confident of these conclusions and more research in this area is needed.

## Conclusion

This article reviews the available evidence on the structure of credit risk – how the risk of exposures with a given rating varies across different types of borrower, different countries of domicile, and different maturities.

Research to date indicates that there is a strong maturity structure to credit risk, although some studies indicate that the positive dependence on maturity is less pronounced for lower quality credits. The evidence on the other questions is less clear cut. There is some evidence that the riskiness of exposures to borrowers with the same rating varies according to country of domicile but the effect does not appear to be particularly strong.

Likewise, there is no clear message on the differences between the riskiness of sovereign and corporate exposures. Ratings seem to be more stable for sovereigns than for industrials but data on bond-market spreads indicate that the market perceives exposures to BBB and BB sovereigns to be rather riskier than exposures to industrials, perhaps

because dealing with problems is more complex and outcomes are less certain.

The evidence on banks versus industrials points to lowly-rated banks being less risky than lower-rated industrials, while the contrary is true for highly-rated banks and industrials. Overall, US evidence indicates that default probabilities are lower for banks than non-banks but the difference (around 50 per cent) is nowhere near the current difference in the capital requirements on the two groups (1.6 per cent for lending to banks and 8 per cent for lending to corporates). Also spreads indicate that the market perception is that exposures to banks are riskier than exposures to non-banks, perhaps reflecting higher loss given default rates.

In assessing relative credit risk on exposures to different types of obligor and across the maturity spectrum, this article has drawn on evidence from both market perceptions of risk (spreads) and more direct measures of credit risk (default rates and ratings changes). Given that most bank exposures are loans rather than bonds, more research is needed on the extent to which evidence from the bond markets can be used to draw conclusions about risk in loan books.

Empirical studies indicate that agency ratings are helpful in forecasting default. But, questions have recently been raised about: (i) the timeliness of ratings changes; (ii) the constancy of criteria used by the agencies in setting ratings; and (iii) apparent divergences between ratings and bond market spreads.

On the accuracy of credit risk models, although such models are clearly a major advance for banks and potentially for regulators in understanding banks' credit exposures, concerns remain about the reliability of the risk measures they supply. This is especially true in the case of non-US portfolios for which data are hard to obtain.

Finally, important avenues of research not examined in this paper include whether the structure of credit risk for large retail books and middle-market exposures is similar to that of large corporates and also the relationship between market liquidity and credit risk.

## References

- 1:** Altman, E and Suggitt, H (1999) 'Default Rates in the Syndicated Bank Loan Market: A Mortality Analysis', *Journal of Banking and Finance*, forthcoming.
- 2:** Altman, E and Kishore, V (1996) 'Almost Everything you Wanted to Know About Recoveries on Defaulted Bonds', *Financial Analysts' Journal*.
- 3:** Ang, J and Patel, K (1975) 'Bond Rating Methods: Comparison and Validation' *Journal of Finance* 30, pp. 631-40.
- 4:** Basel Committee on Banking Supervision, (1999a) 'Credit risk modelling: current practices and applications', Basel, April.
- 5:** Basel Committee on Banking Supervision, (1999b) 'Capital Adequacy Framework', Basel, June.
- 6:** Blume, M E. Lim, F and MacKinlay, C (1998) 'The Declining Credit Quality of US Corporate Debt: Myth or Reality?', *Journal of Finance* 4, pp. 1389-1413.
- 7:** Cantor, R and Packer, F (1995), 'Sovereign Credit Ratings', Current Issues in Economics and Finance, Federal Reserve Bank of New York, June 1995
- 8:** Carey, M (1994) 'Are Bank Loans Mispriced?' unpublished Federal Reserve Board mimeo.
- 9:** Carey, M (1998) 'Credit Risk in Private Debt Portfolios', *Journal of Finance* 53(4) pp. 1363-87
- 10:** Crouhy, M, Galai, D and Mark, R (1999) 'A Comparative Analysis of Current Credit Risk Models', *Journal of Banking and Finance*, forthcoming.
- 11:** Delianedus, G and Geske, R (1998) 'Credit Risk and Risk Neutral Default Probabilities: Information about Ratings Migrations and Defaults', Working Paper, Anderson School, UCLA, Los Angeles.
- 12:** Duffee, G R (1999) 'The Relationship Between Treasury Yields and Corporate Bond Yield Spreads', *Journal of Finance*, forthcoming.
- 13:** Gordy, M (1999) 'A Comparative Anatomy of Credit Risk Models', *Journal of Banking and Finance*, forthcoming.
- 14:** Hand, J, Holthausen, R and Leftwich, R (1992) 'An Ordered Profit Analysis of Transaction Stock Prices', *Journal of Financial Economics* 31, pp. 319-79.
- 15:** Helwege, J and Turner, C (1999) 'The Slope of the Credit Yield Curve for Speculative-Grade Issuers', *Journal of Finance*, forthcoming.
- 16:** IMF (1999) 'International Capital Markets: Developments, Prospects and Key Policy Issues', World Economic Surveys, pp. 185-214.
- 17:** Jackson, P and Perraudin, W (1999) 'Regulatory Implications of Credit Risk Modelling', *Journal of Banking and Finance*, forthcoming.
- 18:** Jackson, P, Furfine, C, Groeneveld, H, Hancock, D, Jones, D, Perraudin, W, Radecki, L and Yoneyama, M (1999) 'Capital Requirements and Bank Behaviour: The Impact of the Basel Accord', Basel Committee on Banking Supervision Working Paper (No 1 – April 1999).
- 19:** Jackson, P, Nickell, P and Perraudin, W (1999) 'Credit Risk Modelling', *Financial Stability Review*, Bank of England, June.
- 20:** Jarrow, R A and Turnbull, S M (1999) 'The Intersection of Market and Credit Risk', *Journal of Banking and Finance*, forthcoming.
- 21:** J P Morgan 1997, CreditMetrics Technical Document.
- 22:** Jones, D (1999) 'Emerging Problems with the Accord: Regulatory Capital Arbitrage and Related Issues,' *Journal of Banking and Finance*, forthcoming.
- 23:** Kaminsky, G and Reinhart, C (1999), 'The Twin Crises: The Causes of Banking and Balance-of-Payments Problems', *American Economic Review* (June 1999).
- 24:** Kao, C and Wu, C (1990) 'Two Step Estimation of Linear Models with Ordinal Unobserved Variables: the Case of Corporate Bonds', *Journal of Business and Economic Statistics* 8, pp. 317-25.
- 25:** Kaplan, R and Urwitz, G (1979) 'Statistical Models of bond ratings: a methodological inquiry', *Journal of Business* 62, pp. 231-61.
- 26:** Kiesel, R, Perraudin, W and Taylor, A (1999a) 'The Structure of Credit Risk', unpublished Bank of England mimeo.
- 27:** Kiesel, R, Perraudin, W and Taylor, A (1999b) 'Credit and Interest Rate Risk', unpublished Bank of England mimeo.
- 28:** Leake, J (1999) 'Yield Spreads on Sterling Bonds and the Term Structure of UK Interest Rates,' Bank of England mimeo.
- 29:** Litterman, R, and Iben, T (1991) 'Corporate Bond Valuation and the Term Structure of Credit Spreads', *Journal of Portfolio Management*, Spring, pp. 52-64.
- 30:** Longstaff, F, and Schwartz, E (1995) 'A Simple Approach to Pricing Risky Fixed and Floating Rate Debt', *Journal of Finance*, 50, pp. 789-819.
- 31:** Lopez, J A and Saldenber, M R (1999) 'Evaluating Credit Risk Models', *Journal of Banking and Finance*, forthcoming.
- 32:** Merton, R C (1974) 'On the Pricing of Corporate Debt: The Risk Structure of Interest Rates', *Journal of Finance*, 29, pp. 449-70.
- 33:** Mingo, J (1999) 'Policy Implications of the Federal Reserve Study of Credit Risk Models at Major U.S. Banking Institutions', *Journal of Banking and Finance*.
- 34:** Morris, C, Neal, R and Rolph, D (1999) 'Credit Spreads and Interest Rates', Indiana University mimeo, March.
- 35:** Nickell, P, Perraudin, W and Varotto, S (1998) 'Ratings- Versus Equity-Based Credit Risk Models: An Empirical Investigation', unpublished Bank of England mimeo.
- 36:** Nickell, P, Perraudin, W, and Varotto, S (1999) 'Stability of Rating Transitions', *Journal of Banking and Finance*, forthcoming.
- 37:** Perraudin, W, and Taylor, A (1999) 'On the Consistency of Bond Spreads and Ratings', unpublished Birkbeck College mimeo.
- 38:** Sarig, O and Warga, A (1989) 'Some Empirical Estimates of the Risk Structure of Interest Rates', *Journal of Finance*, 44, pp. 1351-60.
- 39:** Standard & Poor's, (1999a) 'Ratings Performance 1998: Stability and Transition', March 1999.
- 40:** Standard & Poor's, (1999b) 'Sovereign Versus Corporate Ratings Stability', *CreditWeek*, 9-13 September.
- 41:** Treacy, W F and Carey, M (1999) 'Credit Risk Rating Systems at Large U.S. Banks', *Journal of Banking and Finance*, forthcoming.
- 42:** Wood, P. R. (1991) 'Principles of International Insolvency', Sweet and Maxwell, London.

# Risk management

## with interdependent choice



Stephen Morris  
Yale University



Hyun Song Shin  
Nuffield College, Oxford

This article was recently published in the Autumn 1999 edition of the *Oxford Review of Economic Policy* which was devoted to financial market instability.

**SUMMER** and autumn of 1998 were exceptionally turbulent times for financial markets and the risk management systems of financial institutions engaged in proprietary trading went through a searching examination. Although the financial system pulled back from the brink and the feared financial meltdown did not materialize, many institutions suffered significant losses on their trading activities.

One theme which has emerged in the subsequent debate on the performance of the risk management systems has been the criticism that many financial entities entered the period of turbulence with very similar trading positions<sup>1</sup>. In one respect, this was entirely natural. If the prevailing conventional wisdom deems certain trades as being the most profitable, and the commonly available data buttress this conventional wisdom, then it is understandable that institutions end up with similar trading positions. However, the consequence of this was that, when many of the institutions attempted to unwind their trading positions, they encountered similar attempts by others, leading to exaggerated price movements and the drying up of liquidity even in the most widely traded instruments. The collapse of the dollar against

the yen on 7 and 8 October illustrated how even the most liquid of markets were vulnerable to concerted selling pressure. Thus, although we can explain why institutions entered the crisis with similar positions, this cannot be an excuse for any failures of risk management systems in place at the time. Why did so many sophisticated financial institutions with highly developed risk management tools get caught out? What was the blindspot?

### Blindspot in risk management

Conventional risk management techniques rest on the assumption that risk management is a single-person decision problem – in the jargon, a ‘game against nature’. That is, uncertainty governing price movements is assumed to be exogenous, and assumed not to depend on the actions of other decision makers. The analogy is with a gambler facing a spin of a roulette wheel, where the bets placed by other gamblers do not affect the outcome of the spin. The roulette wheel may have an unknown number of outcomes with differing probabilities, but as long as the outcome is unaffected by the actions of other gamblers, it is simply a matter of applying standard statistical techniques to past outcomes to enumerate

<sup>1</sup>: See, for instance, *Economist*, 14 November 1998, pp. 140-145.

what these outcomes are, and to estimate their respective probabilities. Many of the sophisticated techniques in the current state of the art can be seen as alternative ways of refining such estimation procedures, as well as tracking the non-linear payoff structures arising from derivative securities such as options<sup>2</sup>.

In normal market conditions, when trading is orderly and markets function well, there is little harm in treating uncertainty as being exogenous in this way. However, during a crisis, such a world view is likely to throw up nasty surprises. When short run changes in prices depend on the actions of other traders, the 'roulette wheel' view of uncertainty is no longer adequate. Since short run price changes depend on what others do, my decision depends on what others do. In other words, the uncertainty is *strategic*, in the sense used in game theory. When the outcomes of trading decisions depend on what others do, the uncertainty facing a trader has elements of poker, as well as roulette.

The neglect of strategic effects in risk management is all the more puzzling when set against the lessons drawn after the October 1987 crash of the stock market, barely a dozen years ago. The Brady Commission's report (1988) attributed the magnitude and swiftness of the price decline to practices such as portfolio insurance and dynamic hedging techniques. Such trading techniques have the property that they dictate selling an asset when its price falls and buying it when the price rises. Best estimates at the time suggested that around US\$100 billion in funds were following formal portfolio insurance programs, representing around 3 per cent of the pre-crash market value. However, this is almost certainly an underestimate of total selling pressure arising from informal hedging techniques such as stop-loss orders (see the survey evidence presented in Shiller (1987)).

There are similarities between the 1987 crash and the events of last year. Perhaps more than any other market, the fall of the dollar against the yen in October 1998 shares many of the same themes – dynamic hedging strategies, stop-loss orders and price magnification effects of selling into a falling

market. There is also an irony here. Some of the institutions which suffered the largest losses due to the fall in the dollar were precisely those which had exploited the price-feedback effect of a market stampede of selling into a falling market during the Asian crisis of 1997. Thus, to understand the failure of risk management due to strategic uncertainty, it is instructive to examine first one of the trading 'successes' of such institutions.

### Currency attacks

Defending a currency peg in adverse circumstances entails large costs for the government or monetary authorities. The costs bear many depressingly familiar symptoms – collapsing asset values, rising bankruptcies, the loss of foreign exchange reserves, high interest rates and the resulting reduction in demand leading to increases in unemployment and slower growth. Whatever the perceived benefits of maintaining a currency peg, and whatever their official pronouncements, all monetary authorities have a pain threshold at which the costs of defending the peg outweigh the benefits of doing so. Understanding the source and the severity of this pain is a key to understanding the onset of currency attacks.

Facing the monetary authority is an array of diverse private sector actors, both domestic and foreign, whose interests are affected by the actions of the other members of this group, and by the actions of the monetary authority. The main actors are domestic corporations, domestic banks and their depositors, foreign creditor banks, and outright speculators – whether in the form of hedge funds or the proprietary trading desks of investment banks. Two features deserve emphasis.

- Each actor faces a choice between actions which exacerbate the pain of maintaining the peg and actions which are more benign.
- The more prevalent are the actions which increase the pain of holding the peg, the greater is the incentive for an individual actor to adopt the action which increases the pain. In other words, the actions which tend to undermine the currency peg are mutually reinforcing.

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<sup>2</sup>: The technical documents provided by RiskMetrics Group (1999) set out perhaps the most common techniques, based on the covariance structure of asset returns. Other approaches include simulations based on historical returns, and on Monte Carlo experiments. See Jorion (1997) or Goodhart *et al* (1998, ch. 5) for an introduction.

For domestic corporations with unhedged dollar liabilities, they can either attempt to hedge their positions or not. The action to hedge their exposure – of selling baht to buy dollars in forward contracts, for example – is identical in its mechanics (if not in its intention) to the action of a hedge fund which takes a net short position in baht. For domestic banks and finance houses which have facilitated such dollar loans to local firms, they can either attempt to hedge their dollar exposure on their balance sheets or not. Again, the former action is identical in its consequence to a hedge fund short-selling baht. As a greater proportion of these actors adopt the action of selling the domestic currency, the greater is the pain to the monetary authorities, and hence the greater is the likelihood of abandonment of the peg. This increases the attractiveness of selling baht. In this sense, the actions which undermine the currency peg are mutually reinforcing. They are ‘strategic complements’, in the sense used in game theory.

Indeed, the strategic effects run deeper. As domestic firms with dollar liabilities experience difficulties in servicing their debt, the banks which have facilitated such dollar loans attempt to cover their foreign currency losses and improve their balance sheet by a contraction of credit. This in turn is accompanied by a rise in interest rates, fall in profit and a further increase in corporate distress. For foreign creditor banks with short-term exposure, this is normally a cue to cut off credit lines, or to refuse to roll over short-term debt. Even for firms with no dollar exposure, the general contradiction of credit increases corporate distress. Such deterioration in the domestic economic environment exacerbates the pain of maintaining the peg, thereby serving to reinforce the actions which tend to undermine it. To make matters worse still, the belated hedging activity by banks is usually accompanied by a run on their deposits, as depositors scramble to withdraw their money.

The following table contains a (somewhat simplistic) taxonomy of the various actors and their actions which undermine the peg. The feature to be emphasized is the increased pain of maintaining the peg in the face of widespread adoption of such actions, and hence the *mutually reinforcing* nature of the actions which undermine the peg. The greater is the prevalence of such actions, the more attractive such actions become to the individual actor.

Actor	Action(s) undermining peg
Speculators	Short sell baht
Domestic firms	Sell baht for hedging purposes
Domestic banks	Sell baht for hedging purposes Reduce credit to domestic firms
Foreign banks	Refuse to roll over debt
Depositors	Withdraw deposits

To be sure, the actual *motives* behind these actions are as diverse as the actors themselves. A currency speculator rubbing his hands and looking on in glee as his target country descends into economic chaos has very different motives from a desperate owner of a firm in that country trying frantically to salvage what he can, or a depositor queuing to salvage her meagre life savings. However, whatever the motives underlying these actions, they are similar in their consequences. They all lead to greater pain on holding to the peg, and hence hasten its demise.

### Multiple equilibria

Although the mutually reinforcing effects of certain actions have been well understood in the academic debate, one of the difficulties in developing this theme for risk management is that a formal analysis of this problem yields multiple equilibria, and hence does not yield a definite prediction of the outcome. This indeterminateness is largely due to the self-fulfilling nature of the belief in an imminent sell off. If speculators and exposed borrowers believe that a currency will come under attack, their actions in anticipation of this precipitate the crisis itself, while if they believe that a currency is not in danger of imminent attack, their inaction spares the currency from attack, thereby vindicating their initial beliefs.

Recent work by Morris and Shin (1998a, 1999a, 1999b) has provided one way to tackle the problem of indeterminateness. The theory rests on two features.

- The actions of diverse economic actors which exacerbate a currency crisis are mutually reinforcing,
- Market participants have access to a large mass of information concerning the economic fundamentals, and hence are often well informed of the underlying state of the economy. However, perhaps because of the sheer volume of

information, there are small disparities in the information at the disposal of each economic actor.

The first of these features has already been discussed. The innovation comes with the second feature. When there are small disparities in the information of the market participants, the indeterminateness of beliefs inherent in the multiple equilibrium story is largely removed. Instead, it is possible to track the shifts in beliefs as we track the shifts in the economic fundamentals. This is so, since uncertainty about others' beliefs now takes on a critical role, and such uncertainty often dictates a particular course of action as being the uniquely optimal one. Even vanishingly small differences in information suffice to generate such uncertainty about others' beliefs. When we consider the sheer quantity of information available to market participants – the news wire services, in-house research, leaks from official sources, as well as the press and broadcasters – exact uniformity of information is the last thing we can expect.

Indeed, the fragmentation of the media in modern times has generated the paradoxical situation in which ever greater quantities of information are generated and disseminated, but this comes at the expense of the shared knowledge of its recipients. Apart from totalitarian regimes in which there is a single source of information (or perhaps in the heyday of the BBC Home Service), the receipt of information is rarely accompanied by the knowledge that everyone else is also receiving precisely this information at that time. Even among financial markets, the foreign exchange market is especially fragmented. Its market microstructure is characterized by the decentralized nature of the trade necessitated by round-the-clock trading, and the geographical spread which goes with it. At its most basic, a speculative attack is a resolution of a co-ordination problem among the diverse interested parties – both foreign and domestic. Small disparities of information determine the outcome of such co-ordination problems.

### Unique equilibrium

When these two ingredients are brought together, the apparent multiplicity of equilibria induced by mutually reinforcing actions makes way for a unique equilibrium in which market participants employ a 'switching strategy'. Morris and Shin (1998a) show this in the context of a simple static example, while

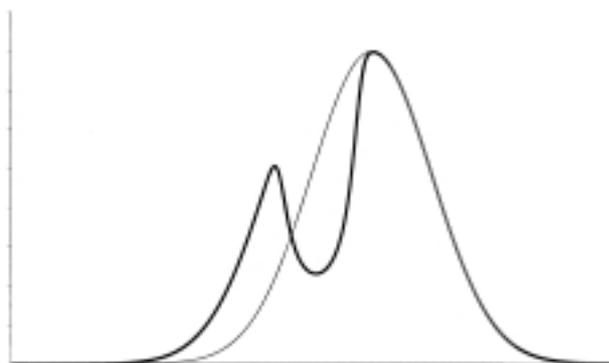
the follow-up paper (Morris and Shin (1998b)) extends this analysis to a dynamic setting. Market participants base their actions on their best estimate of the underlying fundamentals, bearing in mind that all other market participants are engaged in the same exercise. A switching strategy is a rule of action in which the action chosen is determined by whether the best estimate of the underlying fundamentals is above or below some pre-determined benchmark level. This equilibrium also happens to be a symmetric equilibrium, in the sense that the same benchmark switching point is used by all the market participants.

In terms of the observable implications, the behaviour of market participants injects an additional source of variability into the picture. When market outcomes depend on the actions of its participants (as surely they must), the sharp breaks induced by the switching strategies can generate significant short-term fluctuations. This conclusion has to be qualified by adding that the severity of the breaks observed depends on the parameters of the model. When the noise in the market participants' signals is large, the breaks are less pronounced. This is because the noise generates a greater dispersion of estimates of the underlying fundamentals, and hence there is less unanimity in judgements as to whether the critical threshold of the switching strategy has been breached. In contrast, when the noise is small, the market outcome suffers a much sharper break, since the distribution of estimates conditional on the true realization of fundamentals is that much more concentrated around the mean. This gives rise to much more precipitous breaks in the market outcome.

As an illustration of this point, one may consider the short run price distribution of an asset whose liquidity is limited, and hence whose price depends on the incidence of selling observed in the market. If traders operate under short time horizons, such short run fluctuations in price will affect their trading decisions, and the mutually reinforcing effect of selling into a falling market will operate. More concretely, let us suppose that the price of the asset in the next period is given by  $\tilde{\theta} - \lambda s$ , where  $\tilde{\theta}$  is a normally distributed random variable,  $s$  is the proportion of traders who engage in sales of the asset, and  $\lambda$  is a positive number indicating the short-term price response of the asset to sales. When  $\lambda$  is large, sales of the asset elicit large negative price responses. For a fairly typical

configuration of the parameters in which  $\lambda$  is moderately large and the noise in traders' signals is small relative to the variance of  $\tilde{\theta}$  itself, the price distribution of the asset takes on the 'double-humped' shape given in Figure 1.

**Figure 1**



The thin line is the density of  $\tilde{\theta}$  itself, giving the distribution of the underlying fundamentals. The bold line is the price distribution when the effect of sales on price is taken into account. It is the price distribution of the asset arising from the trading strategies of all the traders. The bi-modal distribution is a typical manifestation of the switching strategies followed by the traders in the (unique) equilibrium. When estimates of the realization of  $\tilde{\theta}$  fall below the switching point, the traders sell, but otherwise hold the asset. At low realizations of  $\tilde{\theta}$ , simultaneous selling drives the price down by more than would be the case in the absence of the feedback effect from prices to trades back to prices.

Although this illustration has been couched in terms of the concerted selling of an asset, analogous examples can be constructed in terms of the traders rushing to *buy* the asset, instead. The appropriateness of the example depends on the initial trading positions of the traders in the market. If the market participants start with long positions on the asset (perhaps with large leveraged positions to magnify their gains), the issue is whether they will unwind their long positions or not. Then, the price distribution depicted in Figure 1 may be an accurate picture of the price distribution. However, if the traders start with short positions in the asset (again, possibly quite large), then the issue is whether they buy the asset back to close out their positions. In that case, it would be the right hand tail of the distribution which would be distorted by the switching strategies of the traders. In any case, the

size of the parameter  $\lambda$  – measuring lack of liquidity and size of the leverage – will determine the magnitude of the price response, and hence the degree to which the short run price distribution diverges from the distribution of the underlying fundamentals.

### **Dollar/yen in October 1998: the sharks become the bait**

The short run price distributions induced by switching strategies may be a useful way to understand the behaviour of the dollar against the yen over two memorable days last October – 7th and 8th – when the dollar fell from 131 yen to 112 yen by lunchtime in London on Thursday the 8th, bouncing back sharply to end New York trading at 119 yen. 7 and 8 October were perhaps two of the most turbulent days of trading in financial markets in recent memory, which also saw sharp falls in longer dated government bonds and the virtual seizing up of markets for corporate debt, and for less liquid government debt instruments.

The fall in the dollar was especially dramatic given its strength throughout the spring and summer of 1998, reaching its high of 147.26 yen on 11 August. Many commentators were predicting that dollar/yen would reach 150 or perhaps 200 by the end of the year, especially in the light of the apparent failure (in June) of the joint intervention by the United States and Japan to support the yen more than temporarily. The conventional wisdom among academics, commentators and traders alike was that the yen was bound to fall, and that it was a matter of the speed and the magnitude of its fall rather than the direction. Indeed, by the summer of 1998, this conventional wisdom had almost acquired the status of an immutable truth. Although such arrogance seems misplaced with the benefit of hindsight, it is easy to see how such a confident view of the world arose. Since the spring of 1995, the dollar had continued to appreciate against the yen (with a brief respite in mid-1997), and the contrasting macroeconomic fortunes of the United States and Japan, with strong growth in the former and weakness in the latter seemed to presage more of the same in the months ahead.

The combination of an appreciating dollar and the large interest rate differential between Japan and the United States gave rise to the singularly profitable trading opportunity of borrowing yen, buying dollar

assets, and gaining both on the appreciation of the dollar and the interest rate differential. This 'yen-carry' trade was widespread among hedge funds, the proprietary trading desks of investment banks, and even some corporations. Funds were raised in the interbank market through term repo agreements, or by issuing money market paper. Then these funds would be swapped for foreign currency or exchanged in the spot market to fund purchases of higher-yielding assets, including US Treasuries, corporate bonds, mortgage-backed securities and also even riskier instruments such as Russian treasury bills known as GKO's. Japanese banks also resorted to the yen-carry trade by accumulating foreign assets. In the first three quarters of 1998, the net holdings of assets denominated in foreign currencies increased by about US\$44 billion, while the holdings of yen-denominated assets abroad declined by US\$103 billion (IMF (1998, p.126)). Thus, the conventional wisdom concerning the relentless rise in dollar/yen was also apparently shared by the Japanese institutions.

The tide began to turn after the Russian default in August, but the initial weakening of the dollar was relatively orderly, falling by less than 10 per cent against both the yen and the Deutschemark between mid-August and early October. However, in the week beginning 5 October, the decline of the dollar against the yen accelerated sharply – closing down roughly 15 per cent over the week. Significantly, the fall in the dollar against the Deutschemark was much less pronounced, falling less than 2 per cent during the week. It was also noteworthy how this fall in dollar/yen coincided with an unprecedented steepening of the yield curve for mature debt markets outside Japan, as bond yields bounced back from their historic lows. During the same week, the yield gap between three month rates and 10 year rates widened by 85 basis points in the United States, 60 basis points in the United Kingdom and 50 basis points in Germany. The coincidence of (i) the rapid fall in dollar/yen (ii) less precipitous fall in dollar/Deutschemark and (iii) rapid steepening of the yield curve in markets outside Japan is consistent with the unwinding of the yen-carry trades – the 'switching strategy' referred to in the previous section having been triggered.

One of the implications of the equilibrium in switching strategies is that a *moderate* fall in asset value is highly unlikely. Either the asset does not fall in value at all, or the value falls by a large amount.

The logic of the mutually reinforcing effects of selling into a falling market dictates this conclusion. The fall in dollar/yen is also likely to have been exaggerated by stop-loss orders, and by the cancellation of barrier options and the unwinding of associated hedging positions by dealers. One estimate of the volume of outstanding yen foreign currency contracts at the end of June was in excess of US\$3.3 trillion (Bank of Japan (1998)). Just as in the stock market crash of 1987, the effect of such trading techniques is to exaggerate price movements, by selling onto a falling market. In retrospect, the bi-modal distribution of asset prices referred to earlier is exactly what one should expect in a market which is marked by such high levels of leverage, undertaken by so many diverse institutions. The unwinding of yen-carry trades proceeded at such a pace that press reports referred to market rumours of imminent collapse of one or more hedge funds. The Bank of Japan reported large buying of yen by at least one large hedge fund (*Financial Times*, 9 October, p.19).

The poignant irony could not have been lost on observers of the Asian financial crisis. Just a year earlier, the hedge funds and assorted proprietary trading desks of investment banks had profited handsomely from the stampede by Asian borrowers with unhedged dollar liabilities to cover their positions in a desperate attempt to keep afloat. In October 1998, these same 'sharks' had become their own bait. It was now they who were scrambling to cover their positions. The logic of mutually reinforcing sales meant that the harder they tried to swim away, the more they provoked the feeding frenzy. The sense of fear was palpable during the turbulent trading of 8 October. With sentiment already fragile after the forced rescue of Long Term Capital Management, rumours of the imminent collapse of a major hedge fund further reinforced the disengagement from risk.

Can the events of October be seen as a 'currency attack' on the dollar? Although it may seem incongruous even to entertain such a question, all the hallmarks of a classic currency attack are there – large unhedged foreign currency positions, and the scramble to unwind these positions exacerbated by the price feedback effect of selling into a falling market. There is, of course, one important difference between the collapse of the dollar and the Asian financial crisis. Unlike its Asian precursors, the US Federal Reserve *cut* US interest rates in response to

the crisis, injecting liquidity and curtailing the vicious circle of selling. This was very different from the policy response to the Asian crisis. The medicine prescribed for these countries by the IMF and the US Treasury was for steeply *higher* interest rates, exacerbating financial distress and fuelling the vicious circle of selling.

The analogy between the fall in the dollar and the Asian crisis is intended to be provocative, and rather tongue in cheek. However, it is instructive nevertheless. It is all too easy to paint a picture of the victims of crises as being riven by incompetence and corruption, and to attribute their misfortunes exclusively to the moral hazard so generated. Moral hazard and political abuse exist in many poor countries, and are justifiably reviled. However, one can question the wisdom of enforcing financial tightening at the height of a crisis. A strict regime of diet and exercise would be desirable for someone at risk of a heart attack, but it is inappropriate for someone who has just been struck down by one. It is hard to escape the conclusion that the policy response to the Asian crisis was more akin to the latter, causing severe social and economic hardship.

### Systemic risk and regulation

The adoption of explicit risk management techniques has been accompanied by a growing acceptance by regulators of self-policing by the financial institutions themselves using their own internal risk management models. This growing acceptance has raised the stakes in the search for adequate risk management systems. The initial proposals by the Basel Committee on Banking Supervision (1993) to deal with market risk generated by proprietary trading was much more cautious, and placed relatively little weight on the internal risk management models. Indeed, it had more in common with the 'building blocks' approach of the original 1988 Basel Accord. However, during the consultation process which followed, the banking industry mounted a successful campaign to establish the use of internal models. In two BIS documents two years later (1995a, 1995b), the principle was conceded by the Basel Committee, and this concession was enshrined in the amendment to the Basel Accord the following year (BIS 1996). Thus, from 1 January 1998, the provisions of the amendment came into effect, requiring internationally active banks in the G10 countries to maintain regulatory capital to cover market risk.

It was unfortunate that 1998, the first year of the new regimen, saw such unprecedented market turbulence. Much of this turbulence had its roots in trading decisions taken much earlier on, but it should give food for thought for both regulators and market participants. What is at issue is whether such bouts of turbulence will subside as more sophisticated versions of current risk management techniques become more widely adopted, or whether the more widespread adoption of such techniques merely serves to increase the fragility of the system. If the argument in this essay has any force, then the latter possibility cannot be ruled out. As long as the world view underlying the risk management models discounts the feedback effect from actions to outcomes, the building blocks underlying such models remain suspect. If the 'externalities' generated by one trader's actions on the payoff distribution of another is not taken into account, the assumptions supporting the model are undermined.

The term 'externality' is used advisedly. The usual context in which this notion appears is in welfare economics, such as when applied to environmental issues, in which the absence of markets generates inefficient outcomes among market participants. Thus, when I take my car out on to the congested roads, I am contributing to the congestion, but this added inconvenience to others is not priced by the market, as there is no market for unencumbered use of the road. There is an analogy with the trading decisions of market participants. When one hedge fund decides to engage in the yen-carry trade, the decision is based on the profitability for that trader alone. However, by short-selling the yen, this trader generates an externality for all other market participants who are engaged in the same trade. This is so, since when the yen begins to rise, its rise will be that much more accentuated by the attempt to cover the short yen position by this trader. Thus, just as a driver discounts the inconvenience caused by his own driving on the welfare of other drivers, the hedge fund discounts the possible losses inflicted on other market participants by his own trades.

Indeed, the externalities inflicted by traders on other traders will be worse than this analogy suggests. A driver taking his car out on to the road will at least anticipate the selfish actions of other drivers – daily experience of congestion will have reinforced this. However, the hedge fund engaging in the yen-carry trade will underestimate the risks if the trading

positions of other traders are ignored. The hedge fund will hold *incorrect* beliefs if his risk management model is based on a 'roulette-wheel' view of the world in which there is no feedback effect from the actions of other traders on the market outcome. During normal, tranquil market conditions, the daily signs from the market do not serve to warn the hedge fund of impending danger. As seen from Figure 1, the price distribution is only distorted for one of the tails of the distribution. As long as the underlying fundamentals move within a small interval of the median, the outcomes are indistinguishable from that generated by the symmetric normal distribution. It is only when the underlying fundamentals wander off to the left that the hedge fund will realize that something is seriously wrong. But by then, it is too late.

