

# Quarterly Bulletin

Winter 2003



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# Bank of England Quarterly Bulletin

## Winter 2003

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# Quarterly Bulletin—Winter 2003

## **Markets and operations** (pages 393–406)

This article reviews developments since the Autumn *Quarterly Bulletin* in sterling and global financial markets, UK market structure and the Bank's official operations.

## **Research and analysis** (pages 407–62)

***Research work published by the Bank is intended to contribute to debate, and does not necessarily reflect the views of the Bank or of MPC members.***

**Understanding and modelling swap spreads** (by Fabio Cortes of the Bank's Foreign Exchange Division). Interest rate swap agreements were developed for the transfer of interest rate risk. Volumes have grown rapidly in recent years and now the swap market not only fulfils this purpose, but is also used to extract information about market expectations and to provide benchmark rates against which to compare returns on fixed-income securities such as corporate and government bonds. This article explains what swaps are; what information might be extracted from them; and what appear to have been the main drivers of swap spreads in recent years. Some quantitative relationships are explored using ten-year swap spreads in the United States and the United Kingdom as examples.

### **The distribution of unsecured debt in the United Kingdom: survey evidence**

(by Merxe Tudela and Garry Young of the Bank's Domestic Finance Division). The Bank recently commissioned a survey asking people about their unsecured borrowing and whether it is a burden to them. This article summarises the main results. As of October, 34% of respondents had some form of unsecured debt, over and above that which they expected to pay off at the end of the month, and the average amount owed was around £3,500. Some people owed much more than the average: 26% of those with some debt owed more than £5,000. Around 10% of borrowers said that their unsecured debt was a heavy burden to their households, similar to earlier surveys. For purposes of comparison over time, the questions were based on those used in earlier surveys. The evidence suggests that the proportion of people with some debt has not changed since at least the late 1980s. While the average amount borrowed by debtors has increased, since 2000 the extra borrowing has been concentrated among those with household incomes above £17,500. Despite the rise in average debt levels in recent years, the proportion of people who consider their debt not to be a burden has increased. But, the amount borrowed and the share of unsecured debt accounted for by those who consider it a heavy burden have both increased.

**Innovations in retail payments: e-payments** (by Helen Allen of the Bank's Market Infrastructure Division). Ways to make retail payments using the internet and mobile phones are proliferating. Some are offering new access routes to existing payment means, others use different means to transfer value, but all attempt to provide greater convenience and choice in payment services. Few, however, have reached critical mass and none has displaced existing payment methods. Nevertheless, the prospect that these new services could be widely used raises some policy questions. For example, central banks are interested in any potential effects on financial stability and, in the longer term, in whether such innovation might have monetary policy implications. For these reasons, central banks monitor the evolution of the market, even though any

such impacts may be a long way off. Moreover, it may well be that the system-wide risks will be relatively small even if e-payment usage becomes significant.

**The macroeconomic impact of revitalising the Japanese banking sector** (by Katie Farrant and Bojan Markovic of the Bank's International Economic Analysis Division and Gabriel Sterne of the Bank's Monetary Assessment and Strategy Division). In this article we assess the possible macroeconomic effects of proposals to revitalise the banking system in Japan. Our analysis is supported by a theoretical model that incorporates various interactions between the banking sector and the wider economy. In the long run, a planned reduction in the ratio of non-performing loans (NPLs) to total loans and the intended fall in the risk premium faced by Japanese banks may help to boost the level of investment. Achieving a revitalised banking system cannot be done costlessly, however, and our model suggests that there may be some negative short-run macroeconomic impact as credit growth is reduced.

## Reports

(pages 463–75)

**Financial stability and the United Kingdom's external balance sheet** (by Mhairi Burnett of the Bank's Monetary and Financial Statistics Division and Mark Manning of the Bank's Domestic Finance Division). This article, one in an annual series, examines the United Kingdom's financial transactions with the rest of the world, paying particular attention to the implications for financial stability. In recent years, the United Kingdom's stocks of external assets and liabilities have increased considerably, and each now exceeds £3.5 trillion. This is three times UK GDP and around a third of the United Kingdom's total financial assets. The monetary financial institutions (MFI) sector accounts for approximately half of the external balance sheet, reflecting both the international orientation of UK-owned banks and the cross-border activities of foreign-owned UK-resident banks. The article begins with a conceptual discussion of how external positions might affect financial stability, before turning to recent developments. The principal focus is on the MFI and private non-financial corporate (PNFC) sectors, in which the largest external positions exist. The discussion draws upon data from a variety of sources, including the *Pink Book*, sectoral financial balance sheets, the Bank of England and the IMF.

# Markets and operations

*This article reviews developments since the Autumn Quarterly Bulletin in sterling and global financial markets, UK market structure and the Bank's official operations.<sup>(1)</sup>*

- *Sterling short-term interest rates rose on changing perceptions about the outlook for UK monetary policy.*
- *Equity indices were relatively stable; credit spreads continued to narrow.*
- *The US dollar effective exchange rate index fell to a seven-year low.*
- *Remaining sterling money market instruments were successfully dematerialised and migrated to CREST; CMO was closed on 16 October.*
- *The Bank announced a review of its operations in the sterling money markets.*

Compared with recent quarters, major global interest rate, credit and equity markets have been fairly stable over the past three months (Table A). Market participants expect the steady pace of global economic recovery to continue and policy rates in the euro area and the United States to remain unchanged for some months to come. However, sterling market interest rates have risen as perceptions about the outlook for UK

monetary policy have changed; on 6 November, the Monetary Policy Committee (MPC) increased the Bank's repo rate by one quarter of a percentage point to 3.75%. In the foreign exchange market, there was some increase in volatility and the US dollar depreciated. The sterling exchange rate index has remained within a range of 97 to 102.

**Table A**  
**Summary of changes in market prices**

	5 Sept.	28 Nov.	Change
<b>March 2004 three-month interest rate future</b> (per cent)			
United Kingdom	4.08	4.43	35 bp
Euro area	2.29	2.33	4 bp
United States	1.32	1.38	6 bp
<b>Ten-year nominal government forward rate</b> (per cent) (a)			
United Kingdom	4.96	5.05	9 bp
Euro area	5.40	5.45	5 bp
United States	6.91	6.59	-32 bp
<b>Equity indices</b>			
FTSE 100 index	4257	4343	2.0%
Euro Stoxx 50 index	2615	2630	0.6%
S&P 500 index	1021	1058	3.6%
<b>Effective exchange rates</b>			
Sterling effective exchange rate	99.1	100.5	1.4%
Euro	88.4	90.7	2.6%
US dollar	104.5	97.4	-6.8%

Sources: Bank of England and Bloomberg.

(a) Three-month forward rates, derived from the Bank's government liability curves. Estimates of the UK curve are published daily on the Bank of England's web site at [www.bankofengland.co.uk/statistics/yieldcurve/main.htm](http://www.bankofengland.co.uk/statistics/yieldcurve/main.htm).

## Short-term interest rates

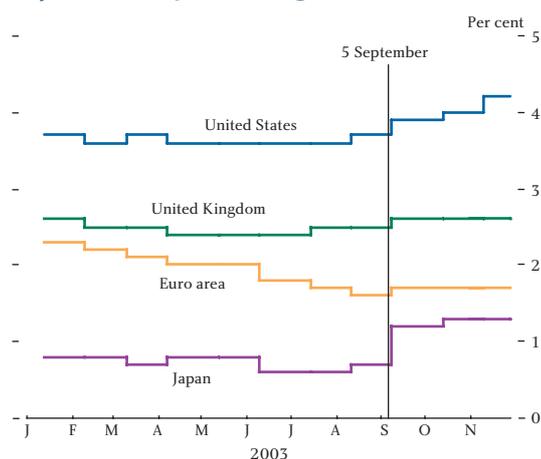
Over the period, there was mixed news about the pace of global economic recovery, and economists' forecasts for GDP growth in 2004 were not revised significantly (Chart 1). US growth in 2004 is expected to be the most rapid of the economies shown, and the average forecast rose slightly, but the US economy is thought to have sufficient capacity to expand without inflationary pressures.

Readings of short-term and long-term real interest rates early in the period implied little change in perceived monetary policy conditions in the United States and the euro area. In the United Kingdom, by contrast, a tightening of monetary conditions was expected, as short-term real rate forecasts rose towards long-run expectations (Chart 2).<sup>(2)</sup>

(1) The period under review is 5 September (the data cut-off for the previous *Quarterly Bulletin*) to 28 November.

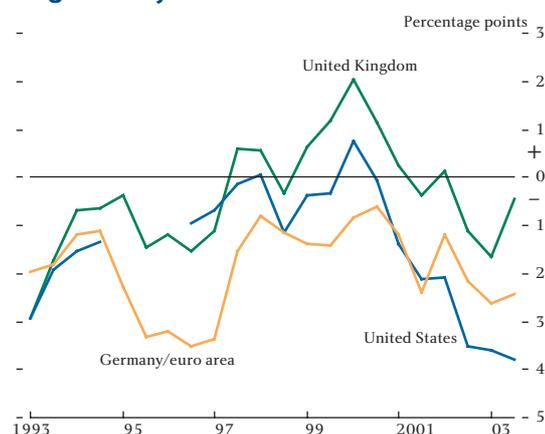
(2) The change in, rather than the size of, the gap should be the focus. This gap is calculated by subtracting survey-based inflation expectations from nominal yields at two maturities. If the nominal yield curve is upward sloping, due to term premia, the gap between short and long rates may be persistently biased downwards.

**Chart 1**  
Expected 2004 real GDP growth



Source: Consensus Economics.

**Chart 2**  
Survey-based difference between short and long-maturity forward real interest rates<sup>(a)</sup>



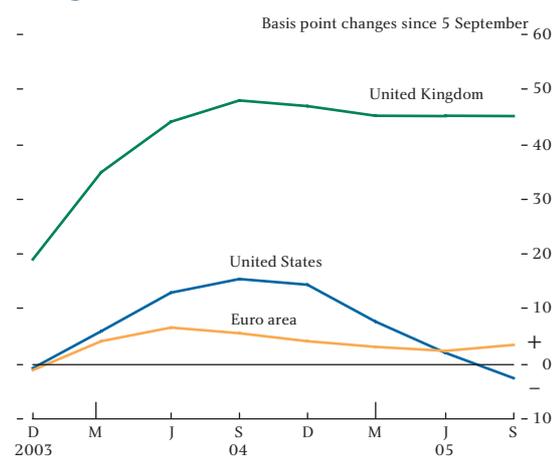
Sources: Bank of England and Consensus Economics.

(a) Derived from the Bank's government liability nominal forward curves and Consensus Economics semi-annual surveys of inflation expectations (for the next calendar year and five to ten calendar years ahead) conducted in April and October.

Sterling short-term nominal forward rates rose by 20 to 50 basis points over the period, compared with more modest increases in US dollar and euro rates (Chart 3). Central banks in the United States and euro area are expected to leave interest rates unchanged in the near term. Fed funds futures contracts do not imply a significant probability of a US rate increase until March, when around a 75% chance of a 25 basis point increase is priced in. Euribor futures suggest changes in interest rates by the European Central Bank are not expected until dates beyond March.

In the United Kingdom, there was little reaction in market interest rates to the November MPC announcement, suggesting such a move had been widely anticipated. Ahead of the announcement, UK

**Chart 3**  
Changes in short-term nominal forward rates<sup>(a)</sup>



Source: Bloomberg.

(a) As implied by short-term interest rate futures contracts.

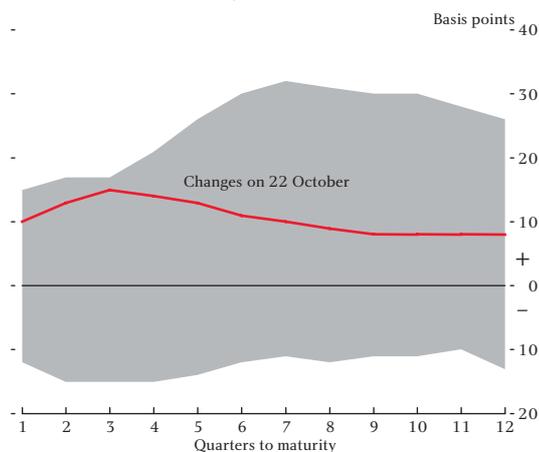
data releases—including, for example, revisions to second-quarter 2003 GDP and measures of housing market activity—were stronger than the market had expected. Market interest rates had also risen following publication of the minutes of the October MPC meeting, which reported that four of the nine Committee members had voted for a rate increase—a higher number than the market had anticipated.

Chart 4 shows the range of previous reactions in short sterling implied three-month forward interest rates to releases of the MPC minutes since 1997. The red line shows that the reaction to the October minutes was amongst the largest at horizons of less than one year, but was not particularly unusual at longer horizons, suggesting the impact of the minutes was to bring forward expectations of monetary policy tightening. This continued the pattern of previous months, with expectations of the timing of the turning point in sterling interest rates gradually brought forward (Chart 5).

Three-year spot sterling *real* rates continued to rise over the period. Chart 6 shows the difference between this rate ( $r_S$ ) and implied five-year real rates five years forward ( $r_L$ ). Short-maturity real rates will be affected by the current outlook for economic growth, including the expected monetary policy response, whereas longer-maturity real rates are likely to be affected rather less by the cyclical position of the economy.<sup>(1)</sup> It is possible to trace out the path implied by the yield curve (except at short horizons, denoted by dotted lines in Chart 6) for these short and longer-maturity real rates to

(1) See Haldane, A and Read, V (1999), 'Monetary policy and the yield curve', *Bank of England Quarterly Bulletin*, May, pages 171–76.

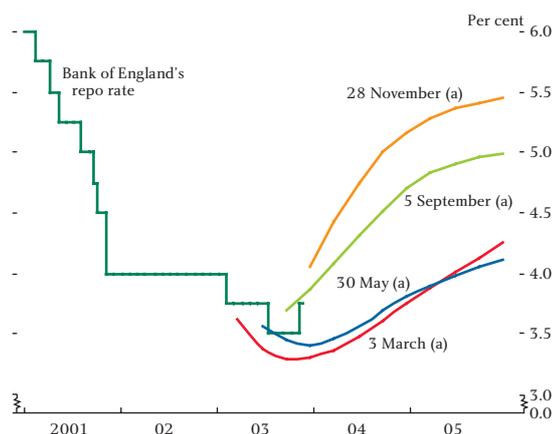
**Chart 4**  
Range of changes in nominal forward rates implied by short sterling futures contracts on MPC minutes days<sup>(a)</sup>



Source: Bloomberg.

(a) Grey area shows range of changes in interest rates on publication days of all previous MPC minutes.

**Chart 5**  
Short-term nominal forward rates



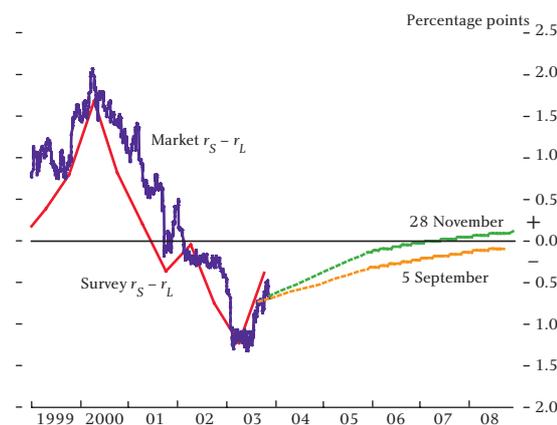
Source: Bloomberg.

(a) Three-month nominal forward rates implied by short sterling futures contracts. Dates relate to data cut-off points for previous *Quarterly Bulletin* 'Markets and operations' articles.

converge again, implying more neutral monetary conditions. This implied path has moved higher over recent months.

Chart 7 shows that, at short to medium-term maturities, some of the rise in nominal forward rates over the period may be explained by a rise in inflation expectations or inflation risk premia, in addition to the tightening of monetary conditions in the United Kingdom. While expectations for inflation derived from the UK gilt market remained anchored around 2.5% at the ten-year horizon, inflation expectations at 2½ years rose. This might in part have reflected an unwinding of concerns about possible global deflation, but market contacts also

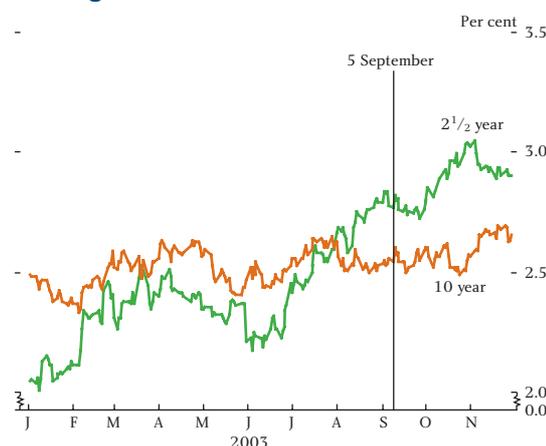
**Chart 6**  
Difference between short and long-maturity sterling real forward rates<sup>(a)</sup>



Sources: Bank of England and Consensus Economics.

(a) Constructed both from index-linked gilts and by subtracting survey-based inflation expectations from nominal forward rates derived from conventional gilts.

**Chart 7**  
Sterling inflation forward rates<sup>(a)</sup>



(a) Three-month forward rates derived from the Bank's government liability curves.

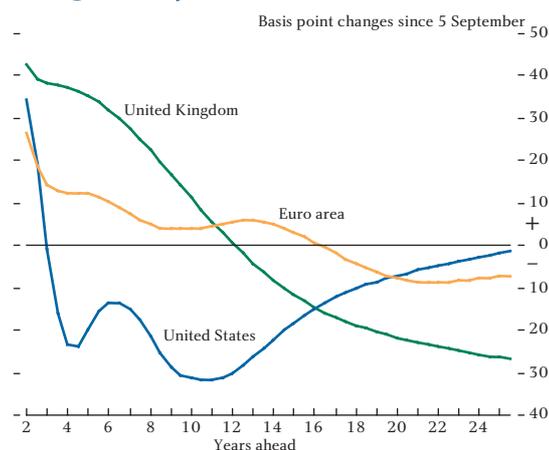
reported some increase in short-run inflation expectations or risk premia relating to (uncertainty about) the implications of a change in the Government's inflation target from an RPIX measure.<sup>(1)</sup> On 10 December, the Government announced a new operational inflation target for monetary policy of 2%, as measured by the twelve-month increase in the harmonised Consumer Prices Index.

### Long-term interest rates

The pattern of changes in euro, sterling and US dollar implied forward rates varied (Chart 8). In the euro area, forward rates were relatively stable. In the United States, there were large declines in forward rates towards the end of the period, despite stronger-than-expected data releases. Contacts reported that this was largely due to

(1) This might also reflect expected future differences between the RPI (retail prices index) inflation measure, to which inflation-linked gilts are indexed, and the RPIX inflation measure.

**Chart 8**  
Changes in implied nominal forward rates<sup>(a)</sup>

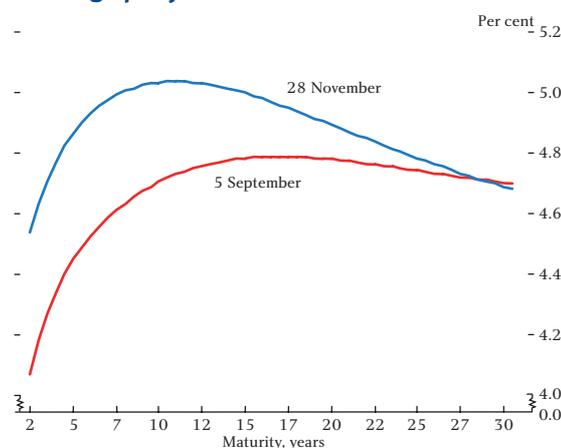


(a) Three-month forward rates derived from the Bank's government liability curves.

market repositioning, as dealers and speculators covered short positions they had established in anticipation of a rise in US dollar yields.

In sterling, yields rose across the curve (Chart 9); but this rise was far less pronounced at the long end, so that long-term forward rates fell.

**Chart 9**  
Sterling spot yield curve<sup>(a)</sup>



(a) Derived from the Bank's government liability curves.