Externalities justify a role for the regulator, whether it be in reducing congestion on the roads, or in reducing the damaging effects of market turbulence. This role can be justified even though the individual decision-makers are perfectly rational, and are able to take informed decisions themselves. The incentives for individuals, whether they be individual drivers or traders, do not always take into account the effect of their decisions on others' welfare. The Basel Committee (BIS 1995b) has provided for a 'buffer' in the capital requirements set against market risk, in which the value at risk obtained from the internal risk-management models of the banks is multiplied by a factor of three to reach the capital requirement. Indeed, this factor is raised by a colour-coded 'plus factor' if the internal models of the banks perform inadequately in actual trading. The green zone attracts no plus factor, while the yellow zone attracts a plus factor of 0.4 to 0.85, rising in the red zone to a full point. Thus, banks in the red zone must set aside four times the value at risk obtained from their internal model. Such a buffer may serve to extinguish some of the dangers arising from the externalities generated by traders' trading positions on others' but it is likely to be a subject of some controversy in the days to come, since such provisions undermine the profitability of banks.

### What role for transparency?

The term 'transparency' has been a touchstone of the policy response following the Asian crisis of 1997/8, and the issue has taken on added significance following market turmoil of the summer and autumn of 1998. It has figured prominently in numerous official publications (IMF (1998b), BIS (1999)). The

debate on transparency has many themes, but one presumption running throughout the debate has been that it was a lack of information about the underlying fundamentals which exacerbated the crises, both during the Asian crisis, and the subsequent turbulence in the mature financial markets. There is a sense in which this presumption is well-founded, and another sense in which it is not.

In one respect, lack of information was a key. If a hedge fund uses an incorrect risk management model by, say, disregarding the trading positions of other traders, then the dangers of the situation can be impressed upon the hedge fund manager by showing him the correct model, and educating him on the true risks involved.

However, there is another sense in which 'transparency' is a red herring. Suppose that all the traders now begin to use the correct risk management model which takes into account the trading positions of others. The externality problem is not solved by information alone. There is still a mismatch between the incentives of an individual trader and overall welfare, just as the driver taking his car out on to the congested roads will not factor in the environmental harm done by his driving. Now, what is the effect of better information in this instance? What is the effect of the provision of more accurate and timely information to market participants? In terms of the formal theory described above, more accurate information corresponds to a smaller degree of noise in the signals of the market participants, and the 'switching strategies' used by these traders can now rely on better information concerning the fundamentals. In the limit, as the noise becomes negligible, there will then be an exact correspondence between the true state of fundamentals and the perception of these fundamentals by the market participants, and hence their switching strategies will dictate a much sharper break than before. In other words, the violence of sudden market movements may be exacerbated by better information. However, this effect may be countered by a generalized shift in the region in which such a break takes place, so that the overall effect on welfare is ambiguous. Formal analysis in Morris and Shin (1999a, 1999b) confirms that the general effect is ambiguous. Sometimes, greater provision of information is beneficial, but sometimes it can be detrimental.

These results hold some important lessons for the conduct of public policy in dissemination of information. When calling for improved transparency, it is important to be clear as to *how* the improved information will improve the outcome. The mere provision of information may not be enough to preclude market turbulence. With the benefit of theoretical hindsight, it is perhaps not surprising that the provision of more information to market participants does not mitigate the co-ordination problem. After all, we should draw a distinction between a single-person decision problem and a strategic situation. In a single-person decision problem, more information is always more valuable. When I debate whether to carry an umbrella in to work, an accurate weather forecast will minimize both the inconvenience of carrying a bulky umbrella on a sunny day, and also the opposite inconvenience of getting caught in a shower without shelter. In such instances, ‘transparency’ works.

However, it is far from clear whether better information will mitigate a co-ordination problem. There is little guidance from economic theory that better information about payoffs to players of a co-ordination game leads to greater incidence of successful co-ordination. Indeed, the intuition conveyed by existing theory is of a much more prosaic sort – typified by the debate on the Coase Theorem – in which all the emphasis is placed on the impediments to efficient bargaining. When the interested parties are diffuse and face uncertainty both about the fundamentals and the information of others, it would be overly optimistic to expect *ex post* efficient bargains to be struck. In the case of credit risk, where the issue is the co-ordination of diverse creditors facing a distressed borrower, it is possible to contemplate institutions which may, in principle, serve to achieve successful co-ordination – especially when led by a forceful facilitator. Such institutions could be seen as the ‘Coasian’ solution to the externality problem, relying on the self-interested bargaining of interested parties.

For market risk, however, it is difficult to see how any institutional setup can implement the Coasian solution. Markets, by their nature, rely on the decentralized decision makers making their decisions in isolation from others. The text book alternative to Coasian bargaining is the introduction of taxes and subsidies to align individual incentives towards collectively efficient outcomes. But even here, it is

only marginally more plausible than Coasian bargaining itself. The monitoring and enforcement powers available to the regulators will make any fine-tuning all but impossible, while crude measures may do more harm than good. To a large degree, the externalities associated with market risk will be impossible to remove.

## Conclusions

Episodes of market turbulence such as that experienced last year are a rarity, and the desire to prevent a repeat of such episodes must be tempered by the need to allow financial entities to pursue their legitimate commercial interests. Striking the proper balance rests on the proper recognition of the sources of fragility of the market and the targeting of these weaknesses, guarding against crude, ham-fisted measures borne out of a knee-jerk reaction to market volatility. This essay has emphasized two issues in particular.

- The ‘roulette wheel’ of market uncertainty is inadequate as a basis for modelling market risk. For markets whose outcomes depend on the actions of market participants, game theoretic issues must be addressed explicitly. The greater the leveraged positions of the traders in those markets, and the greater the uniformity of these trading positions, the more important it is to recognize the feedback effect from outcomes to actions back to outcomes. One role for ‘transparency’ in the market is in aiding the education of market participants and in bringing the potential whiplash effects of such markets to their attention.
- However, transparency is not a panacea. Even if every market participant transcends the roulette wheel world view to recognize the interdependent choices in these markets, this does not fully align the incentives of the market participants towards the collective interest. Just as a driver does not price in the congestion externality when taking his car on the road, a trader does not take into account the externality generated by mimicking the trading position of another trader. In this respect, regulation still has a place.

The foreign exchange market is perhaps the best case where these lessons may usefully be kept in mind. One of the enduring puzzles in financial economics is why ‘uncovered interest parity’ does not hold in

practice. That is, why it is that differences in interest rates do not perform well as a predictor of the future movement of exchange rates<sup>3</sup>. On average, it has been profitable to borrow a currency with a low interest rate and buy assets denominated in the currency with a higher interest rate. This being so, there is always a bias towards trading positions which bet against uncovered interest parity. Given the size of the foreign exchange market the collective trading positions can take on enormous magnitudes. The yen-carry trade of the late nineties was just an extreme case of this. At the moment of writing, the euro has fallen to its lowest level to the dollar – just over 1.02 dollars to the euro as compared with 1.17 at its launch. So far, it has been another instance in which it has proved profitable to bet against uncovered interest parity (euro interest rates being 2.5 per cent compared with dollar rates of 4.75 per cent). Only time will tell how long this period of euro weakness will last, but both traders and regulators would do well to keep the lessons of October 1998 in mind.

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#### References

- 1:** Bank of Japan (1998) 'Regular Derivatives Market Statistics in Japan', Bank of Japan, Tokyo.
- 2:** Basel Committee on Banking Supervision (1993) 'The Supervisory Treatment of Market Risks', Bank for International Settlements, Basel.
- 3:** Basel Committee on Banking Supervision (1995a) 'Proposal to Issue a Supplement to the Basle Capital Accord', Bank for International Settlements, Basel.
- 4:** Basel Committee on Banking Supervision (1995b) 'An Internal Model-Based Approach to Market Risk Capital Requirements', Bank for International Settlements, Basel.
- 5:** Basel Committee on Banking Supervision (1996) 'Amendment to the Capital Accord to Incorporate Market Risks', Bank for International Settlements, Basel.
- 6:** Basel Committee on Banking Supervision (1999) 'Recommendations for Public Disclosure of Trading and Derivatives Activities of Banks and Securities Firms', Bank for International Settlements, Basel.
- 7:** Brady, N (1988) 'Report of the Presidential Task Force on Market Mechanisms', Government Printing Office, Washington D.C.
- 8:** Goodhart, C A E, Hartmann, P, Llewellyn, D, Rojas-Suarez, L and Weisbrod, S (1988) 'Financial Regulation', Routledge, London.
- 9:** International Monetary Fund (1998a) 'World Economic Outlook and International Capital Markets: Interim Assessment', <http://www.imf.org/external/pubs/ft/weo/weo1298/index.htm>

- 10:** International Monetary Fund (1998b) 'Report of the Managing Director to the Interim Committee on Strengthening the Architecture of the International Monetary System', <http://www.imf.org/external/np/omd/100198.htm>
- 11:** Jorion, P (1997) 'Value at Risk', McGraw-Hill, New York.
- 12:** Morris, S and Shin, H S (1998a), 'Unique Equilibrium in a Model of Self-fulfilling Currency Attacks' *American Economic Review*, 88, pp. 587-97.
- 13:** Morris, S and Shin, H S (1998b) 'A Theory of the Onset of Currency Attacks', unpublished paper, <http://www.nuff.ox.ac.uk/users/Shin/working.htm>
- 14:** Morris, S and Shin, H S (1999a), 'Co-ordination Risk and the Price of Debt', unpublished paper, <http://www.nuff.ox.ac.uk/users/Shin/working.htm>
- 15:** Morris, S and Shin, H S (1999b), 'Private versus Public Information in Co-ordination Problems', unpublished paper.
- 16:** Obstfeld, M and Rogoff, K (1997) 'Foundations of International Macroeconomics', MIT Press, Cambridge, MA.
- 17:** RiskMetrics Group (1999) 'RiskMetrics Technical Manual', RiskMetrics Group, London, <http://www.riskmetrics.com/research/techdocs/index.cgi>
- 18:** Shiller, R (1987) 'Investor Behaviour in the October 1987 Stock Market Crash: Survey Evidence' NBER discussion paper 2446, reprinted in 'Market Volatility', MIT Press, 1990.

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**3:** See Obstfeld and Rogoff (1997) pp. 621-30 for an introduction to the empirical literature.

# Lender of last resort:

## a review of the literature



Xavier Freixas  
Pompeu Fabra University,  
Barcelona



Curzio Giannini  
Banca d'Italia



Glenn Hoggarth  
Bank of England



Farouk Soussa  
Bank of England<sup>1</sup>

The maintenance of financial stability is facilitated by well-designed ‘safety net’ arrangements aimed at limiting the risk of disruption in the financial system (crisis prevention) and the consequences of disruption if it arises (crisis management). An important element of crisis management is the lender of last resort (LOLR) function. This article reviews the main ideas on LOLR reflected in the academic literature, going back to Henry Thornton almost two hundred years ago.

**THE CONCEPT** of LOLR originated at the beginning of the 19th century when Henry Thornton (1802) spelt out the basic elements of sound central bank practice with respect to distress lending. Walter Bagehot (1873), who is most often credited with establishing modern LOLR theory, expanded on Thornton’s work (although without referring to him by name). Both authors justified the need for a LOLR whose role, they argued, was:

“...(1) to protect the money stock, (2) to support the whole financial system rather than individual financial institutions, (3) to behave consistently with the longer-run objective of stable money growth, and (4) to preannounce its policy in advance of crises so as to remove uncertainty” (Humphrey, 1989).

Bagehot suggested that, in a liquidity crisis, a central bank should lend freely, at a high rate of interest relative to the pre-crisis period, to any borrower with good collateral, where good collateral was any paper normally accepted by the central bank, valued at

between panic and pre-panic prices. He also recommended that the quality standards on collateral taken by the Bank of England during a crisis should be relaxed. Institutions without good collateral were assumed to be insolvent and should, Bagehot argued, be allowed to fail.

Although this description of the LOLR function continues to influence central bank policy makers today, current LOLR practices have also been shaped by changes in the financial and regulatory system over the past century.

This paper addresses the issues set out in the recent literature on LOLR support. It starts with the fundamental question of whether an LOLR is necessary and then reviews the modern debate on LOLR. This is followed by a discussion of when and why capital injections to insolvent banks might be necessary and, finally, the costs of LOLR and capital injections.

<sup>1</sup>: We would like to thank Alastair Clark, Paul Tucker and Geoffrey Wood for helpful comments.

## The need for a lender of last resort

The term 'LOLR' is used in different ways in the literature. In this paper, LOLR is taken to mean the *discretionary* provision of liquidity to a financial institution (or the market as a whole) by the central bank in reaction to an adverse shock which causes an abnormal increase in demand for liquidity which cannot be met from an alternative source.

The central bank provides liquidity (reserve money) in exchange for, or against the security of, financial assets. Although this increases the liquidity of a bank's balance sheet it does not change the overall value of its assets.

## Asymmetric information

This section addresses cases of emergency lending to illiquid but *solvent* institutions. The distinction between solvent and insolvent banks is a feature of the academic literature. In practice, however, a central bank may not always be able to make this distinction, particularly in the short time-scale in which a lending decision may have to be made<sup>2</sup>.

### Bank runs

A distinguishing feature of banks is that their assets are largely illiquid term loans while their liabilities comprise predominantly unsecured short term deposits. Moreover, deposits are paid out in full on a first-come-first-served basis. Most economists agree that these features of banks' balance sheets make them susceptible to depositor runs. Since in general banks' assets are not readily marketable, such runs can result in the forced disposal of these assets at depressed 'fire sale' prices and thence to the insolvency of an otherwise fundamentally sound bank. This potentially involves a welfare loss to the public as a whole which would justify public sector intervention, assuming that the benefit of such intervention outweighs the costs involved.

In the literature on bank runs, it is usually assumed that depositors are individuals or firms who have placed funds in a bank for an indefinite period but with the understanding that these funds may be redeemed at face value on demand or at short notice. This literature does not cover other types of bank liability such as interbank borrowing, CDs, bonds and commercial paper, all of which typically have a

pre-specified maturity. Although in practice some of these may be the source of liquidity problems for banks – for example short-term interbank lending may not be rolled over – the literature reviewed here focuses on deposits as defined above.

The first paper formally to model the possibility of bank runs was that of Diamond and Dybvig (1983), where it was demonstrated that despite certainty about the soundness of a bank, depositors may run due to co-ordination problems. This is because each depositor is aware that if other depositors withdraw early, the bank would have to convert illiquid assets into cash at a loss and might not therefore have enough cash to cover all deposits. Any external event, therefore, which triggers depositors to believe that other depositors will withdraw their deposits results in a run. Diamond and Dybvig described such events as 'sunspots' (exogenous uncertainty).

Diamond and Dybvig's argument that 'sunspots' alone can trigger runs has been criticised for being unrealistic (Dowd, 1992). More recently, Morris and Shin (1999) have developed the co-ordination failure idea by extending it to the general creditor-borrower relationship and introducing incomplete information. They demonstrate that if the soundness of the borrower is uncertain and different lenders have different beliefs about it, runs on the borrower may occur. The trigger for the run would be a commonly observed signal about the borrower which raises lenders' doubts about whether other lenders will find the borrower sound, even if they do not themselves share that view. It is therefore rational to pre-empt withdrawals of other lenders by withdrawing first.

Diamond (1984) argues that the core of a bank's business is to extend loans based on private information about the borrower. Depositors are not easily able to observe the financial condition of the borrowers or the bank, and the bank depositor-manager relationship therefore potentially gives rise to agency problems (depositors entrust their money to bank managers and rely on them to invest it prudently). If depositors believe managers are behaving imprudently, they can discipline managers by withdrawing their funds – ie run on the bank (Calomiris and Kahn (1991); Davis (1995)). An alternative to the threat of running would be to

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<sup>2</sup> Hawtrey (1932) argues that the central bank can avoid having to make a decision as to the solvency of a bank if it lends only on collateral. If the bank fails, however, the central bank will avoid losses only if sufficient margin had been taken to cover any fall in the value of the collateral.

demand higher interest rates. However, this would imply that depositors are capable of monitoring and pricing the risks bank managers take, which the bank run literature assumes they are not able to do. In fact, Avery et al (1988), and Park (1995), among others, find evidence that large, wholesale depositors *are* able to discipline banks by demanding higher interest rates; but there is no evidence that small depositors behave in this way. This is perhaps not surprising, if only because small deposits are typically protected by deposit insurance. In the absence of deposit insurance and where depositors are unable to monitor their banks, the decision to run will depend on depositors' confidence in their bank's management.

Thus the nature of the deposit contract, together with the absence of complete information on the assets of the bank, result in the possibility of a solvent bank experiencing a run. Deposits may be switched into cash and other non-bank assets, or into deposits at another bank which is perceived to be less risky.

As first argued by Thornton (1802), when a bank's depositors convert their deposits into cash or other non-bank assets, this creates a need for a source of liquidity outside the banking system. The drain on a bank's funds cannot be offset by borrowing from other banks as there is no corresponding increase in these other banks' liquidity. Moreover, such a flight to cash may be symptomatic of depositors' loss of confidence in the banking system as a whole, which would be characterised by a generalised liquidity crisis affecting many or all banks. Prior to the existence of central banks, such crises were a concern for financial stability. According to Bordo (1986), Miron (1986) and Goodhart (1988), however, the development of central banks has reduced their frequency. Miron in particular shows that prior to the creation of the Federal Reserve Board in 1914, US banking crises – reflected in a flight out of deposits of the banking system as a whole – occurred every three years on average, and followed a seasonal pattern. In contrast, almost no such crises occurred between 1914-1928.

More generally, during this century the creation of a broad safety net, including deposit insurance,

regulation and supervision, as well as LOLR, has often been credited with having helped reduce the occurrence of panic deposit withdrawals into cash and other safe, non-bank assets (see Friedman (1959)). Mishkin (1999) points out that the United Kingdom has not suffered a banking panic since the 1860s, despite a deposit insurance scheme being in existence only since 1979 (although it did of course have a central bank). Overall, the relationship between deposit insurance and financial stability is not clear cut. Indeed, Demirgüç-Kunt and Detragiache (1999) find in a sample of 61 countries between 1980-1997 that explicit deposit insurance schemes *increase* banking crises for countries that do not have an effective system of prudential regulation and supervision. One interpretation is that, unless other safeguards are in place, comprehensive insurance schemes induce more risk-taking.

#### *Failure of the interbank market*

Whereas a flight out of bank deposits generally creates a role for the central bank as LOLR, a transfer of deposits from one bank to another does not necessarily do so. This is because the resulting surplus liquidity in some banks could, in principle, be transferred back to the illiquid bank (or banks) through the interbank market (see, for example, Selgin, (1993)). However, this requires that the interbank market should work efficiently<sup>3</sup>.

In a normally functioning interbank market, the inability of a bank to borrow funds through the market indicates that it is insolvent or failing. However, the interbank market may not always operate smoothly and under certain circumstances solvent institutions may be unable to borrow. The literature identifies three sources of such problems in the interbank market, all arising from asymmetric information.

First, because the interbank market has access only to incomplete information, doubts may arise about the solvency of a bank which is in fact sound<sup>4</sup>. The authorities *may* be in a better position to observe the financial position of the bank, particularly if they have access to supervisory information. Berger *et al* (1998) test the hypothesis that

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<sup>3</sup>: Although the literature concentrates on runs by small and uninformed ('retail') depositors, in practice wholesale depositors are often the source of runs on individual banks (e.g. Continental Illinois).

<sup>4</sup>: Under such circumstances, even a bank with collateral that would normally be accepted would not be able to borrow if there was residual legal uncertainty over the title of the collateral. Efforts to remove this friction include the introduction of repurchase agreements and the European Union Settlement Finality Directive, which aims at reducing legal uncertainty and harmonising transaction laws across the European Union.

supervisors in the United States have more accurate information than the market on the health of financial institutions. They do so by testing whether supervisory assessments are more accurate than market assessments in predicting future changes in bank performance. They conclude that shortly after supervisors have inspected a bank, supervisory assessment on its future performance is more accurate than the market. This suggests that from time to time it may be efficient for a central bank with access to up-to-date supervisory information to lend to banks which the interbank market may (wrongly) have judged insolvent. However, they also conclude that if the supervisory information is *not* up-to-date, market assessments of changes in a bank's performance are more accurate than those of the supervisor.

Second, the interbank market may become more cautious in times of crisis. Flannery (1996) develops a model with incomplete information to illustrate this. He shows that where the liquidity problem is small, a bank with surplus liquidity would be able to lend to all illiquid banks and the overall return from such lending would be acceptable. Usually, however, an individual bank's surplus is insufficient to lend to all illiquid banks. This increases the probability of loss to the extent it is equivalent to putting 'all one's eggs into one basket'. Flannery argues that in such a case there is scope for the central bank to lend to troubled institutions. This is not, he claims, because the LOLR has better information (he considers this unlikely) but rather because it has the capacity to realise the benefits of diversification by lending to all illiquid borrowers.

A final form of interbank market failure described in the literature is presented by Freixas, Parigi and Rochet (1998a). In their model, they consider cases where liquidity may dry up in the interbank market because each bank refuses to lend if it cannot be confident that it will itself be able to borrow in the interbank market in order to address its own possible liquidity shortage. These expectations become self-fulfilling through a co-ordination mechanism similar to the one which generates bank runs in the Diamond and Dybvig (1983) model. One response is an LOLR, which is not itself subject to liquidity risk because it 'prints' the ultimate means of settlement

(central bank money), either to provide liquidity or reassurance to banks that liquidity will be available in the case of a shortage.

Some argue, as did Thornton (1802) and Bagehot (1873), that the concern of the central bank is to protect the level of the aggregate money stock. Thus, distribution problems – where funds are not efficiently recycled by the interbank market in the event of depositors switching out of some banks into others – should not matter as the overall stock of money remains unchanged. As discussed below, however, there is a substantial literature that emphasises the uniqueness of bank loans. Such credit relations are not easily transferable from one bank to another. Financing may therefore be disrupted, particularly to borrowers who do not have access to capital markets as an alternative. Such problems in the credit creation process, independent of the overall liquidity of the market, may need to be addressed at the level of the individual bank.

These possible interbank market failures<sup>5</sup> provide one rationale for LOLR. But intervention will be justified only if the benefits outweigh the costs (Freixas, 1999).

### **Systemic risk**

The potential effects on the financial system as a whole of the failure of illiquid but solvent banks are perhaps the most important rationale for LOLR. Failure could involve negative externalities if the ability of the financial system as a whole to operate smoothly and effectively was threatened.

### *Credit relations*

The failure of a large bank, or a number of smaller ones, could result in system-wide financial instability. Such failures could threaten the ability of the financial system to perform its primary functions, including provision of the payments system, the efficient pricing of risk, and the allocation of resources. On the last of these, Diamond (1984) models banks as intermediaries who specialise in gathering information about borrowers. This information is private to the bank and contributes to the development of relationship banking. Greenbaum and Venezia (1985), Diamond, (1989), Greenbaum, Kanatas, and Venezia (1989),

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<sup>5</sup>: To our knowledge though, there is no empirical literature that establishes the existence of these forms of interbank market failure.

Sharpe (1990), Rajan (1992) and Greenbaum and Thakor (1995), among others, study *relationship banking* and argue that banks develop customer relations with client firms to gather information about them over time. With the failure of a bank, that relationship is lost and the borrower is then faced with the task of finding a new lender, which will take time as that lender will have to replicate the screening/monitoring efforts of the failed bank.

The credit process is important because certain types of borrower, small firms and households in particular, would find it difficult or impossible to raise funds directly in capital markets. This point is made by, for example, Mishkin (1995) and Bernanke and Gertler (1995). Capital markets are accessible only to large firms with substantial reputations (see Diamond (1991a)) or those who have sufficient capital to pledge as collateral (see Hölmstrom and Tirole (1993)). Individual bank failures could thus result in a cutback in credit to some small firms and individuals.

Because the threat to financial stability is often related to the size of the failed bank, Goodhart and Huang (1999) produce a rationale for the 'too big to fail' doctrine. However, the small banks crisis in the UK in the early 1990s demonstrates that the degree to which a bank is systemic is 'context-dependent' and not necessarily dependent on size. The Bank of England at the time "was quite clear that, had... [they] failed to intervene [by helping a few small banks], the pressure would have spread, and ...[the Bank] would then have found it harder to stop" (George, 1994).

The decision to support banks will thus inevitably be the result of weighing-up the current and prospective costs of such support against the costs to the economy of financial instability. These costs of financial instability are normally proportionately higher for large banks, notwithstanding higher support costs, although not necessarily so (Freixas (1999)).

#### *Interbank credit risk exposures*

Because of the extensive network of interbank exposures of various kinds, the failure of one bank to

fulfil its obligations may have an immediate and direct knock-on effect on other banks.

One mechanism through which this may occur is interbank lending, which is usually unsecured. Although intuitively this is clearly a possible source of systemic risk, careful modelling of interbank market exposures has not been widely developed. Rochet and Tirole (1996) present a general model, the purpose of which is to "...provide a framework in which some of the issues surrounding systemic risk can start being analysed." Their contribution to this discussion is that they provide a model of the inter-linkages that exist between banks, grouped under the generic heading 'interbank lending'. In their model, peer monitoring is presented as a potential source of systemic risk via interbank lending. This is because, if peer monitoring is to be encouraged, the authorities must commit to closing all banks who suffer losses from interbank loan exposures: if the failure of one bank causes the failure of another which had lent to it, both banks must be allowed to fail. If this is not the case, there would be no incentive for peer monitoring. Because it is difficult for the central bank to commit to a closure policy that would allow knock-on effects to occur, Rochet and Tirole conclude that the practical relevance of peer monitoring is seriously reduced.

Empirical analysis of the magnitude of interbank market exposures, and thus their likely systemic consequences, is constrained by a lack of available data. However, in one study of interbank exposures, Michael (1998) concludes that such exposures in the United Kingdom interbank market are significant, particularly amongst the large settlement banks which provide payment services to other banks.

Another source of systemic risk lies in the operation of settlement and payment arrangements<sup>6</sup>. Humphrey (1986), McAndrews and Wasilyew (1995) and Angelini, Maresca and Russo (1996) all examine the risks posed by payment system exposures and conclude that they are significant, although to varying degrees, depending on system characteristics. The most fundamental difference is that between payment systems with deferred (uncollateralised) net settlement and those with real-time gross settlement<sup>7</sup>.

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6: See Bank of England (1989) and Hills and Rule (1999) in this issue for a discussion of the potential risks inherent in payments and settlement systems.

7: A deferred net settlement system is one in which a bank's net position – the difference between the sum of the value of transfers it is owed and owes – is calculated at a point in time, such as the end of day, and at the same time a corresponding payment/receipt is made (see BIS (1997a)).

Systems with deferred uncollateralised net settlement generate substantial interbank exposures. From the time payment instructions are exchanged until the settlement is completed, the receiving bank is exposed to the sending bank. Kobayakawa (1997) and Schoenmaker (1995) discuss the possibility of systemic disturbances in a deferred net settlements system.

A real-time gross settlement system (RTGS) eliminates these exposures between members. However, if the central bank provides uncollateralised intra-day liquidity (as is the case with Fedwire in the United States) to facilitate the process of real-time settlement, the central bank takes on the credit risk. In the European Union, central banks have addressed this risk by themselves taking collateral from members of the systems in overdraft.

Freixas and Parigi (1997) compare the benefits and costs of a real time gross settlement system and a deferred net settlement system. They conclude that a gross payment system is preferable when the probability of bank failures is high (for a given cost of bank failures), the cost of holding reserves is low and the volume of payments is low<sup>8</sup>.

Empirical evidence on interbank exposures arising from payment and settlement systems is limited. Using data from the Federal Reserve's large value transfer system, Fedwire, Furfine (1999) concludes that the threat to systemic risk posed by bilateral payment system exposures relative to capital is exaggerated. However, as Furfine's data represent just twenty per cent of the interbank exposures in the US system, he concedes that his results may represent a conservative estimate of the importance of system risk via interbank exposures as a whole.

### Contagion

The possibility of runs on individual banks as a result of the combination of the deposit contract and asymmetric information was considered in the section on bank runs. Widespread runs which affect several

banks in a domino fashion (contagion) are considered in this section.

The failure of one bank may lead to runs on another bank if depositors perceive similarities between the two (Docking, Hirschey, and Jones, 1997). Although bank portfolios may vary, certain banks may specialise in similar types of business (e.g. commercial real estate, automobile loans etc.) or geographic areas (e.g. regional banks) and may therefore hold similar assets. If the failure of a bank leads depositors in similar banks to withdraw their deposits, while depositors in dissimilar banks do not, the contagion is said to be information-based (Chari and Jagannathan, 1988). That is, depositors take the decision to withdraw their funds based on information about the similarity of the two banks. If, however, the failure of a bank results in wide-spread runs regardless of any assessment of similarities or differences between banks, such a situation is referred to as 'pure panic' contagion.

The idea that the failure of a bank may change depositors' confidence in the solvency of other banks, independently of the correlation in asset quality, has been expressed often but seldom modelled. This view assumes that depositors' irrational behaviour may lead to a run on a sound bank in reaction to another bank's failure. Such an occurrence is implied, for example, by the Diamond and Dybvig (1983) model, described earlier<sup>9</sup>.

Kaufman (1994) presents evidence addressing the question of whether past episodes of wide-spread bank runs were motivated by pure panic, or were information-based. He reviews empirical studies that assess the reaction of uninsured depositors (for which equity-holders are used as a proxy) to the failure, or announcement of significant losses, of another bank<sup>10</sup>. These studies examine whether, following a bank failure, share prices fall more for banks with similar characteristics than those with dissimilar ones (e.g. size, geographical location) to the failed bank. Similar studies published since

<sup>8</sup> In practice, RTGS may not require higher reserves but would operate on the basis of intra-day credit by the central bank. The cost would therefore be the conditions imposed by the central bank in providing such credit (e.g. collateral, interest etc.).

<sup>9</sup> Krugman (1999) argues that the recent east Asian crisis appears to have had some characteristics of a panic. In particular, the pattern of capital outflows from Asian countries in 1997-98 only partly reflected the pre-crisis fundamentals in the affected economies (see Haldane (1999) in this issue).

<sup>10</sup> These include studies by Wicker (1980), Aharony and Swary (1983), Swary (1986), Lamy and Thompson (1986), Cornell and Shapiro (1986), Federal Reserve Bank of Cleveland (1986), Smirlock and Kaufold (1987), Peavy and Hempel (1988), Madura and McDaniel (1989), Wall and Peterson (1990), Smith and White (1990), Musumeci and Sinkey (1990), Dickinson, Peterson, and Christiansen (1991), Gay, Timme and Young (1991), Karafiath, Mynatt, and Smith (1991), Kane (1992), and Aharony and Swary (1992). These are all event-studies (i.e. measure share-price reaction to particular events). Other studies (not reviewed by Kaufman) include Saunders and Wilson (1996), Gorton (1988), Schoenmaker (1996) and Calomiris and Mason (1997).

Kaufman's review include Liu and Ryan (1995), Aharony and Swary (1996), and Docking, Hirschev, and Jones (1997). They all support the view that contagion very rarely takes place due to pure panic. Rather, information-based contagion through perceived similarities between banks is found to be far more significant, although these studies are not directly based on deposit contracts.

### Central banks' response to illiquidity problems

If LOLR implies the exchange of illiquid assets (whether for a bank or for a market) for reserve money, in order to be fully credible the provider of LOLR facilities needs to have unlimited capacity to supply reserve money. The issues are somewhat different however depending on whether the shortage is at the level of a firm or the market generally<sup>11</sup>.

### Lending to the market

Since Bagehot's day, there has been a substantial widening and deepening of interbank markets. One view in the academic literature is that in the light of these developments, emergency liquidity provision need only ever be made to the market as a whole through OMOs (see, for example, Goodfriend and King (1988), Bordo (1990), Schwartz (1992, 1995))<sup>12</sup>. This is because, as discussed earlier, the interbank market would ensure the allocation of liquidity from banks with surpluses to those with deficits, provided that the latter are considered creditworthy<sup>13</sup>.

OMOs are also the principal mechanism through which monetary policy is implemented by the central bank on a day-to-day basis in normal circumstances. The question of whether or not a distinction can be made between monetary policy and LOLR support to the market as a whole therefore arises. Goodfriend and King (1988) draw no distinction between the two, arguing that LOLR to the market as a whole is

monetary policy aimed at smoothing interest rates (the supply of reserve money is increased to match an increase in reserve money demand, thus stemming upward pressure on interest rates). There is little other modern literature on the matter, but Thornton (1802) suggested LOLR support is to satisfy extraordinary *short-term* increases in the demand for reserve money whereas monetary policy is aimed at targeting medium-long run growth in monetary aggregates (and thus inflation)<sup>14</sup>. However, regardless of the motive, LOLR support to the money market as a whole will involve an increase in the supply of reserve money in order to satisfy the increase in reserve money demand. Since there is no distinction between the operations used for LOLR to the market and for monetary purposes, Goodhart (1999) argues that the term LOLR should be used only for central bank liquidity support to individual banks<sup>15</sup>.

### Liquidity support to individual institutions

The main reason put forward in the literature for central bank lending to individual banks is that the inefficiencies in the interbank market described earlier could result in some solvent banks becoming illiquid because they cannot borrow from other banks. While LOLR support to the market as a whole increases the supply of reserve money, lending to specific banks need not. Any bilateral lending may be offset through reduced provision of liquidity to the market as a whole via OMOs, implying that although the composition of the central bank's assets change, the supply of total reserve money does not.

It is important to note too that the distinction between illiquidity and insolvency discussed in the analysis above is seldom clear-cut in practice. Goodhart (1995), Lastra (1997) and Goodhart and Huang (1999) all argue that the time-scale required

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**11:** Since usually one important source of information in assessing solvency is from supervisory returns and there is risk involved in using public funds, the provision of LOLR will usually require close co-operation and exchange of information amongst the central bank, the supervisor (in countries where this is located outside the central bank) and the government. In the United Kingdom this has been formalised in the Memorandum of Understanding (MoU) between the Bank of England, the Financial Services Authority and HM Treasury. The MoU is set out as an annex in the Bank of England Quarterly Bulletin, May 1998.

**12:** It should be noted that in practice most central banks have a limited number of counterparties in OMOs who are expected to on-lend to the market more generally. These counterparties are selected on the basis of strict criteria. The Bank of England, for example, requires that counterparties (i) have the technical capability to respond to OMOs, (ii) maintain an active presence in gilt repo/bill markets, (iii) participate regularly in OMOs, and (iv) provide useful information on market conditions and developments.

**13:** As discussed in the section on the failure of the interbank market, this view implies that the central bank has no informational advantage over the interbank market.

**14:** In practice, faced with a sudden increase in financial instability, e.g. the 1987 stock market crash, central banks have sometimes loosened monetary policy in order to maintain monetary stability.

**15:** It is possible, however, as with the plans for Y2K, for central banks to satisfy temporary increases in the financial system's demand for liquidity through either discretionary increases in the supply of reserves, or passive increases where standing facilities are provided, without changing their monetary policy interest rate.

for making a decision as to whether or not to lend to a bank is often too short to be able to arrive at firm conclusions over its solvency. Even where the potential sources of pressure are observable far in advance, eg Y2K, or build-up slowly, such as the small bank crisis in the UK in the early 1990s, and the authorities can thus plan somewhat, the need for action at short notice is still possible. Moreover, a bank which is solvent *ex ante* may not be so *ex post*; e.g. a future deterioration in the general economic situation may mean that a bank which was solvent at the time of the liquidity injection becomes insolvent later. Central banks which lend in such circumstances should have a clear exit strategy.

### Risk-capital support

#### Justification

So far this article has described LOLR as being largely motivated by the negative consequences bank failures originating in liquidity problems have on the stability of the financial system. The stability of the financial system can of course also be threatened by the failure of an obviously *insolvent* bank. Moreover, it is possible that the failure of an insolvent non-bank financial institution could also pose a systemic threat. In such circumstances the *ex ante* provision of risk capital rather than liquidity support may need be considered by the authorities.

Systemic risk aside, it is possible that it may be less costly to restructure an insolvent bank than allow it to fail<sup>16</sup>. James (1991), among others, has obtained results showing that the liquidation value of a bank is lower than its market value as a going concern. Guttentag and Herring (1983) also make this point, stating that “banks usually are worth more alive than dead even when their worth alive is negative.” This is primarily a justification for the take-over of bad banks by good banks. However, some argue that, failing this, capital injection by the public sector accompanied by restructuring of a bad bank may be justified where the benefits outweigh the costs of doing so.

Goodhart and Huang (1999) argue that financial instability resulting from the failure of a bank is characterised by panic in which the behaviour of depositors becomes unpredictable. Mistakes in the

conduct of monetary policy are thus more likely to occur. They argue that when the central bank is approached by a bank for liquidity support, it does not have time to verify whether or not the bank is solvent. If the central bank provides support to a bank that is revealed later to be insolvent, it will incur a direct financial loss as well as suffering a reputational cost. The central bank will therefore in practice need to weigh the probable cost of providing capital to a possibly insolvent bank against the cost of the instability that its failure could generate.

#### The provision of risk capital in practice

Empirical analyses of the resolution of cases of bank default indicate that failing banks are more often dealt with through the injection of capital rather than being liquidated. Goodhart and Schoenmaker (1995), for example, gather evidence on the effective resolution policies in 24 countries. Out of a sample of 104 failing banks, they find that 73 resulted in rescue and 31 in liquidation. Santomero and Hoffman’s (1998) review of bank default resolution similarly establishes that access to the discount window in the US between 1985 and 1991 was often granted to banks with poor CAMEL ratings that later failed<sup>17</sup>. (Access was granted, they argue, in order to keep institutions afloat – even those which were known to be insolvent – so as not to impose further costs on the deposit insurance fund which had suffered large losses.)

#### Who should provide capital to banks?

There are a number of reasons why the provision of LOLR support and the provision of risk capital for insolvent banks may or should fall to different institutions.

In theory, emergency support in its strictest sense to solvent but illiquid banks implies no risk to the central bank. In practice, as discussed in the section on liquidity support to individual institutions, the value of the collateral may fall below the value of the loan thus creating a risk to the central bank. Therefore, lending to a bank – particularly a large one – that is not clearly solvent, could expose the central bank to potential loss. Many central banks would not be in a position to take on such risk independently and therefore it would require a

<sup>16</sup>: Note that this also provides further justification for extending liquidity support to illiquid, solvent but non-systemic banks.

<sup>17</sup>: CAMEL ratings are scores assigned by US supervisors that reflect their judgement of a bank’s Capital, Asset quality, Management, Earnings and Liquidity.

government guarantee to cover the central bank exposure (Goodhart and Schoenmaker (1993) and Goodhart (1999)).

Stella (1997) argues that a central bank may not need capital in the same way as commercial banks. Capital is necessary for commercial banks in order to provide a buffer against losses, to provide start-up funds, and to overcome moral hazard problems with creditors. He argues that none of these factors applies in the same way to central banks. Stella calculates a central bank's net worth taking into account the net present value of future income (including seignorage revenue), so that the importance of subscribed capital for central banks is reduced. However, he argues that a weak balance sheet (resulting perhaps partly from exposures to troubled banks) may compromise its independence and ability to retain flexibility in its conduct of monetary (and foreign exchange) policy.

In practice, if an institution were *clearly* insolvent the government would need to make a decision on whether or not to provide risk capital to prevent its failure. Although the central bank would probably advise on the systemic consequences of the failure of the institution, the government's decision for support might also be made on other criteria (eg for social reasons).

#### **The costs of LOLR/capital injections – moral hazard**

Any form of insurance, and liquidity and capital support are no exception in this respect, creates moral hazard. Moral hazard arises when the provision of insurance, by modifying the incentives for the insured party to take preventive actions, increases the probability of occurrence of the event being insured against. Moral hazard is inherently forward-looking: a particular episode 'creates' moral hazard only to the extent that it influences expectations of how a similar situation will be dealt with in the future. In principle, where liquidity support can be clearly separated from provision of risk capital, the moral hazard created will be limited to possible mismanagement of liquidity risk. Capital support, however, may raise expectations that the financial institution is insured against mismanagement of virtually all types of risk, including credit and market risk (from which particular benefits may accrue).

#### **Moral hazard in emergency assistance and bailouts of individual institutions**

If exercised too leniently, LOLR may lead to banks expecting liquidity support from the central bank "...as a matter of course" (Bagehot, 1873). Indeed, if liquidity support is extended on terms more favourable than are available in the market, it ceases to be lending of *last resort* altogether. It is for this reason that Bagehot's 'rules' proposed, among other things, that lending be made at a rate high relative to the pre-crisis rate. This, he believed, would ration access to liquidity and decrease the moral hazard problem. Also, a penalty rate was thought to be a fair price to pay for the protection offered to the failing bank through the provision of liquidity or to cover the central bank's risk exposure (Humphrey, 1989).

An injection of capital, on the other hand, may have two effects on bank behaviour (Freixas and Rochet, 1997). First, it gives the bank managers and shareholders incentives to take additional risks so as to maximise the subsidy implicit in such a rescue. Second, the possibility that the official sector will provide risk-capital to a failed financial institution may reduce the incentives for uninsured creditors to monitor the behaviour and performance of the institutions to which they have lent (Kaufman (1991) and Rochet and Tirole (1996)). Whereas deposit insurance is explicit and typically covers only retail depositors, and then usually only up to a certain amount, capital injections *implicitly* insure all investors<sup>18</sup>. They will thus further reduce the incentives of partially insured depositors to monitor *and* also weaken the incentives of uninsured investors and peer banks as well.

Both Thornton (1802) and Bagehot (1873) were well aware of this risk of moral hazard. As Bagehot put it, "any aid to a present bad bank is the surest mode of preventing the establishment of a future good bank". Bagehot's proposal to lend only on security reflects the attempt to eliminate the moral hazard capital provision entails.

Under modern financial conditions, however, the applicability of Bagehot's rules is questionable. To begin with, the idea of lending at a penalty rate is often challenged and in practice emergency lending

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<sup>18</sup>: One exception is the current deposit insurance scheme in Japan which covers all depositors and creditors. However, mainly in recognition of moral hazard concerns, this scheme is planned to end in March 2001 (see Nakaso (1999)).

to individual solvent institutions has sometimes been made without applying a premium over the current notional market rate (Goodhart and Schoenmaker (1995), Prati and Schinasi (1999)). This occurred, for example, during the Savings and Loans crisis in the United States. This divergence from Bagehot's rules has several justifications: lending at a high rate may (i) aggravate the bank's crisis (Crockett (1996); Garcia and Plautz (1988)); (ii) send a signal to the market that precipitates an untimely run, unless it is provided covertly; and (iii) give the managers incentives to pursue a higher risk/reward strategy to get themselves out of trouble ('gamble for resurrection'). These risks may be more likely in modern financial systems where clearly solvent financial institutions should normally be able to obtain liquidity from the interbank market.

However, as we have seen, it may be socially desirable for the public sector to intervene even when faced with a clearly insolvent institution. Prati and Schinasi (1999) and Giannini (1999) point out that in many industrial countries, authorities have often felt the need to advance support even when confronted with a genuine insolvency problem.

One means of limiting the moral hazard leads to the notion of 'constructive ambiguity'. As Corrigan (1990) has argued, by introducing an element of uncertainty into the provision of support, pressure can, in principle, be maintained on banks to act prudently, since the latter will not know individually whether they will be rescued or not. Constructive ambiguity is, by definition, difficult to pin down and formalise. An informal definition of the notion can be found in a recent G10 Report which states that:

"... any pre-commitment to a particular course of action in support of a financial institution should be avoided by the authorities, who should retain discretion as to whether, when and under what conditions support would be provided. In addition, when making such a decision, it is important to analyse rigorously whether there is a systemic threat and, if so, what options there may be for dealing with systemic contagion effects in ways that limit the adverse impact on market discipline" (BIS, 1997b).

As this passage makes clear, *ex ante* constructive ambiguity is a complex notion, encompassing, besides uncertainty as to whether intervention will take place

at all, also uncertainty regarding both the *exact timing* of the intervention and the *terms* and *penalties* attached to any particular intervention.

Ambiguity regarding whether intervention is actually taking place, which implies that liquidity assistance may be provided covertly, might be desirable either to avoid 'imitation effects' within the banking system or where, due to the bank's size and operational ramifications, the handling of an individual bank's problem risks itself triggering systemic repercussions (Enoch, Stella, and Khamis, 1997). The rationale for this type of secrecy, in circumstances where wide-spread panic has not yet occurred, was, for example, set out in a speech by Eddie George, Governor of the Bank of England, where he stated that:

"...we usually try to keep the fact that we are providing systemic support secret at the time... If people know that we are so concerned about systemic fragility that we have judged it necessary to provide support, that could lead to a wider loss of confidence. They would wonder how far that support would be extended, and we could rapidly find ourselves in the position where we were in practice underwriting all the liabilities of the banking system" (George, 1994).

When a panic has already set in, however, it is sometimes recognised that management of the crisis, including support operations, may usefully be made public. This is because transparency during a crisis may reduce uncertainty and thereby have a calming effect on financial markets (Bagehot, 1873).

Ambiguity regarding the conditions attached to liquidity support, in turn, may be needed to keep managers and shareholders uncertain as to the cost they will have to bear should a firm's illiquidity result from imprudent behaviour (Crockett, 1996).

The downside of constructive ambiguity is that it places a large degree of discretion in the hands of the agency responsible for crisis management. As in other fields of economic policy-making, discretion raises a time-consistency problem: while it is in the interest of the authorities to deny their willingness to provide a safety-net, *ex post* they may later find it optimal to intervene. Lack of transparency enables them to avoid having to justify treating differently what the general public may perceive as identical situations. Enoch, Stella and Khamis (1997) argue that central bank

discretion in handling individual cases could be balanced against firm rules for disclosure after the event<sup>19</sup>. Indeed, as the IMF's Code of Good Practices on Transparency in Monetary and Financial Policies itself testifies, an effort is currently being made in this direction (IMF, 1999)<sup>20</sup>.

In practice, the effectiveness of constructive ambiguity as a check on moral hazard can be expected to be greater to the extent that there exist procedures for 'punishing' the managers and shareholders of imprudently managed intermediaries. Furthermore, the effects of moral hazard have often been contained by rules directly constraining or indirectly encouraging banks and other financial intermediaries to act prudently, including in managing their capital and liquidity.

'Punishing' the managers and shareholders of imprudently managed intermediaries is widely regarded as crucial in the context of official capital injection. As Andrew Crockett has recently put it:

"... if it is clear that management will always lose their jobs, and shareholders their capital, in the event of a failure, moral hazard should be alleviated" (Crockett, 1996).

The extent to which moral hazard and time consistency problems have been limited in practice in individual countries is, of course, debatable. Unsurprisingly, countries that experienced serious banking problems have also felt it necessary to modify their institutional set-up. In the United States, for example, the S&L crisis stirred a heated debate on whether limits should be placed on the degree of forbearance authorities may show in deciding when to trigger 'punishment strategies'. The debate led to the revision of the overall safety net through the FDIC Improvement Act (1991), which aimed at making it "more incentive-compatible by providing for a graduated series of regulatory sanctions to mimic market discipline" (Benston and Kaufman (1998)). The notion of Prompt Corrective Action – according to which sanctions become mandatory after a certain threshold has been reached – is an important component of the reform.

### **Concerted private sector lending – a possible solution to the moral hazard problem**

As discussed earlier, disruptions in the interbank market may justify a role for the central bank as LOLR if such problems cannot be overcome in some other way. However, the central bank may be able to overcome the market's co-ordination and information problem through organising private sector liquidity support rather than lending itself.

The central bank may have a role of bringing potential lenders together where individual banks, even when known to be solvent, are unable to obtain funds due to co-ordination problems among creditors. This is the basis of the interbank market failure in Freixas, Parigi, and Rochet (1998) (which builds on the co-ordination failure literature of Diamond and Dybvig (1983)), described in the section on failure of the interbank market. Such co-ordination problems could be resolved by the central bank bringing all banks together and encouraging dialogue: if banks are able to reassure one another that liquidity will be forthcoming, interbank lending will resume.

The other failures of the interbank market described earlier are related to uncertainty about the solvency of the bank in question. In such cases, some pressure by the central bank on surplus banks to lend may be warranted if the former has superior information to markets participants (via the supervisor, involvement in the payment system or as part of an application for emergency liquidity assistance).

Giannini (1999) points out that often in the past central banks have acted as an agent organising the channelling of other banks' private funds – concerted lending – to the bank in difficulty. In principle, organising such private sector support could be either the responsibility of the central bank or another official agency (Fischer (1999)). The central bank, however, as the bankers' bank and at the heart of the monetary and payments system, has an advantage in organising private sector liquidity support because it can provide agency (eg escrow) facilities or act as a principal intermediary.

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<sup>19</sup>: This is exemplified by the Bank of England's handling of the small banks crisis in the early 1990s where, at the time, it was not made public that the Bank was providing assistance to a small number of small banks. After the direct systemic threats were averted, however, the Bank then disclosed its operations to the public and accounted for its actions (see for example *Bank of England Annual Report*, various issues).

<sup>20</sup>: "...aggregate information on emergency financial support by financial institutions should be publicly disclosed through an appropriate statement when such disclosure will not be disruptive to financial stability" (IMF, 1999 para 7.3.1).

Central bank involvement in organising private liquidity support is targeted at overcoming co-ordination problems<sup>21</sup>. The central bank should not need to 'coerce' other banks to lend as all parties should be better off doing so. If the central bank does pressure banks to lend, or to lend on terms that would improve the failing bank's position relative to what it would otherwise have been, then this would indicate that the problem is not purely one of co-ordination. In such a case, private sector support is still, in effect, subsidising the failing bank (Goodfriend and Lacker, 1999).

More generally, co-ordination problems may be difficult to overcome because of the short-term competitive advantage surplus banks experience during a crisis. In these circumstances, 'moral suasion' and regulatory powers may be required to instil a co-operative attitude into what are otherwise keen competitors. This seems to underlie Kindleberger's view that:

"... the optimum may be a small number of actors, closely attuned to one another in an oligarchic relation, like-minded, applying strong pressure to keep down the chiselers and free-riders, prepared ultimately to accept responsibility" (Kindleberger, 1989).

Historical evidence seems to confirm the existence of a tension between the effectiveness of concerted support and the degree of competition in the financial system. Orchestrated liquidity support operations occurred often in the past. The Bank of England's co-ordination of the rescue of Baring Bros. in 1890 and its organisation of a 'life-boat' during the secondary banking crisis in the early 1970s (see Reid (1982)) are prominent examples, as is the Clearinghouse System – a private institutional framework in place for dealing with liquidity problems – operating in the United States from the 1860s up to the 1910s. Such private sector solutions, however, became less feasible as the degree of competition in the market increased. The Clearinghouse System was brought down, at the beginning of the century, by the marked increase in competition in the key U.S.

financial centre, New York. Likewise, orchestrated operations became more difficult to organise in the United Kingdom during the 1980s, when the difficulties encountered in the rescue of Johnson Matthey Bankers Ltd., a London bank which had been an active market-maker in the gold bullion sector, in an environment of heightened competition led the authorities to rethink their approach to LOLR support (Capie et al (1994))<sup>22</sup>.

The notion that liquidity support should be seen primarily as the responsibility of the institutions operating in the market has, however, remained in countries where competition in the financial system has until recently been somewhat limited eg France, Italy, and Germany: in the last of these it was formalised with the creation, in the 1970s, of the so-called LikoBank to deal with liquidity problems at smaller banks. The U.S. authorities at the beginning of the 1990s were concerned that the climate of competition characteristic of their financial markets prevented this feature of continental European banking practices from being reproduced on the other side of the Atlantic. As Corrigan put it:

"Private institutions either are more willing, or feel more compelled, to participate in stabilisation or rescue efforts in foreign countries than they are in the United States.(...) Where a handful of banks dominate national banking systems, that handful of banks feels more directly threatened by potential dangers of a systemic nature than do banks here in the United States" (Corrigan, 1990).

However, the handling of the crisis of Long Term Capital Management (LTCM), in 1998, may reflect a change in view of the importance of systemic risk to counterparties of financial institutions. As William McDonough (1998) recently stated, the failure of LTCM would have had substantial repercussions on financial markets, on which LTCM's counterparties "voiced their own concerns" so that, in the end, "a private sector solution... involving an investment of new equity by Long-Term Capital's creditors and counterparties" was reached<sup>23</sup>. This may suggest that in some circumstances a financial institution can be

**21:** An analogy can be drawn with the Bank of England's 'London Approach', which is aimed at overcoming co-ordination problems amongst creditors of non-financial institutions (see Kent (1997) and Brierley and Vlieghe (1999)).

**22:** It should be noted, however, that the more recent failure of Barings in 1995 was because the magnitude of Barings' losses were uncertain since open positions in derivatives markets made the risk to potential creditors unquantifiable (see the evidence given before the Treasury Select Committee by Eddie George, Governor of the Bank of England (Treasury and Civil Service Committee, 1995)).

**23:** Statement before the Committee on Banking and Financial Services in the United States Congress, October 1998.

'too big to fail' even from the perspective of the rest of the private sector.

### Summary

This paper has identified, from the literature, two main reasons for the existence of the central bank's role as LOLR:

- informational asymmetry which makes otherwise solvent banks vulnerable to deposit withdrawals and/or the drying up of interbank lending in times of crisis; this can result in insolvency for otherwise sound banks, and thus a welfare loss to the bank's stakeholders.
- the potential risk to the stability of the financial system as a whole following the failure of a solvent bank. Widespread financial instability may prevent the financial system from performing its primary functions including the smooth operation of the payments system, and intermediating between savers and borrowers with an efficient pricing of risk. Such problems may be induced by the failure of a large financial institution, or a group of smaller ones, which have ripple effects on other financial institutions through direct credit or payments exposures or via contagion.

Risks to the stability of the financial system as a whole also arise with the failure of a large insolvent bank (and possibly non-bank financial institutions). In such cases, the government would make a decision on whether or not to provide risk capital to prevent its failure. The central bank would likely play a role in providing objective expert advice on the systemic consequences of the failure of the institution concerned.

LOLR and/or capital support should be considered only when the benefits from intervention outweigh the costs, particularly of moral hazard and also potential losses to the tax-payer.

Two channels of possible LOLR support are identified in the literature – (i) lending to the market as a whole and (ii) lending to individual institutions. LOLR support to the market as a whole is used to deal with generalised liquidity shortages. Such operations (which are made against high quality collateral) reduce the general level of short-term interest rates or prevent them from rising further. Put another way, such support increases the supply of reserve money. The distinction between LOLR support to the market

and a loosening in monetary policy is not easily made leading some academics to suggest that they are one and the same thing.

Central bank emergency liquidity support to individual illiquid but solvent institutions occurs when such institutions cannot borrow from other banks or from the central bank through normal facilities. Unlike lending to the market as a whole, lending to individual institutions need not increase the size of the central bank's balance sheet, but will change its composition. This implies that there need be no conflict with monetary policy. It is likely that such lending is made against collateral not acceptable in normal monetary operations or on the interbank market. Therefore, emergency assistance may expose the central bank to risk should the bank which receives it become insolvent and the value of the collateral taken subsequently fall below the value of the loan. In practice, when an institution faces a sudden liquidity crisis, it is sometimes difficult for the central bank to obtain timely and detailed information to assess whether the institution is fundamentally solvent or not. A central bank may therefore mistakenly lend to an insolvent bank. Moreover, what may start as an illiquidity problem may evolve into an insolvency one. In such circumstances it is important that the central bank has a clear exit strategy.

The literature identifies a number of costs from providing liquidity and especially solvency support. There is a direct financial cost involved in the explicit provision of risk-capital to insolvent institutions and in losses incurred through providing liquidity to banks which turn out subsequently to be insolvent. Moreover, by insuring banks against the costs of liquidity or solvency problems, the provision of support may result in banks being less concerned than would be the case otherwise to avoid such problems (ie it promotes moral hazard). In particular, if LOLR is given to individual firms on too favourable terms, it may cease to be last resort lending altogether and banks may come to rely on it as a matter of course. More importantly, the expectation of bail out in an insolvency situation may result in bank managers and shareholders taking excessive risks and creditors and uninsured depositors not properly monitoring their banks.

A potential method to reduce, although not eliminate, the moral hazard problem is, as suggested by Bagehot

more than a century ago, through imposing a high rate (relative to the pre-crisis period) but this may: (i) aggravate the bank's crisis; (ii) send a signal to the market that precipitates an untimely run; and (iii) give the managers incentives to pursue a higher risk-reward strategy in order to repay the higher rate ('gamble for resurrection'). In practice, moral hazard has often been reduced through maintaining a degree of uncertainty about which financial institutions receive support and which will be allowed to fail

('constructive ambiguity') coupled with procedures for 'punishing' the managers and shareholders of imprudently managed intermediaries. In addition, safeguards have been used to limit the impact of moral hazard and the amount of discretion allowed in liquidity support. The cost to the public sector has also been minimised through the central bank/supervisor encouraging liquidity support from the private sector.

## References

- 1: Aharony, J and Swary, I (1983) 'Contagion Effects of Bank Failures: Evidence from Capital Markets', *Journal of Business* (July), Vol 56(3), pp. 305-22.
- 2: Aharony, J and Swary, I (1992) 'Local Versus Nation-wide Contagion Effects of Bank Failures: The Case of the South West', Working Paper, Israel Institute of Business Research.
- 3: Aharony, J and Swary, I (1996) 'Additional Evidence on the Information-based Contagion Effects of Bank Failures', *Journal of Banking and Finance*, Vol. 20, pp. 57-69.
- 4: Allen, F and Gale, D (1997) 'Innovation in Financial Services, Relationships and Risk Sharing', University of Pennsylvania Working Paper, pp. 97-126.
- 5: Angelini, P and Giannini, C (1994) 'On the Economics of Interbank Payment Systems', *Economic Notes*, Vol 23, No 2, pp. 191-215.
- 6: Angelini, P, Maresca, G and Russo, D (1996) 'Systemic Risk in the Netting System', *Journal of Banking and Finance*, Vol. 20, pp. 853-68.
- 7: Avery, R B, Belton, T M and Goldberg, M A (1988) 'Market Discipline in Regulating Bank Risk: New Evidence from the Capital Markets', *Journal of Money, Credit, and Banking*, Vol. 20, pp 597-610.
- 8: Bagehot, W (1873) 'Lombard Street: A Description of the Money Market', London, H S King.
- 9: Bank for International Settlements (1994) 'Public Disclosure of Market and Credit Risks by Financial Intermediaries', Basel, September.
- 10: Bank for International Settlements (1997a) 'G10 Report on Financial Stability in Emerging Market Economies', Basel.
- 11: Bank for International Settlements (1997b) 'Real-time Gross Settlement Systems: A Report Prepared by the Committee on Payment and Settlement Systems of the Central Banks of the G10 Countries', Basel.
- 12: Bank for International Settlements (1998) 'Report of the Working Group on Strengthening Financial Systems', Basel.
- 13: Bank of England (1998) 'The Bank of England Act 1998', *Quarterly Bulletin*, May, pp. 93-99.
- 14: Bank of England (1989) 'Payment and Settlement Systems Risk and Efficiency: A Discussion Paper', mimeo.
- 15: Begg, D, De Grauwe, P, Giavazzi, F, Uhlig, H and Wyplosz, C (1998) 'The ECB: Safe at Any Speed?', *Monitoring the Central Bank 1*, CEPR, London.
- 16: Benston, G J and Kaufman, G (1998) 'Deposit Insurance Reform in the FDIC Improvement Act: The Experience to Date', *Federal Reserve Bank of Chicago*, second quarter, vol 22(2) pp. 2-20.
- 17: Berger, A, Davies, S and Flannery, M (1998) 'Comparing Market and Regulatory Assessments of Bank Performance: Who Knows What When?', Federal Reserve Board Working Paper, March.
- 18: Berger, A and Davies, S (1994) 'The Information Content of Bank Examinations', Proceedings, Conference on Bank Structure and Competition, Federal Reserve Bank of Chicago.
- 19: Bernanke, B and Gertler, M (1995) 'Inside the Black Box: The Credit Channel of Monetary Policy Transmission', *Journal of Economic Perspectives*, Vol. 9, Autumn, pp. 27-48.
- 20: Bhattacharya, S and Gale, D (1987) 'Preference Shocks, Liquidity, and Central Bank Policy' in Barnett, W and Singleton, K (eds.) 'New Approaches to Monetary Economics', Cambridge University Press, Cambridge pp. 69-88.
- 21: Bhattacharya, S and Fulghieri, P (1994) 'Uncertain Liquidity and Interbank Contracting', *Economics Letters*, Vol. 44, pp. 287-94.
- 22: Bordo, M D (1986) 'Financial Crises, Banking Crises, Stock Market Crashes and the Money Supply: Some International Evidence, 1870-1933', in Capie, F and Wood, G E (eds.) 'Financial Crises and the World Banking System', MacMillan, London pp. 190-248.
- 23: Bordo, M D (1990) 'The Lender of Last Resort: Alternative views and Historical Experience', *Federal Reserve Bank of Richmond Economic Review*, Jan/Feb, pp. 18-29.
- 24: Briault, C (1999) 'The Rationale for a Single National Financial Services Regulator', Financial Services Authority, Occasional Paper, No. 2, May.
- 25: Brierley, P G and Vlieghe, G W (1999) 'Corporate Workouts, the London Approach and Financial Stability', *Financial Stability Review*, Bank of England, issue 7, November.
- 26: Brimmer, A F (1989) 'Distinguished Lecture on Economics in Government: Central Banking and Systemic Risks in Capital Markets', *Journal of Economic Perspectives*, Vol. 3, pp. 3-16.
- 27: Bryant, J (1980) 'A Model of Bank Reserves, Bank Runs and Deposit Insurance', *Journal of Banking and Finance*, Vol. 4, pp. 335-44.
- 28: Calomiris, C and Gorton, G (1991) 'The Origins of Banking Panics: Models, Facts and Bank Regulation', in Hubbard, G R (ed.), 'Financial Markets and Financial Crises', University of Chicago Press, Chicago pp. 107-73.
- 29: Calomiris, C and Khan, C (1991) 'The Role of Demandable Debt in Restructuring Optimal Banking Arrangements', *American Economic Review*, June, Vol 81(3) pp. 497-513.
- 30: Calomiris, C and Khan, C (1996) 'The Efficiency of Self-Regulated Payment Systems: Learning from the Suffolk System', *Journal of Money Credit and Banking*, Vol 28(4) Part 2 pp. 767-96.
- 31: Calomiris, C and Mason, J R (1997) 'Contagion and Bank Failures During the Great Depression: The June 1932 Chicago Banking Panic', *American Economic Review*, Vol. 87, pp. 863-83.
- 32: Capie, F, Goodhart, C A E, Fischer, S and Schnadt, N (1994) 'The Future of Central Banking: The Tercentenary Symposium of the Bank of England', Cambridge University Press, Cambridge.
- 33: Chari, V and Jagannathan, R (1988) 'Banking Panics, Information and Rational Expectations Equilibrium', *Journal of Finance*, Vol. 43, pp. 749-61.
- 34: Clark, J and Perfect, S (1996) 'The Economic Effects of Client Losses on OTC Bank Derivative Dealers: Evidence from the Capital Markets', *Journal of Money Credit and Banking*, vol 28(3) Part 2 pp. 527-45.
- 35: Cornell, B and Shapiro, A (1986) 'The Reaction of Bank Stock Prices to the International Debt Crisis', *Journal of Banking and Finance*, March, vol (10) 1 pp. 55-73.
- 36: Corrigan, E G (1990) 'Statement Before US Senate Committee on Banking, Housing and Urban Affairs', Washington D.C.
- 37: Crockett, A (1996) 'The Theory and Practice of Financial Stability', *De Economist*, vol. 144(4) pp. 531-68.