These forward rates can be thought of as the rates of interest at which it is possible to agree today to lend (for three months) at some specified points in the future. In theory, each forward rate can be explained as the sum of three terms—the expected future (three-month) interest rate, a risk premium and a convexity adjustment. The risk premium compensates the lender for the risk that the future short-term interest rate might be higher than expected. The convexity adjustment is related to

uncertainty about the future interest rate and has a negative impact on the forward rate. It adjusts for the fact that—if the forward contract were traded—it would be valued in terms of the future one-period bond price, which is a convex function of the future interest rate.<sup>(1)</sup>

So a decline in forward rates could, in theory, be due to lower expectations of, or higher uncertainty about, future interest rates, or a fall in the risk premium. At long horizons, it is difficult to rationalise a fall in expectations that is greater at, say, 25 years than it is at 15 years. There is also little evidence to suggest that there has been a marked increase in uncertainty over future sterling interest rates. From a theoretical point of view, this suggests that the profile of sterling long-term forward rate changes in Chart 8 is more likely to be explained by a fall in the risk premium, perhaps on the basis that the long end of the curve is now perceived to be more closely anchored to long-run prospects for growth and inflation. But again, it is difficult to explain why this might have been particularly the case over recent months.

An alternative explanation relies on institutional factors, with the fall in sterling forward rates related to a rise in demand for long-dated gilts. The rise in sterling short-term interest rates noted in the previous section meant that yields at medium to long maturities also rose (Chart 9) and the duration of these assets fell.<sup>(2)</sup> Contacts reported that this prompted some investors—such as pension funds—to switch into longer-duration securities in order to match the interest rate risk of their liabilities. This additional demand may have put downward pressure on longer-term interest rates. There were also reports of UK pension funds reallocating assets from equities to long-dated bonds.

### Interest rate uncertainty

The degree of market uncertainty about the future path of short-term interest rates may be reflected in measures of implied volatility from short-term interest rate options contracts. Quoted implied volatility, which is expressed as a percentage of the underlying interest rate, remained higher for US dollars than for sterling and euro (Chart 10). But this is largely an artefact of the low level

(1) The time  $t$  price of a forward contract to lend at time  $t+n$ , for example, can be written as  $\exp[-f_{t+n}]$ , where  $f_{t+n}$  is the contracted forward rate. In the absence of risk premia, this should equal the expected price of a one-period bond at time  $t+n$  ie  $E[\exp[-r_{t+n}]]$ , where  $r_{t+n}$  is the future short-term interest rate. Taking a second-order approximation, it follows that the forward rate is equal to:  $f_{t+n} \approx E[r_{t+n}] - 0.5V[r_{t+n}]$  where the second term is the convexity adjustment and is determined by the expected variance of the future short rate,  $V[r_{t+n}]$ .

(2) The duration of a bond is the average time remaining to future coupon and principal payments weighted by their present value.

**Chart 10**  
Six-month quoted implied volatility of short-term interest rates



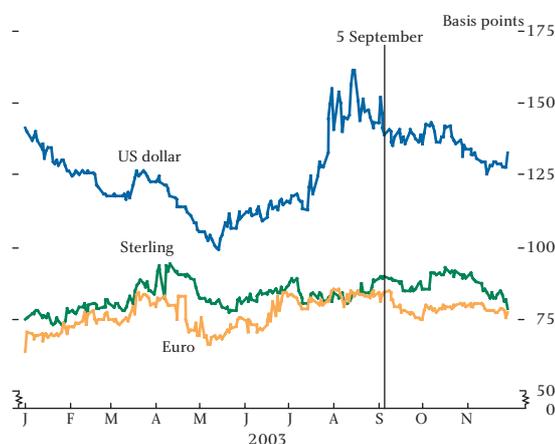
Sources: Bank of England, CME and LIFFE.

**Chart 11**  
Six-month implied basis point volatility of short-term interest rates



Sources: Bank of England, CME and LIFFE.

**Chart 12**  
Three-month implied basis point volatility of ten-year swap rates



Source: Bloomberg.

of current US dollar interest rates, combined with a perception that the US Federal Reserve would still make any changes to its target interest rate in units of 25 basis points. Measured in basis points, uncertainty about short-term US dollar rates over a six-month horizon remained lower than in sterling (Chart 11). Implied basis point volatility across currencies has edged higher in recent months and the gap between them narrowed, but levels are not historically high.

Measures of near-term uncertainty about interest rates at longer maturities derived from the swaption market remained within the range seen earlier in the year, edging down slightly, including in US dollars, where there had been a pickup in volatility in July and August (Chart 12). The profile of three-month swaption-implied volatility at different swap tenors, or the 'term structure' of implied volatility, is discussed in the box on page 398.

## Credit spreads and equities

US dollar investment-grade corporate yields fell over the period, unwinding some of the increases seen in the summer. Sterling and euro investment-grade corporate yields rose, but not by as much as government bond yields, and sub investment-grade bond yields fell across currencies. Credit spreads in all currencies narrowed therefore, suggesting a decline in perceived credit risk and a continued 'search for yield' by investors (Charts 13 and 14).<sup>(1)</sup> Declines were broad-based, across industry groups.

Chart 15 shows the implied volatilities from equity options over a long time period, and illustrates that equity-implied volatilities have fallen since spring to their lowest levels in a number of years.

Most major equity indices rose only slightly over the period, in contrast to the larger increases over the previous six months (Chart 16). With small changes in real interest rates, the continued rise in equity prices might have reflected upward revisions to expected corporate earnings or lower risk premia. US third-quarter earnings were strong and upward revisions to US GDP growth consistent with stronger-than-expected earnings. However, the Nikkei fell over the period, in part on concerns about the possible impact on Japanese economic recovery of the yen's appreciation.

(1) See also section 1.1 of the *Bank of England Financial Stability Review*, December 2003, pages 17–18.

## Term structure of implied volatility

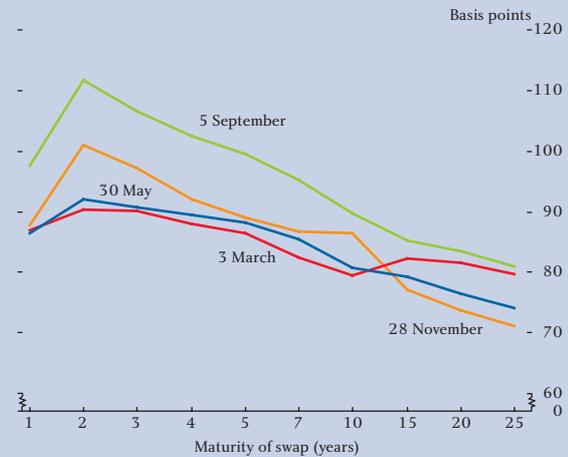
Using the prices of short-term options to lend at different maturities, it is possible to back out a term structure of implied volatility. Options on swaps—swaptions—are generally more frequently traded, and so provide a clearer read on the term structure of implied volatility, than options on, for example, government bond futures contracts. A swaption gives the buyer the right, but not the obligation, to enter into an interest rate swap at a specified date in the future for a specified term. Chart A shows implied basis point volatility from three-month options on swaps with tenors ranging from one to 25 years.

Two points are worth noting in particular. First, the implied volatility curve is generally upward sloping at short maturities but downward sloping beyond two years. This suggests that, in the near term, the greatest uncertainty is typically about changes in the cyclical path of the economy and, so, in the expected stance of monetary policy, over the next couple of years. The lower longer-term uncertainty might reflect credibility of the UK monetary policy framework and expected stability in the determinants of long-term real rates of interest, at least in the near term. Second, and following on from that, the shape of the front end of the curve can vary over time, depending on the degree of monetary policy uncertainty, which may be greatest around perceived turning points. For example, there was a flatter profile of sterling swaption volatility in the early part of the year.

Chart B shows the term structure of volatility across currencies. While the shape of the curve is broadly similar, the level of US dollar implied basis point volatility is higher, and has been for some time, and there is a noticeable hump in its term structure around the two to ten-year tenor. This may reflect a different pattern to the sterling and euro markets of relative demand for and supply of swaptions in the US dollar markets, as US dollar swaptions are used to hedge prepayment risk on US mortgage assets.<sup>(1)</sup>

(1) For a discussion of recent US mortgage hedging activity, see 'Markets and operations', *Bank of England Quarterly Bulletin*, Autumn 2003, pages 258–59.

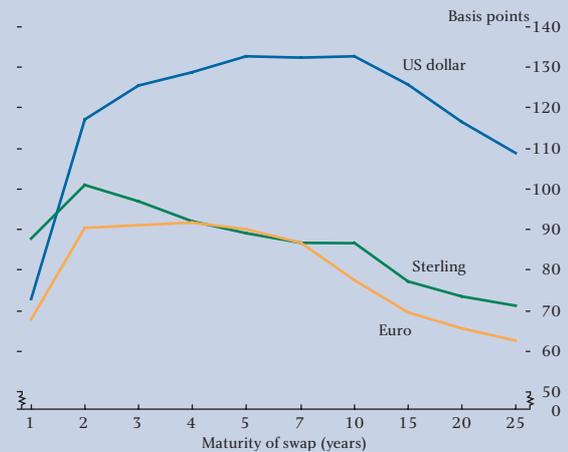
**Chart A**  
Term structure of three-month option-implied basis point volatility of sterling fixed/floating interest rate swaps<sup>(a)</sup>



Source: Bloomberg.

(a) Dates shown relate to data cut-off points for previous *Quarterly Bulletin* 'Markets and operations' articles.

**Chart B**  
Term structure of three-month option-implied basis point volatility of euro, sterling and US dollar fixed/floating interest rate swaps<sup>(a)</sup>



Source: Bloomberg.

(a) As at 28 November 2003.

## Exchange rates

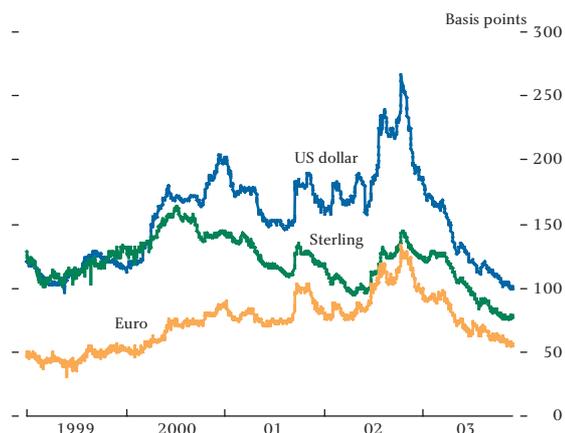
The Japanese yen trade-weighted exchange rate index (ERI) appreciated by 2.6% (Chart 17); this was largely accounted for by an appreciation against the US dollar, of 6.6%. The US dollar ERI declined by 6.8% to its lowest level in nearly seven years.

The US dollar depreciation occurred despite a slight pickup in US GDP growth forecasts relative to other

regions (Chart 1), which might, other things being equal, have been expected to increase demand for US dollar assets or exposure to the US economic recovery. Table B decomposes exchange rate movements according to the uncovered interest parity (UIP) condition, which seeks to assess the impact of interest rate news on the exchange rate.<sup>(1)</sup> Interest rate news here is measured as the change in relative ten-year government bond yields. Movements in euro, US dollar and yen interest rates only

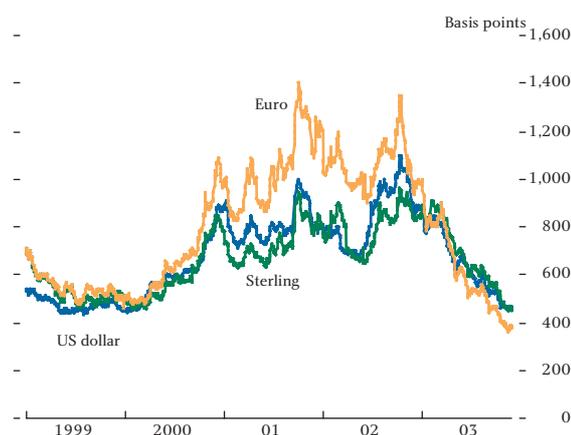
(1) See Brigden, A, Martin, B and Salmon, C (1997), 'Decomposing exchange rate movements according to the uncovered interest parity condition', *Bank of England Quarterly Bulletin*, November, pages 377–89.

**Chart 13**  
Investment-grade option-adjusted corporate bond spreads



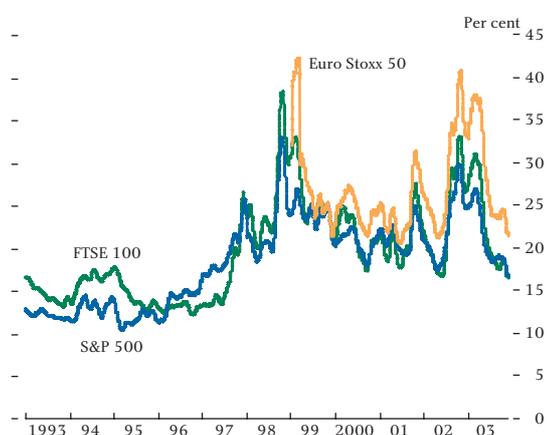
Source: Merrill Lynch.

**Chart 14**  
Sub investment-grade option-adjusted corporate bond spreads



Source: Merrill Lynch.

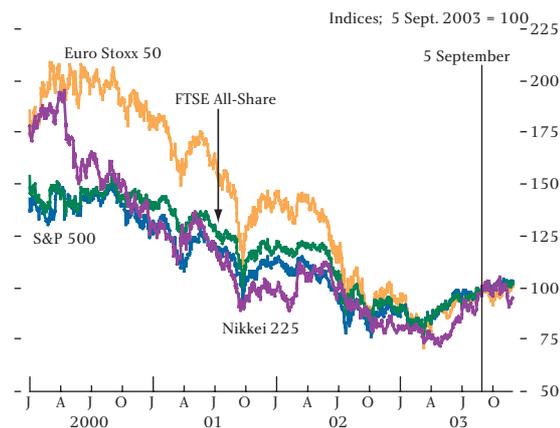
**Chart 15**  
Six-month implied volatilities of selected equity indices<sup>(a)</sup>



Sources: Bank of England, CME, Eurex and LIFFE.

(a) Thirty-day moving averages.

**Chart 16**  
Selected equity indices



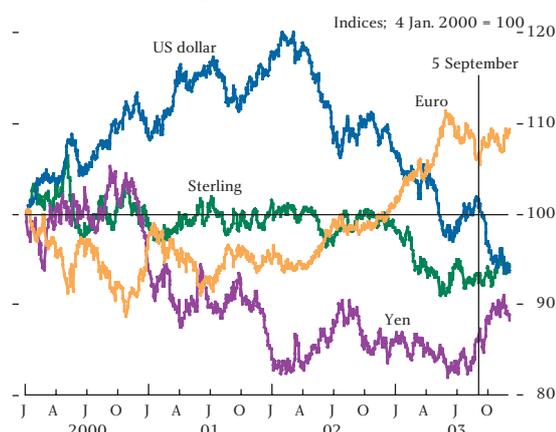
Source: Bloomberg.

partially accounted for movements in the US dollar bilateral exchange rates over the period.

Market contacts suggest that a more plausible proximate explanation for the depreciation of the US dollar is uncertainty about the sustainability of the US current account deficit. Indeed, much of the movement in the US dollar ERI occurred following the 22 September G7 communiqué, with increased market speculation that the US dollar would be allowed to depreciate, especially against Asian currencies. This was followed by a large spike in US dollar-yen option-implied volatility (Chart 18). However, conditions overall in the foreign exchange market were generally orderly and, set against a longer backdrop, the level of implied volatilities was not especially elevated and has since fallen back. Contacts say that one reason implied exchange rate volatilities are not higher is the belief that Asian central banks will intervene effectively to smooth any further appreciation in their currencies against the US dollar.

The sterling ERI was fairly stable over the period as a whole, and has remained within a range of 97 to 102

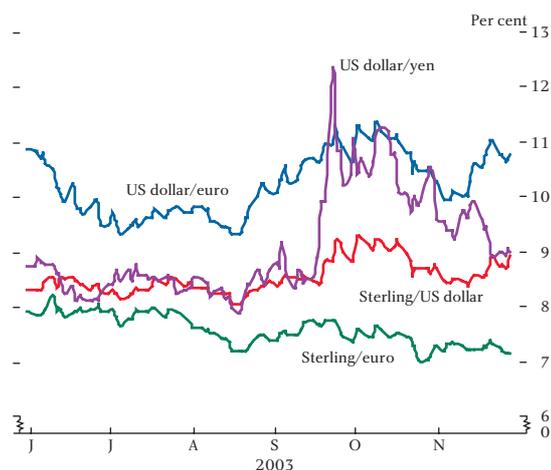
**Chart 17**  
Effective exchange rates



**Table B**  
**Exchange rate movements and news:**  
**5 September–28 November**

	£ ERI	€/£	\$/£	\$/€	¥/£	¥/\$
Actual change (per cent)	1.4	-0.2	8.5	8.7	1.8	-6.2
Interest rate news (percentage points)	2.9	2.1	4.5	2.4	4.0	-0.5
of which: domestic	2.0	2.0	2.0	-0.1	2.0	-2.5
foreign	0.9	0.1	2.5	2.5	1.9	1.9

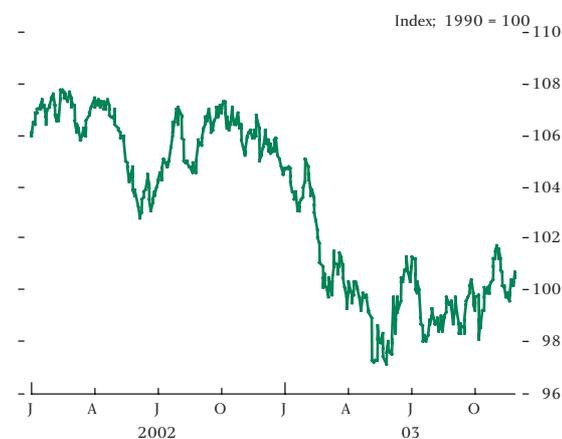
**Chart 18**  
**Three-month implied foreign exchange volatilities**



Source: British Bankers' Association.

prevailing since late February (Chart 19). As sterling reached the upper end of this range in October, market contacts reported that this strength in part reflected 'carry trades' undertaken in anticipation that the MPC would raise the Bank's repo rate in November. (See the box on page 401 for a discussion of such trades.) Some market contacts also reported increased overseas official sector demand for sterling bonds as

**Chart 19**  
**Sterling effective exchange rate**



part of strategies to diversify exchange rate risk in their foreign reserves.

## Developments in market structure

This section provides an update on some significant changes in market infrastructure, as well as developments in sterling money market trading patterns and bond market practices.

### Settlement of money market instruments

The final stage of the work programme begun in the late 1990s to reduce risk in UK payment and settlement systems was completed in October, when the remaining paper money market instruments were migrated from the Central Moneymarkets Office (CMO) to CREST. The CMO was closed on 16 October.<sup>(1)</sup>

Until the migration to CREST, money market securities were generally paper, negotiable instruments, settled in the CMO. They included Treasury bills, bankers' acceptances, and certificates of deposit (CDs).<sup>(2)</sup> The paper money market securities were held in the CMO Depository and the transfer of the securities was effected as 'contractual delivery' across the electronic records of the CMO. Settlement between the settlement banks of CMO members took place on a bilateral net basis at the end of each day across their accounts at the Bank of England.

The migration of money market securities to CREST followed a series of preparations by the Bank, CRESTCo and HM Treasury (including the UK Debt Management Office) and consultations with the market. Legislation to modify the Uncertificated Securities Regulations 2001 was needed to provide for the non-material equivalents of money market securities, known as eligible debt securities (EDS), and this came into force on 24 June 2003.

Migration occurred in a number of stages from mid-September 2003, with existing negotiable securities being cancelled and equivalent securities being issued into CREST. This was a smooth process, which did not affect, for example, the CD primary market (Chart 20)—some market participants had been concerned about the potential impact of migration on CD market liquidity and amounts outstanding.

(1) See Bank of England News Release, 'MMI migration marks completion of UK securities settlement consolidation', 16 October 2003, [www.bankofengland.co.uk/pressreleases/2003/111.htm](http://www.bankofengland.co.uk/pressreleases/2003/111.htm).

(2) Although in practice, CDs were issued in non-material form in the CMO through a deed of covenant and contractual framework involving issuers and CMO members.