- 38:** Davies, H (1997) 'Financial Regulation: Why, How and by Whom?' *Bank of England Quarterly Bulletin*, February pp. 107-12.
- 39:** Davies, S (1993) 'The Importance of Market Behaviour in Predicting Bank Performance', Board of Governors of The Federal Reserve System Working Paper, March.
- 40:** Davis, K (1991) 'Assessing Financial Institution Risk', in Johnson M R, Kriesler P and Owen, A D (eds.) 'Contemporary Issues in Australian Economics', MacMillan, Melbourne.
- 41:** Davis, K (1995) 'Bank Deregulation, Supervision and Agency Problems', *Australian Economic Review*, 3rd Quarter, pp. 43-54.
- 42:** De Bandt, O and Hartmann, P (1998) 'What is Systemic Risk Today?', Risk Measurement and Systemic Risk: Proceedings of the Second Joint Central Bank Research Conference', Bank of Japan, November pp. 37-84.
- 43:** De Bonis, R, Giustiniani, A and Gomel, G (1999) 'Crises and Bail-Outs of Banks and Countries: Linkages, Analogies and Differences', *The World Economy*, Vol. 22(1).
- 44:** Demirgüç-Kunt, A and Detragiache, E (1999) 'Does Deposit Insurance Increase Banking System Stability? An Empirical Investigation', World Bank, unpublished.
- 45:** Diamond, D (1984) 'Financial Intermediation and Delegated Monitoring', *Review of Economics Studies*, July, pp. 393-414.
- 46:** Diamond, D (1989) 'Reputation Acquisition in Debt Markets', *Review of Economic Studies*, Vol. 99, pp. 689-721.
- 47:** Diamond, D (1991a) 'Monitoring and Reputation: The Choice Between Bank Loans and Directly Placed Debt', *Journal of Political Economy*, Vol. 99, pp. 689-721.
- 48:** Diamond, D (1991b) 'Debt Maturity Structure and Liquidity Risk', *Quarterly Journal of Economics*, Vol. 106, pp. 709-37.
- 49:** Diamond, D and Dybvig, P (1983) 'Bank Runs, Deposit Insurance and Liquidity', *Journal of Political Economy*, Vol. 91, pp. 401-19.
- 50:** Dickinson, A, Peterson, D and Christiansen, W (1991) 'An Empirical Investigation into the Failure of the First Republic Bank: Is There a Contagion Effect?', *Financial Review*, Summer, pp. 303-18.
- 51:** Docking, D, Hirschey, M and Jones, E (1997) 'Information and Contagion Effects of Bank Loan-Loss Reserve Announcements', *Journal of Financial Economics*, pp. 219-39.
- 52:** Dowd, K (1992) 'Models of Banking Instability: A Partial Review of the Literature', *Journal of Economic Surveys*, Vol. 6, pp. 107-32.
- 53:** Enoch, C, Stella, P and Khamis, M (1997) 'Transparency and Ambiguity in Central Bank Safety Net Operations', IMF Working Paper, WP/97/138.
- 54:** Euro-Currency Standing Committee (1997) 'Report of a Task Force on The Implications of Structural Change for the Nature of Systemic Risk', paper discussed at ECSC meeting, December.
- 55:** Federal Reserve Bank of Cleveland (1986) 'An Analysis of the Timing of Deposit Reductions Prior to Suspension in a Selected Group of Banks', *Annual Report 1985*, pp. 468-76.
- 56:** Fischer, S (1999) 'On the Need for an International Lender of Last Resort', Paper prepared for the American Economic Association and the American Finance Association Meetings, IMF, mimeo.
- 57:** Flannery, M (1996) 'Financial Crises, Payment System Problems and Discount Window Lending', *Journal of Money, Credit and Banking*, Vol. 28, pp. 804-24.
- 58:** Freixas, X (1999) 'Optimal Bail Out Policy, Conditionality and Creative Ambiguity', mimeo, Bank of England.
- 59:** Freixas, X and Parigi, B (1997) 'Contagion and Efficiency in Gross and Net Payment Systems', *Journal of Financial Intermediation*.
- 60:** Freixas, X, Parigi, B and Rochet, J C (1998a) 'Systemic Risk, Interbank Relations and Liquidity Provision by the Central Bank', Mimeo, IDEI.
- 61:** Freixas, X, Parigi, B and Rochet, J C (1998b) 'The Lender of Last Resort: A Theoretical Foundation', Mimeo, IDEI.
- 62:** Freixas, X and Rochet, J C (1997) 'Microeconomics of Banking', MIT Press, Cambridge, MA.
- 63:** Friedman, M (1959) 'A Program for Monetary Stability', Number Three, Fordham University Press, New York.
- 64:** Furfine, C (1999) 'Interbank Exposures: Quantifying the Risk of Contagion', Bank For International Settlements Working Paper, no. 70.
- 65:** Garcia, G and Plautz, E (1988) 'The Federal Reserve: Lender of Last Resort'. Ballinger, Cambridge, MA.
- 66:** Gay, G, Timme, S and Yung, K (1991) 'Bank Failure and Contagion Effects: Evidence from Hong Kong', *Journal of Financial Research*, Summer, pp. 153-65.
- 67:** George, E A J (1994) 'The Pursuit of Financial Stability', *Bank of England Quarterly Bulletin*, February pp. 60-66.
- 68:** George, E A J (1997) 'Are Banks Still Special?', *Bank of England Quarterly Bulletin*, February pp. 113-118.
- 69:** Giannini, C (1999) 'Enemy of None but a Common Friend of All? An International Perspective on the Lender of Last Resort Function', *Princeton Essays in International Finance*, No 214.
- 70:** Goodfriend, M and King, R G (1988) 'Financial Deregulation, Monetary Policy and Central Banking', *Federal Reserve Bank of Richmond Economic Review*, Vol. 74, No. 3.
- 71:** Goodfriend, M and Lacker, J M (1999) 'Limited Commitment and Central Bank Lending', Federal Reserve Bank of Richmond Working Paper, 99-2.
- 72:** Goodhart, C A E (1988) 'The Evolution of Central Banks', MIT Press, Cambridge, MA.
- 73:** Goodhart, C A E (1995) 'The Central Bank and the Financial System', MIT Press, Cambridge, MA.
- 74:** Goodhart, C A E (1999) 'Myths About the Lender of Last Resort', *International Finance* 2:3.
- 75:** Goodhart, C A E and Huang, H (1999) 'A Model of the Lender of Last Resort', LSE Financial Markets Group Discussion Paper, dp0131.
- 76:** Goodhart, C A E and Schoenmaker, D (1993) 'Institutional Separation between Supervisory and Monetary Agencies', LSE Financial Markets Group Special Paper, No. 52.
- 77:** Goodhart, C A E and Schoenmaker, D (1995) 'Should the Functions of Monetary Policy and Bank Supervision be Separated?', *Oxford Economic Papers*, Vol. 39, pp. 75-89.
- 78:** Gorton, G (1988) 'Banking Panics and Business Cycles', *Oxford Economic Papers*, Vol. 40, pp. 751-81.
- 79:** Greenbaum, S I, Kanatas, G and Venezia, I (1989) 'Equilibrium Loan Pricing Under the Bank-Client Relationship', *Journal of Banking and Finance*, Vol. 13, pp. 221-35.
- 80:** Greenbaum, S I and Thakor, A (1995) 'Contemporary Financial Intermediation', The Dryden Press, Orlando, FL.
- 81:** Greenbaum, S I and Venezia, I (1985) 'Partial Exercise of Loan Commitments Under Adaptive Pricing', *Journal of Financial Research*, Vol. 8, pp. 251-63.
- 82:** Greenspan, A (1996) 'Remarks on Evolving Payment System Issues', *Journal of Money Credit and Banking*, Vol. 28, pp. 689-95.
- 83:** Guttentag, J and Herring, R (1983) 'The Lender of Last Resort Function in an International Context', *Princeton Essays in International Finance*, Number 151, May.
- 84:** Haldane, A G (1999) 'Private Sector Involvement in Financial Crisis: Analytics and Public Policy Approaches', *Financial Stability Review*, Bank of England, Issue 7, November.
- 85:** Hawtrey, R (1932) 'The Art of Central Banking', London.
- 86:** Heeler, H R (1991) 'Prudential Supervision and Monetary Policy', in Downs, P and Vaez-Zadeh, R (eds.), 'The Evolving Role of Central Banks', IMF, Washington.
- 87:** Hills, B and Rule, D S (1999) 'Counterparty Credit Risk in Wholesale Payment and Settlement Systems' *Financial Stability Review*, Bank of England, Issue 7, November.

- 88:** Hirsch, F (1977) 'The Bagehot Problem', The Manchester School of Economic and Social Studies, March.
- 89:** Hölmstrom, B and Tirole, J (1993) 'Financial Intermediation, Loanable Funds and the Real Sector', *Quarterly Journal of Economics*, Vol. 112, pp. 663-91.
- 90:** Humphrey, D B (1986) 'Payments Finality and Risk of Settlement Failure', in Saunders, A S and White, L J (eds.), 'Technology and Regulation of Financial Markets: Securities, Futures and Banking', Lexington Books, Lexington, MA pp. 97-120.
- 91:** Humphrey, T (1989) 'The Lender of Last Resort: The Concept in History', *Federal Reserve Bank of Richmond Economic Review*, March/April, pp. 8-16.
- 92:** International Monetary Fund (1999) 'Code of Good Practices on Transparency in Monetary and Financial Policies: Declaration of Principles', IMF, Washington.
- 93:** Jacklin, C (1987) 'Demand Deposits, Trading Restrictions and Risk Sharing', in 'Contractual Arrangements for Intertemporal Trade', Prescott, E and Wallace, N (eds.), University of Minnesota Press, Minneapolis.
- 94:** Jacklin, C and Bhattacharya, S (1988) 'Distinguishing Panics and Information-based Bank Runs: Welfare and Policy Implications', *Journal of Political Economy*, Vol. 96, pp. 568-92.
- 95:** James, C (1991) 'The Losses Realised in Bank Failures', *Journal of Finance*, September, pp. 1223-42.
- 96:** Kahn, C and Roberds, W (1996a) 'On The Role of Bank Coalitions in the Provisions of Liquidity', Federal Reserve Bank of Atlanta Working Paper, June.
- 97:** Kahn, C and Roberds, W (1996b) 'Payment System Settlement and Bank Incentives', Federal Reserve Bank of Atlanta Working Paper, September.
- 98:** Kane, E J (1992) 'How Incentive-Incompatible Deposit Insurance Plans Fail', in Kaufman, G (ed.), *Research in Financial Services*, Vol. 4, JAI Press, Greenwich, Conn.
- 99:** Karafiath, I, Mynatt, R and Smith, K L (1991) 'The Brazilian Default Announcement and the Contagion Effect Hypothesis', *Journal of Banking and Finance*, June, pp. 699-716.
- 100:** Kaufman, G (1991) 'Lender of Last Resort: A Contemporary Perspective', *Journal of Financial Services Research*, Vol. 5, pp. 95-110.
- 101:** Kaufman, G (1994) 'Bank Contagion: A Review of the Theory and Evidence', *Journal of Financial Services Research*, pp. 123-150.
- 102:** Kent, P (1997) 'Corporate Workouts: A UK Perspective', *International Insolvency Review*, Vol. 6 pp. 165-82.
- 103:** King, M A and Goodhart, C A E (1987) 'Financial Stability and the Lender of Last Resort: A Note', LSE Financial Markets Group Special Paper Series, Special Paper no. 2.
- 104:** Kindleberger, C (1989) 'Manias, Panics and Crashes: A History of Financial Crises', Basic Books, New York.
- 105:** Kobayakawa, S (1997) 'The Comparative Analysis of Settlement Systems', CEPR Discussion Paper No. 1667.
- 106:** Krugman, P (1999) 'Balance Sheets, the Transfer Problem and Financial Crises', *Journal of Money, Credit, and Banking*, Vol. 11, pp. 311-25.
- 107:** Lamy, R E and Thompson, G R (1986) 'Penn Square, Problem Loans and Insolvency Risk', *Journal of Financial Research*, Summer, pp. 103-12.
- 108:** Lastra, R M (1997) 'Lender of Last Resort', paper presented at EBRD seminar; unpublished.
- 109:** Liu, C and Ryan, S G (1995) 'The Effect of Bank Loan Portfolio Composition on the Market Reaction to an Anticipation of Loan Loss Reserves', *Journal of Accounting Research*, Vol. 33, pp. 77-94.
- 110:** Madura, J and McDaniel, W (1989) 'Market Reaction to Increased Loan-Loss Reserves at Money-Center Banks', *Journal of Financial Services Research*, December, pp. 359-69.
- 111:** McAndrews, J and Roberds, W (1995) 'Banks, Payments and Co-ordination', *Journal of Financial Intermediation*, Vol. 4, pp. 305-27.
- 112:** McAndrews, J and Wasilyew, G (1995) 'Simulations of Failure in a Payments System', Federal Reserve Bank of Philadelphia Working Paper 95-119.
- 113:** McDonough, W J (1998) 'Statement Before the Committee on Banking and Financial Services, U.S House of Representatives', Washington D.C.
- 114:** Michael, I (1998) 'Financial Interlinkages and Systemic Risk', *Financial Stability Review*, Bank of England, Issue 4, Spring pp. 26-33.
- 115:** Miron, J (1986) 'Financial panics, the seasonality of the nominal interest rate, and the founding of the Fed', *American Economic Review*, Vol. 76, pp. 125-40.
- 116:** Mishkin, F (1995) 'Symposium on the Monetary Transmission Mechanism', *Journal of Economic Perspectives*, Vol. 9, Autumn.
- 117:** Mishkin, F (1995) 'Comments on Systemic Risk' in Kaufman, G (ed.) *Banking Financial Markets and Systemic Risk: Research in Financial Services, Private and Public Policy*, Vol. 7, JAI Press Inc., Hampton pp. 31-45.
- 118:** Mishkin, F (1999) 'Moral Hazard and Reform of the Government Safety Net,' paper prepared for FRB Chicago conference 'Lessons from Recent Global Financial Crises.' Chicago, September 30 – October 2.
- 119:** Morris, S and Shin, H (1999) 'Co-ordination Risk and the Price of Debt', mimeo.
- 120:** Musemeci, J and Sinkey, J Jr (1990) 'The International Debt Crisis, Investor Contagion and Bank Security Returns in 1987: The Brazilian Experience', *Journal of Money Credit and Banking*, May, pp. 209-30.
- 121:** Nakaso H (1999) 'Recent Banking Sector Reforms in Japan', *Economic Policy Review*, Federal Reserve Bank of New York, July pp. 1-7.
- 122:** Park, S (1995) 'Market Discipline by Depositors: Evidence from Reduced-Form Equations', *The Quarterly Review of Economics and Finance*, Vol. 35, pp. 497-514.
- 123:** Peavey III, J W and Hempel, G H (1998) 'The Penn Square Bank Failure', *Journal of Banking and Finance*, pp. 141-50.
- 124:** Prati, A and Schinasi, G (1999): 'Financial Stability in European Economic and Monetary Union', mimeo.
- 125:** Rajan, G (1992) 'Insiders and Outsiders: The Choice Between Informed and Arm's-length Debt', *Journal of Finance*, Vol. 47, pp. 1367-1400.
- 126:** Reid, M (1982) 'The Secondary Banking Crisis, 1973-75: Its Causes and Course', Macmillan, London.
- 127:** Rochet, J C and Tirole, J (1996a) 'Interbank Lending and Systemic Risk', *Journal of Money Credit and Banking*, Vol. 28, pp. 733-62.
- 128:** Santomero, A and Hoffman, P (1998) 'Problem Bank Resolution: Evaluating the Options', The Wharton School Financial Institutions Center Discussion Paper 98-05.
- 129:** Saunders, A (1987) 'The Interbank Market, Contagion Effects and International Financial Crises', in Portes and Swoboda (eds.) 'Threats to International Financial Stability', CEPR pp. 196-232.
- 130:** Saunders, A and Wilson, B (1996) 'Contagious Bank Runs: Evidence from the 1929-1933 Period', *Journal of Financial Intermediation*, Vol. 5, pp. 409-23.
- 131:** Schoenmaker, D (1995) 'A Comparison of Alternative Interbank Settlement Systems', LSE Financial Markets Group Discussion Paper No. 204.
- 132:** Schoenmaker, D (1996) 'Contagion Risk in Banking', LSE Financial Markets Group Discussion Paper No. 239.
- 133:** Schwartz, A (1986) 'Real and Pseudo-Financial Crises', in Capie, F and Woods, G (eds.), 'Financial Crises and the World Banking System', Macmillan, London pp. 11-40.
- 134:** Schwartz, A (1992) 'The Misuse of the Fed's Discount Window', *Federal Reserve Banks of St. Louis Review*, September/October, pp. 58-69.
- 135:** Schwartz, A (1995) 'Systemic Risk and the Macroeconomy' in Kaufman, G (ed.), *Banking Financial Markets and Systemic Risk: Research in Financial Services, Private and Public Policy*, Vol. 7, JAI Press Inc., Hampton pp. 19-30.
- 136:** Selgin, G (1993) 'In Defence of Bank Suspension', *Journal of Financial Services Research*, Vol. 7, pp. 347-64.
- 137:** Sharpe, A (1990) 'Asymmetric Information, Bank Lending and Implicit Contracts – A Stylised Model of Customer Relationships', *Journal of Finance*, Vol. 45, pp. 1069-87.

- 138:** Smirlock, M and Kaufold, H (1987) 'Bank Foreign Lending, Mandatory Disclosure Rules and the Reaction of Bank Stock Prices to the Mexican Debt Crisis', *Journal of Business*, July, pp. 347-64.
- 139:** Smith, B F and White, R W (1990) 'The Capital Market Impact of Recent Bank Failures', *Canadian Journal of Administrative Sciences*, June, pp. 41-47.
- 140:** Stella, P (1997) 'Do Central Banks Need Capital?' IMF working paper, WP/97/83.
- 141:** Summers, B J (ed.) (1994) 'The Payment System, Design, Management and Supervision', International Monetary Fund, Washington, D.C.
- 142:** Swary, I (1986) 'Stock Market Reaction to Regulatory Action in the Continental Illinois Crisis', *Journal of Business*, July, pp. 451-73.
- 143:** Thornton, H (1802) 'An Enquiry into the Nature and Effects of the Paper Credit of Great Britain'.
- 144:** Treasury and Civil Service Committee (1995) 'Sixth Report: The Regulation of Financial Services in the U.K., Volume II', HC1994-95 332 II.
- 145:** Wall, L and Peterson, D R (1990) 'The Effect of Continental Illinois' Failure on the Performance of Other Banks', *Journal of Monetary Economics*, August, pp. 77-99.
- 146:** Wicker, E (1980) 'A Reconsideration of the Causes of the Banking Panic of 1930', *Journal of Economic History*, September, pp. 571-83.

# Corporate workouts, the London Approach and financial stability

Peter Brierley; Gertjan Vlieghe

## A Introduction

**EPISODES OF INCIPIENT** or actual financial instability are often accompanied by problems in the corporate sector, which may in turn give rise to more widespread losses in the financial system. But company failures sometimes occur because a company is unable to resolve temporary liquidity or other financial difficulties, even though the company's longer-term viability and solvency appear sound. This may reflect a co-ordination failure between creditors, arising from asymmetric information about the company's prospects or relative creditor priority. Some creditors may believe they have an advantage in triggering early liquidation, even though their returns might in fact be higher if they co-operated with other creditors in restructuring a viable company. Alternatively, a conflict of interest may exist between secured and unsecured creditors: whereas unsecured creditors may be more inclined to keep a company alive if they believe the going concern value exceeds the liquidation value, secured creditors are more likely to favour early liquidation, as liquidation is more likely to meet their claims sooner. To the extent that this results in the unnecessary liquidation of viable companies, it represents a market failure which could cause or amplify financial instability. In particular, severe creditor losses associated with liquidation may cause further liquidations, which, to the extent that creditors are in the financial sector, may damage financial institutions. Unnecessary liquidation also represents a welfare cost in the form of unemployment and misallocation of capital.

A country's insolvency regime should aim to limit the costs arising from these market failures, for example by supporting an effective private sector mechanism

for the reorganisation of companies. This may in turn mean providing incentives for debtors and creditors to negotiate corporate workouts at the pre-insolvency stage. An effective statutory regime can contribute directly to financial stability by allocating risk among debtors and creditors in a predictable and equitable manner, which improves the *ex ante* functioning of financial markets and can make it more likely that informal arrangements work satisfactorily. Such considerations, in the light of practical experience in the recent East Asian crises, prompted the G22 Working Group on Financial Crises<sup>1</sup> and the IMF<sup>2</sup> to highlight the need for effective insolvency regimes and to set out the desirable features of such regimes.

This article evaluates, in section B, the UK insolvency regime in the light of the IMF's conclusions, and considers the issues surrounding reform of the United Kingdom's statutory approach in the context of the government's current insolvency review. It considers, in particular, the potential role of non-statutory corporate restructuring at the pre-insolvency stage. In the United Kingdom, the 'London Approach' to corporate workouts provides a framework for such restructuring. Section C describes the main features of the London Approach, including the Bank of England's role. Section D then considers how the London Approach might evolve in the light of recent developments in financial markets and corporate finance. Section E places these developments in a global context, and considers some of the key issues which are raised by cross-border corporate workouts. It also examines the extent to which similar issues apply in international financial insolvencies, in particular the tensions between separate-entity and single-entity insolvency regimes. Some conclusions are presented in Section F.

1: 'Key Principles and Features of Effective Insolvency Regimes' (1998), G22 Working Group on International Financial Crises, available at [www.imf.org/external/np/g22/index.htm](http://www.imf.org/external/np/g22/index.htm). This report is discussed in more detail in Drage, J and Mann, F (1999), 'Improving the stability of the international financial system', *Financial Stability Review*, Bank of England, June.

2: 'Orderly and Effective Insolvency Procedures: Key Issues' (1999), IMF Legal Department, available at [www.imf.org/external/pubs/ft/orderly/index.htm](http://www.imf.org/external/pubs/ft/orderly/index.htm)



Peter Brierley



Gertjan Vlieghe

## B The UK Insolvency Regime

### (i) Current features

There are a number of different ways of reorganising a company facing financial difficulties. In the United Kingdom, whose statutory regime is summarised in the Annex, these include receivership, administration, company voluntary arrangements (CVAs) and a compromise or arrangement under section 425 of the Companies Act 1985. All these options are designed to address, in differing ways, the problems arising from co-ordination failures and conflicts of interest among creditors.

The various routes differ considerably, notably in their treatment of different classes of creditor; the extent to which the procedure is court-driven; and the powers granted to the company management and independent insolvency practitioners respectively. A key consideration in the ranking of claims, and rights of creditors, is the extent and nature of the security attached to the provision of credit to the company, and the corresponding effect on the ability of the company to use its assets for the purposes of carrying on its business. This will depend on whether those assets are subject to 'fixed charges' (where the secured creditor has full control over the assets) or 'floating charges' (where the secured creditor allows the company to deal with those assets in the ordinary course of carrying on its business, until the occurrence of some enforcement event that causes the security to 'crystallise' and so become subject to a fixed charge).

Each of the statutory approaches to company reorganisation has advantages and disadvantages. Receivership (including administrative receivership) offers the benefits of speed and decisiveness, but is subject to the risk that potentially viable companies are not reorganised in a manner that maximises returns to all (rather than simply secured or preferred) creditors. Administration was designed to limit this risk: like receivership it displaces the company management, but it includes a formal

procedure for a moratorium on creditors enforcing their claims and for the binding of minority creditors. It is also court-supervised, which as a by-product has the potential advantage that the administrator or insolvency practitioner may command more recognition in an international insolvency than would a receiver. Like administration, a CVA provides a facility for binding minority creditors (although the threshold for acceptance is 75 per cent rather than 50 per cent), but it lacks a statutorily-imposed moratorium between the announcement of the proposal and its formal adoption. It therefore leaves open the possibility of secured creditors attaching assets vital to the company's operations. This risk of loss of control is the main reason why a CVA has generally in practice formed part of an administration, rather than being separate from it. Finally, a section 425 approach may be appropriate in cases where there is a complex structure of different classes of creditor (e.g. different types of bondholder or loan stock creditor); in such cases, approval by a single creditors' meeting (as in a CVA) may not be a viable approach and may be too easily challenged in the courts. But the section 425 procedure is more costly, cumbersome and above all risky, since it depends on substantial goodwill from a high proportion of the company's creditors.

The 1986 Insolvency Act introduced the options of administration and CVAs. But the Act did not result in a dramatic shift to the administration/CVA route. Chart 1 shows the number of corporate reorganisations effected by each approach since 1986. Although the number of administrations and CVAs has been increasing relative to administrative receiverships, this was mainly due to a decline in the number of the latter.

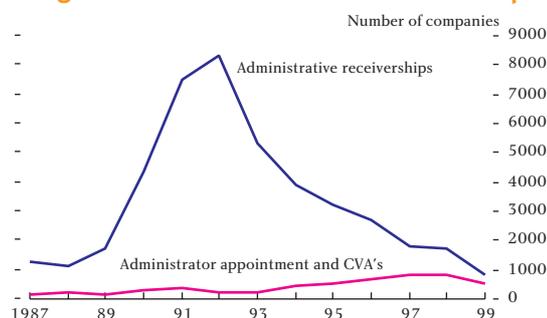
There are two drawbacks to administration:

- It is subject to effective veto by those lenders (usually banks) with security over a large part of the

company's assets. In practice, such lenders have often been unwilling to surrender their right to call in an administrative receiver.

- The statutory hurdles that need to be surmounted before an administration order can be granted are quite high. In particular, the requirement that a company is, or is likely to be, unable to pay its debts precludes the use of administration as a means of reorganising a currently solvent company being managed ineptly. This prevents administration being used as a device to prevent or forestall future corporate insolvencies.

**Chart 1:**  
**Administrator appointments, company voluntary arrangements and administrative receiverships<sup>(a)</sup>**



Source: DTI.

(a) 1999 figure covers Q1 and Q2.

### (ii) The IMF report and the debate on reform in the UK

The report by the IMF's Legal Department aims to promote orderly and effective insolvency systems in member countries. It builds on, and is consistent with, the 'Key Principles and Features of Effective Insolvency Regimes' set out in the report of the G22 Working Group on International Financial Crises. It also incorporates comments from other international organisations, including the World Bank, the Organisation for Economic Co-operation and Development, the European Bank for Reconstruction and Development, the Asian Development Bank and the International Finance Corporation. The report does not attempt to establish international standards, recognising that the approaches adopted by different countries reflect not only different legal traditions but also different policy choices, particularly on the degree to which the system should favour creditors or debtors. A 'debtor-oriented' regime is sometimes thought to refer to a regime that allows the ailing company's management to retain control. However, a

regime can also be termed debtor-oriented merely because it allows the company to continue operating, albeit under the management of a court-appointed administrator. A 'creditor-oriented' regime is generally one in which few barriers to liquidation exist, allowing secured creditors to realise promptly the value of their collateral. But the IMF report argues that, whether debtor or creditor-oriented, an insolvency regime will enhance financial stability effectively only if it realises two essential, but potentially conflicting, objectives:

- To allocate risk among participants in a market economy in a predictable, equitable and transparent manner.
- To protect and maximise value for the benefit of all interested parties and the economy in general.

The IMF's recommendations point to various issues concerning the United Kingdom's current insolvency regime, some of which are being considered in the government's current review of insolvency legislation. Draft legislation is being proposed which would, first, require companies to be given notice before an administrative receiver is appointed and, secondly, enable smaller companies only to apply to the court for a moratorium when negotiating a CVA with their creditors. A consultative document<sup>3</sup> has been published which invites comments on other possible measures to promote the rescue of viable companies in financial difficulties. These include changing voting procedures in CVAs, allowing solvent companies to enter administration, and reassessing the status of preferential creditors.

Many of the IMF's recommendations have long been part of the UK's insolvency regime, such as adherence to the ranking of claims, the treatment of director fraud, and co-operation with foreign insolvency proceedings. Although the government review predates the IMF's report, the fact that some of the proposals are in line with IMF recommendations reflects current thinking on insolvency regimes. In particular, the government review addresses the following issues:

- Currently, only companies which are actually or prospectively insolvent may apply for an administration order. The government review

3: 'A Review of Company Rescue and Business Reconstruction Mechanisms' (1999), The Insolvency Service, Department of Trade and Industry, October.

## The IMF Report

The main conclusions reached by the IMF report are as follows:

- Corporate restructuring proceedings (at the pre-insolvency stage) should be capable of being initiated by either debtor or creditor: evidence of inability to pay debts should be required in the latter case, but not in the former case, to encourage early restructuring designed to avert insolvency.
- Ideally, a corporate restructuring should involve the debtor initially continuing to operate the business on a day-to-day basis, but under the close supervision of an independent court-appointed administrator. This should be subject to the ability of a court to displace the company management where evidence of gross mismanagement or misappropriation of assets exists. The IMF report regards this approach as a compromise between an excessively creditor-oriented approach, which may eliminate the debtor's incentive to seek restructuring at an early point, and an excessively debtor-oriented regime, which may encourage the debtor to take excessive risks in the knowledge that the burden of any losses will fall disproportionately on creditors (this is commonly known as the moral hazard problem).
- The IMF report argues in favour of a stay on the ability of both secured and unsecured creditors to exercise their rights at the pre-insolvency stage (commonly referred to as a moratorium). If the restructuring fails, there should continue to be some restraint on unsecured creditors enforcing legal remedies during a liquidation, while the liquidation regime should strike a balance between realising the value of secured creditors' collateral and protecting the estate against a premature 'grab race' by secured creditors, which may undermine the objective of maximising the estate's assets.
- On majority voting/cram-down<sup>1</sup>, the IMF report also argues for a balance between imposing a plan on a minority of dissenting creditors and protecting the interests of such creditors if impaired. A minimum standard is that minority creditors should not be bound by a plan which does not provide them with at least as much as they would have received under a liquidation. The IMF report adds that, "in circumstances where the capacity of the institutional infrastructure is limited", a cram-down procedure may undermine confidence in the law.
- Creditors should be allowed to play a full role in a corporate restructuring, for example through the designation of a lead bank and/or creditors' committee.
- If liquidation becomes necessary, the assets of the debtor should be transferred to a court-appointed liquidator at the commencement of liquidation proceedings.
- The ranking of claims in a liquidation should pay due regard to security rights and subordination.
- Following a liquidation, the discharge of debtors should be on such terms as to facilitate a fresh start in business, but this should not apply to those engaged in fraudulent behaviour or who have failed to disclose material information during rehabilitation or liquidation proceedings.
- In the case of cross-border corporate restructurings and insolvencies, measures should be taken to facilitate the recognition of foreign insolvency proceedings and co-operation between insolvency courts, e.g. through adoption of the UNCITRAL Model Law on cross-border insolvencies (see section E).

<sup>1</sup>: The IMF report defines 'cram-down' as a mechanism that will enable the support of a plan by one class of creditors to make the plan binding on other classes without their consent.

suggests that this requirement might be removed, in order to encourage a company's management to take early action to avert financial difficulties.

- Neither administrative receivership nor administration allows the debtor to continue to operate the business on a day-to-day basis

(commonly known as 'debtor in possession'). The administrative receiver or administrator takes full charge of the running of the company. This point is addressed in the draft legislation, which provides for a new CVA procedure that allows the management to remain in charge subject to supervision by a court-appointed nominee.

- Only an administration order grants a stay on the ability of fixed or floating charge holders to exercise their rights. However, floating charge holders with the ability to appoint an administrative receiver may do so before the court hears a petition for administration. This arrangement could be altered under the draft legislation by allowing a debtor to apply unilaterally for a moratorium in the context of a CVA.

The review is aimed in the first instance at small and medium-sized firms, although any new provisions could of course be extended to cover all firms. Several of the key proposals were first mooted in the mid-1990s: expanding the powers of the administrator, making administration more of a reconstruction mechanism, and beefing up the CVA procedure by adding a statutory moratorium and requiring advance notice of the intention to appoint an administrative receiver (which would apply to all companies, regardless of size). Some of these proposals had been shelved in earlier reviews, partly reflecting a concern that, if lenders' capacity to enforce their security was impaired, the terms of lending, especially to smaller businesses, might be tightened. The current proposals may raise similar concerns.

Underlying both the government review and the IMF report is a set of questions about how to strike the balance between creditor and debtor interests. There have been attempts in the academic literature to quantify the direct costs of debtor and creditor-oriented regimes. The US insolvency regime is often quoted as an example of a debtor-oriented regime, because the Chapter 11 procedure effectively allows the debtor to call a moratorium and negotiate restructuring plans, which if approved by a majority of creditors are then binding on all. Both the United Kingdom and Germany are generally regarded as examples of creditor-oriented regimes, because they facilitate the secured creditors' ability to enforce their security. One measure of the cost to creditors is the average writedown, ie the amount that creditors lose following a reorganisation, measured as a fraction of the face value of debt. The average writedown in UK receiverships has been estimated at 66 per cent, whereas the average writedown for US Chapter 11 cases has been estimated at 49 per cent<sup>4</sup>. On the face

of it, this might seem to point in favour of a debtor-oriented regime. However, as the authors of this study point out, there are more solvent firms entering into Chapter 11 arrangements than into UK receiverships. One would therefore expect, other things being equal, lower writedowns in the Chapter 11 case. Comparisons of other measures of the direct costs of either regime, such as the total administrative costs, are inconclusive.

The direct costs of insolvency are, however, only part of the total costs. The social cost of underinvestment that results from premature liquidation of viable companies needs also to be taken into account. This cost cannot be captured by average writedown statistics. And the cost of overinvestment that results from postponing the liquidation of non-viable companies, usually associated with debtor-oriented regimes, is captured by average writedown statistics only if the cost is borne by creditors, in the form of writedowns, rather than by shareholders, in the form of subsequent below-market returns.

Lastly, there may be other public policy objectives which govern the choice of insolvency regime. For example, the next stage of the current government review will raise the question of whether a creditor-oriented regime increases the stigma attached to bankruptcy, perhaps thereby discouraging enterprise and risk-taking in the economy. Proponents of a more debtor-oriented approach point to the advantages of Chapter 11 in the United States, under which a company has enhanced protection from creditors. The greater dynamism and flexibility of the US economy is partly attributed to the reduced downside associated with corporate bankruptcy in such a system. On the other hand, the US insolvency regime has also been criticised for being time consuming, arbitrary and costly in terms of overinvestment, as liquidation of non-viable companies is postponed.

Ultimately, both creditor and debtor-oriented systems contain elements of optimal insolvency regimes and the issue is one of balance. Much depends on the cause of the company's problems. If they reflect an external shock or the short-term economic cycle, a debtor-oriented approach may be more likely to ensure that viable companies are not wound up. But

<sup>4</sup>: Various studies compiled in Franks, J R, Nyborg, K G and Torous, W N (1996), 'A Comparison of US, UK and German Insolvency Codes', *Financial Management*, Autumn.

if they reflect mismanagement by the board of directors or a secular decline in a company's business, a debtor-oriented approach, which effectively supports rather than penalises bad management, carries a moral hazard risk and may also result in the unjustified postponement of the liquidation of non-viable companies.

### C Pre-statutory solutions: The London Approach

While an improved insolvency regime may reduce some of the costs associated with the current statutory regime, there has long been an alternative approach to corporate reorganisation in the United Kingdom. This involves a corporate 'workout', entailing the financial rehabilitation or restructuring of a company which takes place outside the confines of a statutory insolvency process. This alternative approach also addresses the need to resolve co-ordination and conflict of interest problems between creditors, as does the statutory insolvency regime. However, a corporate workout aims to avoid some potential problems with the statutory regime, notably:

- the risk of unnecessary liquidation of companies facing short-term financial problems, but which are viable in the longer run;
- the danger of reorganising companies in a manner which favours one group of creditors at the expense of others (as may happen in a receivership);
- the inability to reorganise any companies other than those which are, or are likely to become, insolvent (as is the case in administration).

Given this, a workout outside the statutory insolvency regime can sometimes offer creditors higher returns than reorganisations within the statutory framework. A recent study<sup>5</sup> demonstrated the cost advantage to be substantial, as shown in Table 1 which compares average writedowns of UK receiverships with those of workouts:

Prior to the 1980s, however, there was no agreed framework for organising corporate workouts in the United Kingdom. The Bank of England, building on a

**Table 1**  
Average writedowns for a sample of UK Firms

Creditor Class	Receivership	UK Workouts
Secured	47	19
Preferential	59	–
Unsecured	97	5
All creditors	66	15

Source: Data taken from Franks, Nyborg and Torous (1996), 'A comparison of US, UK and German insolvency codes', *Financial management*.

tradition of involvement in industrial restructuring since the 1920s<sup>6</sup>, and guided in particular by a desire to limit the financial repercussions of recession in the United Kingdom towards the end of the 1980s, took the lead in developing a set of principles for corporate workouts which came to be known as 'the London Approach'<sup>7</sup>. For the most part, this involved the informal codification of a set of practices which had come to be widely accepted in the vast majority of multi-lender corporate workouts undertaken in the United Kingdom.

The key features of the London Approach are:

- A willingness by the main creditors to consider, initially, a non-statutory resolution of a company's financial difficulties, rather than resorting to a formal insolvency procedure such as liquidation, administration or a CVA, and without recourse to other enforcement procedures such as receivership and administrative receivership.
- As part of this consideration, the commissioning by creditors of an independent review (generally by a firm of independent accountants) of the company's long-term viability, drawing on comprehensive information made available by, and shared between, all the likely parties to any workout.
- During the period of the review, the company's bankers agreeing to maintain their facilities in place, effectively operating an informal standstill sufficient to preserve the confidence of suppliers and customers by allowing the company to continue to trade normally.

5: Franks, J R *et al* (1996), *op cit*

6: As described, for example, in Sayers, R S (1976), 'The Bank of England 1891-1944', vol. I, chapter 14.

7: Leigh-Pemberton, R (1990), 'Corporate Finance, banking relationships and the London Rules', *Bank of England Quarterly Bulletin*, November.

- Drawing on the independent review, the company's main creditors working together to reach a joint view on whether, and on what terms, a company is worth supporting in the longer term (a key point being that there is no presumption that a business will necessarily be rescued).
- To facilitate these discussions, a co-ordinating or lead bank may be designated (generally the bank with the largest exposure to the company, which is usually also its main relationship bank), and a steering committee of creditors formed. The latter provides a forum to which some decisions can be delegated by the key funders of the company.
- In addition to the maintenance of existing facilities (generally by reference to exposures at the date of entry into the informal standstill), it may be necessary to allow the company to supplement its existing borrowing with new money if this is needed to overcome an immediate liquidity shortfall. New money may be provided *pro rata* by all existing lenders, by specific lenders with priority arrangements, or by the release of asset disposal proceeds subject to priority considerations.
- Other principles underlying this critical period of financial support include the recognition of existing seniority of claims and the sharing of loss on an equal basis between creditors in a single category.
- If, on the basis of the review, there is agreement among the creditors that the company is indeed viable in the long term, the creditors move on to consider more lasting forms of financial support for the company, eg an interest holiday, extension of loan maturities, further lending of new money and conversion of debt into equity.
- Such longer-term financial changes will need to be conditional on the implementation of an agreed business plan, which may well involve management changes, sales of assets or division, or even the take-over of the company.

The Bank's interest in corporate workouts is linked directly to its core responsibilities relating to the maintenance of financial stability and the promotion of an effective and efficient financial system. The

Bank's role in the London Approach<sup>8</sup> is designed to meet these objectives by:

- the provision of a coherent framework for the rehabilitation rather than liquidation of solvent companies facing short-term financial problems, but deemed to be viable in the longer-term, thereby preserving jobs and productive capacity which might otherwise be lost;
- the minimisation of creditor losses, and so disruption to the financial system, arising from temporary corporate financial difficulties;
- the limitation of knock-on effects on trade creditors, suppliers and customers of such companies, which could in turn affect the financial system more generally;
- the minimisation of disruption to the wider economy.

Such considerations have led the Bank to stand ready to act as a mediator in corporate workouts, if invited and mandated to take on that role by creditors. During the recession of the early 1990s, a substantial number of UK companies were successfully restructured following collective action by their bankers and, in some cases, bondholders and other creditors, based on the London Approach principles. The principles have come to be widely accepted in the London markets and there have, so far, been relatively few instances where a corporate workout has failed because the banks have been unable to agree the basis on which it should be organised. However, not all London Approach cases lead to corporate restructuring: after careful consideration and sharing of information lenders may well conclude that breaking up the company and selling its assets provides the best return for creditors.

In recent years, there have been fewer corporate workouts involving the Bank directly, partly reflecting the more stable macroeconomic environment and partly because the widespread acceptance of the principles underlying the London Approach has often enabled creditors and debtors to reach a satisfactory resolution of a problem without the Bank's direct involvement. But the Bank in principle remains ready to play a mediating role if asked and where this

<sup>8</sup>: For more details see Kent, P H (1997) 'Corporate Workouts – A UK Perspective', *International Insolvency Review*, vol 6.

appears necessary to help resolve the potentially conflicting interests or co-ordination problems of a company's creditors.

The current debate about the desirability of changes to statutory insolvency arrangements highlights the advantages of having a non-statutory alternative at the pre-insolvency stage. The London Approach combines aspects of both creditor and debtor-oriented regimes. As already noted, one of its key objectives is to minimise the loss of value resulting from winding up viable companies; such loss is one of the main risks of a creditor-oriented statutory insolvency procedure. In a London Approach workout, the creditors commit to work with the existing company management to maintain a supportive policy to a company thought viable in the long-term, on the basis of a full exchange of information covering all the creditors. But the moral hazard risks of a debtor-in-possession approach, such as Chapter 11, should be avoided as the ultimate reorganisation will usually involve a take-over or other restructuring of the company, in which the existing management will be replaced.

One indication of the contribution made by the London Approach is that similar regimes are being established in some emerging markets. The Jakarta Initiative in Indonesia, for example, involves the use of a mediator/facilitator, a set of principles agreed between debtors and creditors for corporate restructurings, and a one-stop regulatory approval for these restructurings. The regimes being developed in South Korea and Thailand also have much in common with the London Approach. The authorities in these countries, in conjunction with the IMF and World Bank, are also considering whether principles underlying cross-border corporate workouts (discussed in Section E below), especially in relation to the respective roles of creditors and debtors in the private sector, could be capable of being applied to sovereign debt workouts in emerging markets (see also the article 'Private sector involvement in financial crisis: analytics and public policy approaches' by Andy Haldane in this issue).

#### D The London Approach: development

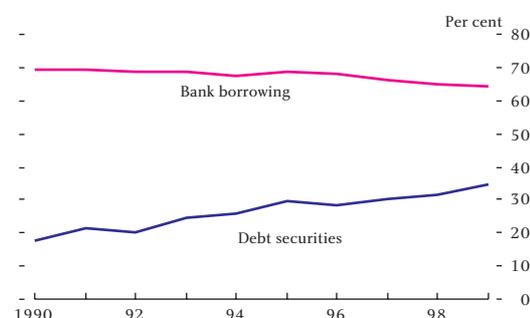
In the light of innovations and developments in financial and credit markets, the London Approach remains under continuous review. This section

examines some of the key issues surrounding the London Approach in the light of specific recent developments.

#### (i) The unanimity requirement

The trend towards disintermediation, as illustrated in Chart 2, has increased the number of creditors involved in a workout, which may make it more difficult to establish a collective view on how to proceed with the restructuring. Furthermore, developments such as greater use of complex financing and subordinating structures increase the scope for conflicts of interest between senior and junior creditors.

**Chart 2:**  
**Bank and capital market borrowing by UK corporates**



Source: ONS. Data relate to percentages of total borrowing by private non-financial corporations.

All this sharpens one of the key questions in the creditor-oriented versus debtor-oriented debate, namely the degree of influence to be accorded to minority creditors. As already discussed, formal insolvency procedures in the United Kingdom, notably administration and CVAs, provide for a form of majority voting (at the 50 per cent and 75 per cent levels respectively), but subject to potential veto by secured creditors. The London Approach has been based on unanimity, which may be practicable when the creditors comprise a small group of banks but is less workable when the creditor group is larger and more diversified, perhaps including non-banks. A requirement for unanimity risks delaying or stalling the workout process, since it gives each lender, no matter how insignificant, an effective power of veto.

The Bank of England has in the past suggested the possibility of majority voting at the pre-insolvency stage<sup>9</sup>. The current insolvency review may have a

<sup>9</sup>: Kent, P H (1994), 'The London Approach: distressed debt trading', *Bank of England Quarterly Bulletin*, May

bearing on this, especially if it introduces more widespread use of majority voting in statutory insolvency procedures. A disparate workout group may be more prepared to tolerate a limited departure from unanimity at the pre-insolvency stage if a failure to achieve unanimity would force a resort to statutory procedures in which a greater degree of cram-down is permitted.

#### **(ii) The lack of a formal moratorium**

Although the London Approach generally entails an informal standstill, at least during the initial stages whilst the company's viability is evaluated, it does not necessarily involve a formal moratorium extending over part or all of the period of resolution of the company's problems. A voluntary agreement to remain supportive can come under strain as time passes. It becomes more difficult to protect the company from 'unwilling' creditors, who may lose confidence and endanger or undermine the workout. Creditors may take such action even if it later turns out to have been against their own interests, reflecting the fact that they had insufficient information about the company or about other creditors' intentions.

The UK banking industry is currently debating ways in which the London Approach could possibly be adapted to provide more readily for the use of a formal moratorium extending more comprehensively over the various stages of a workout. A number of issues are being covered in the discussion, which can be grouped into three main categories: entering the moratorium phase, the running of the business during the moratorium, and the transition out of the moratorium phase. The first category covers issues such as the majorities required of each class of creditor for the introduction of the moratorium and the relative powers of company directors and creditors in framing the scope and terms of the moratorium. The second category includes the priority accorded to new funding made available during the moratorium, the extent to which set-offs, netting or closing-out of derivatives contracts should be permitted during the moratorium period, the terms governing the disposal of charged and uncharged assets, and the extent to which creditors may challenge such disposals as being prejudicial to their interests. The final category involves terms and conditions on which an extension to the moratorium might be granted, and the optimal exit route from the

moratorium (e.g. consensual workout, CVA or section 425).

If agreement on such principles as these could be reached, a formal moratorium would potentially increase the chances of a successful London Approach workout for viable companies, even in cases where a large group of banks and non-banks is involved.

#### **(iii) Loan trading, securitisation and credit derivatives**

A different set of issues is raised by other relatively recent innovations in corporate finance, notably the growth of corporate debt trading (both par and distressed), and the use of securitisation and credit derivatives.

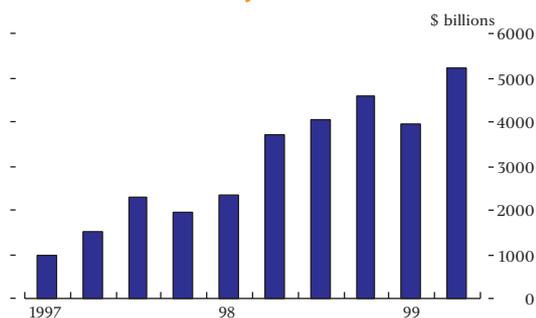
The market for corporate bank debt has developed comparatively recently in the United Kingdom, in contrast to the United States, where an active market has existed for many years. Some recent loan trading statistics for the United Kingdom are provided in Chart 3. Much of the trading in the United States was initially in impaired debt (trading at less than par), although in both the United States and United Kingdom the past six years or so have seen an increased volume of trading in unimpaired debt, eg participation in syndicated credits. For the banks, such trading offers greater scope for managing both liquidity and the risks in loan books. Views are mixed, however, on whether such trading facilitates or obstructs corporate workouts. When the market first developed in the United Kingdom, some of the major participants in corporate workouts were convinced that it would obstruct workouts, arguing that the Bank should try to ban loan trading, at least during restructuring negotiations. This was based on a view that the trading of debt, at least before the terms of a workout were finalised, would be disruptive, by introducing new players into the negotiations who might have differing objectives or want to re-open certain issues. It was feared that these new entrants might also be more prepared to use privileged commercial information obtained through their participation in the workout for short-term commercial or speculative gain.

The Bank took the view that it was impossible to prevent the development of a secondary market for corporate bank debt<sup>10</sup>. Furthermore, it was by no

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<sup>10</sup>: Kent, P H (1994), op cit

**Chart 3:**  
**Value of loans sold by LMA members**



Source: LMA.

means clear that loan trading would necessarily be inimical to effective corporate workouts. Much depends on the level and timing of such trading and on the motives of those acquiring the debt. It is possible that the buyers of debt may be specialist turnaround investors more willing to inject fresh equity into a business or to take a longer-term view. Such investors also offer an exit route for bank lenders unwilling or unable to participate in a corporate workout or to endorse terms agreed by the rest of the lending group; in this respect, loan trading could potentially facilitate corporate restructurings.

The Loan Market Association (LMA) was formed at the beginning of 1997 to promote the orderly development of debt trading in London. It has subsequently developed standard documentation and practices for the trading and settlement of, initially, par value corporate debt, and, more recently, distressed corporate debt. In recent months, the INSOL Lenders Group (ILG)<sup>11</sup>, representing corporate recovery bankers, insolvency practitioners and accountants in the United Kingdom, has been seeking to draw up a trial code of practice for debt trading within workout initiatives, in collaboration with the debt traders themselves. This is part of a wider initiative by the ILG to develop some form of protocol or best practice relating to multi-national corporate workouts (see Section E below). Among the specific issues relating to loan trading being addressed by the ILG are the extent to which the banks should trade loans during the rescue process, particularly during the initial standstill (some banks would support an agreement not to trade loans in this

period, while others are less convinced), and the extent to which members of the steering committee co-ordinating a workout should trade before complete information is made available to all creditors.

This debate contributes to the ongoing process of adapting the London Approach to evolving market practice while maintaining its core principles. Bankers are increasingly of the view that debt traders can bring benefits to a workout, in the form of an injection of new equity capital. Debt traders are themselves increasingly aware that excessive loan trading, at particularly sensitive times during the workout, can cause the failure of restructuring attempts, with adverse consequences for themselves as well as other creditors. The interrelationship between bankers' and loan traders' actions is a prime example of the co-ordination problem that lies at the heart of workout arrangements, whether pre-statutory or statutory.

The benefit of initiatives such as those being taken by the LMA and ILG can potentially carry across to other ways in which banks are seeking to manage the risks of their corporate assets, such as securitisation and the use of credit derivatives. The impact of securitisation of corporate loans on corporate workouts depends partly on the extent to which the bank really does shed the credit risk in a securitisation deal. A bank that has securitised part of its loan book may well remain exposed to reputational risk if it walked away from a loan which it had initiated. A large bank may well have other exposures to the company outside the securitisation package, and therefore a commercial interest in the company's survival.

Similar considerations may apply to credit derivatives, although these appear to offer a clearer route to transfer risk effectively from the lender to another financial institution. The credit derivatives market has grown rapidly in recent years (see Chart 4). A survey on credit derivatives activity<sup>12</sup> estimates that 35 per cent of credit derivatives were issued against corporate assets (as opposed to bank and sovereign assets). This proportion is expected to increase to

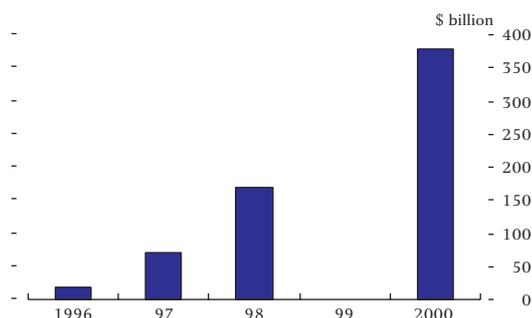
<sup>11</sup>: The ILG was formed in 1994 to encourage and develop cross-border support, co-operation and communication amongst lenders in pre-statutory workouts. The ILG is an affiliated group of INSOL International, the worldwide federation of national associations of accountants and lawyers specialising in insolvency.

<sup>12</sup>: 'BBA Credit Derivatives Report 97/98', British Banking Association.

nearer 50 per cent in 2000. In theory, use of credit derivatives might potentially give a bank that has transferred corporate loan risk an incentive to force the company into liquidation in order to obtain a certain payment from its counterparty. Bankers dispute this, arguing that the reputational risk is too high. Credit derivatives have, though, increased the scope for parties to take an economic interest in the failure of a company. More generally, the growing use of each of the techniques described above – credit derivatives, loan trading, securitisation – is part of a wider shift from relationship to transaction-based banking, and from banking sector to capital market finance. To the extent that this weakens the relationships between corporates and their bankers, non-bank players may become involved in discussions on corporate workouts. The work of organisations such as the ILG seeks to develop principles governing corporate workouts acceptable to a much wider range of domestic and international creditors.

**Chart 4:**

**Size of London market for credit derivatives<sup>(a)(b)</sup>**



Source: 1996 and 1997/98 BBA credit derivatives surveys.

(a) 1999 not covered in the survey.

(b) 2000 estimate is an average of survey respondents.

**E The international dimension**

The globalisation of business and finance means that corporate workouts will in future be increasingly international in scope, involving a wider range of domestic and foreign bank and non-bank lenders. The composition of these groups will also vary more as loans are traded more frequently. It seems likely that purely national-based insolvency regimes, especially those not paying sufficient attention to the desirable features highlighted by the IMF and others, will be unsuited to resolving such situations. Indeed, the mismatch between the national scope of insolvency procedures and the international scale of business and finance could raise the costs of financial

instability or, to the extent that it affects behaviour, become a potential source of financial instability. This raises the issue of whether some form of international understanding concerning the conduct of cross-border corporate workouts could be developed.

**(i) Cross-border corporate workouts: the INSOL Lenders Group**

The ILG is in the vanguard of efforts to promote such an understanding. Over the past three years, it has attempted to develop a set of common procedures (or a 'protocol') relating to the conduct of cross-border workouts. So far, this work has involved a four-phase approach:

- the production of reports on individual country approaches to corporate workout regimes and insolvencies;
- a comparison of these approaches in an attempt to draw together common features which can form the basis of a global protocol;
- an examination of the impact of distressed debt trading outside the United States on corporate support operations, leading to the production of a proposed code of practice on debt trading in the context of corporate workouts;
- communication with, and attempts to gain the support of, as wide a group of potential participants in global corporate workouts as possible.

The ILG put an initial statement of intent to the INSOL Conference in New Orleans in March 1997. A number of principles governing cross-border workouts were agreed at the conference including the following:

- Co-ordination of financial institutions participating in a global workout is best achieved through a lead lender, supported by a committee consisting of a cross-section of participants. The lead lender's responsibilities should include collecting/disseminating information, liaising with different parties, and appointing advisers.
- A moratorium should be put in place, based on each lender's loans outstanding (rather than credit facilities), but limited to a period of, say, 60 days, with extensions by majority creditor decisions.

- Where new money is required, it should be provided *pro-rata* to existing outstanding exposures and subject to priority ranking and security (if there are any unencumbered assets).
- Some form of majority voting should be adopted, although its application across different lender groups requires further debate (and it should not apply to the provision of new money, which should be subject to unanimity).

A number of issues, however, have so far proved difficult to resolve. These include: determining how and when a workout should begin; the extent to which security values should be offset when determining exposure levels; the precise formulation and application of the moratorium; the basis of valuation of impaired assets; the extent to which confidential information can be shared among bank and non-bank participants; and the extent to which majority voting should apply across all creditors or within particular classes of creditors.

#### **(ii) The UNCITRAL Model Law (UML)**

Whereas the ILG protocol covers international co-operation in pre-statutory workouts, a separate but complementary initiative by the United Nations Commission on International Trade and Law (UNCITRAL) covers the international aspects of statutory insolvency procedures. UNCITRAL has drawn up a set of draft provisions relating to cross-border corporate insolvencies, designed to provide for greater international co-operation and co-ordination. This 'Model Law', as it is termed, contains many helpful provisions relating to co-operation between insolvency courts in different jurisdictions, and the granting of recognition and relief to foreign insolvency practitioners.

In order to be effective, the UML will have to be enacted into national law by as many of its members as possible. Enactment into UK law may come about through a clause in a new Insolvency Bill providing for adoption via secondary legislation. This is not contentious; in terms of incoming requests for recognition to UK courts from foreign insolvency practitioners, the current position in the United Kingdom is broadly consistent with the UML. Where the UML will provide assistance over and above UK

law is in situations where a UK insolvency practitioner seeks assistance from foreign courts; in practice, of course, this would be effective only in countries which enact the UML.

#### **(iii) Application of the UML to international financial insolvencies**

Much of the debate on the UML has focussed on the extent to which its principles can be applied to the insolvency of financial institutions, including banks, with international operations. Much separate work has been done on international financial insolvencies, notably by the G30<sup>13</sup>, and it is widely recognised that international financial insolvencies raise substantially different issues from insolvencies of non-financial corporates, as discussed below. The UML therefore contains an opt-out relating to any regime separate from the general corporate bankruptcy law. Although this is not explicitly stated in the text, this opt-out in effect applies to banks and other financial institutions (notably insurance companies).

In practice, regardless of whether countries choose to exercise this opt-out, a close degree of international co-operation is required in any failure of a financial institution with international operations. This is necessary to prevent a disorderly failure and bring about a reorganisation or possibly orderly disposal of assets, and if possible avoid the delays, uncertainties and consequent loss of value associated with formal legal proceedings, which could increase systemic risk. If the financial institution does fail, the provisions of the Model Law relating to judicial cross-border co-operation are potentially helpful. UK bankruptcy law, for example, in some respects does not distinguish between banks and other financial institutions, on the one hand, and general corporates on the other. In the absence of a formal treaty, convention, directive or regulation governing international financial insolvencies, the UML could provide a useful starting point for negotiations involving several countries.

The applicability of the UML to international financial insolvencies would require its provisions to be consistent with internationally recognised principles of banking regulation. In the EU context, this requires consistency between the UML and the EU passport system and principle of home state

<sup>13</sup>: See, for example, the G30 report 'Reducing the threat of international financial insolvency', March 1998.

responsibility for banking supervision. The UML would also need to recognise the draft EC Directive on the Winding-Up of Credit Institutions and draft EC Council Regulation on Insolvency Proceedings, if either or both of these drafts were to come into effect. The Directive on the Winding-Up of Credit Institutions, while more ambitious than the UML, is consistent with the principle of home state supervision, since it provides for a system of mutual recognition based on home state rules. Under this system, only the home state authorities can instigate reorganisation and liquidation proceedings with respect to a credit institution and its EU branches and, subject to certain exceptions, the laws of the home state apply to those proceedings. The preparation of a separate Directive for banks reflects the fact that many EU Member States have traditionally adopted separate arrangements to deal with insolvent banks.

A number of other adaptations of the UML would also be necessary for it to recognise the distinctive features of an international financial insolvency. In particular, depositors, and in the case of insurance companies, policyholders, are in a different position from ordinary creditors, in the sense that they are likely to have less information, be greater in number, and be less well organised to recover their assets than professional creditors. There would need to be some allowance for deposit protection or insurance schemes and procedures for the unwinding of complex financial transactions. Provisions in the UML, for an automatic moratorium upon recognition of a foreign main insolvency proceeding, would have to be consistent with the rights of the banking regulators to intervene, and with the special default procedures of the financial markets and payment and settlement systems.

#### **(iv) Single versus separate entity approach to liquidation of international banks**

All this indicates the difficulty of applying the principles governing cross-border corporate workouts and liquidations to banks and other financial institutions. There is another major issue concerning the liquidation of an international bank. At present, there is a major difference of approach between countries, such as the United Kingdom, which apply a

'single entity' regime to the liquidation of international banks and those, eg the United States, which adopt a 'separate entity' regime.

In a single entity regime, the bank is reorganised or liquidated primarily by the authorities in its country of incorporation, with the worldwide assets of the bank distributed between the worldwide creditors regardless of their location or domicile. Under a separate entity (or 'ring-fencing') approach, the liquidator of a bank branch can take possession of all the bank's assets located in that jurisdiction, and pay off all valid claims of the creditors specifically of that branch; only after such claims are paid is the liquidator authorised to turn over any excess assets to the head office of the bank, or to a duly appointed liquidator in the home country. These issues are discussed in detail in a report of the Basel Committee on Banking Supervision<sup>14</sup>. The report outlines the difficulties that might arise in the liquidation of a multinational bank having branches in countries with single entity regimes and countries with separate entity regimes. The report concludes that differences in liquidation rules across jurisdictions can affect returns to depositors and other creditors, as well as the operation of deposit protection schemes. Specifically, when a bank with a single entity home jurisdiction but a branch in a separate entity jurisdiction is liquidated, creditors of the branch in a separate entity jurisdiction are likely to receive a higher payout than if the branch were located in a single entity jurisdiction. This may affect the deposit protection scheme of the home country, where fewer assets would be available for distribution to creditors.

The debate about single and separate entity liquidation of international banks is essentially a debate about the merits of a universalist or territorial approach to cross-border insolvencies. Under the universalist approach, the courts of an insolvent multinational company's 'home country' have worldwide control and apply the home country insolvency law. Territoriality, by contrast, is a system under which each country has jurisdiction over the portion of the multinational company within its borders.

Although universalism is generally favoured in the literature on cross-border insolvency law<sup>15</sup>, and is

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<sup>14</sup>: 'The Insolvency Liquidation of a Multinational Bank' (1992), reprinted in 'Compendium of Documents Produced by the Basel Committee on Banking Supervision', April 1997.

<sup>15</sup>: As reviewed in LoPucki, L (1999), 'Co-operation in International Bankruptcy: A Post-Universalist Approach', 84 *Cornell Law Review* p. 696.

arguably more consistent with initiatives such as those of the ILG and UNCITRAL, territoriality has some prominent adherents, especially in the United States<sup>16</sup>. Even among those who state that universalism is an ideal for which one should strive, there are authors who acknowledge that, in practice, this approach may increase legal uncertainty and administrative costs<sup>17</sup>. Universalism has been criticised by some US insolvency specialists on the grounds that (a) countries would then be permitting foreign law and foreign courts to govern wholly domestic relationships, and (b) multinationals are capable of redefining their 'home countries' in a manner that could be totally unpredictable. As against argument (a), the application of territorial principles would be fair to all creditors only if companies or banks operated through separately incorporated subsidiaries in each jurisdiction; but in an environment of increasing globalisation of finance this would entail an inefficient use of bank capital. On (b), the definition of 'home country' should be capable of being refined to prevent 'forum shopping' on the part of companies and their legal advisers.

The separate versus single entity debate is relevant to the application of the UML to international financial insolvencies. Article 13 of the UML aims to give foreign creditors of a multinational company the same rights as domestic creditors. It is difficult to see how this might be applied to a financial insolvency in a jurisdiction operating a separate entity approach to the liquidation of foreign banks. While Article 13 might be viewed as consistent with the letter of such a regime, as it distributes funds to the creditors of the local branch of an international bank regardless of nationality, there are in practice unlikely to be many foreign creditors of a branch located in a 'non-home' country. Separate entity liquidation does not therefore seem consistent with the spirit, even if it meets the letter, of Article 13. Countries with a territorial approach to financial liquidations will probably exercise the opt-out for financial institutions. It is also difficult to imagine that a country with a universalist approach to bank liquidations would be prepared to give recognition (and therefore the benefits of the moratorium) to a foreign insolvency practitioner whose jurisdiction operates some form of ring-fencing regime. It is

arguable that the differences of view underlying the universalist and territorial approaches will need to be resolved before further progress is made on initiatives such as applying the UML or the ILG cross-border protocol to international financial institutions.

## F Conclusions

The main conclusions of this paper can be summarised as:

- Some of the changes considered in the government's review of UK insolvency law prospectively take it closer to the recommendations in the IMF report.
- The London Approach can help to resolve a market failure arising from co-ordination failures or conflicting interests between a company's creditors. An active and constructive debate is under way on adapting pre-statutory corporate workouts to the continuing development of the financial system, including the growth of loan trading, use of credit derivatives, and disintermediation generally, which has increased the number and range of a company's creditors.
- The debates on the desirability of changes to the statutory insolvency procedures, and particularly on the balance between creditor and debtor interests, reinforce the benefit of a non-statutory alternative at the pre-insolvency stage. The London Approach can combine key elements of both creditor and debtor-oriented insolvency regimes, while potentially avoiding the pitfalls of each (winding-up solvent but illiquid companies in the creditor-oriented regime; moral hazard in the debtor-oriented regime).
- The globalisation of business and finance, and the fact that international standards do not exist in the area of corporate restructuring and insolvency, means that the adaptation of the London Approach to international corporate workouts could contribute to financial stability. Organisations such as the INSOL Lenders Group, the Loan Market Association, the International Monetary Fund, the World Bank and the United Nations are directly involved in this process, and are also considering whether principles

<sup>16</sup>: LoPucki, L. op cit

<sup>17</sup>: Fletcher, I F (1999), 'Insolvency in Private International Law: National and International Approaches', Oxford Monographs in Private International Law, Clarendon Press, Oxford.

underlying non-statutory cross-border corporate workouts, especially in relation to the respective roles of creditors and debtors in the private sector, might be capable of application to sovereign debt workouts in emerging markets.

- Statutory international corporate restructurings would be facilitated by greater recognition accorded to foreign insolvency practitioners. The UNCITRAL Model Law (UML) aims to foster such an understanding.
- Any adaptation of the UML, governing cross-border corporate restructurings, to international financial insolvencies would need, first, to be consistent with internationally accepted principles of banking regulation, and, secondly, to recognise the distinctive features of international financial insolvencies.
- The UML is based on a 'universalist' approach to cross-border insolvency. Application of such an approach to international financial insolvencies is possible, in all respects, only if a country adopts a single entity approach to the liquidation of international banks. A separate entity, or 'ring-fencing', approach is, in its essentials, inconsistent with a universalist model. Continued adherence to ring-fencing, or territorial, regimes could therefore make it more difficult to achieve greater consensus on the principles governing cross-border corporate workouts and international financial insolvencies. Countries with a separate entity approach will be likely to exercise the UML 'opt-out' for banks and other financial institutions, and countries with a single-entity approach may not be prepared to grant recognition to foreign insolvency practitioners from jurisdictions operating a separate entity regime.

## ANNEX

### UK INSOLVENCY LAW: KEY FEATURES

A1 In UK insolvency law, there are essentially four statutory processes under which a company may be reorganised or liquidated:

- receivership (including administrative receivership);
- administration;
- company voluntary arrangement (CVA);

- compromise or arrangement under section 425 of the 1985 Companies Act.

A2 A receivership is generally brought about by one or more of the company's secured creditors. The holder of a fixed charge security against the company has the right to appoint a receiver to manage the charged assets in accordance with a ranking of creditor claims as follows:

- holders of fixed charge security;
- preferential creditors (mainly employees of the company and the tax, and customs and excise authorities);
- holders of floating charge security;
- unsecured creditors;
- shareholders.

A3 The 1986 Insolvency Act introduced the process of administrative receivership. This gave a creditor with security over all or substantially all of the company's assets and subject to a floating charge the right to appoint an insolvency practitioner to act as administrative receiver and/or manager of the charged assets. His duty is to take control of and manage all or substantially all of the company's assets (since the floating charge normally relates to such assets), subject to the prior fixed charge rights of secured creditors. The key point with administrative receivership (and with receivership generally) is that it takes some or all of the assets of the company out of the control of the company management. The receiver is charged with acting solely in the interests of, and realising maximum value for, the relevant secured creditors.

A4 The 1986 Insolvency Act also introduced the process of administration as an alternative to receivership. The change was motivated primarily by a concern that the receivership process was resulting in too many unnecessary company liquidations, caused by secured creditors appointing receivers to wind up companies, and realise their security, before a comprehensive evaluation of the company's viability had been made. An administration can be inaugurated, via a petition to an insolvency court, by the company, its directors or any of its creditors. On presentation of the petition, and prior to the court

hearing, a company normally cannot be wound up nor can any security be enforced by creditors except that those floating chargeholders with the right to appoint an administrative receiver may do so before the court hears the petition. At the hearing, a court can grant the company protection from creditors under an administration order only if, first, in its view the company is, or is likely to become, unable to pay its debts, and, secondly, one of four statutory purposes is likely to be achieved, as follows:

- the survival of the company as a going concern, with all or part of its business; or
- the approval of a company voluntary arrangement under the 1986 Act (see below); or
- the adoption of a compromise or arrangement under section 425 of the 1985 Companies Act (see below); or
- a more advantageous realisation of the company's assets than would be effected on a winding-up.