## Carry trades in the foreign exchange market

Market practitioners often explain exchange rate movements by referring to the influence of so-called ‘carry trades’.<sup>(1)</sup> This box explains what carry trades are and how they may relate to the uncovered interest rate parity (UIP) concept.

A foreign exchange carry trade occurs when an investor borrows in the currency of a country where nominal interest rates are low by international comparison (the ‘low-yielding currency’), and invests in the currency of a country in which interest rates are high (the ‘high-yielding currency’). The *interest* gain made is called the ‘carry’, the interest earned (or lost) by borrowing an asset and using the proceeds to invest in another asset. For example, at present an investor might borrow Swiss franc (the ‘low-yielding’ currency) in the money market, sell the Swiss franc for a ‘high-yielding’ currency such as sterling or the Australian dollar and invest the proceeds in sterling or Australian dollar-denominated assets, gaining the interest rate differential. The resulting demand for the ‘high-yielding’ currency is reported to have contributed to the appreciation of sterling and the Australian dollar during October.

At face value, these ‘flow-based’ arguments seem to be difficult to reconcile with UIP, which states that *in the absence of risk premia* the positive interest rate differential between, say, the United Kingdom and Switzerland would be associated with an expected depreciation of sterling against the Swiss franc. This depreciation, if it occurs, would be expected to offset *exactly* the carry gained by borrowing in Swiss franc and investing in sterling. However, it is clear that this simple UIP without risk premia does not always hold

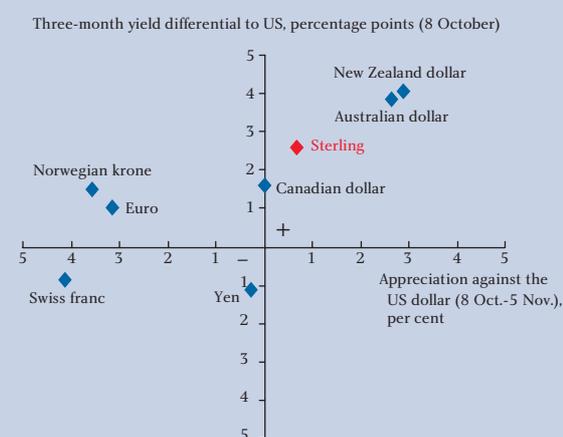
*ex post* over short periods: the currencies of countries with high interest rates have not consistently depreciated relative to those of countries with low interest rates. This is illustrated in Chart A, which shows the change in the exchange rate of various countries against the US dollar on the x-axis and the differential in three-month interest rates relative to US dollar interest rates on the y-axis. It shows that between the October and November MPC meetings (a period during which market practitioners reported carry trades), currencies such as sterling and the Australian dollar have—despite a positive interest rate differential—*appreciated* against the US dollar, while the Swiss franc—despite a negative interest rate differential—*depreciated* against the US dollar.

Allowing for risk premia, Chart A need not be inconsistent with UIP, nor is UIP in principle inconsistent with the idea of carry trades. One could think of a carry trade as the investor being paid a risk premium in order to hold the high-yielding currency now, rather than buy it more cheaply in the forward market. But it is not clear why high-yielding currencies should require such premia. And they would need to be implausibly large to explain some of the larger exchange rate movements observed.

Another way to reconcile carry trades and UIP is through changes in expectations about equilibrium exchange rates. If carry trades reflected changes in expectations about equilibrium exchange rates, the resulting appreciation of the high-yielding currency would not contradict UIP as the latter only makes statements about expected exchange rate changes in the absence of shocks to the expected equilibrium level.

An alternative argument is that carry trades reflect herding behaviour. This could be rational if individual investors believed that the current exchange rate levels would persist for long enough to allow them to earn the carry and close out their position in time, despite the interest rate differential. Positions may build up gradually as investors see the profitability of these trades. But once sentiment changes, positions may be unwound in full and abruptly. This can, at least temporarily, lead to sharp changes in exchange rates as investors try to unwind positions at the same time, a so-called ‘crowded trade’. In this case, the overall change in exchange rates might be consistent with UIP, but the dynamics would certainly differ.

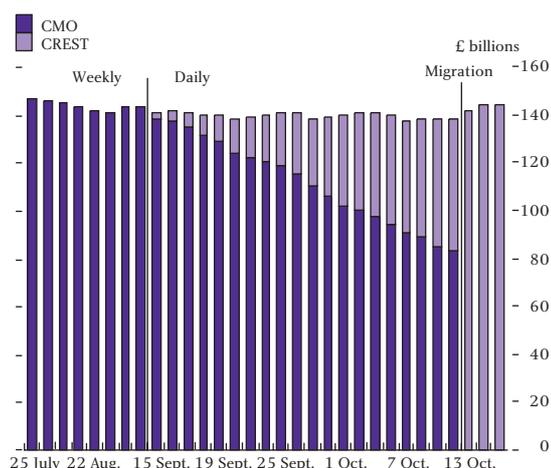
**Chart A**  
Interest rate differential versus US interest rates and appreciation against the US dollar



Source: Bloomberg.

(1) See for example ‘Markets and operations’, *Bank of England Quarterly Bulletin*, Summer 2003, page 156.

**Chart 20**  
**Sterling CDs outstanding in CMO and CREST**



Source: CRESTCo.

As a result of the migration, all UK securities,<sup>(1)</sup> whether gilts, other bonds, equities or money market securities are now settled on the single CREST platform and infrastructure, which has resulted in both efficiency gains and cost savings. More importantly, there has been a significant reduction in risk, as CREST settlements take place on a delivery-versus-payment basis in central bank money, whereas settlement in CMO had entailed large intraday exposures amongst the CMO settlement banks. The settlement banks are also able to take floating charges over their customers' money market securities (as they can over other securities settled in CREST), further reducing risk to settlement banks.

Another advantage of EDS is their fungibility, and this should reduce issuance costs and increase flexibility for issuers and investors. Costs of printing and storing the paper securities are eliminated.

Transactions in EDS can utilise any of the current CREST transaction functionalities, including delivery-by-value (DBV),<sup>(2)</sup> member-to-member transactions, RPO transactions (designed for the settlement of term general collateral repo trades)<sup>(3)</sup> and stock loans. To facilitate such transactions, CRESTCo has established a CREST reference price mechanism for each issue of EDS.<sup>(4)</sup> These enhancements should

encourage the use of money market securities in repo transactions and as collateral. The Bank has observed the wider use of Treasury bills in repo, and contacts report a broader range of banks participating in the Treasury bill market.

### Relative cost of funding via foreign exchange swaps

Sterling CDs are an important source of wholesale funding for some UK banks, but they can also raise non-sterling liabilities and raise sterling via the foreign exchange swap market.

As noted in the previous *Bulletin*, some of the major UK-owned banks have used the US dollar money market—in particular CDs and commercial paper—to help to meet their funding need in sterling, which in turn largely reflects the rapid growth of their UK customer lending.<sup>(5)</sup> These banks have been attracted by the liquidity of the US dollar money market and, contacts report, by relative cost. On an equivalent currency-swapped basis, they report that banks have often been able to secure sterling more cheaply through the foreign exchange swap market.

However, over recent months, contacts have reported an increase in the relative cost of generating sterling from US dollars via the foreign exchange swap market—Chart 21 shows an indicative measure of relative cost at the three-month maturity. But contacts have not reported any deterioration in liquidity in either the underlying money markets or in the swap markets, so that the foreign currency markets still provide the banks with a deep and liquid source of funding.

### Improving market standards in the sterling and euro fixed-income credit markets

In October, a number of large institutional investors in the sterling and euro corporate bond markets launched an initiative intended to improve standards of disclosure and documentation in those markets. In particular, they distinguished 'event risk'<sup>(6)</sup> from credit risk, arguing that the absence of effective protection against event risk in

(1) Except those of unit trusts and open-ended investment companies; work continues to improve settlement facilities for these securities.

(2) In DBV, CREST delivers to the cash lender a basket of securities to a specified current market value and meeting pre-defined criteria (eg gilts and HM Treasury bills).

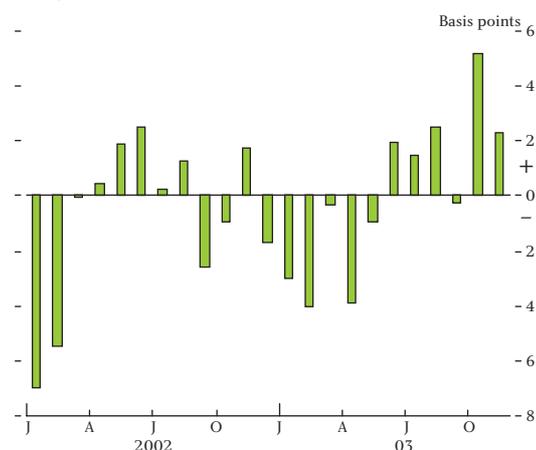
(3) For further details, see *Bank of England Quarterly Bulletin*, Spring 2003, page 16.

(4) The mechanism uses a simple discount-to-maturity calculation based on BBA Libor and long-term credit ratings; it is not intended as an accurate guide to the exact market price at any given time—pricing of any individual money market security remains at the discretion of the parties concerned.

(5) See also Speight, G and Parkinson, S (2003), 'Large UK-owned banks' funding patterns', *Bank of England Financial Stability Review*, December.

(6) Event risk is defined as a 'deliberate change of the risk parameters of an issuer that results in an immediate benefit to equity investors at the expense of fixed-income investors. Examples include leveraged buy-outs, leveraged break-up bids or a borrower substantially changing its risk characteristics through a balance sheet restructuring.'

**Chart 21**  
**Relative cost of raising three-month sterling from US dollars via foreign exchange swaps<sup>(a)</sup>**



Sources: Bank of England and Bloomberg.

(a) Estimate of the cost of issuing three-month US dollar CDs and swapping proceeds into sterling less the cost of issuing three-month sterling CDs.

bond documentation was undesirable, leading to greater volatility in bond prices and lower liquidity than might otherwise be the case.

The group's main recommendations were:<sup>(1)</sup>

- The establishment of minimum covenants for investment-grade corporate issues to protect investors against event risk. In particular, bonds should include a change of control provision, a negative pledge and a disposal of asset restriction.
- Moving away from the so-called 'Spens-call' clause, which relates to the discount rate applied to value a bond redeemed early by an issuer. The proposal is to use a swap-based rate, rather than a gilt rate.
- Better standards of disclosure by issuers, including issuers to make prospectuses available at least three working days prior to an investor roadshow, to send prospectuses to all investors and make them available on web sites, to make detailed

accounts available semi-annually, to hold annual bondholder meetings to coincide with the full-year results and to disclose market-sensitive information in a timely manner.

- All publicly listed bonds to have a rating from at least two principal ratings agencies active in Europe.
- Issuers and investors to work together to encourage dealers to improve secondary market liquidity. In particular, issuers to consult investors on which lead managers provide secondary market liquidity before awarding mandates.

The Bank welcomes this debate and encourages issuers, investors, dealers and the authorities to consider the issues raised.

## Bank of England official operations

### Changes in the Bank of England balance sheet

Table C summarises changes in the components of the Bank's balance sheet between 3 September and 26 November.

The foreign currency components of the Bank's liabilities were broadly unchanged—the Bank maintained the nominal value of its three-month and six-month euro-denominated bills outstanding at €3.6 billion by rolling over bills at maturity. Average issuance spreads were little changed—for three-month bills, they were 11.7 basis points below euribor, compared with 11.2 basis points in the previous period (June-August), and for six-month bills 13.4 basis points below euribor, compared with 14.4 basis points in the previous period.

Notes in circulation, the largest sterling liability on the Bank's balance sheet, increased slightly over the period. It fell in September, as the increased demand related to

**Table C**  
**Simplified version of Bank of England consolidated balance sheet<sup>(a)</sup>**

£ billions

Liabilities	26 Nov.	3 Sept.	Assets	26 Nov.	3 Sept.
Bank note issue	34	33	Stock of refinancing	23	23
Settlement bank balances	<0.1	<0.1	Ways and Means advance	13	15
Other sterling deposits, cash ratio deposits and the Bank of England's capital and reserves	6	7	Other sterling-denominated assets	3	4
Foreign currency denominated liabilities	11	12	Foreign currency denominated assets	12	12
<b>Total (b)</b>	<b>51</b>	<b>52</b>	<b>Total (b)</b>	<b>51</b>	<b>52</b>

(a) Based on published weekly Bank Returns.

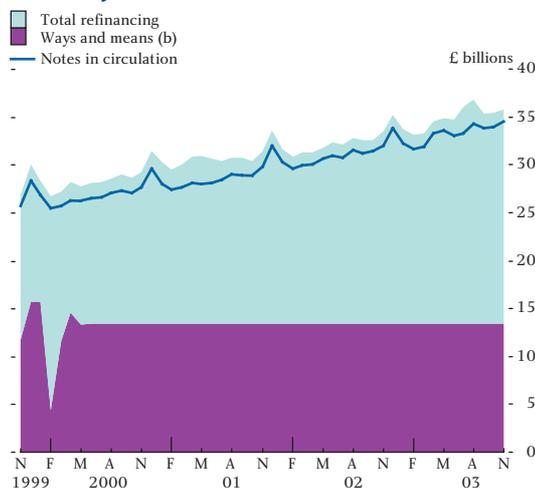
(b) Figures may not sum to totals due to rounding.

(1) For further details, see [www.uksip.org/pdfs/BOND.PDF](http://www.uksip.org/pdfs/BOND.PDF).

the August Bank Holiday unwound, but picked up again late in November, and is likely to continue to rise in the run-up to Christmas and the New Year.

The stock of refinancing provided via the Bank's open market operations moved in line with the changes in notes in circulation (Chart 22). But the size of the banking system's average daily liquidity shortage declined (Chart 23), as there was less recourse to the Bank's overnight lending facilities at 15.30 and 16.20 (Chart 24). This was especially true in the run-up to the MPC's 6 November meeting, when the market expected a quarter-point increase in the Bank's repo rate. Because, under the current operational framework, the Bank's repo rate is fixed for the maturity of the transaction, there was substantial demand by counterparties for two-week repo, at a rate of 3.5%, in the days leading up to the decision. The bid-cover ratio (amount of bids divided by the size of the shortage) in the week leading up to the November MPC decision averaged 4.4, compared with 1.4 in the week prior to the October MPC meeting, when the Committee was expected to maintain the repo rate at 3.5%.

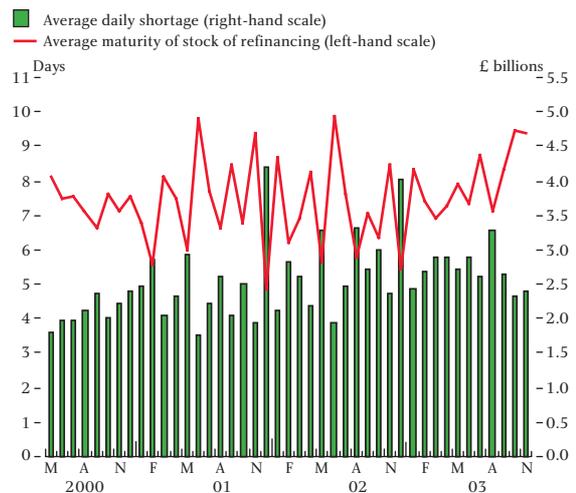
**Chart 22**  
**Bank notes in circulation, the stock of refinancing and 'Ways and Means'**<sup>(a)</sup>



(a) Monthly averages.  
(b) An illiquid advance to HM Government. This fluctuated prior to the transfer of responsibility for UK central government cash management to the UK Debt Management Office in April 2000.

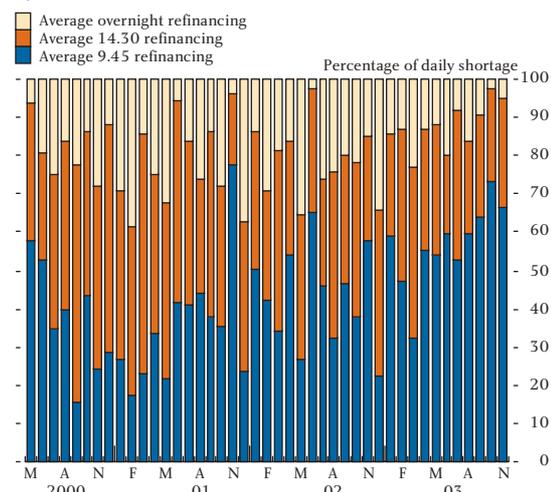
Reduced recourse to the Bank's overnight lending facilities also had the effect of increasing the average maturity of the stock of refinancing (Chart 23). However, the mix of collateral used by the Bank's counterparties was broadly unchanged—gilts, including HM Treasury bills, continued to form the largest part of the Bank's collateral pool. Much of the remainder consisted of euro-denominated EEA government debt (Chart 25).

**Chart 23**  
**Maturity of stock of refinancing and size of daily shortage**<sup>(a)</sup>



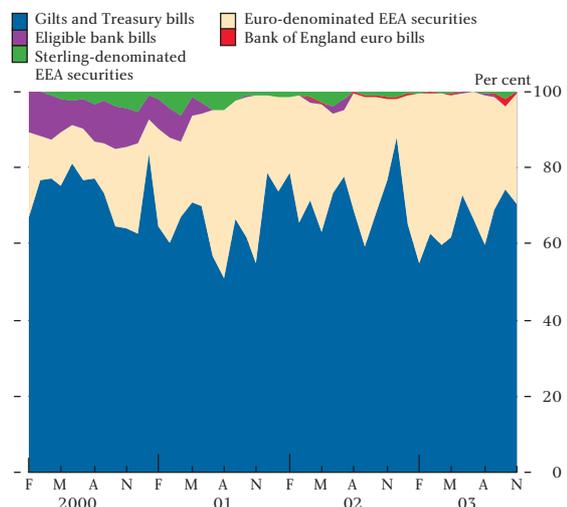
(a) Monthly averages.

**Chart 24**  
**Refinancing provided in the Bank's open market operations**<sup>(a)</sup>



(a) Monthly averages.

**Chart 25**  
**Instruments used as OMO collateral**<sup>(a)</sup>



(a) Monthly averages.

## Review of sterling money markets

On 14 October 2003, the Bank announced it is reviewing its operations in sterling money markets.

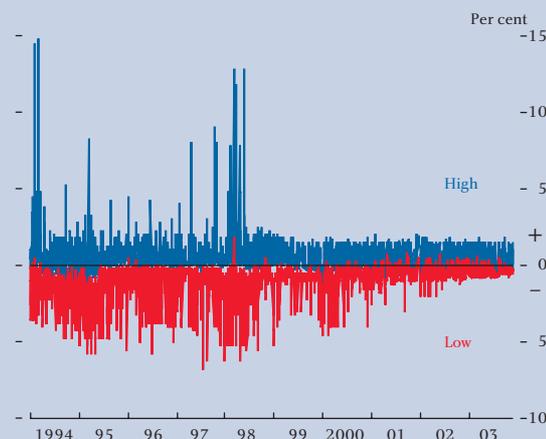
The twin and complementary objectives of the Bank's operations will continue to be to implement monetary policy while meeting the liquidity needs of the banking system. The Bank also wants a framework that continues to support efficient and competitive money markets.

The Bank last reviewed the framework around seven years ago. The changes introduced then—in particular, operating in gilt repo and broadening the range of counterparties—have worked well. The Bank has also made a number of more recent adjustments to its operations, such as the introduction of an overnight deposit facility in June 2001. But the Bank considers it timely to examine now whether there is scope to make further improvements, taking account of the implications for the markets and the wholesale payment systems that support them.

Variability in the sterling overnight interest rate has declined over the past ten years (Chart A). But the dispersion of sterling overnight interest rates remains greater than that in other major currencies. Chart B shows that the distribution of the overnight interest rate index<sup>(1)</sup> around its average spread to the policy rate is wider for sterling than it is for the euro and the US dollar.

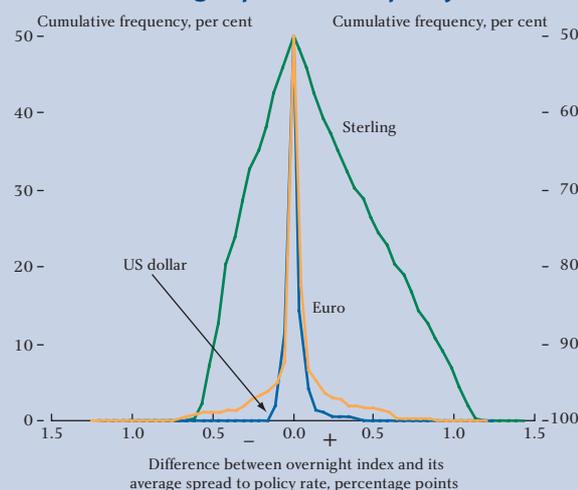
Since its announcement, the Bank has begun a round of consultation with a range of market participants, including the settlement banks, its open market operations counterparties, other banks and intermediaries, other users of the

**Chart A**  
Sterling overnight interest rate<sup>(a)</sup>



(a) High and low of the day observed by the Bank's dealing desk as a spread of the policy rate.

**Chart B**  
Distribution of the overnight interest rate index around its average spread to the policy rate<sup>(a)(b)</sup>



Source: Bloomberg.

(a) From 2 January 2002 to 28 November 2003.  
(b) Figures on the y-axis refer to the frequency with which the average spread was at or below the corresponding figure on the x-axis. For spreads below zero, see the left-hand y-axis; above zero, see the right-hand y-axis.

markets, market associations and infrastructure providers. Any other sterling money market participants that wish to give their views are encouraged to contact the Bank.

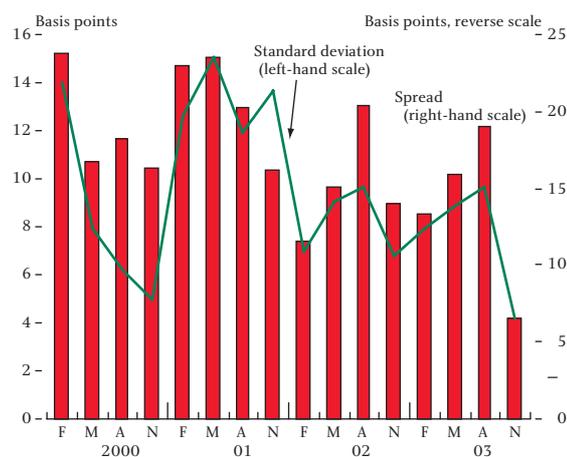
(1) A representative average overnight interest rate weighted by the size of reported transactions. Exact calculations differ across currencies, but the euro, sterling and US dollar indices are broadly comparable.

The spreads between short-dated sterling money market rates and the Bank's repo rate were narrower during the period than over the preceding three months. The two-week GC repo rate averaged 7 basis points below the repo rate from September to November, compared with 19 basis points from June to August (Chart 26). The variability of the rate also diminished—its standard

deviation was 4 basis points from September to November, compared with 10 basis points in the preceding three months.

In October, the Bank announced a review of its operations in the sterling money markets (see the box above).

**Chart 26**  
Size and volatility of two-week GC repo/Bank repo rate spread<sup>(a)</sup>



(a) Quarterly averages.

### Forecasting the liquidity shortage

The average difference between the Bank's daily 9.45 liquidity forecast and the final liquidity shortage of the banking system was close to its average since 2000. There has been some improvement in the accuracy of the 16.20 liquidity forecast in recent months (Table D).

One measure of the quality of settlement banks' own liquidity forecast is the average flow in the End of Day Transfer Scheme (EoDTS).<sup>(1)</sup> In recent months, these flows have been below their typical 2000–2002 levels. However, there has been a marked increase in use of the Late Transfer Window (LTW). The LTW allows settlement banks to make payments to each other after CHAPS closes, at 16.20, and before the EoDTS takes place. It is intended to provide an opportunity for settlement banks to correct technical problems, relating to

**Table D**  
Intraday forecasts versus actual shortages

Mean absolute difference (standard deviation), £ millions

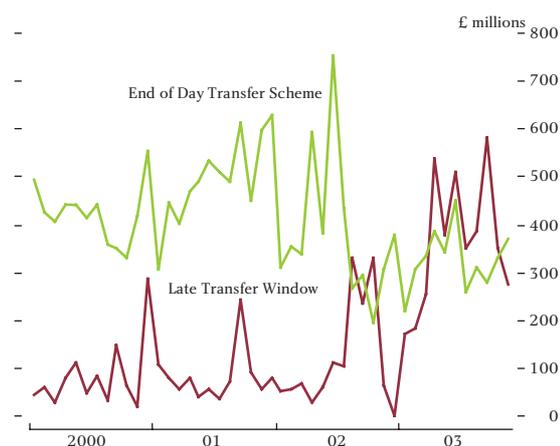
	9.45 forecast	14.30 forecast	16.20 forecast
2000 (a)	121 (96)	99 (64)	103 (56)
2001	98 (205)	56 (51)	30 (73)
2002	85 (107)	43 (79)	30 (73)
2003 H1	99 (108)	50 (66)	35 (37)
July 2003	145 (261)	126 (237)	111 (238)
Aug. 2003	104 (69)	61 (44)	66 (50)
Sept. 2003	105 (109)	83 (98)	76 (80)
Oct. 2003	67 (50)	50 (40)	47 (29)
Nov. 2003	80 (124)	48 (65)	46 (49)

(a) From April 2000.

system/authorisation failures, that prevent transfers from settling during normal CHAPS operating hours.

Chart 27 suggests that, rather than an improvement in forecasting accuracy, the decline in EoDTS flows is related to increased use by settlement banks of LTW transfers. The Bank discourages this substitution, and expects use of the LTW to fall.

**Chart 27**  
Use of the Late Transfer Window and EoDTS<sup>(a)</sup>



(a) Monthly averages.

(1) For an explanation of this scheme, see page 163 of the Summer 2003 *Quarterly Bulletin*, or the APACS web site: [www.apacs.org.uk/downloads/EoDT.pdf](http://www.apacs.org.uk/downloads/EoDT.pdf).

# Understanding and modelling swap spreads

By Fabio Cortes of the Bank's Foreign Exchange Division.

*Interest rate swap agreements were developed for the transfer of interest rate risk. Volumes have grown rapidly in recent years and now the swap market not only fulfils this purpose, but is also used to extract information about market expectations and to provide benchmark rates against which to compare returns on fixed-income securities such as corporate and government bonds. This article explains what swaps are; what information might be extracted from them; and what appear to have been the main drivers of swap spreads in recent years. Some quantitative relationships are explored using ten-year swap spreads in the United States and the United Kingdom as examples.*

## Introduction

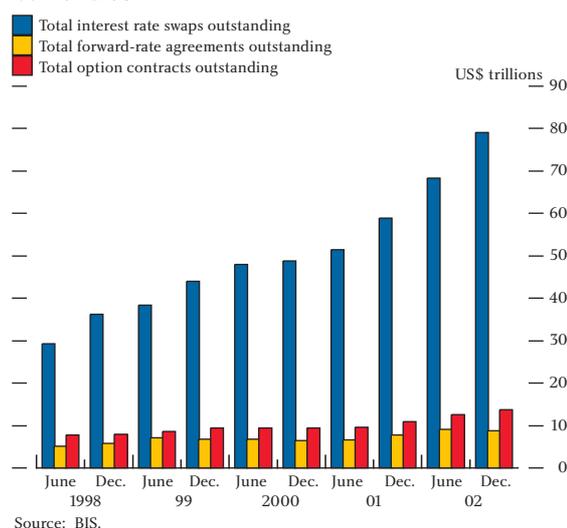
A swap is an agreement between two parties to exchange cash flows in the future. The most common type of interest rate swap is a 'plain vanilla fixed-for-floating' interest rate swap<sup>(1)</sup> where one party wants to receive floating (variable) interest rate payments over a given period, and is prepared to pay the other party a fixed rate to receive those floating payments. The floating rate is agreed in advance with reference to a specific short-term market rate (usually three-month or six-month Libor).<sup>(2)</sup> The fixed rate is called the swap rate and should reflect, among other things, the value each party attributes to the series of floating-rate payments to be made over the life of the contract. Swap markets serve as a link between government debt, corporate debt and money markets, across currencies (via basis swaps)<sup>(3)</sup> and maturities.

Differences between swap rates and government bond yields of the same maturity are referred to as swap spreads. If the swap and government bond markets are priced efficiently, swap spreads may reveal something about the perception of the systemic risk of the banking sector. This is because the risk of the systemic failure of the banking sector is embedded in Libor rates. If however, the swap and government markets are not

priced efficiently at all times, swap spreads may be altered by perceptions of the economic outlook and supply and demand imbalances in both the swap and the government bond markets.

The volume of swap transactions has increased rapidly in recent years (see Chart 1). Swaps are the largest type of traded interest rate derivatives in the OTC (over-the-counter)<sup>(4)</sup> market, accounting for over 75% of

**Chart 1**  
OTC interest rate contracts by instrument in all currencies



- (1) Another common type of swap is a currency swap involving the exchange of principal and interest payments in one currency for principal and interest payments in another currency.
- (2) The London Interbank Offered Rate (Libor) is a measure of the interest rate at which banks borrow funds from other banks in the London interbank market. US dollar and sterling Libor rates are determined each day by averaging over a panel of banks determined by the British Bankers' Association. The euro area has a similar interbank rate, called Euribor.
- (3) A basis swap is an interest rate swap carried out between two floating rates set against two different reference rates. The cash flows (interest payments) exchanged are calculated from two floating-rate indices which might differ by currency and/or by instrument, eg Libor, certificate of deposit or Treasury bill.
- (4) Over-the-counter means an asset that is not traded on an exchange but traded as a result of direct negotiation between buyers and sellers.

the total amount traded of these contracts.<sup>(1)</sup> Initially developed as a means of allowing institutions to manage interest rate exposures on their asset and liability portfolios more effectively, more recent demand has come from hedging and speculative sources. One recent source of demand—for hedging mortgage-backed security portfolios—will be discussed later.

To illustrate how interest rate swaps can be used to manage interest rate risk, suppose that an institution has floating-rate liabilities (debt), and that it pays 5 basis points over a reference rate such as three-month Libor, but has fixed-rate paying assets. Should interest rates rise, it will be paying out more via its floating debt payments but its fixed-rate asset income will remain the same, ie it will incur a loss. To reduce this interest rate risk exposure, the institution can enter into a swap where it pays a fixed rate, and receives a floating rate. As interest rates rise, part of the gap between its floating-rate payments and its fixed-rate income will be closed by its incoming floating-rate coupons. The key idea is that an institution can *synthetically* create either fixed or floating-rate assets via a swap agreement.

The fixed 'leg' in a swap can be thought of as a fixed-rate bond trading at par and paying a coupon equal to the swap rate, that is, the swap rate is equivalent to a par yield.<sup>(2)</sup> The large volume of swap contracts outstanding implies that par yields of swaps are easily obtainable for different maturities allowing market participants to build and use swap yield curves. Indeed, swap yield curves have become popular as benchmarks against which market participants can assess the returns on their (fixed-income) assets.<sup>(3)</sup>

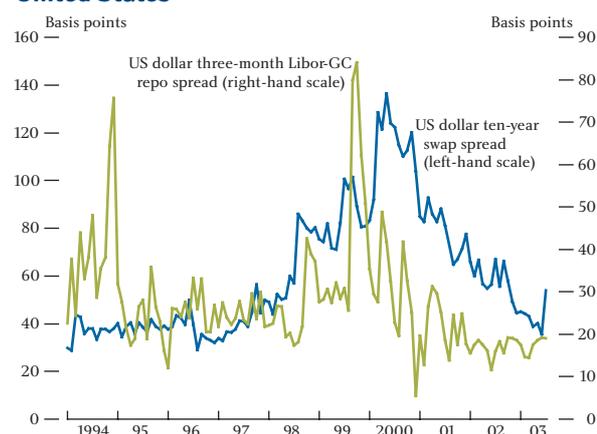
### The theory: fair value of swap spreads

Compared with a government bond yield curve, the swap yield curve also reflects expectations of the future spread between the relevant Libor rate and the general collateral (GC) repo rate<sup>(4)</sup> of equivalent maturity.<sup>(5)</sup> This Libor-GC repo spread should reflect the premium that investors require to compensate them for the probability of a systemic failure of the banking sector. This

premium would be embedded in the Libor rate, but it is not present in the GC repo rate. We note, however, that there is survivorship bias in the Libor indices; the risk of an individual bank defaulting has an almost negligible impact on Libor and hence on swap rates since banks whose credit rating deteriorates drop from the Libor panel.

So, in theory, the fair value of the swap spread should encapsulate the compensation required by interbank lenders to offset expected losses on a series of rolling unsecured loans (referenced to Libor) over the life of the swap. This relies on there being a close relationship between expectations of future Libor-GC repo spreads and the swap spread, and there is some evidence to suggest that this relationship does not hold closely in practice. By way of example, Chart 2 plots the current three-month Libor-GC repo spread against the US dollar ten-year swap spread.

**Chart 2**  
Swap spreads and the Libor-GC repo spread in the United States



Sources: Bloomberg and Thomson Financial Datastream.

Chart 2 shows that the US dollar ten-year swap spread displays persistent deviations from the Libor-GC repo spread, while the latter seems to revert quickly to its long-run average, having been affected by short-run disruptions such as the three months prior to the Millennium.<sup>(6)</sup> There is also some academic evidence to indicate that expected future Libor-GC repo spreads, and

(1) In currency terms, euro and US dollar interest rate swaps accounted for over 70% of all interest rate swaps outstanding at the end of June 2003. Sterling interest rate swaps only accounted for 7% of all OTC interest rate derivatives (source: BIS).

(2) See Cooper and Scholtes (2001).

(3) See Haubrich (2001).

(4) A repo is a bilateral agreement in which one party ('seller') agrees to sell securities to the other ('buyer') and, at the same time and as part of the same transaction, the seller agrees to repurchase equivalent securities at an agreed price on a specified future date. The economic effect of this transaction is to create a collateralised loan from the buyer to the seller. The return on this collateralised loan, the repo rate, is typically quoted and used to calculate the repurchase price.

(5) See Cooper and Scholtes (2001) for a detailed explanation.

(6) The R-squared of the regression of the three-month Libor-GC repo spread on the US dollar ten-year swap spread is only 0.05 during the 1993–2003 period.

hence banking sector risk, are not the main drivers of observed swap spreads.<sup>(1)</sup> Rather, external factors may affect the relative pricing of swaps and government bonds—for example, the strong demand coming from hedging sources noted above. In the remainder of this article, we attempt to quantify the impact of these and other factors on US dollar and sterling swap spreads in recent years.

### Main drivers of US dollar swap spreads

Since 1993 there have been three phases in ten-year swap spreads in the United States<sup>(2)</sup> (see Chart 3). Swap spreads fluctuated in a narrow range during the 1993–98 period, significantly widened during the 1998–2000 (May) period, and have been tightening since their peak in May 2000.

**Chart 3**  
Medium-run developments and short-run variations of US dollar ten-year swap spreads



Sources: Bloomberg and Thomson Financial Datastream.

Swap spreads have fluctuated around these three phases, but there have been three noticeable short-term variations of swap spreads (see Chart 3). The first was during Summer/Autumn 1998. In August 1998, Russia defaulted on its sovereign debt, and liquidity began to dry up rapidly worldwide as derivative positions were quickly unwound. By mid-September, mounting margin requirements drove the hedge fund Long Term Capital Management (LTCM) to the verge of collapse. LTCM answered its margin calls by liquidating many of its leveraged positions.<sup>(3)</sup> This unwinding process was

exacerbated by the fact that other market participants faced similar selling pressures to LTCM. There was a noticeable reduction in the risk capital employed by hedge funds, which were typically receiving fixed payments in swaps, thereby widening swap spreads. Simultaneously, many investors moved their funds rapidly into high-credit securities, especially government bonds, causing bond yields to fall, putting further widening pressure on swap spreads.

The US Treasury announcement of debt buybacks in January 2000 had an even larger effect on US dollar ten-year swap spreads. Expectations that the US fiscal position would continue to improve implied that the stock of US Treasury debt outstanding was decreasing to a point where the Treasury had to buy back off-the-run<sup>(4)</sup> bonds to maintain liquidity in their on-the-run bonds. At the time, some market participants even predicted the disappearance of the US Treasury debt market during the coming decade. The reduced prospective supply of Treasuries pushed down Treasury yields and widened swap spreads by over 50 basis points in the following four months.

Finally, in July 2003 US dollar swap spreads widened sharply following a wave of mortgage prepayment hedgers actively paying fixed in swaps during the month. This was associated with the sharp rise of US Treasury yields in July 2003 that caused mortgage prepayment hedgers to pay fixed in swaps in order to reduce the average *duration* of their assets (see the section on mortgage prepayment hedging for a more detailed explanation).

The US Treasury announcement of debt buybacks in January 2000 demonstrates the potential influence of relative imbalances in supply between the government bond and swap markets. Similarly, several demand factors can be seen to be linked to swap spread fluctuations in recent years. Demand for swaps often comes from two main sources: issuers of corporate/credit paper and national funding agencies, and mortgage prepayment hedgers in the United States (as in July 2003). Demand for bonds, in contrast, appears to increase during 'flight-to-quality' periods.

(1) See Litzenberger (1992), Grinblatt (1995) and Collin-Dufresne and Solnik (2001).

(2) This article uses the US dollar swap market as the 'proxy' to study the interplay between swap spreads and other factors. The US dollar swap market is a long-established and very liquid swap market. Sterling interest rate swaps were one quarter of all US dollar interest rate swaps outstanding at the end of June 2003 (source: BIS).

(3) See IMF (2003) for a detailed explanation.

(4) On-the-run government bonds are those that are the most recently issued by the government, that is, they are highly liquid due to frequent trading activity. Off-the-run government bonds are assets less frequently traded, ie more illiquid, that were issued prior to the on-the-run bond.

Finally, deviations in swap spreads also seem to be linked to changes in risk preferences of investors, that is, risk and liquidity premia.

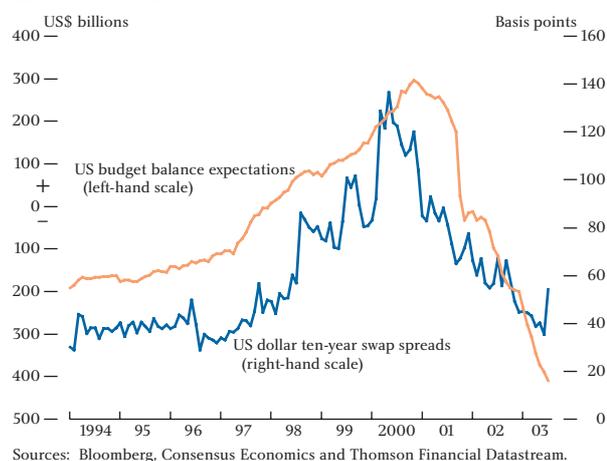
Hence, the risk of a systemic failure of the banking sector, supply and demand imbalances, and risk and liquidity premia seem to be relevant theoretical drivers associated with movements in swap spreads. This section suggests five different variables which empirically seem to help us to quantify the impact on swap spreads over recent years of these theoretical influences. These variables are: expectations of government issuance, the slope of the yield curve, equity-implied volatility, the on-the-run/off-the-run spread and the effective duration of mortgage-backed securities.

### Expectations of government bond issuance

In a cyclical slowdown, market participants might expect tax revenues to fall, leading to increased government borrowing. Government bond prices could fall in response to the extra supply—government bond yields would increase and swap spreads would tighten. In contrast, during periods of high economic growth, governments tend to decrease their debt issuance as tax revenues increase. This might then be associated with widening swap spreads.

A measure of expectations of government bond issuance is expectations of fiscal balances. Consensus Economics provides a monthly average<sup>(1)</sup> estimate of budget balance expectations for the current and subsequent fiscal year. Chart 4 shows that there is an apparent long-run

### Chart 4 Swap spreads and budget balance expectations in the United States



(1) Consensus Economics provides an average of the expectations of budget balances of several economic forecasters.

(2) See Cooper, Hillman and Lynch (2001).

relationship between this measure and swap spreads. The more positive the budget balance expectations, the smaller the expected government bond issuance, and hence the wider the swap spreads.

### The slope of the yield curve

Empirically, swap spreads tend to tighten when the yield curve steepens, and widen when the curve flattens (see Chart 5).

### Chart 5 Swap spreads and the slope<sup>(a)</sup> in the United States



(a) Calculated as the difference between the yield on ten-year US Treasuries and on two-year US Treasuries.