A5 Once an administration order is granted, a moratorium preventing creditors (including floating chargeholders) from enforcing their debts comes into effect: no enforcement of security, or legal proceedings, can be taken against the company without the consent of the administrator or the court. The administrator takes control of the company and can dispose of assets subject to floating charges as if they were uncharged, and also (but subject to the court's approval) dispose of assets subject to fixed charges (the secured creditor is entitled to the net proceeds of sale or open market value, if greater). The administrator must convene a meeting of all creditors within three months of his appointment, at which he will seek approval of his plans for the company. A simple majority of creditors (by value) is required to agree the restructuring proposals. That said, the court has the power to override the creditors if they do not approve the administrator's proposals, so administration effectively involves the binding of minority creditors.

A6 The 1986 Insolvency Act also introduced a process known as the 'company voluntary arrangement' (CVA). A CVA is a contractual arrangement between a company and its creditors under which the company's debts are limited and paid off in full or in part over time. An authorised

insolvency practitioner (known as a 'nominee') convenes a meeting of the company's creditors *and* shareholders, and sends them in advance a set of proposals which normally takes one of two forms:

- a composition of the company's debts, which is an agreement between the company and its creditors that they will accept an orderly repayment of part of their claims in satisfaction of the whole; or
- a scheme of arrangement, which is a more complex restructuring (or winding down) of a company, and can include injection of outside capital and conversion of liabilities into equity or loan stock.

A7 The set of proposals in a CVA must be approved by a 75 per cent majority, by value of claims, of creditors who vote (in person or by proxy) at the meeting, and by a simple majority of shareholders. Each secured or preferential creditor has a veto over the loss of its rights. If a CVA is approved, it is reported to an insolvency court, which over a 28-day period will hear and rule on petitions submitted by any creditor that the CVA is 'unfairly prejudicial' to their interests. If the court makes no such ruling, the CVA becomes binding on all creditors and shareholders.

A8 The final statutory method of company reorganisation in the United Kingdom is a compromise or arrangement under section 425 of the 1985 Companies Act. This predates administration but can in practice either be separate or part of an administration order. It requires court permission and approval by 75 per cent (in value) of each class of creditors (as determined by the court, and sanctioned in separate meetings of the classes) and shareholders. Given that the threshold for approval is that much greater than in a CVA, it was expected at the time of the 1986 Act that section 425 compromises would gradually be replaced by CVAs.

# Private sector involvement in financial crisis: analytics and public policy approaches<sup>1</sup>

Andy Haldane

Involving the private sector in crisis prevention and resolution has become a key plank in the reform of the international financial architecture. This article outlines the scope for private sector involvement in the context of a model of financial crisis. It argues that appropriately designed public policies can bring welfare benefits to both private sector debtors and creditors, by guarding against co-ordination failures. This may, however, call for different public policy tools than traditional international lending of last resort.

**'PRIVATE SECTOR INVOLVEMENT'** has become a - if not the - hot topic in the on-going debate on strengthening the international financial architecture. The G7 statement by finance ministers and central bank governors back in October 1998 called for "...greater participation by the private sector in crisis containment and resolution." In response, the IMF (1999) and the IIF (1999) published papers in April of this year setting out ideas on possible ways forward in involving the private sector. Most recently, the statement by G7 Finance Ministers at the Cologne Summit, published on 20 June, sets out a range of 'principles' and 'tools' for involving the private sector in crisis resolution.

Although the private sector involvement issue is now better understood than a year ago, much remains foggy or unresolved. In part, this may be a problem of language. 'Bailing in' of the private sector and 'burden-sharing' between the official and private sectors have become two key buzzwords of the debate. But both are potentially misleading as a description of what public policy is - or at least should be - attempting to achieve at times of financial crisis.

The central theme of this article is that the genesis of a crisis is often a co-ordination problem among private creditors. Creditors impose externalities on one

another as they race to withdraw their funds. Because of these externalities, the costs of co-ordination problems are felt not just by debtors but by creditors too. So there is a global welfare gain from securing co-operative solutions to crises. Public policies currently under consideration can facilitate such co-operative solutions, helping bind creditors together. Viewed in this way, public policies towards private sector involvement are less about 'burden-sharing' than about 'burden-lifting'. They are not so much about 'bailing in' as about 'binding in' the private sector.

This article addresses three questions:

- (1) Why involve the private sector in crisis prevention and resolution?
- (2) What is the welfare 'burden' associated with crisis and with public policy responses to crisis?
- (3) What can public policy do to mitigate these welfare costs?

## Why involve the private sector?

Why has involving the private sector recently become a greater public policy concern? At root, three factors have been important: official sector resources; the scale and nature of international capital flows; and

<sup>1</sup> This article is an abridged and updated version of a paper titled 'Private Sector Involvement and Public Policy' presented at a conference on International Monetary Reform at the London School of Economics, July 1999.



Andy Haldane

creditor-debtor incentives. The increased frequency and severity of emerging market crises over the past five years has of course added momentum to this debate.

#### (a) Official sector resources

The capacity of the IMF and other official lending agencies to cushion the effects of liquidity crises has undoubtedly diminished over the past thirty years. The reasons for this are twofold. First, the focus of IMF lending policies has shifted from current account to capital account 'financing gaps'. And second, the growth of potential capital account deficits has comfortably outstripped the growth in the IMF's loanable funds.

Because controls restricted capital movement during the Bretton Woods era, the relevant external financing gaps for countries over this period were current account deficits. These rarely exceeded five per cent of GDP. In the liberalised capital account environment of the 1990s, however, external financing gaps now potentially comprise both private current and capital account deficits. The potential scale of the latter has grown exponentially since the 1970s.

Between 1970 and 1996, IMF quotas, measured in constant dollar terms, rose by a factor of 1.7. Over the same period, G7 real GDP rose by a factor of 2.15 and emerging market GDP by a factor of 2.5. World trade volumes grew by a factor of 4.4. And real private sector capital flows grew by a factor of almost 8.5.

As a result, the quantum of official sector money no longer comes close to meeting the potential financing needs of the emerging economies. Take an extreme

example. One proxy for the potential capital account financing gap of the emerging markets would be their stock of external debt. At end-1997, this is estimated by the World Bank to have been US\$2.2 trillion for low and middle income countries.

Even this is a potential understatement of the capital account financing gap in a worst-case crisis scenario, as it ignores domestic capital flight. This is often as important a trigger of financial crisis, as recent experience in Indonesia, Russia and Brazil has illustrated. To give a rough feel for magnitudes, the sum of the M2 money supplies of the emerging markets would add around another US\$3.4 trillion to the capital stock. So taking domestic and foreign capital stocks together gives a total potential capital stock of US\$5.6 trillion. That compares with current IMF quota resources of just under US\$0.3 trillion<sup>2</sup>.

Moving from capital stocks to flows, the picture is much the same. Between 1992 and 1996, net private capital flows to the emerging markets were eight times the size of public sector flows. Even between 1997-98, when IMF lending surged as a result of the Asian crisis, private flows were five times the size of official flows. However the cake is cut, it is clear that the scope for official sector cushioning of the external financing needs of the emerging economies has fallen significantly.

#### (b) The nature of international capital flows

Three broad trends are apparent in the pattern of emerging market financing since the 1980s: a *compositional* shift, away from direct bank lending towards equity and in particular bond financing; a *maturity* shift within bank lending, towards shorter-duration loans; and a *sectoral* shift, with

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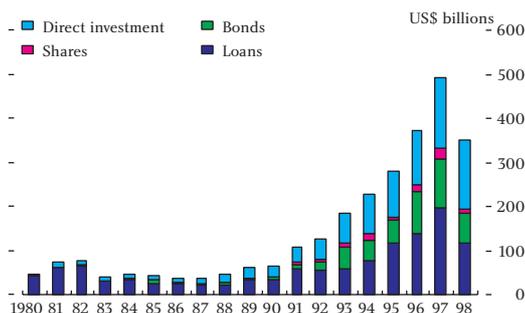
<sup>2</sup> As Fischer (1999) discusses, this would not necessarily be a binding constraint on IMF resources if member governments were willing to extend quotas. But recent experience suggests that is a difficult route to pursue too far.

greater direct bank lending to the private sector and less to the public sector.

(i) *Compositional shift*

The compositional shift is perhaps the most striking feature (Chart 1). Since 1980, gross bond issuance by the emerging markets has grown at an annual average rate of 25 per cent. The annual average growth rate of syndicated lending to emerging markets over the same period is under six per cent. Since 1990, the corresponding growth rates are 37 per cent for bonds and 17 per cent for loans. On World Bank numbers, the stock of emerging market bonds stood at US\$13 billion in 1980, compared with a stock of medium and long-term lending to the emerging markets of almost US\$200 billion at the time. By end-1998, the corresponding stocks were US\$445 billion and US\$556 billion respectively. In both stock and flow terms, bonds have reached near parity with lending.

**Chart 1:**  
**Gross capital flows to emerging countries**



Sources: Capital Data and World Bank.

With this shift towards bond debt, there has been a change in the nature of the international creditor-debtor relationship. During the 1980s, lending syndicates ensured a degree of pre-crisis co-ordination among lenders. Post-crisis, the debt work-out procedures of the London Club ensured co-ordination among creditors. This structure provided both the practical apparatus and the behavioural incentives for creditors to seek co-operative solutions to crisis problems, actual and incipient<sup>3</sup>.

With the growth in bonds, in particular in the 1990s, international creditors have become more atomised

and dispersed. For bonds, there is neither the practical apparatus nor the disciplining device of a lending syndicate or the London Club to enforce co-operative solutions. In their place, non-co-operative solutions to creditor-debtor problems have become more commonplace, pre and post-crisis. The experience of the creditor committee set up to negotiate on defaulted Russian GKO's is a good recent example<sup>4</sup>.

A similar, if less pronounced, shift in financing towards portfolio equity flows has also occurred during the 1990s. Though these flows remain small as a proportion of total gross flows (Chart 1), they have risen significantly. Equity poses none of the work-out problems of debt. Equity investors may, however, operate on shorter investment horizons than syndicated lenders at crisis time, perhaps because they rank after debt-holders in the event of liquidation. The scope for co-ordination of their actions is limited. So it is reasonable to suppose that the investor base of the emerging markets may have become more fleet-of-foot over time and that explicit co-ordination among creditors is more limited now than in the past.

There are some countervailing trends. The most important has been the growth in foreign direct investment (FDI) since the 1980s. On World Bank data, net FDI inflows to low and middle income countries rose from around US\$4.4 billion per annum in 1980, to over US\$160 billion by 1997 (Chart 1). These flows have a specifically medium-term orientation.

(ii) *Maturity shifts*

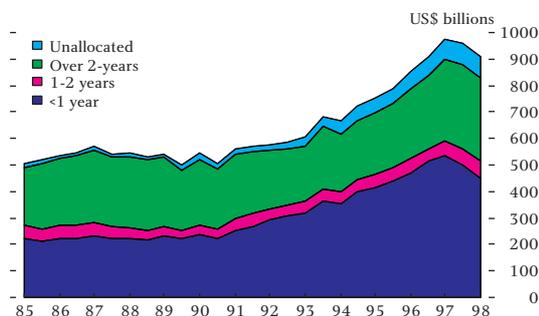
Within bank lending, there is evidence of a shift towards shorter maturity loans. The average maturity of gross syndicated lending flows to the emerging markets has fallen from 6.8 years in 1980 to 4.4 years by 1998. BIS data on bank lending to the emerging economies tell a similar tale. Loans with a maturity of less than one year accounted for more than three-quarters of the US\$400 billion rise in BIS bank lending to the emerging markets between 1985 and 1998 (Chart 2). As a result, the share of

<sup>3</sup>: Though clearly lending syndicates were also exposed to free-rider problems.

<sup>4</sup>: See Yianni (1999) for a discussion of the changing nature of debt contracts and their influence on restructurings. The 1990s do not mark an entirely new era in international debt contracts. Bonded debt dominated international lending for much of this century prior to the second world war. Over earlier periods, however, the creditor co-ordination problem was perhaps less serious than today. The pool of investors was smaller and so creditors were easier to catalyse. Post-crisis, committees developed to co-ordinate the actions of bondholders - for example, in the United Kingdom, the Council of Foreign Bondholders (set up in the 1860s), and in the United States, the Foreign Bondholders Protective Council (set up in the 1930s).

short-maturity (one year or less) loans in total BIS lending to the emerging economies rose from around a third in 1985 to around two-thirds by end-1998.

**Chart 2:**  
**Bank emerging market assets by maturity**

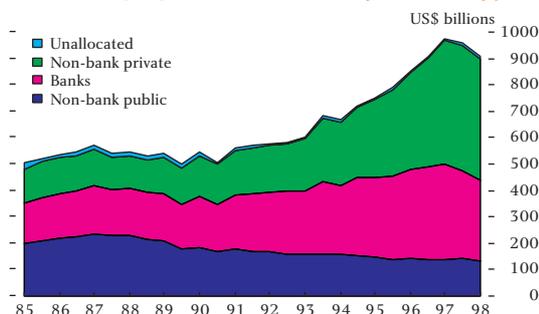


Source: BIS.

*(iii) Sectoral shifts*

As Chart 3 illustrates, the sectoral composition of bank lending has changed significantly since 1985. Public sector borrowing by emerging market governments has fallen in nominal terms over this period. The rise in aggregate emerging market borrowing is entirely accounted for by banks and in particular non-bank corporates. This too has a bearing on the creditor-debtor relationship. Pre-crisis, the pool of both creditors and debtors is likely to have become more diffuse and so less cohesive. Post-crisis, there is no well-established debt work-out procedure for private creditor-private debtor transactions, analogous to the Paris Club (for public-public sector transactions) or London Club (for public-private sector transactions), if domestic bankruptcy law is not up to the task<sup>5</sup>.

**Chart 3:**  
**Bank emerging market assets by debtor type**



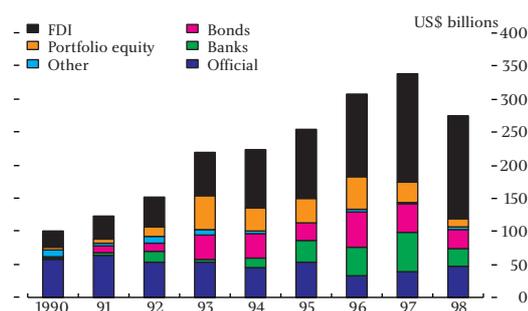
Source: BIS.

These trends seem to have had two related side-effects. First, they have increased the scope for

non-co-operative creditor grab-races – or ‘country runs’ – as private funds are withdrawn rapidly. Second, these country runs have added to the potential burden placed on the official sector, as the private sector will typically be first out of the door.

The pattern of capital flows to the emerging markets following the Asian crisis is ample evidence of both these phenomena (Charts 4a and 4b). Medium-term

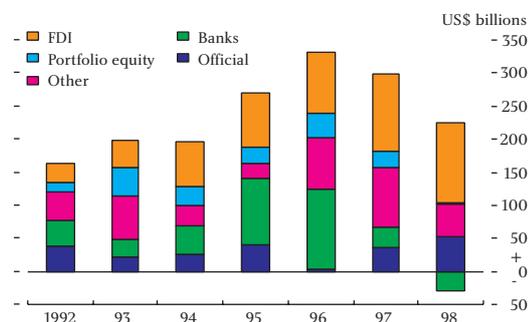
**Chart 4a:**  
**Net medium and long-term capital flows to emerging countries**



Source: World Bank.

bank lending hardly altered following the crisis. Nor did FDI. All of the reversal in capital flow was accounted for by short-run bank lending and portfolio (bond and equity) investment. The ‘run’ occurred through these instruments. If they continue to grow in importance as they have since the 1980s, the scope for ‘runs’ may rise further. In that event, involving the private sector will become even more important – but also potentially more complex.

**Chart 4b:**  
**Net capital flows to emerging countries**



Source: Institute of International Finance.

**(c) Creditor-debtor incentives**

One role of public financial policy is to ensure the right incentives exist for both the providers of capital

<sup>5</sup>: As, recently, has often been found to be the case in the crisis countries – for example, in south-east Asia and Russia.

(the official and private sectors) and the recipients of it (the emerging markets). A failure to align correctly creditor and debtor incentives will generate a welfare cost or 'burden'. But how do we measure the welfare 'burden' of crisis?

### The welfare cost of crisis

#### (a) A model of crisis

To fix ideas and evaluate welfare, it is useful to sketch a model of crisis. There is no consensus within the literature on the correct model of liquidity crisis. First-generation models, such as Krugman (1979) and Flood and Garber (1984), emphasise the role of fundamentals in triggering crisis, such as a country's level of foreign currency reserves. Second-generation models, such as Obstfeld (1994), highlight instead the important role of investor's beliefs. Pessimistic expectations can become both self-generating and self-fulfilling.

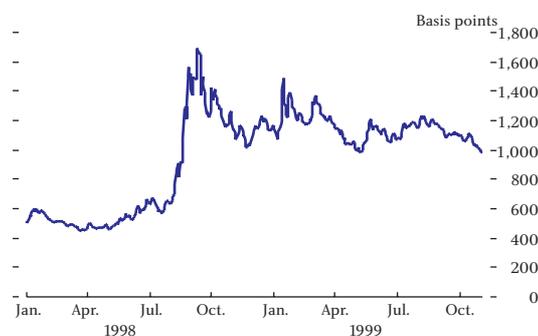
Recent crises have some of the characteristics of first-generation models. Weak fundamentals clearly contributed to the problems in south-east Asia and in Russia: on the macro side, because of inappropriate exchange rate and fiscal policies; and on the micro side, because of failures of banking regulation and poor legal structures and corporate governance.

Recent crises also appear, however, to have some of the characteristics of second-generation models (Krugman (1999), Fischer (1999)). One example would be the sharp turnaround in capital flows – especially short-term banking flows – to Asia in 1997 and 1998. In terms of severity if not direction, this shift in quantities of capital was out of line with the pre-crisis pattern of fundamentals in the affected countries.

A second example would be the spikiness in emerging market countries' dollar borrowing costs – instabilities in financial prices rather than quantities. Again, in terms of size if not direction, these spikes seem to have been out of kilter with observed movements in fundamentals in the countries concerned. To take an example, J P Morgan's EMBI index of dollar bond spreads rose from around 600 basis points to around 1600 basis points between mid-July and mid-September last year (Chart 5). Assuming a recovery rate on defaulted debt of 50 per cent, this would imply a more than

doubling in lifetime default probabilities on emerging market bonds from 28 per cent to around 60 per cent<sup>6</sup>. It is difficult to believe that such a rise in default probabilities could plausibly be explained by shifts in borrowers' fundamentals over this three-month period.

Chart 5:  
J P Morgan EMBI+ spread



Source: J P Morgan.

A third example would be the virulent contagion exhibited across emerging markets at times of stress, for example following last year's Russian crisis. Correlations among emerging equity markets rose from 0.1 in July to 0.6 by September. Often, these spillovers seem to have been out of line with fundamentals-based – trade and capital account – links between the countries concerned. Why, for example, did the Russian shock initially drive down Asian equity markets by over six per cent, when trade and banking links between the two blocs are small?

Chang and Velasco (1998) develop a formal model of the second-generation type. It generates 'country runs'. The mechanism is entirely analogous to a Diamond and Dybvig (1983) 'bank run'. The risk facing an individual creditor depends in part on the true creditworthiness of the borrower. Importantly, however, it also depends on the behaviour of other creditors. If one set of creditors run, and the debtor is liquidity-constrained, this imposes externalities on all other creditors in the event of them requiring repayment. In a non-co-operative creditor game, the individual risk facing a creditor is greater than the aggregate risk attaching to the borrower. Creditors require compensation for that strategic risk. This will lead them to over-price loans to a country relative to its true credit risk, the more so the greater their fear of a run by other creditors.

<sup>6</sup> We assume the bonds are three-year maturity and that the risk-free rate is six per cent. These default probabilities will be an overstatement if some of the rise in spreads reflected increased liquidity risk or risk aversion rather than default risk.

By introducing incomplete information between creditors, Morris and Shin (1998) (1999) are able to examine the welfare implications of country runs still further<sup>7</sup>. The basic story is straightforward. Investors lend money to the borrower, an emerging market economy. Their decision each period is whether to keep their funds in the risky foreign asset or instead shift into a safe asset. Their decision is based on two things.

First, what is the outturn for fundamentals that period,  $\theta$  – say, a productivity shock in the country? This fundamental measures aggregate country risk. So the greater aggregate country risk (the lower  $\theta$ ), the greater the probability of default and so the greater the incentive to flee.

Second, are other creditors likely to stay or flee, given that in the model each creditor receives a noisy and somewhat different signal on fundamentals? The noisiness of the fundamentals signal means that each individual investor cannot be certain of the actions of other creditors. But if other creditors flee while they stay, there is a greater risk of the borrower defaulting. In other words, the behaviour of other creditors exposes each creditor to idiosyncratic risk, in addition to aggregate country risk.

In this model, the borrowing country requires foreign funds to produce goods and generate income. The flow of income that the borrower generates, and which is used to repay lenders, is stochastic. It depends on the outcome for fundamentals – productivity shocks. The borrower's output and income also depends, however, on the number of foreign investors who flee. Too great an exodus of foreign money makes the production process unviable and the borrower unable to repay its debts. In that event, the production process is liquidated and the country defaults. Otherwise value-enhancing projects are shelved, with an attendant value and welfare loss.

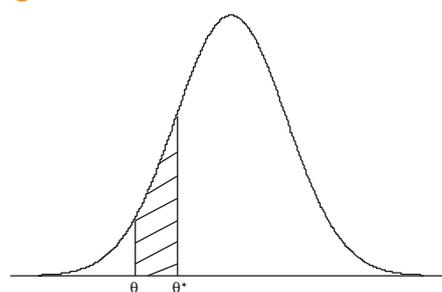
In the absence of some co-ordinating device, the outcome of the resulting strategic game among creditors is a non-co-operative Nash equilibrium. For a given weak state of fundamentals and fearing others fleeing, creditors flee themselves: creditors' expectations become self-generating. The creditor run

in turn increases the chances of default by the borrower, given their dependence on foreign funds: creditors' expectations become self-fulfilling too. The borrower may be driven to default even though, had all creditors chosen to stay, the borrower would have been able to repay them, given fundamentals.

The comparative statics of this model are interesting. The worse the shock to fundamentals, and the greater the proportion of investors who flee, the greater the likelihood that the borrower will default. In this sense, models of this type are really a hybrid of first and second-generation models. Fundamentals and beliefs interact. Within some range of fundamentals, the economy operates as with first-generation models, guided by fundamentals. But the weaker the fundamentals, the more fragile the economy becomes, in the sense that it takes fewer creditors to jump ship to push the economy into default. Weak fundamentals make for expectations of vulnerability. At some trigger point for fundamentals, a run takes hold as creditors lose faith and the economy is driven to default.

Figure 1 illustrates this story<sup>8</sup>. It shows the (assumed normal) distribution of outcomes for fundamentals,  $\theta$ . The value  $\theta_-$  denotes the lower bound on fundamentals in the co-operative game: it is the value of fundamentals at which the country is unable to repay even if all creditors stay. Below  $\theta_-$ , the country faces a solvency crisis. The value  $\theta^*$  denotes the trigger value of fundamentals at which creditors are sufficiently nervous that they flee, a run develops, and the country is driven to default. In other words, it defines the point at which a liquidity crisis is triggered. The welfare cost of crisis is the shaded area between  $\{\theta_-, \theta^*\}$ . It measures the area over which a liquidity crisis drives the country to a position of default. It is the cost of value-enhancing investments being shelved or liquidated.

Figure 1



7: See also Chui, Gai and Haldane (1999) and Morris and Shin in this issue.

8: Taken from Chui, Gai and Haldane (op cit).

In a model of this type, these welfare costs of crisis derive from two sets of behavioural interactions. First, they derive from the relationship *between creditors and debtors* in aggregate, as the marginal cost of loans is raised as creditors run for the exits. Second, they derive from the relationship among individual creditors, as they impose externalities on one another as they run. These two behavioural interactions are usefully separated, for they have quite different public policy implications. Both sets of relationships, however, derive from the same underlying co-ordination problem: atomistic creditors cannot unilaterally enforce a co-operative solution to the crisis game, even though it may be multilaterally advantageous for them to do so.

### (b) Welfare costs: creditor-debtor relationship

Country runs raise the shadow cost of external funds to borrowing countries above their cost based on a country's fundamentals-based creditworthiness, as the aggregate and idiosyncratic credit risks faced by the creditor get compounded. These costs are felt directly by the debtor country, through over-priced external funding. Borrowers pay a 'non-co-operation premium' reflecting idiosyncratic creditor risk, on top of other premia<sup>9</sup>.

In the following section some direct evidence on the extent of this market over-pricing is presented. But the indirect effects of over-pricing were all too evident in Asia following the crises in 1997. An excessive – possibly infinite – shadow cost of external funds forces the debtor country's current account into rapid reversal. In Asia, these current account reversals amounted to US\$12.2 billion in Indonesia (almost eight per cent of GDP) comparing 1998 with 1996; US\$63 billion in Korea (16.8 per cent of GDP); US\$16.7 billion in Malaysia (21.5 per cent of GDP); and US\$29 billion in Thailand (20 per cent of GDP). These are huge adjustments.

To engineer external adjustment on that scale, the exchange rate needs to overshoot and/or domestic absorption is forced to contract sharply. Again, the Asian crisis provides ample evidence of both phenomena. In Indonesia, the exchange rate fell by 60 per cent during 1997 and output contracted by 14 per cent in 1998. The equivalent numbers are 47 per cent and 5.5 per cent in Korea, 35 per cent and 6.2 per cent in Malaysia, and 45 per cent and

eight per cent in Thailand. These first-order costs resulted, at least in part, from the over-pricing of external funds.

### (c) Welfare costs: creditor-creditor relationship

By running, creditors impose externalities on one another. In addition to the aggregate welfare loss, this behaviour also generates a potential *distributional* cost, as fleet-of-foot creditors benefit at the expense of others. The 'others' in this case are likely to include the public sector, who do not have the same incentives or ability to run as private sector creditors.

Table 1 illustrates the potential extent of the distributional distortion for the Asian crisis countries between 1995-98, using figures from the IIF. The rise in capital flows to the Asian countries between 1995-96 was entirely accounted for by commercial banks. Between 1996-97, however, the US\$66 billion fall in capital inflows was more than accounted for by these same institutions. IIF inflows partially insulated the Asian countries from the full extent of this private capital reversal, with a rise in net inflows of over US\$24 billion. At least in an arithmetic sense, public sector money was simply substituting for fleeing private sector money. The pattern is similar between 1997-98, with private banks accounting for over half of the US\$70 billion net contraction in external funds to the emerging markets. This is not of course to say that the private sector in aggregate suffered no losses from recent crises. The IIF estimate these mark-to-market losses to have been US\$350 billion since 1997 (US\$240 billion by equity investors, US\$60 billion by international banks and US\$50 billion by other private foreign creditors). But the distribution of these gains and losses across investors has clearly been uneven.

**Table 1: Change in net external financing of the Asian countries (US\$ billions)**

	1995- 1996	1996- 1997	1997- 1998*
Total external flows	29.2	- 66.0	-72.1
o/w commercial banks	31.5	-90.8	-36.4
o/w IFIs	1.0	24.4	-2.8

\* Estimate.  
Source: Institute for International Finance.

<sup>9</sup> Morris and Shin (1999) discuss and simulate the effects of creditor non-co-operation on the price of country debt.

## What role for public policy?

### (a) Welfare effects of IMF insurance: concepts

What can public policy do to cushion the welfare costs associated with these two sets of relationships? And how successful has it been to date? The focus of IMF policy intervention in recent years has been the provision of loans, with policy conditionality attached. One way to think about official sector loans is as an insurance contract. In essence, the IMF is writing insurance against country runs. As with any insurance contract, the insurer is seeking a balance between efficient risk-sharing on the one hand, and averting moral hazard on the other. Under-priced insurance leaves the insurer bearing too much of the risk (too much moral hazard); while over-priced insurance leaves the insured party too exposed (too little risk-sharing).

A number of outside commentators have emphasised the moral hazard problems of recent IMF intervention. Any insurance contract will embody some moral hazard risk. The question is: how much is too much? Other things equal, too much risk bearing by the official sector, and too little by the private sector, would impose a welfare cost – a moral hazard cost. How is this welfare cost best measured?

Taking the quantum of IMF lending is clearly an overstatement. The IMF provides loans not gifts. In the vast majority of cases, these loans are repaid on time and with interest. The outstanding arrears of the IMF stood at around US\$3 billion in April of this year, only around 3.5 per cent of the IMF's loan book. IMF loans only impose a deadweight welfare cost to the extent that the interest rate charged on them understates the true credit risk of the borrowing country.

Even this is a potential over-statement of the true marginal welfare burden of IMF insurance. Under-priced public sector insurance may be net welfare-enhancing if it is guarding against market over-pricing, which results from co-ordination problems. This follows simply from second-best reasoning. If the IMF can assess objectively a country's creditworthiness, independently of the actions of other creditors, it can offer fairer-priced insurance; it can act as an 'impartial insurer'.

So the net marginal welfare burden of IMF intervention is the balance of two welfare wedges: one representing the marginal cost of over-priced market insurance; the other the marginal cost of under-priced public sector insurance. How large is the market over-pricing premium? How well has IMF insurance guarded against this welfare friction? And has it done so at the expense of introducing a welfare burden of its own? These are empirical questions.

### (b) Welfare effects of IMF insurance: measurement

To calculate these welfare costs and benefits of IMF intervention, three marginal costs are needed: (a) the cost of market loans during crisis; (b) the cost of funds given a country's 'true' creditworthiness; and (c) the cost of IMF loans. The marginal welfare cost of market over-pricing during crisis, given a country's risk, is measured by (a)-(b); while the welfare cost of IMF under-pricing given a country's risk is given by (b)-(c). These marginal welfare costs and benefits can be evaluated for a selection of recent IMF programme countries.

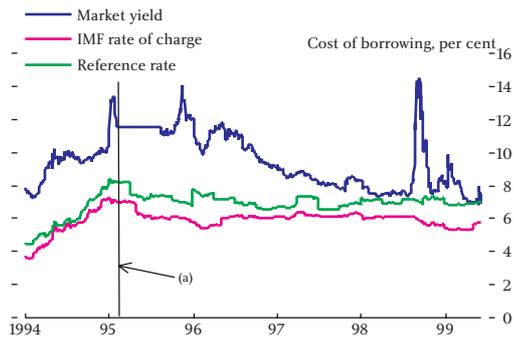
Measuring these marginal costs in the real world is far from straightforward. They are genuine shadow costs. We need also to control for, among other things, maturity and credit risk. The direct cost of IMF dollar loans is measured by three-month US Libor, scaled upwards by an IMF rate of charge<sup>10</sup>. This is a (potentially significantly) downwards biased estimate of the true shadow cost of IMF funds. For example, it takes no account of the indirect costs of IMF programme conditionality, which may be non-trivial. It takes no account of the IMF's preferred creditor status. And it also takes no account of the fact that IMF borrowing is in practice rationed by quantity rather than price. The average term of an IMF facility is around four years.

The 'true' shadow cost of funds for a country of a given credit class is, if anything, even harder to measure. There is no perfect way of controlling for (sometimes unobservable) movements in fundamentals in a country. We use a proxy, namely the yield on syndicated borrowing by countries with the same credit rating as the IMF programme country<sup>11</sup>. This measure ought in principle to price the aggregate

<sup>10</sup>: This scaling factor has on average equalled 1.08 over the past five years. The cost of IMF borrowing is usually expressed in SDR terms. We take the dollar component for comparability with other dollar borrowing costs.

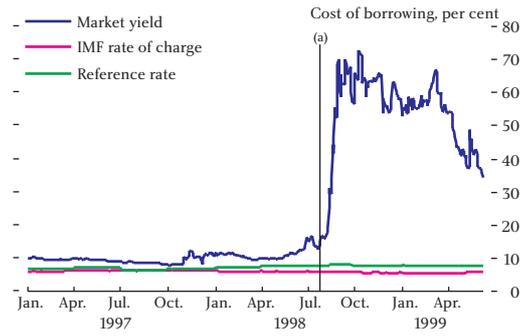
<sup>11</sup>: The data are from Bondware. They are quoted as a spread over US dollar Libor. To arrive at a yield, we add on three-month dollar Libor, as syndicated lending rates are typically re-fixed at three or six-month intervals.

**Chart 6:**  
**Mexico**



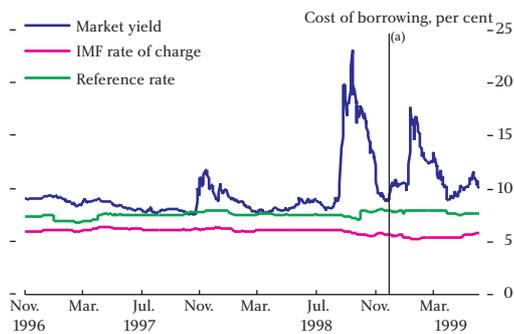
Sources: IMF, Primark Datastream and Standard & Poor's.  
(a) IMF programme, 1 February 1995.

**Chart 9:**  
**Russia**



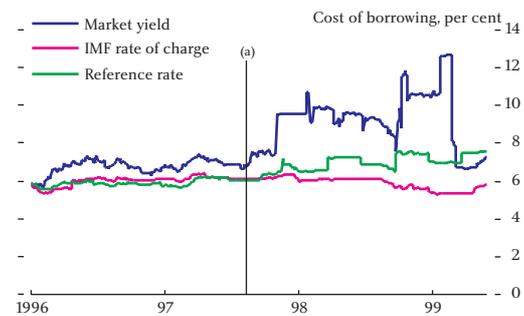
Sources: IMF, Primark Datastream and Standard & Poor's.  
(a) IMF programme, 20 July 1998.