One reason for this behaviour is related to the fact that issuers of corporate debt and national funding agencies are increasingly an important part of the OTC swap market. These institutions usually focus on the total cost of funding their liabilities, typically hedging these liabilities by entering into swap contracts. In a steep yield curve environment the cost of funding long-dated fixed-rate liabilities increases, and these institutions prefer to swap their long-maturity fixed-rate bond issuance for shorter-maturity liabilities by paying floating in the short end and receiving fixed payments in the long end. As swap rates are the prices (fixed rates) that the market is willing to pay to receive floating interest rate payments, this additional demand to receive fixed in the long end may, *ceteris paribus*, cause swap rates to fall, and swap spreads to tighten.

The slope of the yield curve may also be linked to swap spreads via the extent to which it reflects expectations of future economic growth.<sup>(2)</sup> The yield curve usually inverts in anticipation of recession for two reasons: the bond market anticipates future monetary easing, and the demand for risk-free assets shifts along the curve. To

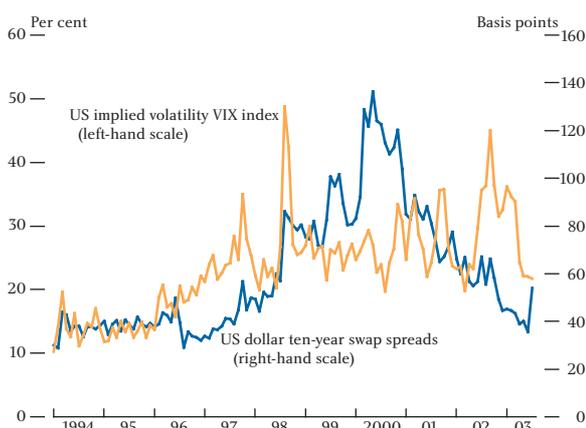
demonstrate this second effect, suppose that an economic slowdown is expected during the following year, then there is likely to be increased demand for long-term government bonds, which will provide fixed receipts in the economic downturn. This may cause the price of long-term bonds to increase causing the yield to maturity to fall. In the meantime, shorter-term assets may be sold to finance the purchase of the long-term government bonds, bringing down the price of the shorter-term asset and thus increasing its yield. The net effect is to cause the yield curve to flatten or invert.<sup>(1)</sup>

In an inverted yield curve environment swap spreads are likely to widen for two reasons. First, assuming that the term structure of swap rates remains constant, swap spreads of long maturities are likely to widen as long-term government bond yields fall. Second, economic slowdowns are normally associated with increasing risks to the stability of the financial system, raising expectations of future Libor-GC repo spreads and putting widening pressure on swap spreads.

### Risk and liquidity premia

A general increase in the perceived level of uncertainty is also often associated with ‘flights to quality’. Chart 6 shows that spikes in uncertainty, as measured by the implied volatility of equity markets, have at times been associated with increases in swap spreads. Similarly,

**Chart 6**  
Swap spreads and VIX<sup>(a)</sup> equity-implied volatility in the United States



Sources: Bloomberg and Thomson Financial Datastream.

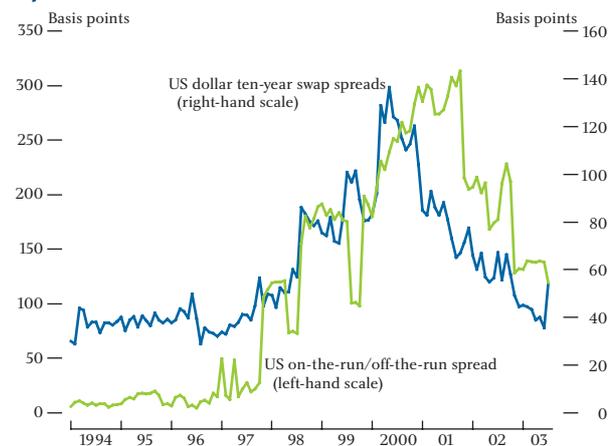
(a) The VIX index (Chicago Board Options Exchange Volatility index) calculates an estimate of future volatility, based on the weighted average of the implied volatility of eight call and put options traded on the Standard & Poor's 100 equity index.

increases in risk premia<sup>(2)</sup> (the amount of return investors require for a given level of risk) would also lead to an increase in demand for risk-free assets—though risk premia are difficult to measure directly.

In addition, during economic downturns the liquidity premium between swap rates and yields on the on-the-run benchmark government bond usually rises, widening swap spreads: government bonds in such periods tend to be the most liquid assets in fixed-income markets, and thus other instruments like swaps usually pay a liquidity premium above the government bond yield.<sup>(3)</sup>

Chart 7 shows the spread between the on-the-run ten-year benchmark bond and a basket of off-the-run bonds that fall within a ten-year maturity range. Compared with swap spreads, there is some evidence of low-frequency correlation between the two series.

**Chart 7**  
Swap spreads and the on-the-run/off-the-run spread in the United States



Sources: Merrill Lynch (via Bloomberg) and Thomson Financial Datastream.

### A recent driver of swap spreads: mortgage prepayment hedging in the United States

In the past few years, swap spreads have also been driven by factors relating to the structure of the US mortgage market. When interest rates fall sufficiently, US homeowners may exercise an option to refinance their fixed-rate mortgages at the lower rates. As a result, Government Sponsored Enterprises (GSEs) such as Fannie Mae and Freddie Mac, which own portfolios of mortgage-backed securities (MBS), may find themselves with a fall in the *duration* of their assets as more of the

(1) See Harvey (1993).

(2) Increasingly, market participants refer to the concept of risk appetite, usually used as the opposite of risk premia.

(3) The liquidity premium is associated with changes in consumer confidence and the stock of US Treasury supply available to investors during economic downturns. See Longstaff (2003) for a detailed explanation.

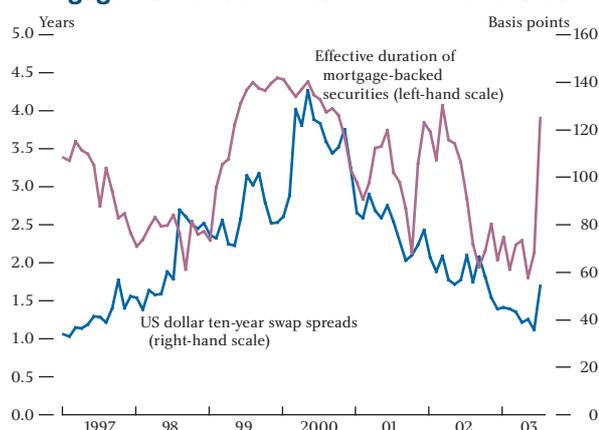
mortgages backing these securities are repaid early.<sup>(1)</sup> With no major change in the duration of their liabilities, this exposes them to interest rate risk.

One way of adding duration to their asset portfolios in a falling interest rate environment is to buy long-maturity Treasuries. This would, *ceteris paribus*, tend to widen swap spreads. Agencies, however, do not usually do this because US Treasuries only remain an effective hedge to add duration while they show similar yield movements to US GSEs' (agency) bonds. As this relationship broke down after the LTCM crisis of Autumn 1998, US GSEs began increasingly to use interest rate swaps<sup>(2)</sup> to extend duration, receiving fixed and paying floating, causing swap spreads to tighten.<sup>(3)</sup>

In contrast, if, as in July 2003, there is a sharp rise in long-term interest rate expectations (reflected in long-term Treasury yields), the incentive of US homeowners to exercise the option to refinance their fixed-rate mortgages diminishes significantly. This will increase the *duration* of the portfolios of mortgage-backed securities, which will trigger a wave of mortgage prepayment hedging activity, whereby hedgers pay fixed in swaps to reduce the *duration* of their assets.

The effective duration of the Merrill Lynch Mortgage-Backed Securities master index potentially offers a simple way to capture this effect empirically (see Chart 8).

**Chart 8**  
Swap spreads and effective duration of mortgage-backed securities in the United States



Sources: Merrill Lynch (via Bloomberg) and Thomson Financial Datastream.

Changes in refinancing activity of US mortgage-holders are usually followed by changes in the effective duration of mortgage-backed securities, and hence, changes in swap spreads.

## Assessing the quantitative effect of these factors on US dollar ten-year swap spreads

In this section, the impact of the proxy variables explained above on swap spreads is evaluated via a contemporaneous regression framework. This provides a way to undertake *ex-post* analysis of swap spreads, ie to help to explain why swap spreads moved over past months. The description of the factors already discussed suggests that the following signs might be expected:

**Table A**  
Expected relationship between swap spreads and explanatory variables

Variable	Coefficient sign	Initial movement	Impact on swap spreads
Treasury issuance expectations	-	Increase	Tightening
Slope	-	Steepening	Tightening
On/off spread	+	Increase	Widening
Implied volatility	+	Increase	Widening
Effective duration of mortgage-backed securities	+	Increase	Widening

We noted from Chart 2 that, in recent years, there have been persistent deviations of swap spreads from the levels that may be represented as a long-run equilibrium, ie representing only banking sector risk. To capture the potential influence of the factors listed above on these persistent deviations, we use a multivariate error correction model (VECM).<sup>(4)</sup> This allows us to identify an 'equilibrium' relationship of swap spreads over our sample period (the past six years),<sup>(5)</sup> indicating the direction in which swap spreads must move following short-run shocks in order to re-establish the medium-run trends apparent in the data.

Changes in swap spreads are regressed against monthly changes in their main drivers and the medium-run adjustment variable. The equation estimated is given below.

(1) See also Box 7 of the *Bank of England Financial Stability Review*, June 2002 (page 72).

(2) See special report of *Risk* magazine, 'Convexity hedging and its impact on US swap spreads', March 2002, Vol. 15, No. 3 (available at [www.risk.net](http://www.risk.net)).

(3) GSEs have also been reported to hedge duration by expanding their balance sheets by purchasing mortgage-backed securities funded by issuing short-term liabilities.

(4) See Fernandez-Corugedo, Price and Blake (2003) for an explanation and a practical application of the VECM.

(5) Over this period at least one cointegrating relationship is identified for US dollar ten-year swap spreads using Johansen's cointegration test. See Johansen (1995) for further detail.

$$\begin{aligned}
 (1) D(\text{swap spread}) = & \\
 & \alpha_1 * D(\text{budget expectation})^{(1)} + \\
 & \alpha_2 * D(\text{slope}) + \\
 & \alpha_3 * D(\text{on/off spread}) + \\
 & \alpha_4 * D(\text{equity-implied volatility}) + \\
 & \alpha_5 * D(\text{effective duration of MBS}) - \\
 & \text{MREC}(-1)
 \end{aligned}$$

Note:  $D$  represents the change in the variable, such that  $D(\text{swap spread}) = \text{swap spread}_t - \text{swap spread}_{t-1}$ . MREC is the medium-run adjustment (error correction) variable that accounts for the persistent deviations in swap spreads.

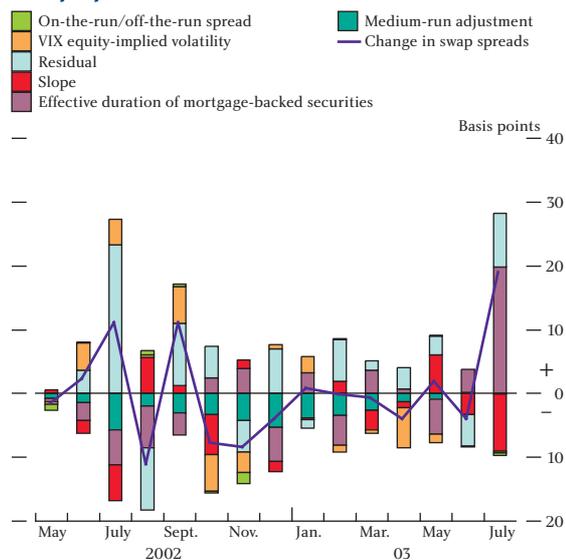
Table B shows the results of regressing changes of US dollar ten-year swap spreads against the explanatory variables and the medium-run adjustment over the past six years<sup>(2)</sup> (January 1997–August 2003). Changes in the slope, changes in equity-implied volatility, changes in the effective duration of mortgage-backed securities and the medium-run adjustment are all significant at the 5% level. All the coefficients have the expected sign, except changes in budget balance expectations. The results suggest that an increase in the slope of the yield curve of 1 basis point would lead to a tightening in swap spreads of 0.19 basis points, and that an increase in the effective duration of mortgage-backed securities of one year would lead to a widening of swap spreads of 11 basis points.

**Table B**  
**OLS regression of US dollar ten-year swap spreads versus main drivers during January 1997–August 2003 period**

Variable	Coefficient	t-stat
D(Budget expectation)	-0.07	-1.86
D(Slope)	-0.19	-3.45
D(On/off spread)	0.05	1.39
D(Implied volatility)	0.71	4.02
D(Effective duration of MBS)	11.03	4.37
MREC(-1)	-0.19	-3.11
<b>R-squared</b>	<b>0.40</b>	

Chart 9 shows the contribution of changes in the explanatory variables and the medium-run adjustment to changes in US dollar ten-year swap spreads in recent months. The residuals show the extent to which the

**Chart 9**  
**Contribution to changes in US dollar ten-year swap spreads<sup>(a)</sup>**



Sources: Bloomberg, Thomson Financial Datastream and Bank calculations.

(a) Based on the regression of monthly US dollar ten-year swap spreads against the explanatory variables and the medium-run adjustment variable during the January 1999–August 2003 period. The near failure of Long Term Capital Management (LTCM) caused a significant shock in swap spreads worldwide. The potential for obtaining spurious results is minimised by starting the regressions in January 1999. Budget balance expectations are excluded from the regression as they appear to be insignificant and have the opposite sign to their expected relationship with the swap spread.

model fails to explain the change in swap spreads completely.

Throughout the past year, the slope of the yield curve appears to have played an important role in causing short-run variations in swap spreads. As noted previously, this may reflect an increase in demand to receive fixed payments when the slope steepens. It may also reflect changes in expectations of future economic growth. Similarly, changes in equity-implied volatility seem to be clearly associated with short-run movements in swap spreads, usually reflecting changes in the perceived level of uncertainty. More recently, however, there has been a large impact of mortgage prepayment hedging activity on swap spreads.

Chart 9 shows that, in July 2003, US dollar ten-year swap spreads widened by some 19 basis points,<sup>(3)</sup> despite changes in the slope of the yield curve suggesting a 9 basis point tightening of swap spreads.<sup>(4)</sup> According to

- (1) This article uses budget balance expectations to measure expectations of government bond issuance. Increases in expected government bond issuance are equivalent to decreases in budget balance expectations. That is, an increase in budget balance expectations would imply a widening of swap spreads.
- (2) Effective duration of mortgage-backed securities is only available since January 1997.
- (3) This article uses US dollar swap spreads estimated as the spread between the ten-year swap rate from Bloomberg and the ten-year government bond benchmark yield from Thomson Financial Datastream. This can be problematic if we want to have an accurate estimate of the levels of swap spreads currently traded in the market because ten-year swap rates have constant ten-year maturity, while Treasury benchmark bonds have a variable maturity. Benchmark bonds are only ten years' maturity whenever the US Treasury issues a new ten-year note. This might distort the amount of change of swap spreads during the month, especially at times when a new benchmark bond is issued.
- (4) Reflected by the product of the change in the slope in July 2003 and the regression coefficient during the January 1999–August 2003 period.

the model, this was mainly caused by the change in the effective duration of mortgage-backed securities, which implied a 20 basis points widening of swap spreads. This change in the effective duration of mortgage-backed securities was associated with US Treasury yields rising significantly in July 2003. The yield of the on-the-run ten-year Treasury note increased by over 90 basis points during the month, motivating a wave of mortgage prepayment hedgers actively paying fixed in swaps during the month. This was reflected in an increase of the effective duration of mortgage-backed securities of 1.8 years, which in turn, was associated with wider swap spreads.

### Assessing the quantitative effect of these factors on sterling ten-year swap spreads

An interesting extension to this exercise is to use the model to account for movements in sterling ten-year swap spreads. Sterling ten-year swap spreads are regressed against the slope of the UK gilt yield curve, expectations of future gilt issuance, implied volatility of the FTSE 100 equity index, US dollar ten-year swap spreads and the medium-run adjustment variable.<sup>(1)</sup> Unlike in the US swap market, mortgage prepayment hedging is not a driver of sterling swap spreads.<sup>(2)</sup> The rationale for including US dollar ten-year swap spreads is to examine whether movements in sterling ten-year swap spreads are influenced by movements in ten-year swap spreads across the Atlantic. Chart 10 shows that there seems to be a close relationship between sterling and dollar ten-year swap spreads.

**Chart 10**  
Sterling versus US dollar ten-year swap spreads



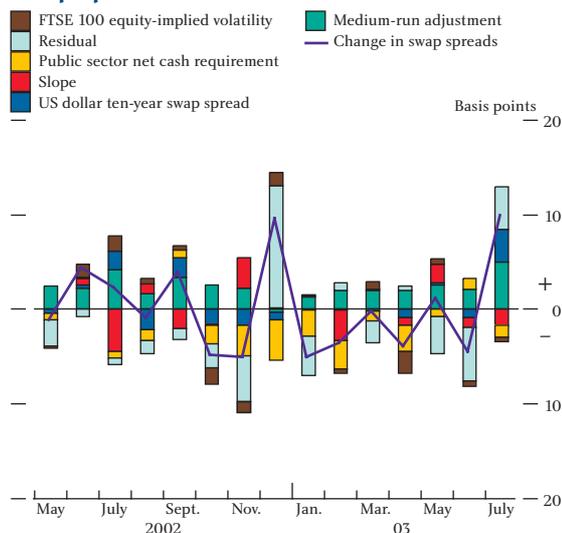
Table C shows the results of regressing changes of sterling ten-year swap spreads against the explanatory variables over the June 1994–August 2003 period. Changes in the slope, changes in equity-implied volatility, changes in US dollar ten-year swap spreads and the medium-run adjustment variable are all significant at the 5% level. All the coefficients have the expected sign.<sup>(3)</sup>

**Table C**  
OLS regression of sterling ten-year swap spreads versus main drivers during June 1994–August 2003 period

Variable	Coefficient	t-stat
D(US swap spread)	0.32	<b>3.74</b>
D(Public cash requirement)	-0.42	-1.07
D(Slope)	-0.09	<b>-2.51</b>
D(Implied volatility)	0.28	<b>2.19</b>
MREC(-1)	-0.25	<b>-4.23</b>
R-squared	0.26	

Chart 11 shows the contribution of changes in the explanatory variables and the medium-run adjustment to changes in sterling ten-year swap spreads.

**Chart 11**  
Contribution to changes in sterling ten-year swap spreads<sup>(a)</sup>



Sources: Bloomberg, Thomson Financial Datastream and Bank calculations.

(a) Based on the regression of sterling ten-year swap spreads against the explanatory variables and the medium-run adjustment variable during the January 1999–August 2003 period.

In July 2003, sterling ten-year swap spreads widened by 9 basis points.<sup>(4)</sup> According to the model, the change in US dollar swap spreads accounted for 4 basis points of this widening. The medium-run adjustment variable implied an extra 5 basis points widening, suggesting that

- (1) Estimated using a Vector Error Correction Model (VECM). At least one cointegrating relationship is identified for sterling ten-year swap spreads using Johansen's cointegration test.
- (2) UK investors tend to hold more floating-rate mortgages than in the United States, so refinancing is less of an issue.
- (3) Note that Consensus Economics provides UK expectations of public sector net cash requirements instead of expectations of budget balance. The expected coefficient on the public sector net cash requirement variable should be of opposite sign to the budget balance variable in the United States.
- (4) Similarly to the United States, this article uses sterling swap spreads estimated as the spread between the ten-year government bond benchmark yield from Thomson Financial Datastream and the ten-year swap rate from Bloomberg.

in July 2003 sterling ten-year swap spreads were trading at levels very low compared with their average since June 1994.<sup>(1)</sup> In contrast, market participants expected an increase in future UK Treasury issuance of £1 billion, suggesting a 1.2 basis points tightening of sterling swap spreads, and the yield curve steepened implying an extra 1.7 basis points of tightening.

One explanation for the historically narrow levels of sterling swap spreads in recent months is that institutional and regulatory factors have been important drivers of sterling swap spreads. Market contacts suggest that the hedging activities of UK pension-related funds and foreign corporations issuing in sterling have had an impact on sterling swap spreads. It has been suggested that both of these classes of market participants may create a tightening bias in the sterling swap market by receiving fixed in swaps. Pension funds use swaps when adjusting their asset/liability mismatch. Foreign corporations have been reportedly issuing in sterling due to the attractiveness of issuing very long-dated sterling debt. They then swap their sterling debt back into their domestic currencies.

The introduction of FRS 17<sup>(2)</sup> and the replacement of the Minimum Funding Requirement<sup>(3)</sup> may have also increased the appeal of UK corporate debt relative to UK gilts, increasing the tightening pressure on sterling swap spreads.

## Conclusion

The fair value of swap spreads is theoretically related to expectations of the future spread between the Libor rate and the general collateral (GC) repo rate. Evidence, however, suggests that there seems to be no clear relationship between the current Libor-GC repo spread and actual swap spreads.

This article suggests other drivers that seem to be linked to swap spread movements in recent years. The relationships between the ten-year swap spread and these drivers are quantified in the US dollar and the sterling swap markets. These relationships are modelled in a contemporaneous regression framework so that we can attempt to analyse changes in swap spreads on a monthly basis. The differences between the US dollar and the sterling ten-year swap markets are found to be quite significant. The use of swaps in hedging mortgage-backed portfolios is an important US market specific factor.

Use of simple models of the type presented in this article may prove useful in analysing why swap spreads changed *ex post*. Whether such models can be useful for forecasting future swap spreads is more debatable; although market participants are known to use such models to inform their trading strategies.

(1) Ten-year sterling swap spreads were around 50 basis points at the end of July 2005, a level significantly lower than their average of 54 basis points during the June 1994–August 2003 period.

(2) See Duggan (2002).

(3) See Department for Work and Pensions (2001).

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# The distribution of unsecured debt in the United Kingdom: survey evidence

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*The Bank recently commissioned a survey asking people about their unsecured borrowing and whether it is a burden to them. This article summarises the main results.<sup>(1)</sup> As of October, 34% of respondents had some form of unsecured debt, over and above that which they expected to pay off at the end of the month, and the average amount owed was around £3,500. Some people owed much more than the average: 26% of those with some debt owed more than £5,000. Around 10% of borrowers said that their unsecured debt was a heavy burden to their households, similar to earlier surveys. For purposes of comparison over time, the questions were based on those used in earlier surveys. The evidence suggests that the proportion of people with some debt has not changed since at least the late 1980s. While the average amount borrowed by debtors has increased, since 2000 the extra borrowing has been concentrated among those with household incomes above £17,500. Despite the rise in average debt levels in recent years, the proportion of people who consider their debt not to be a burden has increased. But, the amount borrowed and the share of unsecured debt accounted for by those who consider it a heavy burden have both increased.*

The recent rapid growth in household debt has been driven by high rates of both secured borrowing, through mortgages, and unsecured borrowing, through personal loans, overdrafts and credit cards. While the aggregate stock of unsecured debt (£164 billion at end-2003 Q2) is small in relation to the stock of mortgage debt (£714 billion) and household sector gross wealth (£5,547 billion, including housing), its fast growth has raised questions about whether an increasing number of people have borrowed more than they can easily afford to repay. This would be more likely if unsecured borrowing is increasingly concentrated among those with relatively low incomes and few assets. Its build-up could also leave others more vulnerable to unexpected changes in their circumstances. These possibilities might have implications for both monetary policy and financial stability. An assessment of the extent of current and potential problems associated with the growth of unsecured debt requires some investigation of how the debt is distributed among individual borrowers. This article is solely concerned with the distribution of unsecured debt and only discusses mortgage borrowing to the extent that this is useful in distinguishing the characteristics of borrowers.

An important source of information on the financial position of individual adults and households is the British Household Panel Survey (BHPS), which since 1991 has asked broadly the same group of people about their economic and social circumstances. However, the most recent information on unsecured debt in the BHPS is for 2000. This was analysed in detail by Cox, Whitley and Brierley (2002). They found that the households with the highest levels of both mortgage and unsecured debts tended also to have the highest levels of income and net wealth in both 1995 and 2000. But they also found that debt to income ratios were highest for low-income households.

## The survey

In order to update this analysis, more recent evidence has been obtained from a specially commissioned survey from NMG Research, that in October 2003 asked a nationally representative sample of 1,950 adults about their unsecured debt. Using the same questions as in the BHPS, people were asked about the types of debt they had, the amounts they owed and whether they considered the debt to be a burden to their household.<sup>(2)</sup> A broad summary of the survey

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(1) A brief summary was also reported in the *Financial Stability Review*, December 2003.

(2) The BHPS asked people about the total amount borrowed on a range of debt instruments, the NMG Research Survey also asked how much they owed on each debt instrument individually.

methodology and exact wording of questions is included in the annex.

Only 11% of interviewees refused to say whether they had any unsecured debt or not. But of those with debt, 33% did not say how much they owed. This may well reflect uncertainty about the amount they owe rather than a wish to conceal it. A recent survey, Citizens Advice (2003), explicitly asked people whether they knew how much they owed in total on all of their credit commitments. It found that 31% of those owing something on credits/loans did not know how much they owed. Information from the NMG Research Survey suggests that the perceived burden of debt among those who do not say how much they owe is not different from that among those who do report the amount they owe. On this basis, we assume that the amount owed by those who do not reveal their debt is not systematically different from the amount owed by those who do reveal it.<sup>(1)</sup>

## Participation

Table A outlines some of the key findings concerning the proportion of people using different methods of borrowing (the participation rate). For each type of debt instrument, people are asked not to include any borrowing that they expect to pay off in full by the end of the month. This is intended to exclude borrowing, mainly on credit cards, that is done on a temporary basis, because it is a convenient way of making transactions.<sup>(2)</sup>

**Table A**  
**Participation by debt instrument and household income**

Per cent

	Household income of those reporting income:						Whole sample	
	Less than £4,500	£4,500–£9,499	£9,500–£17,499	£17,500–£24,999	£25,000–£34,999	£35,000–£59,999		More than £60,000
HP agreement	1	6	6	4	16	11	14	5
Personal loans	11	10	16	16	36	28	31	13
Overdraft	7	4	9	14	18	15	25	7
Credit card	5	6	22	22	33	35	20	15
Catalogue or mail order	7	9	13	9	8	8	7	8
Student loan	8	1	2	3	2	4	2	3
DSS Social Fund	4	7	4	1	1	0	0	2
Other loans	0	2	4	3	2	2	0	2
Any type of debt	<b>33</b>	<b>29</b>	<b>45</b>	<b>42</b>	<b>62</b>	<b>56</b>	<b>48</b>	<b>34</b>
<i>Memo: Proportion of sample in each income group</i>	8	28	28	12	10	11	4	100

Note: Some people have more than one type of debt so the proportion of people with any type of debt is less than the sum of those with each type of debt. Individual responses have been weighted to reflect the UK population (see Annex for further details). Bank calculations.

Source: NMG Research Survey.

Fieldwork: October 2003.

In total, 34% of respondents have some type of unsecured debt. By instrument, 15% of respondents owe money on a credit card, 13% have a personal loan, 8% owe money on catalogue purchases and 7% have an overdraft. In general, participation varies broadly positively with the level of household income for most types of borrowing, except DSS social fund loans, not available to those on high incomes, and borrowing through catalogues and mail order, which is used at a similar rate throughout the income distribution. Student loans are concentrated in the lowest-income group, probably indicating that a high proportion of borrowers are still studying. The overall rate of participation in the unsecured debt market is highest for those with annual household income of between £25,000 and £34,999, around twice that for those with household income below £9,500.

## Average levels of debt by household income and debt instrument

Table B sets out the average amount of debt per borrower. In total, the amount borrowed is also strongly related to household income, with average debt of around £1,800 for debtors with household income in the range £4,500–£9,499 and nearly £6,000 for those with household income in excess of £60,000. The exception to this pattern is for debtors in the lowest-income group, where average debt is £2,400, reflecting a disproportionate number of people with student debt in this group. While the participation of low-income households as borrowers in the overdraft and

(1) The survey also asked about other individual and household characteristics, including household income. Around half of those interviewed did not provide information on their household income. While this is not the main purpose of the survey, information on income is important in assessing the affordability of debt.

(2) This is different to aggregate unsecured debt figures which include any unsecured debt outstanding at a point of time, regardless of whether it bears interest or not. This is discussed further in the box on page 421.

**Table B**  
**Average debt of debtors by debt instrument and household income**

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	Income levels of those reporting income:							Whole sample
	Less than £4,500	£4,500–£9,499	£9,500–£17,499	£17,500–£24,999	£25,000–£34,999	£35,000–£59,999	More than £60,000	
HP agreement	n.a.	1,600	2,000	3,400	1,400	3,800	3,400	<b>2,500</b>
Personal loans	2,000	2,000	3,500	4,800	5,300	5,400	5,300	<b>4,400</b>
Overdraft	700	200	700	1,000	700	800	1,000	<b>700</b>
Credit card	800	1,800	1,000	900	2,300	2,800	1,100	<b>1,400</b>
Catalogue or mail order	200	400	300	300	100	400	n.a.	<b>300</b>
Student loan	5,600	6,500	4,000	4,500	6,100	4,300	n.a.	<b>6,300</b>
DSS Social Fund	300	300	200	n.a.	n.a.	n.a.	n.a.	<b>200</b>
Other loans	n.a.	300	500	6,100	n.a.	n.a.	n.a.	<b>1,400</b>
<b>Any type of debt</b>	<b>2,400</b>	<b>1,800</b>	<b>2,400</b>	<b>3,800</b>	<b>5,100</b>	<b>5,600</b>	<b>6,000</b>	<b>3,500</b>

Source: NMG Research Survey.

Fieldwork: October 2003.

Bank calculations. All figures rounded to nearest £100.

n.a. indicates that the number of debtors in this category is too small for the average to be sensibly calculated. Figures in italics are indicative only as the number of respondents in these categories is less than ten.

credit card markets is relatively low, the average amount they borrow using these products is relatively high. For example, the average overdraft among those with income of less than £4,500 is close to the overall average, while the average credit card debt of those with household income of between £4,500 and £9,499 is above the overall average. By contrast, borrowing is strongly increasing with income for personal loans and (to a lesser extent) hire purchase (HP) agreements, possibly reflecting their use as a method of financing irregular large-ticket income-related spending. For these instruments, borrowers have little discretion to increase their debt without the permission of lenders. On average, borrowing through student loans, personal loans, HP agreements and credit cards is for larger amounts than through overdrafts, catalogue or mail order finance and DSS social fund loans. The overall average debt of borrowers is £3,500.

## Robustness

The averages in the individual cells in Table B need to be treated with care because the sample size is small in some cases (particularly for 'other loans'), although the overall averages for income groups and types of loans are likely to be relatively reliable. More generally, the robustness of the figures on participation and average debt levels can be assessed by comparing them with other evidence. Table C summarises information on participation and average debt levels from other surveys. Some difference is to be expected simply because each survey is based on a small sample of a much larger

population. Moreover, the figures are not exactly comparable because some surveys, such as that by NMG Research, ask about the borrowing of individual adults while others consider the position of households. Evidence from the BHPS, which considers both, suggests that participation rates are about 8 percentage points higher for households than individuals. This is not the only difference in that some surveys prompt the interviewee about the types of debt they may have.<sup>(1)</sup> Taking these differences into account suggests that, with the exception of the KPMG and Citizens Advice surveys, there is a consensus that around 40%–50% of households and 30%–40% of adults have some form of unsecured debt. The probable cause of the high rates of participation found by the KPMG and Citizens Advice surveys is that they do not specifically exclude loans that people expect to pay off in full at the end of the month in question.<sup>(2)</sup>

The average debt of debtors in the NMG Research Survey is also broadly consistent with the findings of other surveys. It is 8% higher than the average debt of debtors in the 2000 BHPS. This difference is smaller than might be expected given that the aggregate level of unsecured debt was 35% higher in October 2003, the date of the NMG Research Survey, than it was in September 2000, when the BHPS was undertaken. This difference could reflect sampling error. The NMG Research estimate is less than the average debt of £4,600 of individual debtors in the FSA survey carried out in 2002. On a household basis, the NMG Research

(1) The Survey of Low Income Families (SOLIF), analysed by Bridges and Disney (2004, forthcoming) includes loans from employers, family and friends and the 'tally man' in addition to loans from financial institutions.

(2) Some of the surveys also provide information on participation by type of debt instrument, which may be used to check the robustness of our findings. Kempson (2002) and FSA (2003) both find that around 19% of households have credit card debt outstanding, slightly higher than our estimate of 15% for adults. They both find that around 8% of households have overdrafts and some 15% have personal loans, close to our findings for adults.

**Table C**  
Evidence from surveys<sup>(a)</sup>

	Date of survey	Sample size	Unit of analysis	Excludes debt paid off at end of month	Additional types of debt mentioned	Percentage with unsecured debt	Average debt of debtors (£)
<b>Survey:</b>							
Berthoud and Kempson	1989	2,212	Household	Yes	Store cards	48	Not given
BHPS	1995	9,249	Individual	Yes	n.a.	35	2,088
BHPS	1995	5,051	Household	Yes	n.a.	43	2,872
Bridges and Disney	1999	4,659	Low-income families	No	Loans from employers, friends, 'tally man'	49	Not given
BHPS	2000	9,006	Individual	Yes	n.a.	35	3,242
BHPS	2000	4,916	Household	Yes	n.a.	43	4,375
Kempson	2002	1,647	Household	Yes	Store cards/ accounts	47	3,500
FSA	2002	3,200	Families	Yes	Rent arrears, store loan, store card, car loan	Not given	4,600 (b)
KPMG	2003	2,304	Individual	No		71 (c)	Not given
Citizens Advice	2003	1,986	Individual	No	Includes some secured loans and remortgaging	74	3,900
NMG Research	2003	1,950	Individual	Yes	n.a.	34	3,500

(a) See references for more details of the surveys.

(b) Individual average.

(c) Based on Bank calculations.

estimate of the average debt of debtors is equivalent to £4,700, if the same relationship between the debt of individuals and households applies as in 2000. This is higher than the average figure of £3,500 given in Kempson (2002). The average value of debt of individuals is similar to the Citizens Advice estimate of £3,900, although this is not strictly comparable as it does not exclude balances to be paid off at the end of the month, raising the participation rate substantially.<sup>(1)</sup> The consistency of the survey-based figures with the aggregate statistics is discussed in the box on page 421.

## Distribution of unsecured debt

Table D shows the amounts owed by debtors, using information from the NMG Research Survey. This is compared with other surveys containing similar information.

The NMG Research Survey shows most debtors owe relatively small amounts, with close to half of debtors owing less than £1,000 and nearly two thirds owing less than £3,000. But there is wide variation in the amounts owed and 26% of debtors owe more than £5,000.<sup>(2)</sup> These figures are close to those of other surveys, although the KPMG survey finds higher debt levels. The

**Table D**  
The distribution of the amount owed by debtors

Per cent	NMG Research	Citizens Advice	KPMG	Kempson
Under £1,000	43	46	25	67
£1,000–£1,999	14	13		
£2,000–£2,999	7	7	33	
£3,000–£3,999	5	6		17
£4,000–£4,999	5	5		
£5,000–£7,499	8	4	20	
£7,500–£9,999	5	3		7
£10,000–£14,999	9	6	17	10
£15,000–£19,999	2	3		
£20,000 or more	2	2	7	

Note: KPMG and Kempson figures have been recalculated by the authors as proportions of debtors. Citizens Advice figures have been adjusted to take account of refusals. Figures may not sum to 100 due to rounding.

KPMG survey is distinctive in that it is an online survey, whereas the others are carried out face to face. It is representative in terms of gender, age, region and social class, but it may be that the anonymity offered by an online survey encourages people to reveal more about their indebtedness. It could also be that an online survey attracts a sample of participants more likely, for whatever reason, to have larger debts.

The unequal distribution of debt across respondents in the NMG Research Survey suggests that a large proportion of outstanding unsecured debt is concentrated among relatively few people. If the survey

(1) There is also a broad degree of consistency across the surveys in estimates of the average amounts of debt for individual types of debt. For outstanding credit card balances, Kempson finds households owe an average of nearly £1,600 while the FSA finds families owe £2,200, both broadly consistent with the NMG Research estimate of £1,400 for adults. Similarly, average personal loans are estimated to be over £5,500 by the FSA and £5,000 by Kempson, compared with our estimate of £4,400 for adults. Overdrafts are also of a similar order across the surveys, with the average in Kempson's sample put at £450 compared with £900 in the FSA sample and £700 here. Interestingly, Kempson notes that the average overdraft in the 1989 survey reported by Berthoud and Kempson (1992) was £1,700 in 2002 prices, whereas the average credit card balance in 1989 was £550 in 2002 prices, indicating a broad shift in the method of borrowing over the past 14 years. The average student loan debt of £6,300 in the NMG Research Survey is consistent with Callender and Wilkinson (2003) who find that the average student loan debt of students was £5,500 at the end of the 2002–03 academic year. This is of course much higher for final-year students.

(2) This is equivalent to 6% of respondents, including those who do not reveal how much unsecured debt they have, and 9% of respondents for whom the level of debt is known or estimated.

## Consistency with aggregate figures

While the NMG Research Survey evidence is broadly consistent with other similar surveys, there is a substantial difference between the grossed-up amount of unsecured debt claimed in survey responses and that reported in official statistics.<sup>(1)</sup> At the end of September, total UK consumer credit was £168.4 billion, whereas the grossed-up figure from the NMG Research Survey was only £56.8 billion.

There are a number of ways of reconciling these figures.

First, there is a difference between what the surveys and official figures intend to cover. Official estimates are derived from lenders and cover all forms of consumer credit outstanding at a particular date, including that which does not bear interest. By contrast, survey respondents are usually asked not to include credit card and other bills being paid off in full in the month of interview. So part of the difference between survey and official figures is that surveys are stating what people perceive to be their normal stock debt position, whereas official aggregate figures are also picking up credit used temporarily to make transactions. This is an issue particularly for credit card borrowing, given that many people now use credit cards for transactions in preference to cash and other means of payment, either because of greater convenience or to take advantage of insurance and cash-back special offers. The Citizens Advice

(2003) survey suggests that around half of all people who use credit cards aim to pay them off in full at the end of the month.<sup>(2)</sup> Unpublished figures from the British Bankers' Association suggest that about three quarters of Visa and Mastercard affiliated credit card balances bear interest.

Second, despite the consensus between surveys, it may be that respondents have a persistent tendency to underreport their debt, perhaps because they do not think of goods being paid for in instalments as debt. There could also be confusion within individual families as to the amount borrowed by other family members. This should be avoided in the NMG Research Survey, which asked people about their own borrowing. To the extent that people included the debts of other family members in their replies, this would have led to an over rather than an underestimate of the total when grossed up by the number of adults.

There is some evidence that the gap between the lender-based and borrower-based estimates of aggregate unsecured debt has been increasing over time. Using information from the BHPS, the proportion of the official, lender-based aggregate estimate of unsecured debt that is accounted for by survey-based information declined from 52% in 1995 to 41% in 2000. According to the NMG Research Survey, this has fallen further to 34% in 2003.

(1) Note that this does not apply to BHPS estimates of labour income, housing wealth and secured debt which, when aggregated, largely agree with aggregate estimates. Financial assets, however, are substantially underrecorded.

(2) The recent CAB survey asked those in their sample that had at least one credit or store card (around 1,200) how much they usually pay off each month and found that: 2% pay off less than the minimum payment, 10% make the minimum payment, 29% pay more than the minimum payment but less than the full balance, 49% pay the full balance, 9% have no outstanding balance, 2% refuses or do not know.

results are grossed up to the UK adult population, then of the total unsecured debt of £56.8 billion, around £29 billion is owed by the 4.3% of the population with individual debt of over £10,000.

### Distribution of debt by household income of the borrower

Table E looks at the breakdown of debt levels according to the household income of the borrower. This is derived from the NMG Research Survey and grossed up to the UK adult population. It provides a guide to the affordability of debt, given that individuals with more

debt and less income are most likely to experience debt problems. In general, it shows relatively few cases where debt levels are high relative to household income. For example, of the 770,000 individuals with debt over £10,000 whose income is known, only 185,000 have household income of less than £17,500, while 340,000 have income in excess of £35,000.