**Chart 7:**  
**Brazil**



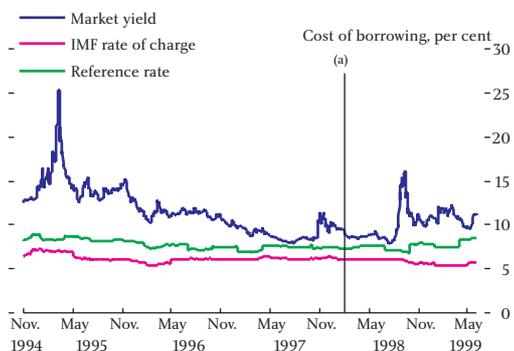
Sources: IMF, Primark Datastream & Standard and Poor's.  
(a) IMF programme, 2 December 1998.

**Chart 10:**  
**Thailand**



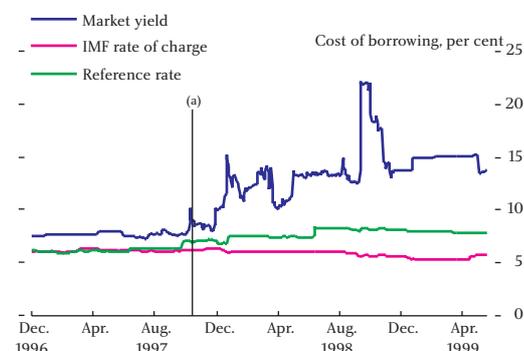
Sources: IMF, Primark Datastream and Standard & Poor's.  
(a) IMF programme, 20 August 1997.

**Chart 8:**  
**Argentina**



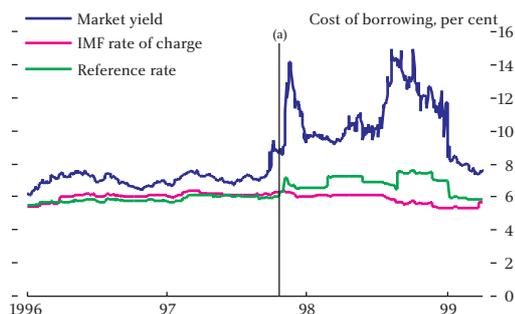
Sources: IMF, Primark Datastream and Standard & Poor's.  
(a) IMF programme, 4 February 1998.

**Chart 11:**  
**Indonesia**



Sources: IMF, Primark Datastream and Standard & Poor's.  
(a) IMF programme, 5 November 1997.

**Chart 12:**  
**South Korea**



Sources: IMF, Primark Datastream and Standard & Poor's.

(a) IMF programme, 4 December 1997.

credit risk of the borrowing country. It will fail to do so if a country's credit rating is for some reason biased. The average maturity of syndicated lending in our sample is around four years, and so bears comparison with the term of IMF lending.

Finally, for the shadow cost of market borrowing, the secondary market yield on the programme country's dollar bonds is used<sup>12</sup>. The scope for downward bias in this market price is significant. During crisis, the marginal cost of funds for a country may be much higher, possibly infinite. The secondary market yield, measured at the time a programme is approved, will also naturally embody expectations of the IMF programme itself, tending to further lower yields.

Notwithstanding these caveats, Charts 6-12 show the three interest rates for a selection of seven IMF programme countries: Brazil, Mexico, Argentina, Russia, Indonesia, Thailand and Korea. Also shown is the date these countries' programmes were approved by the IMF board<sup>13</sup>. Together, these seven countries comprised about 70 per cent of the IMF's loan book at end-1998. Several points emerge:

- For all seven countries, the ranking of the interest rates is as might be expected: the market yield is typically highest and the IMF lending rate typically lowest, with the syndicated lending rate for countries with the same credit rating (the 'reference' rate) holding an intermediate position.

- Looking first at the relationship between the market and reference rates, prior to crisis these tend to move broadly in line. The market rate is typically higher. But roughly speaking, this evidence is consistent with markets pricing each country's credit risk broadly correctly in normal times.
- Yields decouple sharply prior to IMF programme approval in some countries, with market yields spiking upwards. For example, these spikes amounted to around 300 basis points in Mexico and 200 basis points in Indonesia (see Charts 6 and 11). In Korea, the decoupling of yields took place slightly after the programme, rising by some 800 basis points.
- The yield difference between the market and reference interest rates for the seven countries at the time of IMF programme approval is shown in Table 2. This differential varies from 80 basis points in Thailand to almost 600 basis points in Russia, with a mean of around 240 basis points. Assuming the reference rate continues to control correctly for country risk, this market 'over-pricing' differential is non-trivial according to our estimates. Non-co-ordination premia appear to have been significant in practice.
- This premium persists after IMF programme approval. Indeed, the differential typically widens further in the immediate aftermath of a programme – for example, in Mexico, Korea, Indonesia and Brazil. This suggests that, by themselves, IMF programmes have tended not to forestall runs. The non-co-ordination premium remains significant after IMF intervention.
- An alternative explanation for the non-co-ordination premium at the time of IMF programme approval is that credit rating agencies are slow moving and fail to capture high-frequency movements in a country's fundamentals. If that were true, the reference rate would be failing to control accurately for aggregate country risk. Certainly, there were credit rating downgrades after the crises in some of the countries in Charts 6-12.

<sup>12</sup>: The residual maturity of these bonds is chosen to be around four years, for consistency with the IMF and syndicated loan rates; though in some cases this was not possible.

<sup>13</sup>: An alternative would have been to date the programme to the first IMF Letter of Intent.

- But this is not decisive evidence against the over-pricing hypothesis, for three reasons. First, the effects of the over-pricing may themselves have prompted the credit rating downgrade: expectations are, after all, self-fulfilling in the model of crisis sketched earlier. Second, even if the reference rate is adjusted so that it reflects the eventual credit rating of a country (after downgrades), rather than the one prevailing at the time, an over-pricing differential (albeit a slightly smaller one) still persists. And third, over the longer run, the market-reference rate differential tends to converge back to pre-crisis levels – for example, in Mexico, Thailand, Korea and Argentina. Importantly, this convergence occurs not because of a rise in the reference rate but because of a fall in the market rate. This is consistent with markets over-pricing country risk at crisis time, but reaching a more sober assessment after a period of reflection.
- Turning to the differential between the IMF and the reference interest rates, this relationship is reasonably close, pre, during and post-crisis. The spread between the rates has tended to widen post-crisis, sometimes reflecting credit rating downgrades of the country – for example, in Korea – which raise the reference rate.
- At the time of programme approval, the wedge between the IMF and reference rates varies between around zero in Korea and Thailand and 227 basis points in Brazil, with a mean of around 100 basis points (Table 2)<sup>14</sup>. This suggests some IMF ‘under-pricing’, relative to the country’s credit standing. It is interesting to note, however, that the extent of this IMF ‘under-pricing’ is less than the measured degree of market ‘over-pricing’.

### (c) Welfare implications

The potential for bias in these estimates is clearly substantial. But taken at face value, three conclusions suggest themselves.

First, crises or country runs do instigate periods of market ‘over-pricing’ of country credit risk on our measures, with its attendant welfare costs. IMF loans

can potentially help offset that over-pricing problem, by serving as an insurance fund. Moreover, even if this IMF insurance were to some degree under-priced, second-best reasoning suggests it may still have been net welfare-enhancing.

**Table 2: Interest rate differentials at the time of IMF programme approval (basis points)**

	Market – Reference Rate Differential	Reference – IMF Rate Differential
Mexico	327	117
Thailand	80	-8
Korea	218	-1
Argentina	158	130
Indonesia	145	86
Russia	583	139
Brazil	152	227

Second, the under-pricing of IMF insurance on our measures may be more apparent than real. The measures of IMF funding costs take no account of the indirect costs of IMF loans, namely policy conditionality. Nor, importantly, do they take account of the fact that IMF loans are rationed by quantity rather than price. Some have argued that the balance between official financing and country adjustment was actually skewed too heavily towards the latter in the Asian crisis countries<sup>15</sup>. Taken together, this suggests that the *debtor* moral hazard problems potentially associated with IMF intervention may not, in the recent past, have been too great.

But third, as Charts 6-12 illustrate, the market over-pricing problem does not appear to be resolved following the announcement of an IMF programme. Indeed, more often yields have risen further, suggesting a continuation of the run<sup>16</sup>. But if IMF loans do not forestall country runs, the aggregate and distributional costs of crisis are still felt. Too much of the insurance risk is borne by the official sector as its financing substitutes for that of the fleeing private sector. A *creditor* moral hazard problem arises.

<sup>14</sup>: The negative differentials for Korea and Thailand suggest that, ahead of crisis, these countries could borrow on finer terms than the average country in the syndicated lending pool with the same credit rating.

<sup>15</sup>: See, for example, Stiglitz (1998).

<sup>16</sup>: The evidence in Brealey (1999) also suggests no sharp recovery in equity prices following the announcement of an IMF programme in a selection of countries.

Where does this leave us? On the one hand, IMF intervention appears well placed to offset the costs of over-priced external funds. The IMF is in a position to make loans based on an objective assessment of country risk, thereby mitigating the welfare costs of frictions in market credit provision. It is unlikely to have generated significant *debtor moral hazard*.

On the other hand, IMF programmes appear to have done less well in forestalling runs and in ensuring an equitable burden of the insurance risk. Indeed, by cross-subsidising private sector creditors as they ran for the door, IMF policies may have risked generating *creditor moral hazard*. This is perhaps the key driver behind recent official sector attempts to involve the private sector.

This problem is largely a reflection of the limitations of the tools the IMF has at its disposal. IMF loans can provide insurance cover and can thereby offset the effects of the markets over-pricing their cover. This is the IMF's traditional role as lender. But loans cannot by themselves ensure co-ordination among creditors. Their catalytic role is uncertain and limited. And the changing nature of the international lending relationship may have further eroded this catalytic role.

This has prompted a search for other public policy means of achieving creditor co-ordination. In the language used by Fischer (1999), this may in future call for the IMF to play the role of 'crisis manager' rather than traditional 'lender'. Indeed, historically, this is often the role central banks have played in a domestic lender of last resort context (Giannini (1998)). Any institution acting in this role needs ideally to achieve two goals. First, it needs to 'bind in' creditors – ensure a co-operative solution to the crisis game – to guard against the aggregate welfare cost of a country run. And second, it needs to 'bail in' creditors – ensuring a comparable risk is borne by official and private creditors – to guard against the distributional cost of a country run. We evaluate below several public policy measures on those criteria.

### **Mechanisms to involve the private sector**

The G7 Statement in June outlined a set of measures for helping ensure private sector involvement in crisis

resolution. These included introducing collective action clauses into sovereign bond contracts; improving co-ordination and dialogue between creditors and debtors; introducing structured notes which offer countries repayments insurance; and payments standstills<sup>17</sup>. Analytically, these ideas can be grouped under three headings: (a) contractual solutions; (b) co-ordinated solutions; and (c) involuntary solutions.

#### **(a) Contractual solutions**

##### *(i) Collective action clauses*

International bonds have grown hugely in importance over the past twenty years. To date, they have not been covered by formal debt restructurings through the Paris and London Clubs. Recent announcements by the IMF and the Paris Club suggest that international bonds may be embraced in the course of future debt restructurings. Wider restructuring of this type would satisfy the 'bailing in' criteria, by ensuring official and private creditors are treated comparably in the terms they are offered. But there is a practical difficulty involved in 'binding in' bondholders. Bondholders are dispersed and the bonds themselves often held in bearer form. Because investors are typically anonymous, the scope for creditor co-ordination is limited. There is also no established debt work-out procedure, as under the London or Paris Clubs.

Collective action clauses (CACs) in bond contracts are meant to address some of these problems<sup>18</sup>. In effect, CACs offer an *ex post* co-ordination mechanism for bondholders. The clauses typically take one of three forms: collective representation clauses, majority action clauses, and sharing clauses, the first two of which are generally felt to be the most useful. Their purpose is to facilitate the process of binding creditors together: for example, by limiting the chances of litigious creditors attaching assets and by containing provisions for bondholder meetings. In these respects, CACs meet the 'binding in' criterion. They facilitate creditor co-ordination for a particular class of creditor, while still leaving the ultimate choice on a course of action to creditors.

<sup>17</sup>: There are many others, discussed in Drage and Mann (1999).

<sup>18</sup>: The G10 Report on 'The Resolution of Sovereign Liquidity Crises' (the Rey Report), published in 1996, recommended the inclusion of collective action clauses in sovereign bond contracts. This followed the recommendations in Eichengreen and Portes (1995).

International bonds issued under UK law already typically include CACs. These comprise just under 50 per cent of the stock of emerging market eurobonds<sup>19</sup>. Most of the United Kingdom's sovereign foreign currency bonds include CACs. Bonds issued under US law tend not to include CACs, however. There are a number of outstanding practical questions on the inclusion of CACs in bond contracts. For example, would the G7 need to introduce CACs into their own debt as a demonstration effect? Which sovereign debt instruments would CACs be included within? Is there a need for a debt work-out club for bonds? These and other practical issues are currently being debated within the official community and with the private sector.

One argument against the widespread inclusion of CACs is that they may encourage countries to pursue bond default sooner or more frequently. If CACs increased the perceived probability of default, other things being equal they would tend to raise the default premium on emerging market debt and hence its cost<sup>20</sup>. But other things are not likely to be equal. If CACs increase the expected recovery value on defaulted debt – for example, by insuring against a disorderly grab-race for assets – then CACs could actually lower the cost of sovereign bond finance. Which of these opposing factors dominates is an empirical question.

Take the example of a one-year zero-coupon bond issued by a country. Assume that the probability of the country defaulting on its debt (without CACs) during the course of the year is 30 per cent and that the expected recovery value in that event is zero. Other things being equal and assuming risk-neutrality, the debt will have a spread over safe assets of 45 percentage points – roughly the spread on Russian eurobonds at the height of last year's crisis<sup>21</sup>. Assume now that the same duration bond is priced with CACs included, and that the CACs are perceived to raise the default probability by 10 per cent to 40 per cent. If, by guarding against disorderliness, CACs raise the expected recovery value following default from zero to 25 per cent, then the cost of with-CACs debt will not rise. This might arise

because CACs shorten the period between default and disbursement, thereby boosting the NPV of the recovered sum. If the boost to this expected recovery value were greater than 25 per cent, debt would be cheaper for issuers with CACs included.

Although real-world comparisons are problematic<sup>22</sup>, it is informative to look at the yield spreads (over US Treasuries) on pairs of bonds of similar duration issued by the same sovereign, but where one bond includes CACs and the other does not. Looking across a selection of countries with bonds of these types – for example, in Argentina, China, Hungary, the Philippines, Poland and Turkey – indicates no systematic pattern of yield difference between the two types of bond. If a CAC premium does indeed exist in market prices, it does not appear from this evidence to be prohibitively expensive<sup>23</sup>.

Clearly, the inclusion of CACs in sovereign bond contracts is only a small step towards achieving a greater degree of creditor co-ordination. They affect only a particular type of debt, albeit one which is growing in importance. And CACs also would not remove the potential for grab-races by creditors – for example, if vulture funds purchased a majority of the bonds or if the majority voting threshold were set too high. These (possibly small) gains need to be set against the potential practical costs.

#### (ii) *State-contingent debt*

More elaborate forms of financial contracting by a debtor country are clearly possible. These are, in effect, self-insurance schemes. For example, private credit facilities provide a hedge against liquidity risk for a country. At the same time, they 'bind in' and hence 'bail in', by contract, the private sector. Some emerging markets, notably Argentina and Mexico, have already made use of such facilities. Like any form of insurance, private credit lines are not costless for the borrower; there is an insurance premium (commitment fee) to pay. Nor are they foolproof. Dynamic hedging by the private sector – cutting other loan exposures to the country if the line is drawn – may mitigate the insurance benefits of

19: If Brady bonds are included, the proportion is nearer one quarter.

20: This argument has been put by, for example, the IIF (1999).

21: Assuming a risk-free rate of 5%

22: For example, because of liquidity premia and duration differences.

23: As market awareness of the CAC issue grows, this situation could alter.

private contingent credit lines (IMF (1999)). But the Argentinian experience so far offers encouragement.

Turning to more sophisticated forms of financial contracting, there are a variety of contingencies to which debt repayments could potentially be linked. All debt is time-contingent and some is in addition state-contingent. The experience of some emerging markets over recent years is that they have issued debt contingent on outcomes which, when they arise, exaggerate rather than reduce repayments and liquidity problems. Debt instruments have offered the opposite of self-insurance. Some recent examples illustrate this:

- *Short-term debt.* This exposes a borrower to rollover risk, which may be substantial because of, for example, changing risk appetites. The shorter the debt, the greater the repayment risk potentially facing each individual investor – and hence the larger the mood swings in the first place. In this way, short debt is likely to create its own unstable dynamic, as rollover and repayment risks are compounded. A large and growing proportion of short-maturity debt has been a distinguishing feature of recent crises in Mexico, Korea, Russia and Brazil.
- *Foreign currency debt.* Unhedged foreign currency debt exposes a country to substantial repayment risk in the event of a sharp step devaluation: it raises refinancing costs at precisely the time income streams are likely to be depressed. In this way, foreign currency debt adds to the potential for country runs. Of course, when foreign currency

debt is also short-term in nature, this dynamic is amplified. Short-maturity dollar or dollar-indexed debt was a common feature of both the Mexican and Asian crises.

- *Floating rate debt.* This is debt indexed to short interest rates, to which risk the country is then exposed. Under a managed exchange rate regime, capital outflows add to the refinancing burden on borrowers both directly through quantities, and indirectly through the upward pressure on short-term interest rates and servicing costs. Around 70 per cent of Brazil's domestic debt was indexed to overnight rates at the time of their currency crisis earlier this year. Each percentage point rise in interest rates to damp pressure on the exchange rate added 0.5 per cent of GDP to debt servicing costs, thereby increasing the incentive to run.
- *Puttable debt.* Around US\$32 billion of emerging market bonds and loans have embedded puts in them, which give creditors the option to call for early debt repayment in 1999 or 2000<sup>24</sup>. This debt is most likely to be put, and the maturity of the debt thereby shortened, following adverse shocks. As this is precisely the time a country's repayments capacity is likely to be constrained, puttable debt is likely to exacerbate creditor runs.

The reason why the emerging markets have issued these sorts of debt instrument is to lower funding costs. Borrowing countries take on the insurance risk themselves and thereby do not need to offer investors

### The insurance benefits of state-contingent debt for emerging market countries

Assume that a country receives dollar income from export sales, some proportion of which come from oil and commodity exports ( $X$ , expressed as a percentage of GDP). These exports sell at price  $p$ . Both prices and quantities of commodity exports are determined on world markets. The country uses these dollar receipts to service its external dollar debt ( $K$ , expressed again as a percentage of GDP). External

debt comprises two components: a proportion  $(1 - \lambda)$  of plain-vanilla dollar borrowing, at a rate  $r_k$ ; and a proportion  $\lambda$  of external borrowing whose dollar coupon payments are indexed explicitly to oil/commodity prices, and which pay  $r_x$ . Both interest rates are set on international capital markets. Indexed-debt attracts a yield premium,  $\delta$ , which is the compensation investors require for bearing commodity price risk,  $r_x = r_k + \delta$ . Debt stock ( $K$ ) and debt composition ( $\lambda$ ) are choice variables for the borrowing country. These are all plausible assumptions for an emerging economy.

24: See the excellent discussion in IMF (1999).

The aim of the country is to minimise the (conditional expectation of the) variability of its net external financing requirements per period,  $N$ , where  $N = pX - [\lambda r_x + (1 - \lambda) r_k] K$ . The rationale for this (simplified) objective function could be that movements in a country's net external financing requirements induce costly adjustments in their expenditure and/or assets: for example, through a sharp adjustment in import demand; through needing to raise money quickly on the capital markets or from the IMF; or because of the need to adjust sharply the level of foreign exchange reserves. The problem for the country is then:

$$(1) \text{Min } E(N)^2 = (E(N))^2 + \sigma_N^2$$

where  $E$  is the expectations operator. Assume that  $X$  and  $K$  are roughly constant and that, for simplicity sake,  $\sigma_{r_k,p} = \sigma_{r_x,r_k} = 0$ . If the debt is perfectly indexed, we have  $\sigma_p^2 = \sigma_{r_x}^2$  and  $\sigma_{r_x,p} = \sigma_p^2$ . So the problem becomes:

$$(2) \text{Min } E(N)^2 = [E(pX - (\lambda \delta + r_k) K)]^2 + (X^2 + \lambda^2 K^2) \sigma_p^2 + (1-\lambda)^2 K^2 \sigma_{r_k}^2 - 2 \lambda K X \sigma_{r_x,p}$$

Equation (2) makes clear the trade-off involved in issuing indexed debt. It increases the mean cost, by an amount  $\lambda\delta$ , given by the first term in (2). But it also delivers an insurance (covariance) benefit, given by the last term in (2). By taking values of  $\{K, pX, \sigma_p^2, \sigma_{r_k}^2, \delta, r_k\}$  for a selection of countries and by varying  $\lambda$ , we can calibrate this trade-off.

Tables 1-3 evaluate the variability of net external financing costs (equation (2)) for eight emerging markets (Argentina, Brazil, Mexico, Venezuela, Indonesia, South Africa, Russia and Poland) and one developed country (the United States, as a counterfactual), for three assumed values of the indexed-debt yield premium  $\{\delta=0.01, 0.05, 0.1\}$ <sup>1</sup>. One

percentage point is taken as a lower bound on the indexed-debt premium and ten percentage points an upper bound. The first column shows the baseline case of no indexed debt,  $\lambda=0$ . The tables also show the change in the variability of external financing relative to the baseline.

The estimates suggest that, in general, issuing some amount of indexed debt is beneficial for most countries. For example, setting  $\{\delta=0.05, \lambda=0.5\}$ , so that half of all debt becomes commodity price indexed and the yield premium on this debt is five per cent, reduces the variability of net external financing by around 50 per cent in Russia, Argentina, Brazil and Mexico; by 30-40 per cent in Indonesia and Venezuela; and by 15-20 per cent in South Africa and Poland. The one outlier is the United States, where indexed debt tends to raise the variability of financing costs marginally. So for the emerging markets, the insurance benefit associated with indexed debt seems on this evidence to be significant. These benefits can be traced to the high commodity dependence of these countries in relation to GDP, coupled with the high variability of their dollar debt servicing costs.

Inefficiencies and illiquidity in the indexed-debt market, which raised the yield premium on the debt, would tend to offset these insurance benefits. In other words, when issuing indexed debt, countries face a cost-risk trade-off. Other things being equal, however, if state-contingent debt transfers risk from the debtor to an entity better able to bear this risk, a country will be able to reach a preferred point on this cost-risk trade-off. As the simulations show, the insurance benefit of indexed debt is reduced somewhat at values of  $\{\delta>0.05, \lambda>0.5\}$ . But the marginal effects are quite small. All in all, the insulation provided by issuing even modest amounts of indexed debt would on the face of it appear to be fairly significant.

<sup>1</sup> For the other parameters, we take  $K$  from Goldman Sachs' estimates of each country's external debt in relation to GDP at end-1998;  $pX$  from the UN International Trade Statistics Yearbook 1996, covering all commodity exports including oil;  $\sigma_p^2$  is the variance of monthly percentage changes in Goldman Sachs' commodity price index between January 1996 and May 1999, which is common for all countries; and  $r_k$  and  $\sigma_{r_k}^2$  are respectively the mean and variability of long dollar borrowing yields in each of the countries over the same period.

a premium for bearing it. But imprudent debt structures clearly add their own dynamic to the

Table 1	Variance of external financing					Change in variance			
	$\lambda =$					$\lambda =$			
	0	0.25	0.5	0.75	1	0.25	0.5	0.75	1
<i>Delta=0.01</i>									
<b>Country</b>									
Russia	0.065	0.041	0.033	0.041	0.065	-0.371	-0.495	-0.371	-0.002
Argentina	0.005	0.003	0.002	0.003	0.004	-0.366	-0.497	-0.394	-0.055
Brazil	0.009	0.006	0.005	0.006	0.009	-0.375	-0.500	-0.375	-0.001
Mexico	0.002	0.001	0.001	0.001	0.001	-0.296	-0.424	-0.383	-0.174
Indonesia	0.042	0.027	0.022	0.027	0.043	-0.357	-0.474	-0.352	0.010
South Africa	0.004	0.004	0.004	0.004	0.004	-0.039	-0.066	-0.083	-0.088
Venezuela	0.008	0.007	0.006	0.006	0.007	-0.150	-0.217	-0.199	-0.096
Poland	0.005	0.005	0.005	0.005	0.005	-0.023	-0.044	-0.063	-0.079
US	0.002	0.001	0.001	0.002	0.002	-0.259	-0.324	-0.192	0.134

Table 2	Variance of external financing					Change in variance			
	$\lambda =$					$\lambda =$			
	0	0.25	0.5	0.75	1	0.25	0.5	0.75	1
<i>Delta=0.05</i>									
<b>Country</b>									
Russia	0.065	0.041	0.034	0.042	0.067	-0.364	-0.480	-0.347	0.034
Argentina	0.005	0.003	0.002	0.003	0.004	-0.389	-0.534	-0.433	-0.088
Brazil	0.009	0.006	0.005	0.006	0.010	-0.370	-0.487	-0.353	0.035
Mexico	0.002	0.001	0.001	0.001	0.001	-0.385	-0.578	-0.579	-0.388
Indonesia	0.042	0.029	0.026	0.033	0.052	-0.322	-0.393	-0.210	0.224
South Africa	0.004	0.004	0.003	0.003	0.003	-0.100	-0.186	-0.257	-0.314
Venezuela	0.008	0.006	0.005	0.005	0.005	-0.212	-0.336	-0.370	-0.315
Poland	0.005	0.005	0.004	0.004	0.004	-0.079	-0.153	-0.223	-0.288
US	0.002	0.002	0.002	0.003	0.005	-0.058	0.163	0.662	1.439

Table 3	Variance of external financing					Change in variance			
	$\lambda =$					$\lambda =$			
	0	0.25	0.5	0.75	1	0.25	0.5	0.75	1
<i>Delta=0.10</i>									
<b>Country</b>									
Russia	0.065	0.042	0.035	0.045	0.072	-0.355	-0.455	-0.302	0.106
Argentina	0.005	0.003	0.002	0.003	0.005	-0.409	-0.542	-0.401	0.016
Brazil	0.009	0.006	0.005	0.006	0.010	-0.361	-0.461	-0.299	0.125
Mexico	0.002	0.001	0.001	0.001	0.001	-0.473	-0.682	-0.627	-0.308
Indonesia	0.042	0.031	0.032	0.045	0.071	-0.268	-0.242	0.076	0.687
South Africa	0.004	0.004	0.003	0.002	0.002	-0.174	-0.324	-0.449	-0.551
Venezuela	0.008	0.006	0.004	0.004	0.004	-0.285	-0.467	-0.545	-0.519
Poland	0.005	0.005	0.004	0.003	0.003	-0.147	-0.281	-0.403	-0.512
US	0.002	0.003	0.004	0.007	0.011	0.272	1.083	2.431	4.317

non-co-operative creditor game, with attendant welfare costs.

There are many debt instruments that in principle might lower these welfare costs. Longer-maturity, fixed rate debt is one possibility. It limits a country's exposure to rollover and interest rate risk. A more ambitious option would be explicitly state-contingent debt, where repayments are indexed to some macroeconomic variable related to a country's income streams, such as the oil price. So, for example, lower oil prices would reduce debt repayments in line with revenues, thereby offering repayments insurance.

The literature on optimal debt management suggests a potentially important role for state-contingent debt in hedging country risks (Lucas and Stokey (1983)). Few developed countries have gone down that road. But state-contingent debt would in any case seem to offer bigger advantages to the emerging economies. Their income streams are often non-diversified, with a high degree of export specialisation. So their ability to repay debt can be well represented by a relatively limited number of well-defined states. Further, the prices they receive for their goods and at which they borrow are determined on volatile international markets. These ought to be the circumstances in which even simple state-contingent contracts could yield sizeable insurance benefits. Yet despite this, there are to date only a handful of real-world examples of emerging countries issuing state-contingent debt. They include Bulgaria which has issued GDP-indexed bonds, and Mexico which has issued oil-indexed bonds. A box evaluates quantitatively the insurance benefit of state-contingent debt for a selection of emerging market countries.

One of the working groups of the Financial Stability Forum (FSF) is considering debt structures and liquidity management by the emerging markets. In particular, it is considering debt structures which help shift the risk burden from debtors to creditors *ex ante* following adverse shocks – and hence which shift the risk burden from official to private sector creditors *ex post*. Risk-shifting of this nature may well increase the average cost of funding for the emerging markets. This raises the difficult question of how to incentivise borrowing countries to issue debt of this more expensive type. One possibility would be to make prudent debt structures a precondition of official financing. Prudent debt structures are a

prophylactic measure, like fitting burglar or fire-alarms. The 'insurance company' – the IMF – may legitimately insist on them as an eligibility criterion for cover. Appropriate debt and liquidity management is already one of the prerequisites for drawing down the IMF's new Contingent Credit Line.

#### **(b) Co-ordination solutions**

The G7 statement in June suggested "...linking the provision of official support to efforts by [a] country to initiate discussions with its creditors to explain its policy program." In essence, this is a co-ordination solution to the crisis problem. For co-ordinated solutions to operate effectively, however, a forum needs to exist for debtor/creditor negotiations, prior to, during and after crisis has struck. The IIF idea of a 'Country Club' is one model for this type of forum, with debtor/creditor dialogue intensifying the more advanced the crisis. Mexico's 'Investor Relations Office', set up after the Tequila crisis, is probably the closest practical analogue to date.

Unlike the Paris and London Clubs, a Country Club would have an important *ex ante* role to play. The role of the Paris and London Clubs is to divide up the losses equitably: they are concerned with 'bailing in'. The role of a creditor club ought to be to reduce the extent of these losses in the first place by catalysing creditors and forestalling runs: they would be concerned with 'binding in'. A creditor club approach of this type would have similarities with the voluntary debt rollover solutions that were used following the recent Korean and Brazilian crises. The crucial difference is that the creditor club would meet regularly pre-crisis (rather than irregularly post-crisis), to exchange information and seek to establish a co-ordinated creditor position.

This, however, underscores a key problem with the creditor club model. How would it achieve effective *ex ante* 'binding in'? Talk can be cheap. Forestalling runs requires that creditors put their money where their mouth is. What is the commitment technology that prevents creditors agreeing *ex ante* but reneging *ex post*?

There are several potential commitment devices, implicit and explicit. A greater degree of transparency, both between debtors and creditors and among creditors themselves, may be part of the solution. There have already been significant steps taken to improve the transparency of debtor countries' macroeconomic situations: for example, through the

IMF's Special Data Dissemination Standards (SDDS) and the codes of good practice on fiscal, monetary and financial policies<sup>25</sup>. Moves like this should reduce informational asymmetries between creditors and debtors and thereby ease the signal extraction problem for creditors. Among creditors, transparency and peer review could also be a powerful discipline, helping bind individual creditors together. But there are limits on the extent to which private sector creditors would be willing to disclose to other creditors their commercial decisions. Moreover, too much creditor disclosure of this type would risk killing the market, by driving to zero the returns for entering the market in the first place (Grossman and Stiglitz (1980)). So transparency is unlikely to be a panacea for the creditor co-ordination problem<sup>26</sup>.

Having a neutral facilitator may help in arriving at co-operative creditor outcomes. A disinterested party can act as mediator between creditors, much as the New York Fed did during the recent LTCM crisis. There may be lessons to be learned from the United Kingdom's 'London Approach' to corporate debt restructuring, in which the Bank of England plays the role of mediator<sup>27</sup>. Some of the principles of the London Approach have recently been applied to debt restructuring problems in Asia.

An alternative commitment device among creditors would be to have restricted membership of any creditor club – for example, made conditional on members maintaining credit lines or establishing a longer-term strategic interest in a country, say through FDI. This too raises difficult questions. What, in a practical sense, are appropriate club rules? Are breaches of these rules verifiable? Is there a danger of 'insider-information' problems if some creditors are excluded from the club? These are difficult questions. It is telling that no clearly first-best solution to the creditor co-ordination problem has yet been arrived at in the context of corporate bankruptcy procedures (Brierley and Vlieghe (op cit)). These problems are, if anything, more acute in an international context.

### (c) Involuntary solutions

Voluntary co-ordination is one route to a co-operative creditor equilibrium. At the other end of the

spectrum lie involuntary solutions. These are methods of formally binding together creditors, for example through debt moratoria and payments standstills. The G7 statement in June included among its tools "...capital or exchange controls as part of payments suspensions or standstills, to provide time for an orderly debt restructuring".

Standstills are a standard feature of company bankruptcy procedures, for example under Chapter 11 in the United States. They defuse, through quantitative control, incentives to run and for litigious creditors to begin attaching assets. They thereby allow time for a co-operative solution to debt problems to be devised and put in place. The non co-ordination premium evaporates. In this way, they satisfy the 'binding in' and the 'bailing in' criteria. In principle, therefore, they could deliver aggregate and distributional welfare benefits, by preventing creditor externalities arising.