### Characteristics of borrowers and those who report debt to be a burden

The NMG Research Survey also provides qualitative evidence, comparable to that in the BHPS, of the extent

**Table E**  
**The distribution of unsecured debt and income (millions, estimates grossed up from survey respondents)**

	Household income:								Whole sample
	Less than £4,500	£4,500–£9,499	£9,500–£17,499	£17,500–£24,999	£25,000–£34,999	£35,000–£60,000	More than £60,000	Missing	
Debt:									
None	1.2	4.3	3.6	1.6	0.9	1.1	0.4	14.5	27.4
Under £1,000	0.3	0.9	1.1	0.3	0.2	0.1	0.1	1.3	4.1
£1,000–£4,999	0.1	0.3	0.8	0.3	0.3	0.4	0.1	0.7	3.0
£5,000–£9,999	0.1	0.0	0.2	0.1	0.3	0.2	0.1	0.2	1.2
£10,000 or more	0.0	0.1	0.1	0.1	0.2	0.2	0.1	0.4	1.2
With debt but missing value	0.2	0.4	0.6	0.3	0.5	0.4	0.1	2.5	4.9
Missing	0.1	0.6	0.4	0.2	0.1	0.1	0.1	3.8	5.4
<b>Total</b>	<b>1.9</b>	<b>6.6</b>	<b>6.7</b>	<b>2.8</b>	<b>2.4</b>	<b>2.6</b>	<b>0.8</b>	<b>25.4</b>	<b>47.2</b>

Source: NMG Research Survey.

Fieldwork: October 2003.

Bank calculations.

to which individuals consider the repayment of their unsecured debt to be a burden to their household. This is useful in making comparisons with previous years and in assessing the consistency of answers in the survey. It finds that 10% of individuals consider their unsecured

debt to be a heavy burden, 22% say that it is somewhat of a burden and the remainder do not consider it a problem. The survey enables us to examine the characteristics of those who report different degrees of financial distress. This is summarised in Table F.

**Table F**  
**The characteristics of adults with different degrees of debt problems**

	Characteristics of each group:				Contribution of group to overall shares:				Mean debt for those reporting debt to be a heavy burden
	Share of population	Participation rate	Mean debt to income ratio of debtors	Proportion of debtors reporting debt to be a heavy burden	Share of those with positive debt	Share of those reporting debt to be no problem	Share of those reporting debt to be somewhat of a problem	Share of those reporting debt to be a heavy burden	
<b>Overall</b>		34	0.24	10	34	68	22	10	6,900
<b>Age group</b>									
15–24	15	33	0.45	11	16	14	18	17	5,300
25–34	19	54	0.19	13	29	26	33	37	6,600
35–44	18	50	0.18	10	25	25	25	25	5,900
45–54	16	39	0.19	9	17	18	15	15	12,400
55–64	13	26	0.13	5	9	11	6	5	Not given
65 plus	20	7	0.75	5	4	6	2	2	12,600
<b>Income group</b>									
Less than £4,500	4	33	1.03	24	4	4	3	10	4,300
£4,500–£9,499	14	29	0.29	15	12	9	18	18	3,300
£9,500–£17,499	14	45	0.19	13	19	18	20	25	6,700
£17,500–£24,999	6	42	0.18	7	8	8	7	5	15,800
£25,000–£34,999	5	62	0.17	7	10	11	8	7	9,700
£35,000–£60,000	5	56	0.13	0	10	11	9	0	n.a.
£60,000 plus	2	48	0.07	11	3	3	1	3	13,500
Missing income	50	26	n.a.	9	35	37	34	32	7,300
<b>Social class</b>									
AB	19	36	0.14	6	19	21	18	11	7,500
C1	25	41	0.35	7	30	32	30	21	14,500
C2	23	33	0.26	8	22	25	21	17	12,800
DE	34	30	0.20	17	29	25	32	50	2,400
<b>Debt group (for debtors only)</b>									
Under £1,000	43			4	43	49	35	18	500
£1,000–£1,999	14			10	14	13	15	15	1,300
£2,000–£2,999	7			13	7	7	6	10	2,200
£3,000–£3,999	5			8	5	3	14	5	3,300
£4,000–£4,999	5			13	5	6	2	8	4,000
£5,000–£7,499	8			8	8	7	10	6	5,500
£7,500–£9,999	5			11	5	5	3	6	8,000
£10,000–£14,999	9			23	9	6	11	20	12,200
£15,000–£19,999	2			16	2	1	2	3	18,000
£20,000 or more	2			40	2	2	11	9	23,800
With financial assets	35	39	0.21	5	40	46	33	19	6,400
<b>Housing status</b>									
With mortgage	33	47	0.17	4	45	50	44	17	17,700
Own outright	26	18	0.28	5	14	17	9	7	9,600
Rented local authority	23	30	0.24	20	20	18	17	41	2,200
Rented private	10	42	0.49	17	12	9	18	21	10,200
Housing association	7	45	0.18	18	8	6	11	15	7,800

Source: NMG Research Survey.

Fieldwork: October 2003.

Bank calculations.

Figures may not sum to 100 due to rounding.

By age, 37% of those who find debt to be a heavy burden are between 25 and 34. This is about double their weight in the grossed-up sample as a whole and also higher than their share in the debtor population. These individuals do not have a particularly high unsecured debt to income ratio, but their finances are likely to be put under strain by mortgage borrowing and other financial demands at a stage in their life when they are starting families and buying homes.

By income, 28% of those who find unsecured debt to be a heavy burden have household income of less than £9,500. While their participation rate is relatively low, they have an above-average unsecured debt to income ratio. Over half of those who say that unsecured debt is a heavy burden are from the DE social class.<sup>(1)</sup> This is much higher than their 29% representation in the debtor population. Nonetheless, the average level of debt for those from low income or social class households who report their debt to be a heavy burden is low relative to that owed by other groups.

By debt level, over 32% of those whose debt is perceived to be a heavy burden have unsecured debt of over £10,000. This is substantially larger than their 13% share in the population of debtors. The average debt of people who say it is a heavy burden is £6,900, compared with £3,900 for those for whom it is somewhat of a burden and £2,900 for those who say it is not a problem. It is not surprising that those who report their unsecured debt to be a heavy burden also tend to have more of it. This suggests that unsecured debt in aggregate is to some extent concentrated among those who experience difficulties in repaying it. Almost 20% of unsecured debt is owed by those who consider it a heavy burden, and 25% by those who say it is somewhat of a problem.

It is clear from the survey that unsecured debt is less of a problem for those with other assets. Only 19% of those reporting unsecured debt to be a heavy burden have financial assets compared with 40% in the debtor population as a whole. Only 17% of those who report unsecured debt to be a heavy burden have a mortgage compared with 45% in the debtor population as a whole. By contrast, 41% of those for whom debt is a heavy burden live in local authority rented

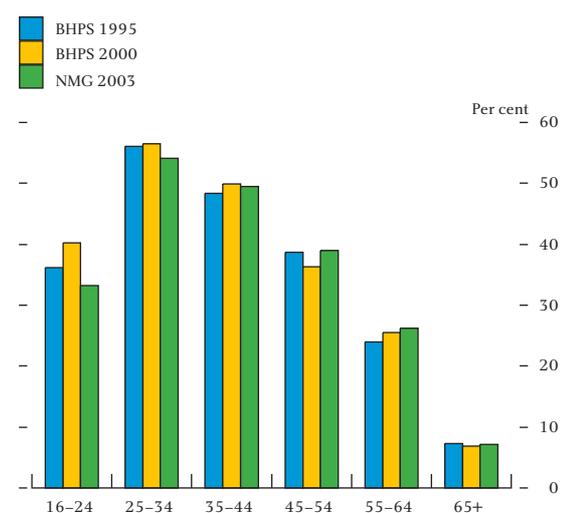
accommodation, compared with 20% in the debtor population as a whole.

These figures on the proportion of people reporting debt to be a heavy burden indicate that a significant minority of debtors are struggling with their unsecured debt. This is consistent with other evidence from debt counsellors and the Citizens Advice Bureaux.

## Comparisons over time

One of the key reasons for asking the same questions in our survey as in the BHPS is to ensure, as far as possible, that the results are comparable over time. These combined results show that there has been no overall change in the participation rate between 1995 and 2003. This confirms Kempson's (2002) analysis of the 1989 to 2002 period that 'the large increase in consumer borrowing is not due to a larger proportion of the population owing money'. This may seem surprising in view of the substantial increase in credit cards in circulation in recent years, but this does not necessarily imply that a larger proportion of people borrow using these cards.<sup>(2)</sup> Moreover, Kempson finds that greater use of credit cards has substituted for other forms of credit such as mail order catalogues and hire purchase arrangements. Chart 1 plots the participation rate for different age groups between 1995 and 2003. This shows very little change in participation rates across age groups in recent years. It also suggests that the NMG

**Chart 1**  
Unsecured debt participation rates by age group



Sources: BHPS, NMG Research and Bank calculations.

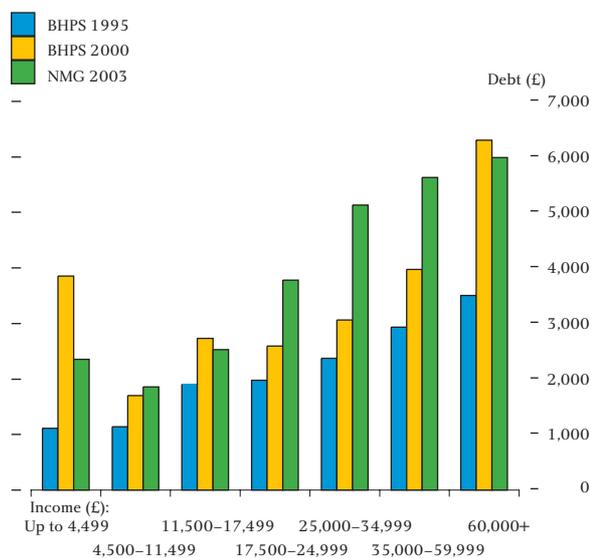
(1) Social class is defined as follows: AB: Professionals, directors, self-employed people employing more than 25 staff, employees in senior positions with professional qualifications and/or a degree; C1: Office workers without a degree, employees in junior positions with professional qualifications and/or a degree, self-employed people employing 1-24 staff, students in full-time education; C2: qualified skilled manual workers; DE: semi-skilled and unskilled manual workers, shop assistants, cleaners, unemployed, retired on state pension only.

(2) The number of credit cards issued rose from 28.3 million in 1995 to 58.8 million in 2002 according to APACS (2003).

Research Survey is comparable with the earlier BHPS results.

The surveys suggest that the average unsecured debt to income ratio of debtors doubled between 1995 and 2003, with unsecured debt levels rising from 12% to 24% of income.<sup>(1)</sup> The increase between 1995 and 2000 was fairly well-spread across the income distribution, albeit with the largest increase in the lowest-income group. By contrast, the increase since 2000 has been concentrated in households with income of £17,500 and above. Indeed there has been a sharp fall in unsecured debt among the lowest-income group since 2000. Chart 2 shows average unsecured debt levels by income group in the 1995 and 2000 waves of the BHPS and in the 2003 NMG Research Survey.

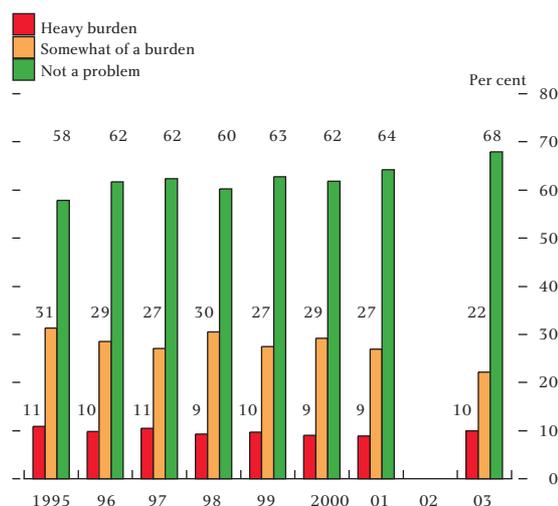
**Chart 2**  
Mean debt by household income groups



Sources: BHPS, NMG Research and Bank calculations.

Despite the increase in average debt levels and debt to income ratios, comparable figures suggest that this has not added to the proportion of households experiencing debt problems. Chart 3 shows that the proportion of debtors reporting that unsecured debt is not a problem has increased from 58% in 1995 to 68% in 2003, while the proportion reporting that it is somewhat of a burden has declined from 31% to 22% over this period. The proportion reporting debt to be a heavy burden has been broadly stable at around 10%. It is not clear from this evidence what has caused the decline in the proportion of people reporting debt

**Chart 3**  
Trends in the burden of debt



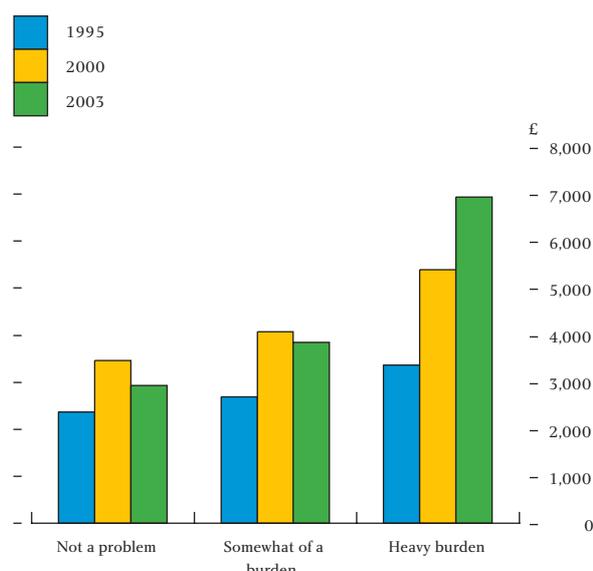
Sources: BHPS, NMG Research and Bank calculations.

to be somewhat of a burden, but it is likely to be associated with the fall in effective interest rates on unsecured debt and the fact that, in aggregate, unsecured debt has remained small relative to household wealth.

**Changes in the concentration of debt**

There is some evidence that the concentration of debt among riskier borrowers has increased over time, despite the fact that the proportion of people reporting debt problems has declined. Chart 4 shows that the average

**Chart 4**  
Changes in average debt by attitude to debt



Sources: BHPS, NMG Research and Bank calculations.

(1) This is broadly consistent with the increase in the aggregate unsecured debt to income ratio from 12.6% to 21.9% of household income between 1995 Q2 and 2003 Q2 although, as pointed out in the box on page 421, the level of aggregate debt is higher than is implied by the survey evidence. The level of aggregate income is also higher because the income of non-debtors is included.

amount of debt held by individuals who consider it to be a heavy burden has increased by more than it has for those who are more relaxed about their unsecured debt. This reflects a sharp increase in the unsecured debt to income ratio of those reporting debt to be a heavy burden and implies that the level of borrowing at which debt becomes a problem is higher now than in the recent past. It also suggests that debt has become more concentrated among riskier borrowers.

## Summary

The main results of the NMG Research Survey analysed in this article are as follows:

- Around 34% of adults have some type of unsecured debt. Participation in the unsecured debt market is greatest among the higher-income groups. The participation rate peaks at 62% for those with annual household income of between £25,000 and £34,999. It is about half this rate for those with household income below £9,500.
- Unsecured debt is strongly related to household income, with average debt of £1,800 for debtors with household income in the range £4,500–£9,499 and £6,000 for those with household income in excess of £60,000. The overall average debt of borrowers is £3,500. The average for households is estimated at about £4,700.
- The aggregate amount of unsecured debt implied by surveys of borrowers is substantially less than lender-based official figures. This partly reflects the exclusion of debt used for transactions from borrower-based surveys.
- Most debtors report that they owe relatively small amounts, with close to half of debtors owing less than £1,000 and two thirds owing less than £3,000. Nevertheless, there is considerable variation in the amounts owed and 26% of debtors report that they owe more than £5,000.
- The unequal distribution of debt across the sample suggests that a large proportion of outstanding unsecured debt is concentrated among relatively few people. Around half of the identified aggregate obtained by grossing up the survey results is owed by around 4.3% of adults with individual debt of over £10,000.
- About 10% of debtors say that their debt is a heavy burden. Around half of these people are in social class DE, around 40% live in local authority rented accommodation, few have other assets, and a disproportionate number are between 25 and 35.
- There does not appear to have been any upward trend in the participation rate over time. But the debt to income ratio of borrowers has doubled between 1995 and 2003. Since 2000, the increase has been concentrated among those with household income above £17,500.
- There has been an increase since 1995 in the proportion of households who consider their debt not to be a burden despite the general rise in unsecured debt. This may reflect falling interest rates on unsecured debt and the relatively small share of unsecured debt in household sector wealth. But the debt levels of those reporting it to be a burden have increased disproportionately.

In summary, the recent growth of unsecured debt has not as yet caused widescale debt problems. Moreover, the survey evidence suggests that most unsecured borrowing is arranged through personal loans and HP agreements where borrowers have little discretion to increase their debt without the permission of lenders. There is, however, evidence of large unsecured borrowing relative to income by a small proportion of individuals. This may not necessarily be a problem currently, although it could become one if these borrowers experienced adverse financial shocks, such as unexpected increases in interest rates or falls in income.

## Methodology

NMG Research runs a monthly omnibus survey, MarketMinder, of the investments, savings and pensions markets. To compile this omnibus survey, a nationally representative sample of 2,000 adults aged 15 and over are interviewed each month by Ipsos Capibus.

Interviews are conducted face to face, in respondents' homes, using Computer Assisted Personal Interviewing. Interviews are carried out in around 120 areas of the country selected using a two-stage stratified random location design. Different local areas are selected for each month.

In order to correct for minor deviations in terms of the generated sample profile week on week, Capibus uses a rim-weighting system which weights to their National Readership Survey defined profiles for age, social grade, region and working status—within sex.

Three questions on unsecured debt were added to this omnibus for interviews carried out between 3 and 9 October 2003. The questions were:

- I would like to ask you now about financial commitments you may have apart from mortgages and housing-related loans. Do you currently owe any money on the following types of loan or credit agreement? (please exclude any borrowing that will be fully repaid at the end of the month, eg the settling of your credit card in full).

- 1 Hire purchase agreement.
- 2 Personal loan.
- 3 Overdraft.
- 4 Credit card.
- 5 Catalogue or mail order agreement.
- 6 Student loan.
- 7 DSS social fund loan.
- 8 Any other loans.

- Can you please tell me how much money you currently owe to the following types of lender (but please exclude any borrowing that will be fully repaid at the end of this month, eg the settling of your credit card in full).

- 1 Hire purchase agreement.
- 2 Personal loan.
- 3 Overdraft.
- 4 Credit card.
- 5 Catalogue or mail order agreement.
- 6 Student loan.
- 7 DSS social fund loan.
- 8 Any other loans.

- To what extent is the repayment of such debts and the interest a financial burden on your household? Would you say it is:

- 1 A heavy burden.
- 2 Somewhat of a burden.
- 3 Not a problem.

Table 1 summarises the number of responses to the questions about debt and household income.

**Table 1**  
Summary of survey responses

	Has no debt	Declares debt level	Has some debt but does not say how much	Refuses	Total
Declares income	496	285	96	62	939
Does not declare income	637	120	100	154	1,011
<b>Total</b>	<b>1,133</b>	<b>405</b>	<b>196</b>	<b>216</b>	<b>1,950</b>

Source: NMG Research Survey.

Fieldwork: October 2003.

Bank calculations.

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# Innovations in retail payments: e-payments

By Helen Allen of the Bank's Market Infrastructure Division.<sup>(1)</sup>

*Ways to make retail payments using the internet and mobile phones are proliferating. Some are offering new access routes to existing payment means, others use different means to transfer value, but all attempt to provide greater convenience and choice in payment services. Few, however, have reached critical mass and none has displaced existing payment methods. Nevertheless, the prospect that these new services could be widely used raises some policy questions. For example, central banks are interested in any potential effects on financial stability and, in the longer term, in whether such innovation might have monetary policy implications. For these reasons, central banks monitor the evolution of the market, even though any such impacts may be a long way off. Moreover, it may well be that the system-wide risks will be relatively small even if e-payment usage becomes significant.*

Innovative products for making retail payments have proliferated in the past few years, in parallel with the widespread adoption of the internet, e-mail and mobile phones. The new payment offerings based around these channels, along with related technologies such as smart cards, are widely referred to as 'e-payments'.