Moratoria do, however, come with costs. For non-sovereign debts, they are equivalent to imposing capital controls on a country on a temporary basis. The signalling effect to investors of such a move is likely to be adverse. Following Malaysia's decision to impose unilaterally capital controls last September, equity prices fell by almost 15 per cent and yield spreads on dollar debt rose by 150 basis points. Moreover, there is a risk that if investors expect moratoria to be used on a more frequent basis, this may simply lead them to run sooner. If that were to happen, standstills could become self-defeating.

The effects of moratoria may also spill over to other countries. For example, standstills reduce the liquidity of investors' portfolios. Imposing a standstill in one country may leave leveraged investors needing to liquidate portfolios in other emerging markets to meet margin calls. This heightens contagion across emerging markets. The experience following the Russian domestic debt moratorium last year was particularly striking. Emerging market contagion was virulent. Spillovers to liquid emerging markets – even those with little direct link to Russia, such as Mexico – were substantial (Kaminsky and Reinhart (1998)).

25: See Drage and Mann (1999) and the article by King in this issue.

26: See Morris and Shin (1999) on this point.

27: See the article by Brierley and Vlieghe in this issue.

How might these costs be minimised? Getting an international body, such as the IMF, to sanction a standstill may bring some benefits. It would require a change in the IMF's Articles – in particular, Article 8(II)b – which would in turn require changes in member countries' domestic legislation. That would be a difficult task. But an IMF sanction would serve as a powerful demonstration effect of the collective international interest – rather than purely national self-interest – in forestalling a country run. It would help ensure that any capital controls imposed as part of the standstill process are indeed temporary and are removed as soon as the dust has settled. It would provide some protection from creditor litigation, because the standstill would be secured under international law. And because of this, the sanctioning body could ensure that creditors were treated on comparable terms.

In sum, in a world of periodic liquidity crises, standstills are a potentially important part of the toolkit policymakers should have at their disposal, albeit one which would be expected to be used sparingly. They may often be an efficient means of forestalling country runs, for the same reason payments suspensions can be efficient in the face of bank runs. There is a pressing need for further work by the international community on the modalities of payments standstills in forestalling and resolving crises.

## References

- 1: Brealey, R A (1999), 'The Asian Financial Crisis', *International Finance*, Vol II July 99, pp.249-272
- 2: Chang, R and Velasco A (1998), 'Financial Crises in Emerging Markets: A Canonical Model', Federal Reserve Bank of Atlanta, Working Paper 98-10.
- 3: Chui, M K, Gai, P S and Haldane, A G (1999), 'Sovereign Liquidity Crises: Analytics and Implications for Public Policy', mimeo, Bank of England.
- 4: Diamond, D and Dybvig, P (1983), Deutsche Bank (1999), 'Bank Runs, Deposit Insurance, and Liquidity' *Journal of Political Economy*, 91, pp.401-19.
- 5: Drage, J W and Mann, F C (1999), 'Improving the Stability of the International Financial System', *Financial Stability Review*, Issue 6 pp.40-77.
- 6: Eichengreen, B and Portes, R (1995), 'Crisis, What Crisis? Orderly Workouts for Sovereign Debtors', CEPR, London.
- 7: Fischer, S (1999), 'International Lender of Last Resort', mimeo, International Monetary Fund.
- 8: Flood, R and Garber, P (1984), 'Collapsing Exchange Rate Regimes: Some Linear Examples', *Journal of International Economics*, 17, pp.1-13.
- 9: Giannini, C (1998), 'Enemy of None but a Common Friend of All? An International Perspective on the Lender-of-Last-Resort Function', Temi di Discussione No.341, Banco d'Italia
- 10: Grossman, S J and Stiglitz, J E (1980), 'On the Impossibility of Informationally Efficient Markets', *American Economic Review*, 66, pp.246-53.
- 11: Institute for International Finance (1999), 'Involving the Private Sector in the Resolution of Financial Crises in Emerging Markets'.

## Conclusions

The debate on involving the private sector in financial crisis has often been conducted as though it was a zero-sum game. The language of the debate – of 'burden-sharing' between public and private sectors and of 'bailing-in' the private sector – has helped perpetuate this view. It carries the implication that private sector involvement is essentially a distributional issue.

This is an inaccurate description of what public policy initiatives can in fact achieve at times of financial crises. In these situations, appropriately designed public policies can be a positive-sum game, by enforcing co-operative rather than non-co-operative solutions to crises. There are welfare benefits to be had by both debtors and creditors. Private sector involvement then becomes not a distributional issue, but can secure an aggregate welfare gain.

Securing those aggregate welfare gains may, however, call for new and different public policy instruments. Some of these instruments are currently being debated and put in place – for example, more sophisticated forms of financial contracting, or formalised payments standstills. In the absence of an international lender of last resort, the demand for these new types of public policy initiative seem likely to increase rather than diminish over time.

- 12: International Monetary Fund (1999), 'Involving the Private Sector in Forestalling and Resolving Financial Crises', International Monetary Fund.

- 13: Kaminsky, G L and Reinhart, C M (1998), 'On Crises, Contagion, and Confusion', mimeo.

- 14: Krugman, P (1979), 'A Model of Balance of Payments Crises', *Journal of Money, Credit and Banking*, 11, pp.311-25.

- 15: Krugman, P (1999), 'Balance Sheets, The Transfer Problem, and Financial Crises', mimeo.

- 16: Lucas, R E and Stokey, N L (1983), 'Optimal Fiscal and Monetary Policy in an Economy without Capital', *Journal of Monetary Economics*, 12(1), pp.55-93.

- 17: Morris, S and Shin, H (1998), 'Unique Equilibrium in a Model of Self-Fulfilling Currency Attacks', *American Economic Review*, 88(3), pp.587-97.

- 18: Morris, S and Shin, H (1999), 'Coordination Risk and the Price of Debt', mimeo.

- 19: Obstfeld, M (1994), 'The Logic of Currency Crises', *Cahiers Economiques et Monétaires*, Banque de France, 43, pp.189-213.

- 20: Stiglitz, J (1998), 'Preventing Financial Crises in Developing Countries', Global Economic Prospects, The World Bank.

- 21: Yianni, A (1999), 'Resolution of Sovereign Financial Crises – Evolution of the Private Sector Restructuring Process', *Financial Stability Review*, No.6, pp.78-84.

# Reforming the international financial system: the middle way



**Mervyn King**  
Deputy Governor, Bank of England

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**ONE OF THE** roles which international financial officials are sometimes required to play is to describe disasters as triumphs and to make the dramatic seem bland. So, on 16 September 1992, following massive speculation against sterling and its suspension from the Exchange Rate Mechanism, the then Chancellor of the Exchequer, Norman Lamont, opened his statement with the words: “Today has been an extremely difficult and turbulent day”. In the seven years since, several finance ministers have had cause to echo those words. Officials have spoken of the risks associated with capital flows. Well they might. Sharp reversals of capital flows to emerging markets have caused crises with a frequency and on a scale that threaten support for an open, market-led international economy.

These crises have created millions of victims, whose circumstances and aspirations were totally unrelated to financial markets. In Korea unemployment tripled, in Indonesia several years of economic growth were wiped out leading to political instability, and similar results have been visible in other parts of Asia as well as Latin America. Over the past century, governments

in the industrialised world have, in the wake of domestic financial crises, taken steps to regulate and strengthen the financial system. Is there a similar need to change the rules of the game for the international financial system?

Capital markets do not operate on their own. They need an adequate legal and supporting infrastructure for participants to engage with each other. There is no magic wand that can be waved to create such an infrastructure internationally. Short of a world authority what is required is a patient process of building such an infrastructure. Some have described this as a need for new architecture; others as a need for plumbing. I prefer to speak of bricklaying. But after innumerable meetings of ministers and governors, deputies, deputies’ deputies and so on, we still do not have an adequate building. Recent crises have shown that the need is not for a lavish palace but simply a roof over our heads. We need to get to the point where less time is spent on the role of the IMF in handling crises and more on the role of the World Bank in promoting development. So where should we start?

In order to answer that question it is necessary to understand the causes of recent crises. Without pretending to be comprehensive, I shall focus attention on the importance of balance sheets – national balance sheets – as the trigger for financial crises. I shall discuss four issues. First, I shall try to identify the problems underlying recent financial crises. Second, I shall discuss two fundamental or purist solutions which, although infeasible in the short run, do provide us with some ideas about how we might deal with these problems in our imperfect world. Third, I shall describe some practical steps – a ‘middle way’ – to improve the international financial system. These are the bricks which are slowly being laid in place. Fourth, in the context of the middle way, I shall argue that transparency is of crucial importance. Notwithstanding the weaknesses in domestic policies pursued by a number of emerging market economies, there is a structural fault in the nature of international capital flows. Short-term debt flows, especially bank finance, are highly volatile. Unless that problem is tackled the potential for future crises will remain.

### What is the source of the problems?

“Small open economies are like rowing boats on an open sea. One cannot predict when they might capsize.”<sup>1</sup> So wrote Joseph Stiglitz, Chief Economist at the World Bank. He also likened the international financial system to a road which, after too many accidents, raises more doubts about the design of the road than the drivers involved. The analogy with travel has been taken up by Larry Summers, who compared global financial markets with jet aeroplanes. Travel is faster and, on the whole, safer. But crashes, when they do occur, are more spectacular. Whichever form of travel you prefer, one thing is clear. In recent years, the passengers have suffered from severe travel sickness. So much so, that their journey towards an open capital market has seemed, at times, a nightmare.

The core of the problems faced by a number of emerging markets has been the sharp reversal of capital flows. Between 1996 and 1998, the reversal of capital flows to the five Asian countries primarily affected (Korea, Thailand, Indonesia, Malaysia and the Philippines) was of the order of US\$125 billion, equivalent to 12 per cent of the pre-crisis level of GDP.

These reversals imply equal and opposite swings in the current account. To turn a large current account deficit into a substantial surplus within two years almost certainly requires a recession. In 1998 real GDP fell by six per cent in Korea, by nine per cent in Thailand, by 14 per cent in Indonesia, by seven per cent in Malaysia, and by one per cent in the Philippines.

Moreover, the reversal of capital flows to emerging markets means that the industrialised countries must in aggregate run a larger trade deficit. The distribution of that increase in the collective deficit has already led to a debate about appropriate domestic policies in the G7, making it harder to resist the ever present protectionist pressures, especially in election years. So rapid reversals of capital flows bring substantial economic costs.

Capital flows also bring real economic benefits. They enable savings in one country to finance more profitable investment in another. That was a key feature of the world economy in the nineteenth century. Such flows also facilitate the transfer of knowledge and expertise. And by investing overseas, domestic residents are able to pool risks of various kinds with residents of other countries. To date, international diversification of portfolios has been remarkably limited. In particular, equity portfolios of investors in the industrialised world are heavily biased towards domestic equities. In part, this reflects the difficulty of obtaining adequate information about the legal, accounting and other aspects of the infrastructure of economies overseas. But the failure to exploit the full benefits of an open capital market reflects also the instabilities resulting from the volatility of short-term capital flows.

The volatility of capital flows has affected not only Asia but also Latin America, and almost all emerging markets have suffered directly or indirectly as spreads on their debt have risen to levels that in some cases have come close to cutting them off from the international capital market altogether. Indeed, Eisuke Sakakibara, formerly of the Japanese Ministry of Finance, has insisted that the past five years have been a “crisis of global capitalism”<sup>2</sup>. The so-called ‘Washington consensus’ that sound macroeconomic and financial policies should embrace the free movement of capital has come under fire. Both

1: Stiglitz, J.E. *Financial Times*, 25 March 1998.

2: Sakakibara, E. (1999), ‘Reform of the International Financial System’, speech to the Manila Framework Meeting in Melbourne on 26 March 1999.

Mexico and Korea, regarded as models of development, to such an extent that they were admitted to the OECD, experienced damaging crises shortly after their elevation to the premier league of advanced economies. Contrast their fate with that of India. Capital controls insulated India to a large extent from the recent crisis. If we cannot find a way to reconcile free movement of capital with prevention of financial crises, then many countries may draw the lesson that they are better off with capital controls – either explicit or implicit – than without. Over the past decade, the two-year swing in the current account among G7 countries has been of the order of one to two per cent of GDP. The largest swing was less than four per cent (3.7 per cent for Italy over the period 1992-94). These are small compared with the swing of 17 per cent for Korea, in 1996-98.

Two dimensions of the reversal of capital flows have been evident in recent experience. First, their intensity and scale. Second, the rapid contagion from one emerging market to other previously unaffected countries. Both phenomena are a product of the nature of the capital flows concerned. The problems arise from short-term flows of debt finance, not long-term equity flows or direct investment.

Equity investment has a self-stabilising mechanism. When an investor wishes to withdraw from the equity market he or she has to find a buyer before they can head for the exit. The market price adjusts in order to attract a buyer to replace the seller. The physical investments financed by equity flows remain in place, even if their value on the market has fallen. The need to find a buyer to replace a seller can be expressed in the equivalent statement that the maturity of the liability is extremely long, in this case indefinite. The real problems stem from liabilities with very short maturities. These occur with debt finance, whether in terms of bank deposits payable on demand or longer-term debt finance which has almost run to maturity. In these cases, depositors who wish to withdraw their funds do not have to find replacement depositors. They simply take their funds out. The result is that, if this rush to the exit is on a sufficiently large scale, banks find themselves on the receiving end of a liquidity run. Such runs can occur even if the fundamentals are sound, although they are more likely when the fundamentals are weak. And the banking systems of some emerging markets

compounded the problem by borrowing in foreign currency at short maturities and investing the proceeds in domestic currency assets at longer maturities. This was indeed a recipe for instability.

The importance of short-term debt finance in the reversal of capital flows in recent years is clear. Virtually the whole of the US\$125 billion reversal of flows to the five Asian crisis countries was accounted for by swings in short-term debt finance. And 80 per cent of this swing resulted from changes in the net flow of finance from commercial banks. Figures from the Institute of International Finance suggest that the same picture is true for a larger group of emerging markets, with 81 per cent of the decline in private net capital flows to the 29 most important emerging market economies accounted for by bank lending.

Liquidity runs, although not the sole cause of problems, did play a major part in recent financial crises. Such runs reflect mismatches in the national balance sheet. Such mismatches can occur in either the public or private sectors. An example of the former is Mexico in 1994, where short-term official dollar denominated debt exceeded foreign exchange reserves. Examples of the latter are Thailand, Korea and Indonesia in 1997, where the private sector had borrowed short in order to lend long. Either maturity or currency mismatches create the potential for sudden reversals of capital flows on a huge scale. In the technical jargon, such markets are subject to multiple equilibria where a small event can cause a shift from one benign equilibrium state to another which is accompanied by rapid capital outflows. The possibility of a rapid shift from one equilibrium to another explains, in the words of Maurice Obstfeld, “why capital markets can appear to impose too little discipline before the crises arise, and too harsh a discipline afterwards”<sup>3</sup>.

If this diagnosis is correct, two observations follow. First, capital flows in the form of foreign direct investment and portfolio equity investment should be encouraged. Emerging markets can do a great deal to increase these by adopting modern accounting standards, a transparent legal framework, and a stable market-friendly environment to which foreign investors will be prepared to commit long-term investments. Second, ways must be found to reduce the volatility of short-term flows of bank finance. The

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3: Obstfeld, M (1998), ‘The Global Capital Market: Benefactor or Menace?’, NBER Working Paper 6559, mimeo.

key is to avoid maturity and currency mismatches on the national balance sheet. That is easier said than done, and similar mismatches on the balance sheets of domestic financial institutions have caused financial collapses on a regular basis in the industrialised world.

Before turning to the question of how such mismatches might be limited, if not prevented, let me mention two other contributory factors to recent crises. The first was overvalued real exchange rates, reflecting attempts to maintain fixed nominal exchange rates beyond their economic shelf life. Not only did such attempts contribute to a crisis when the nominal peg could no longer be sustained, but they also contributed to the illusion that it might be profitable to borrow at lower interest rates in foreign currency and invest at higher rates domestically, thus exacerbating the balance sheet mismatches. The second is that capital outflows do not result solely from the actions of overseas residents. Capital flight by domestic residents has been a factor in increasing the scale of outflows from a number of emerging markets. It is important to focus on the *nature* of capital flows not the *nationality* of investors concerned. Hence the resolution of crises involves more than simply restructuring liabilities to foreign banks or overseas investors. The problems created by the volatility of short-term debt flows require a structural solution.

### Purist solutions

How can we design an appropriate infrastructure for the international capital market to prevent, or at least limit the frequency of, crises? To return to our transport analogy, there is clearly a case for eliminating blind spots on the road or lengthening the runway. But this is not enough. We also need to think about how the emergency services should respond to a crash.

The purist is led naturally to consider solutions of two opposite kinds. One, which maintains open and free capital movements, is to create an international lender of last resort (ILOLR). The second, at the opposite end of the spectrum, is to reinstate permanent capital controls.

Consider first the merits of an ILOLR. The obvious institution to play that role would be the IMF, and its First Deputy Managing Director, Stanley Fischer,

provided a comprehensive cost-benefit analysis of an ILOLR earlier this year<sup>4</sup>. Although not new, the concept of an ILOLR has, in polite official circles, become the facility that dare not speak its name.

The principle of a lender of last resort was described by Thornton and Bagehot in the nineteenth century as a willingness to lend freely against good collateral at a penal rate. All three aspects of this principle – ‘lending freely’, ‘good collateral’, and a ‘penal rate’, are problematic at the international level. An effective LOLR must be willing to lend whatever it takes to prevent a liquidity run. The more credible the LOLR, the less the resources that are required to be lent in practice. Domestic LOLRs have credibility. But for a prospective ILOLR the decision for a group of countries, either jointly or via the IMF, to lend large sums to another country will always be difficult. In a world of nation states, it is unreasonable to suppose that political considerations will not enter the choice of recipient of such largesse. And the greater the political uncertainty about the willingness to act as an ILOLR, the larger the amount of funding that will be required. In turn, the operation will appear less credible, and the authorities are caught in a vicious circle. The current resources of the IMF – between US\$125 billion and US\$150 billion depending on how they are measured – are wholly inadequate for an ILOLR. Nor are resources on the appropriate scale likely to be forthcoming.

Moreover, serious moral hazard arises when the private sector ignores the risks of lending to a country because it believes that the country would be bailed out by the international community in the event of a liquidity crisis. And investors are encouraged to lend to emerging markets in forms – short-term debt – which are more likely to be bailed out. In the domestic context, the LOLR ensures that neither the managers nor the equity holders of the institution receiving support are allowed to benefit. Internationally, it is not easy for the IMF to penalise those responsible for management of the economy, nor to distinguish between those citizens that have been responsible for excessive risk-taking and those who will be the innocent victims of the consequences of a financial crisis. It is the ordinary taxpayers in emerging market countries who will have to bear the burden of servicing loans from the IMF<sup>5</sup>.

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4: Fischer, S (1999) ‘On the need for an International Lender of Last Resort’, IMF.

5: A point stressed by Calomiris (‘The IMF’s imprudent role as lender of last resort’, *Cato Journal*, Vol 17 No. 3 1998) although he underestimates, in my view, the possibility of liquidity runs as seen, for example, in Korea in 1997.

Absent a world government, it is difficult to see a credible ILOLR on the horizon. The basic reason is the maxim: “it’s the politics, stupid”.

The second purist solution, at the opposite end of the spectrum, is the imposition of permanent capital controls. In other words, a return to the world in which the Bretton Woods institutions were created half a century ago. The advantage of capital controls is that they prevent the liquidity runs that result from currency and maturity mismatch of the financial sector. India did not experience a financial crisis, Korea did. They also enable countries to maintain a fixed exchange rate while retaining some flexibility in domestic interest rates. And they might limit the movement of capital to lower taxed jurisdictions, thus slowing the inexorable decline of capital income taxation resulting from the development of a world capital market. But it is difficult to distinguish between controls on capital flows and flows related to trade. The growth of trade in services has highlighted the difficulty of separating currency trade-related flows from those representing investment. Thus, to be effective, capital controls are likely to impede trade flows. This would be a heavy price to pay and few countries have chosen to pay it.

Permanent capital controls have other disadvantages. They forsake all the economic benefits of a free capital market. And controls are never implemented by wise, or even merely clever, economists. They attract rent-seeking and corrupt behaviour in both official and private sectors. And they undermine the cause of market liberalisation. There is no shortage of protectionist tendencies that seek to limit trade and investment. We should not add to them.

So neither purist solution is likely to appeal – the one because there is insufficient political and financial support for an ILOLR, and the other because permanent controls go against the grain of promoting market reforms and good governance.

But the present system is not sustainable. The danger is that we have the worst of both worlds. The IMF may lend large amounts, create moral hazard in doing so, and still not be able to ward off the threat of financial crises. And faced with a run on their currency or banking system, countries may be forced to take unilateral action to suspend payments. So what to do?

### The middle way

Given that neither purist approach is on the agenda, the international community has been trying to take some practical steps forward. The aim is to reduce the frequency and severity of financial crises. Some might describe this as muddling through. I prefer to call it the ‘middle way’. The difference is that the middle way is based on the principle that if the emergency services will be slow to arrive then whichever form of transport you care to think of, borrowing countries should drive slowly.

How to encourage and enforce careful driving has been the subject of innumerable international meetings. Initially, the discussion took place in the G10, which, as you know, comprises eleven countries. Then last year the discussion was taken up by the G22. By the spring of this year that group had become the G33. Can you complete the sequence by guessing which international forum will take the lead next year? Suffice it to say that at the original Bretton Woods conference there were 44 countries and it took place 55 years ago.

In terms of practical steps forward, it is useful to distinguish between the *prevention* and *resolution* of crises. On the former, recent experience suggests five lessons for emerging markets:

(1) Create a do it yourself (DIY) LOLR, with the aim of providing self-insurance against a liquidity crisis. There are several ways of providing such insurance. One is simply to build up large foreign currency reserves. This has already been taken to heart by emerging markets. China has substantial foreign exchange reserves (US\$147 billion at the end of June). And Korea, perhaps the best example of a country suffering a liquidity run on its banking system in terms of foreign currency, has raised its reserves from a low point of US\$7.3 billion in November 1997 to a current high of US\$64.8 billion in August. It is unfortunate that the absence of more efficient solutions to the risk of crises means that scarce capital might be deployed in this inefficient way. Building up net reserves – via current account surpluses – will reduce world demand at a time when the US economy is unlikely to provide as large a stimulus as over the past five years. An alternative is to create gross reserves by borrowing from abroad and investing the proceeds in liquid international securities. Both methods involve costs. A second approach to DIY LOLR is for emerging markets to

create contingent credit facilities with international banks, as Argentina has done with its contingent repo facility, or try to set up collateralised loan facilities along the lines suggested by Martin Feldstein<sup>6</sup>. A final approach to the DIY LOLR, in the absence of an effective multilateral ILOLR, is the creation of regional self-insurance funds. All of these approaches are likely to be pursued, to a greater or lesser extent, in the wake of recent financial crises.

(2) Manage the national balance sheet, and, as far as possible, avoid maturity and currency mismatches. For a country without a track record of international borrowing, it is important to manage its external liquidity position, especially in foreign currency. The lack of foreign exchange controls means that it will be difficult to observe, let alone manage, the balance sheet of the entire private sector. But the key elements are those relating to the public and banking sectors. Governments already have information on these sectors. As important as anything is the need for self-awareness by the countries concerned of the state of their national balance sheet and the approach of impending liquidity difficulties. When governments and markets alike are informed of the potential for future financing difficulties, both sides have time to take preventive action. Of course, the use of derivative instruments and hedging techniques makes the assessment of risk exposure more difficult. But the effort must be made. Alan Greenspan has suggested that consideration be given to simple rules of thumb such as that countries without a track record of international borrowing should maintain unencumbered foreign exchange reserves sufficient to meet all foreign currency liabilities over the following year, and that the average maturity of external liabilities should exceed three years. Rudiger Dornbusch has proposed the use of value at risk assessments of country balance sheets. Ideas such as these, precisely because they focus on the national balance sheet, are sure to be centre stage.

(3) Encourage inflows of equity rather than debt finance. This is an extension of the need to manage the national balance sheet. The imperative is the old adage: borrow long not short. A credible legal and institutional infrastructure for private investors would go a long way to encourage equity inflows. Reserve requirements on short-term debt inflows, as adopted in Chile, might help to modify the pace of vulnerable

capital inflows, but will, in themselves, do little to help in times of rapid capital outflow. It is also time to reconsider the incentive to the provision of short-term finance provided by the Basel Accord risk weights.

(4) Promote the better design of debt contracts which provide a framework for negotiation between creditors and debtors when financing difficulties arise. The particular proposal – advanced initially by a G10 Deputies' report in 1996 and subsequently endorsed by the G7 – for the use of collective action clauses in sovereign debt contracts has attracted interest. How far such clauses would help is unclear. Bonds issued under UK, but not US, law – currently these account for just under 50 per cent of the stock of emerging market eurobonds – generally include such clauses already. But their widespread adoption looks unlikely, not least because of the reluctance of the G7 to incorporate such clauses into their own debt contracts. More productive in the short run is likely to be the promotion of regular contacts between debtor countries and their creditors in good times, well before any crisis occurs. State-contingent debt where returns are related to the price of major exports is another possibility.

(5) Avoid, at all costs, the defence of fixed but adjustable exchange rate pegs when they are no longer consistent with internal and external equilibrium. Thailand shows the cost of a prolonged and ultimately unsuccessful attempt to defend its exchange rate. Brazil shows that there is life after a fixed exchange rate. It is much too early to conclude that emerging markets have little option but to adopt the dollar as their currency.

To these five imperatives, I have refrained from adding the mantra of better banking supervision. Of course, banking supervision should always strive to be better. But is it not time to ask the question of whether the implicit government guarantee afforded to the banking systems of the major industrialised countries is itself not part of the problem. One of the factors contributing to the scale of short-term debt flows to emerging markets is the moral hazard implied by the financing of banks in the developed world. It is certainly crucial that international rescue packages do not lead to moral hazard in the provision of finance to emerging markets. But an important lesson for the G7 is that moral hazard starts at home.

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6: Feldstein, M (1999), 'A self-help guide for emerging markets', *Foreign Affairs*, March/April, pp. 93-109.

In the resolution of crises less progress has been made. The IMF can, and has, provided financial assistance without which the cost of recent crises to the affected countries would have been even greater. But the stumbling block has been how “to involve the private sector”. Although the statement by G7 finance ministers to the Cologne Summit in June set out both ‘principles’ and ‘tools’ for involving the private sector in crisis resolution, much remains obscure. Unilateral debt moratoria can be damaging in terms of future access to capital flows. But there will be circumstances in which a debtor country and its creditors could benefit from a joint resolution of temporary payments difficulties, and procedures are needed to prevent some creditors from free-riding on others. The following four elements in crisis resolution merit some consideration. They have no particular status, but are issues that need to be faced. The four are:

- (1) the provision of official finance should be linked to the involvement of other creditors, including the private sector, in the resolution of crises. This can be achieved by the IMF setting a floor for the minimum level of foreign exchange reserves a country is required to maintain;
- (2) the aim of resolution is to find a co-operative solution negotiated between a debtor and its creditors. No particular class of creditor should be in a privileged position, unless the instrument in question explicitly gives it preferred creditor status;
- (3) the use of temporary standstills – possibly sanctioned by the international community – would allow time for a country to negotiate with its creditors. In the absence of a formal mechanism to achieve this, the IMF can indicate its endorsement of a standstill by being prepared to provide new money to a country which has temporarily suspended payments to its creditors (often referred to as IMF lending into arrears). By making standstills part of the furniture – or one of the bricks – they would be seen not as an ad hoc response, which might lead to contagion in other emerging markets, but part of an approved process;
- (4) measures, including perhaps strictly temporary capital controls, to prevent capital flight by domestic residents in exceptional circumstances. It would be odd to sanction a standstill of payments to foreign creditors while allowing domestic residents to move assets overseas without restriction.

The essence of the middle way is to find practical steps forward to enable emerging markets to better manage the liquidity positions of their external liabilities, and to reduce their dependence on debt finance. Crises will still occur. But the aim is to reduce their frequency and severity. To that end there is one further policy which is fundamental to the success of the middle way – transparency.

### Transparency

Transparency is one of the most popular words in economic policy today. Much has been said about transparency, and, interestingly, much has been done. Why is transparency so important? In itself, transparency will neither prevent nor resolve financial crises. But transparency can help reduce the frequency of crises – by alerting not only markets but also policy-makers to problems on the horizon – and their severity – by minimising the surprises about the scale of any liquidity problems. In Korea, the foreign currency exposure of its banking system was not known until after the crisis had hit. And in Thailand, the true state of the foreign exchange reserves was unknown even to its own finance ministry, let alone financial markets. So transparency can be seen as a ‘second best’ policy when purist solutions to financial crises are unavailable. It is in the context of the middle way that transparency comes into its own.

The aims of transparency are to allow better informed decisions in both public and private sectors; to reduce the risk of contagion by allowing markets to differentiate among borrowers; and to encourage macroeconomic policy to become more predictable. Transparency is not simply a question of making available certain data. It is an approach to economic policy, almost a way of life. The G22 Report of the Working Group on Transparency and Accountability (which I was privileged to co-chair with Andrew Sheng of the Hong Kong Monetary Authority) was published in October 1998. Its recommendations were endorsed in full by the G7. It stressed the importance of transparency in three different sectors: national governments, the private sector, and the international financial institutions. Good progress has been made in implementing many of its recommendations.

Rather than give an exhaustive account of progress in transparency, let me give a few examples. In March of this year, the IMF’s Special Data Dissemination

Standard was strengthened by the inclusion of a template covering the disclosure of net foreign exchange reserves and short-term foreign currency liabilities of central government. These data are required to be published monthly with a lag of no more than one month, and the transitional period for observing the standard extends to the end of March 2000. Agreement is close on a Code of Monetary Policy Transparency to match the earlier Code on Fiscal Policy Transparency.

BIS data on international banking statistics will be produced quarterly from next spring, and the lag in publication shortened. One of the three Financial Stability Forum Working Groups is considering the quality and timeliness of disclosure of exposures to highly leveraged institutions. This category includes hedge funds. Proposals for direct regulation of internationally mobile funds are unlikely to be workable. But many commentators remain suspicious, regarding such funds as like children playing just out of sight who are told – “I don’t know what you’re doing, but, whatever it is, stop it.”

The IMF itself has become more open about the release of information. During an 18-month experiment, countries will be able to publish their Article IV reports. And more background information, including policy papers and programme reviews, is now available. All this should improve the transparency and accountability of national governments, the private sector, and the IMF.

But there is one further step on which progress is urgently required. In a world of sovereign states, countries cannot, and should not, be compelled to disclose information if they do not wish to do so. But countries should not be able to claim to be transparent when in fact they are not. A crucial substitute for the inability to make transparency mandatory is that we need transparency about transparency. That is why the G22 Report recommended that the IMF – in the context of its Article IV consultations – prepare a Transparency Report for each country summarising the degree to which that economy complied with disclosure standards and codes of conduct. The case for ‘transparency about transparency’ is the case for honesty in economic policy.

Some progress has been made. Pilot transparency reports on the UK and Argentina have been produced by IMF staff. Other pilot reports are to come. Australia has published a self-assessment transparency report. The need now is to make the production of Transparency Reports an integral part of the Article IV process. There is no reason for further delay. Transparency Reports should always be published. I very much hope that the IMF will make rapid progress towards the regular production and publication of Transparency Reports on each country. This practical measure could do a great deal to enhance the performance of all economic actors involved in the international capital market.

### Conclusions

Unrestricted capital mobility and the absence of an ILOLR are not a recipe for a stable international financial system. Short-term interbank flows are the Achilles heel of present arrangements, leading to both currency and maturity mismatches. Throw in a predilection of emerging markets for pegged exchange rates and you have a dangerous cocktail. Purist solutions – whether of an ILOLR or a return to permanent capital controls – are, for good reasons, unlikely to be pursued. What is needed now are some practical steps forward. Central to any such programme is the need to monitor and manage the national balance sheet. The objective cannot be to eliminate the risk of financial crises. The middle way will not do that. But it can reduce the frequency and severity of crises. In this context, transparency is important. There will still be crises in the future, but transparency will reduce their costs and help to keep governments closer to the straight and narrow. All central bankers will surely welcome that.

Of course, the immediate crisis has receded, and some of the Asian countries, in particular, have recovered sharply over the past year. But we should not be misled by the calm after the storm. There will be future storms, and now is the time to prepare for them. There is no need for another international conference of the kind which led to the creation of the Bretton Woods institutions. But there remains a need for thinking as original and imaginative as that which inspired the Bretton Woods conference. The middle way is a start, but no more.

David Ignatius has written about the “founding generation”, people such as Dean Acheson and George C. Marshall, who created the great post-war institutions. All of those institutions have now passed their fiftieth birthday. It is time to appraise carefully the architecture, foundations, plumbing and even bricklaying of that inheritance. Ignatius described the qualities of the founding generation as “resolve and clarity”. Those qualities are still required.

Dean Acheson entitled his memoirs, ‘Present at the Creation’. Let us hope that, similarly, a new generation of officials will be able, at some future date, to look back at the creation of an open world economy in which financial crises were successfully contained. That would be an achievement of which all economic bricklayers could be proud.

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