The types of services take a variety of forms—some are new ways of accessing existing payment arrangements, others offer alternative payment arrangements, but all link in some way to existing payment and banking channels. The first section of this article describes the current range of products. The precise way in which such services will develop is impossible to predict, but the second section of the article highlights some influences on their future direction, for example, the type of services already established in the market and how easily new entrants can establish networks of participants.

The final section of this article considers some policy questions prompted by e-payments, which could become important if such products became widely used. From a financial stability perspective, changes in the risks and usage patterns of existing payment systems (and the consequences for payment system oversight) would be of particular interest to central banks. Any monetary

policy implications from changes in payment arrangements would also be assessed by central banks, though there are as yet few signs that there will be significant effects in the foreseeable future.

## A tour of e-payment products

The fast-changing nature of this market makes it a moving target to describe, but the main e-payments services can be grouped broadly into those that are mostly based around the internet, those based on mobile phones and those using pre-paid cards.

### Internet and payments

**Plastic cards on the internet.** These, particularly credit cards, are the predominant means of payment for internet shopping in the United Kingdom. Some 90% of online purchases are made by card.<sup>(2)</sup> At its most basic level, this is the straightforward use of the internet as an access channel for card transactions, similar to making card purchases over the telephone. The cards themselves are not a new product, but are being adapted in significant ways for more secure and convenient use in the internet environment.

Security developments include the introduction of smart cards with user passwords to enable financial

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(1) The author would like to thank Mike Bowman, Peter Finlayson and Richard Martin from APACS for helpful comments and making data available, although this article does not necessarily reflect the views of APACS.

(2) Credit cards account for around two thirds of these payments and debit cards for the remainder (source: APACS, market research, 2003). The dominance of credit cards is also true Europe-wide: see 'Electronification of payments in Europe', *ECB Monthly Bulletin*, May 2003, pages 61–72.

institutions to authenticate to merchants the validity of cards used in online payments.<sup>(1)</sup> And the use of 'e-wallets' can save customers from entering payment card data and address instructions for each transaction. E-wallet providers store these data, enabling the information to be provided (following security authentication) with only a few mouse clicks.

Online **account-based e-payment services** facilitate person-to-person ('P2P') payments and some are used by businesses as a means for customers to pay online.<sup>(2)</sup> They require users to set up and pre-fund an 'e-payments' account with the service provider, which can then be used to make 'instant' online payments to any other user—see Figure 1. The sender needs only to know the recipient's e-mail address, not their full bank details<sup>(3)</sup> and recipients of funds must join the payment service to accept the money. There are several UK examples including Moneybookers and NatWest FastPay; worldwide the best known is probably PayPal in the United States—see the box on page 433.

A variation on the theme is where recipients do not need to join the e-payments service. For example, EggPay in the United Kingdom can also send recipients their funds via a transfer to any UK bank account that the recipient specifies. Some services can also operate using a mobile phone, rather than internet/e-mail, as the access channel to the e-payments account.

The examples selected are grouped broadly by access channel—though in practice these, and indeed any method of categorisation, overlap in several ways.

**Internet based**

- Plastic (ie credit and debit) cards
- Account-based e-payment services
- Other e-mail/online payments

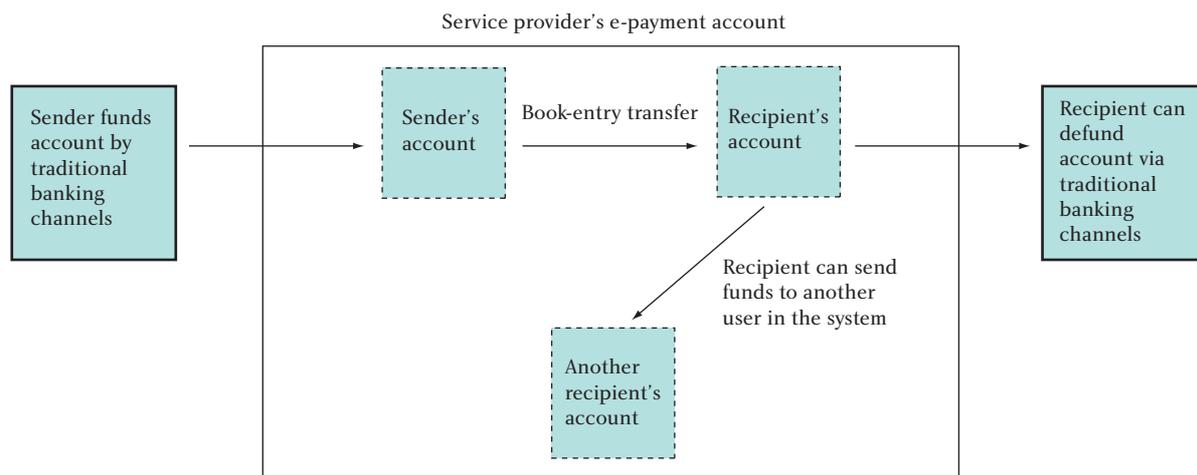
**Mobile phone based**

- Access channel
- Reverse charging/*ex-post* billing
- Premium-rate services
- Pre-paid airtime

**Pre-paid cards/e-purses**

There are also similar looking **e-mail/online payment products** but without a separate e-payment account. Instead, an internet service 'overlays' existing banking arrangements to offer online bank account to bank account transfers. Again, the sender needs only to know the recipient's e-mail address to initiate a transfer. This makes it more like an access channel to existing payment arrangements and probably has more in common with online banking (ie involving no fundamental change to underlying banking arrangements). The CertaPay service in Canada, branded Email Money Transfers by its

**Figure 1**  
**Account-based e-payment services**



Initiation, notification and confirmation of transactions are via e-mails between sender, service provider and recipient. There is no direct communication between sender and recipient.

(1) Smart cards are plastic cards with an embedded microchip for storing information. These are in the process of being rolled out across Europe (and elsewhere), using the internationally agreed EMV standard. In the United Kingdom, the change-over is referred to as 'Chip and PIN'—see [www.chipandpin.co.uk](http://www.chipandpin.co.uk).  
 (2) These services are referred to in several ways, including 'virtual accounts', 'personal online payments' and 'P2P' services. Issues relating to these, especially those operating in the United States, are discussed in Kuttner, K N and McAndrews, J J (2001), 'Personal online payments', *Federal Reserve Bank of New York Economic Policy Review*, December, pages 35–50.  
 (3) This distinguishes them from many online banking services, where users would need to know the counterparty's bank details before effecting a transfer.

participating banks, is an example of such a service. There is also a parallel with the card-to-card (P2P and cross-border) payment services developed by MasterCard and Visa (MoneySend and Visa Direct respectively). These too are designed to 'overlay' the existing card/bank infrastructure and one (of their several) access routes is online, requiring the sender to supply only the recipient's e-mail address.<sup>(1)</sup>

### Mobile phones and payments

Mobile phones are spawning numerous payment offerings, often loosely grouped under the heading 'm-payments'. Some use the handset as a convenient access mechanism to traditional payment means. Others are integrating characteristics of the mobile phone itself into payments procedures, such as piggy-backing on existing billing of phone calls or spending the mobile phone's pre-paid airtime. And there are attempts to bring arrangements together under the umbrella of single-branded services.<sup>(2)</sup>

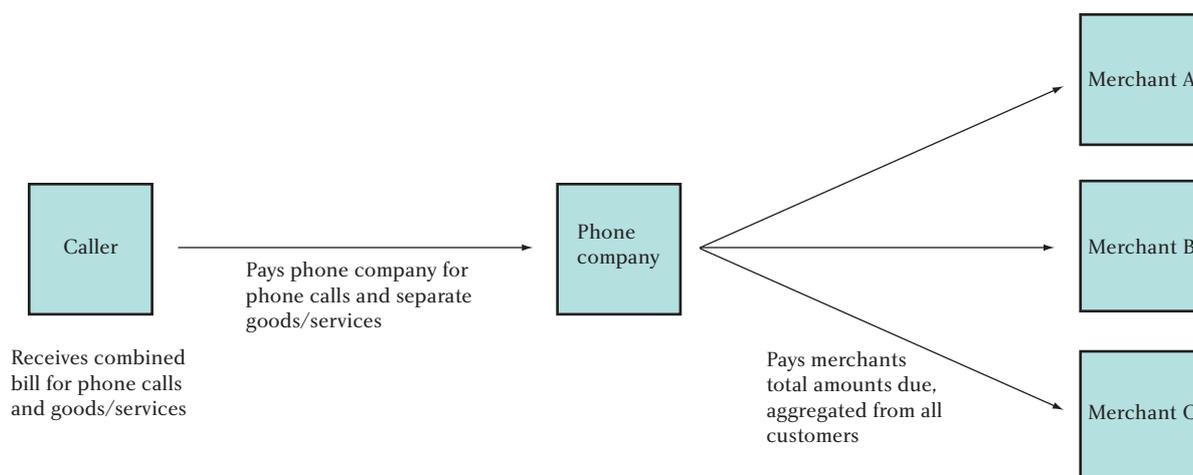
**Mobile phones can act as an access channel** through which to initiate and authenticate transactions from existing payments means such as bank accounts or payment cards. In the United Kingdom, mobile network operators are currently offering services for users to charge purchases directly to their payment cards that they have pre-registered with the service (similar to the use of e-wallets for online transactions).

**Reverse charging, or *ex-post* billing,** is also associated with (though not exclusive to) mobile phone purchases. This is where payments for goods/services are placed as additional items on the customer's post-paid phone bill. The bill is then paid in the normal way, say monthly through direct debit or at a bank. The phone company records all payments from each customer to each merchant and sends the merchant a consolidated payment periodically (see Figure 2).

**Premium-rate services (PRS)** allow purchases to be made by routing the purchasing call through a premium-rate number. For the caller, the cost of the call covers both the call itself and an amount for the goods/services purchased. These payment arrangements seem suited to low-value payments of perhaps up to a few pounds. Typically, the caller's phone company routes such calls to another phone company which then either provides the premium-rate service itself or may link on again to another supplier—see Figure 3. The revenue from the caller is divided between the various parties to the transaction. Though often associated with mobile phones, these services are also available to callers using fixed-line phones. They can be paid for using either pre-paid airtime or *ex-post* billing arrangements.

**Pre-paid airtime on mobile phones** can be used to pay directly for non-telephone items from third parties. Again, this is suited to lower-value purchases and may be suited to users (particularly younger people) without

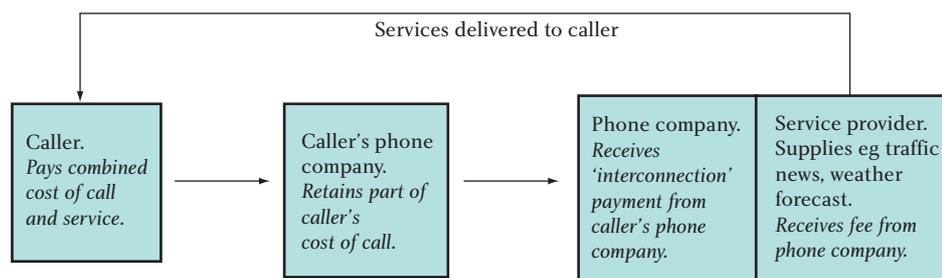
**Figure 2**  
**Reverse charging**



(1) There are also other online payment-related services. For example, internet bill payment services let users pay bills online, typically by accepting card payments for a defined list of companies (such as utility companies), while Electronic Bill Presentation and Payment (EBPP) services integrate the presentation and payment of bills on the internet so customers can receive and pay the bills across the same platform.

(2) For example, in the United Kingdom, MobileATM and Simpays plan to offer a range of m-payment arrangements under their respective brands. MobileATM is a joint venture between LINK (which manages the UK ATM network) and a mobile technology provider, while Simpays is an association of mobile network operators.

**Figure 3**  
**Premium-rate services**



bank accounts or credit cards. The phone company collects the funds from the user to pay for airtime in advance of transactions. When the user makes a purchase, the phone company can retain the part that is its own revenue for the phone call and pays the merchant (possibly periodically) what is due for the goods/services purchased. Purchase of pre-paid airtime is available at some ATMs.

The varied range of mobile payments also includes those directed at micropayments—low-valued payments such as for web content or ring tones. These offer several of the payment options described. For example, Ymogen enables the cumulative payment for premium web content/services, billing daily to the users' credit/debit card or to certain mobile phones by sending reverse charge SMS messages. Micropayments services are also available using internet-based access—a further demonstration of how e-payment 'categories' overlap. An example is BT click&buy which allows registered users to have content purchases from participating online merchants charged directly to their credit/debit card, to a direct debit or BT phone bill each month.

### Pre-paid cards/e-purses

The products with the longest history, of over a decade, among e-payment services are pre-paid cards aimed at low-value transactions. At one time these were generally called **e-money**,<sup>(1)</sup> but this term is now used across the whole area of e-payments. This article refers to these pre-paid products as **e-purses**. Despite early predictions that they would displace notes and coins, they remain

niche products often associated with specialist uses such as mass transit systems or university campuses.

The e-purse scheme operator (or its agents) takes conventional money from card users in exchange for a card loaded (or reloaded) with the same amount of value. Retailers accepting the cards in payment for goods or services ultimately receive conventional money from the scheme operator. There are several models through which this can be carried out.<sup>(2)</sup> Worldwide, there have been a number of attempts to introduce these payment cards.

In the United Kingdom, several e-purse trials took place around the late 1990s, for example of Mondex and Visa Cash e-purses in Swindon and Leeds respectively and the trials on campuses. These projects, however, were mostly discontinued. The UK market, like most others, remains quiet, though sporadic interest continues.

### The development of the market for e-payments

The use of e-payment products is patchy. The most active area is paying by plastic cards on the internet. This is estimated to account for some 90% of all online purchases and represents around 3% of all card payments (a similar share to those made over the telephone). Moreover, it is an expanding market; surveys show around 60% of internet users have made online purchases, a three-fold rise in three years.<sup>(3)</sup>

For the many other e-payment services, however, the picture is less clear. For these, it is not possible to point to any one model as a 'front-runner', and despite niche

(1) 'Network (or software) based e-money' and 'digital coins' are terms sometimes used to describe broadly equivalent services designed for online purchases. For descriptions of some of these products and other e-payments see section 2 of 'E-Payments in Europe—the Eurosystem's perspective', *European Central Bank Issues Paper*, 16 September 2002 ([www.ecb.int/events/conf/other/epayments/epayments.pdf](http://www.ecb.int/events/conf/other/epayments/epayments.pdf)). Descriptions are also found in Committee on Payment and Settlement Systems (2001), 'Survey of electronic money developments', Bank for International Settlements, Basel, CPSS Publications No. 48, November ([www.bis.org/publ/cps48.htm](http://www.bis.org/publ/cps48.htm)). The next survey will be published in early 2004.

(2) For more information on the arrangements and issues in this area, see Committee on Payment and Settlement Systems (1996), 'Security of electronic money', Bank for International Settlements, Basel, CPSS Publications No. 18, August ([www.bis.org/publ/cps18.htm](http://www.bis.org/publ/cps18.htm)); 'Report on electronic money', European Central Bank, August 1998 ([www.ecb.int/pub/pdf/emoneysecurity200305.pdf](http://www.ecb.int/pub/pdf/emoneysecurity200305.pdf)); and 'Electronic money security system objectives (EMSSO) report', European Central Bank, May 2003 ([www.ecb.int/pub/pdf/emoney.pdf](http://www.ecb.int/pub/pdf/emoney.pdf)).

(3) Data from APACS for 2003. Online banking has also expanded markedly: APACS survey data suggest some 11 million users in the first half of 2003 (which is 39% of internet users), of which some 2.5 million had only been using the services for less than six months.

examples of user uptake, the wider market for these new services has yet to be realised. The above data suggest that, excluding the direct use of plastic cards, all internet-based e-payments services account for at most 10% of all online purchases, which overall is a fraction of one per cent of all non-cash transactions. The data, however, are very limited—the general impression of usage patterns comes from sources such as surveys, market participants and the trade press.

The many entries and exits from the market reflect the difficulties in establishing new services. Products building on online or mobile channels (themselves only well-established relatively recently) inevitably have had little time to develop trusted services, to open new markets or to displace traditional methods. Moreover, any service not only has to attract end-users but also needs a viable commercial proposition for other participants—be they retailers, financial institutions and/or phone companies.

This highlights the importance of network effects—where the value of the system to each participant rises as others join. These are characteristic of payment systems, and networks of participants may need to be established at several levels (say consumer to consumer, or consumers and retailers) depending on the nature of the service. The difficulties new services face in entering markets with established networks are well documented and illustrated by the experiences of e-purses.<sup>(1)</sup> These need to attract sufficient end-users carrying the cards, retailers who accept the cards, plus sufficient facilities to load cards—this whole network is required for a product to be viable. Another example is those P2P account-based payment services that require both senders and recipients to join: until a critical mass of end-users is established, the attraction of such a service is limited. However, those e-payment services that build on existing payment arrangements will face fewer network issues. Most obviously, the fact that plastic cards have an existing customer base, widespread merchant acceptance, established business structures along with a well-known product and brand, goes a long way to explaining their significance in e-payments to date.

The varied current pattern of retail payment instrument use across countries is likely to be repeated in the development of e-payments. Whether there is scope to add sufficient value to encourage people to substitute from their existing payment means depends very much on existing payment arrangements. For example, the United Kingdom's direct debit system for regular bill payments is reliable, understood and trusted by personal and business users, which could limit the opportunities for a new product for electronic bill payment. Yet the same new product may find a receptive market in a country where bill payments can be made only laboriously by cheque.

Another illustration is the differences in market opportunities between countries. For example, PayPal in the United States began to develop its network from the niche of providing payment services to internet auction sites (see the box on page 433). That same opportunity would not have existed in countries without significant internet auction use. But different markets may offer other openings and see payment services develop along different paths. For example, many new e-payment services aim at specific market segments, such as low-value transactions, or young people—sectors that in some markets may not be suited to existing payment means such as credit cards or bank transfers.

Any sustained adoption of e-payments also requires the services to have appropriate security. Public perceptions of this can be as important to the market's development as the actual security position.<sup>(2)</sup> Overall user confidence in payment services is affected not only by technical security measures but also, for example, by the liability arrangements for unauthorised transactions and the public's understanding of them. These are some of the many areas that are the subject of policy attention.

## Policy interests in e-payment developments

Many policy issues associated with e-payments (such as security, consumer protection, regulation) are common across financial services and electronic commerce. Responsibilities in these areas can fall to a range of organisations, including regulators and competition

(1) There are comments on network effects in payment systems in section 4 of 'UK payment systems', Office of Fair Trading, May 2003 ([www.oft.gov.uk/NR/rdonlyres/e612ged5itojvmwq7rsxtkfoas2ydnocmb7pqyxoenpnq4nfimaxkpaazcfravmdy4zawkoryokw3amas25vbt3271/oft658.pdf](http://www.oft.gov.uk/NR/rdonlyres/e612ged5itojvmwq7rsxtkfoas2ydnocmb7pqyxoenpnq4nfimaxkpaazcfravmdy4zawkoryokw3amas25vbt3271/oft658.pdf)). Further discussion and academic references are found in Schmitz, S W (2002), 'The institutional character of electronic money schemes: redeemability and unit of account', in Latzer, M and Schmitz, S W (eds) (2002), *Carl Menger and the evolution of payment systems*, Edward Elgar Publishing.

(2) These issues are considered in 'Study on the security of payment products and systems in the 15 Member States', commissioned by DG Internal Market of the European Commission. This was presented in September 2003 at an EC conference entitled 'Payments & Confidence'. The study and the other conference presentations are available at: [www.europa.eu.int/comm/internal\\_market/payments/conference\\_en.htm](http://www.europa.eu.int/comm/internal_market/payments/conference_en.htm). For a discussion of security and e-payments issues, see Jakubowicz, Z, Hanssens, B and Henriksen, S (2003), 'Is paying on the internet risky? What are the risks related to internet payments?', *ePSO Discussion Starter no. 2*, September, available at [www.e-psy.info/epso/index.html](http://www.e-psy.info/epso/index.html).

## PayPal in the United States

Probably the best known e-payment offering is PayPal in the United States.<sup>(1)</sup> It is a non-bank, account-based service. Founded in 1999, it grew out of a niche market—P2P payments between users of internet auction sites. It provided a solution to the problem of payments between individuals who were geographically distant and unknown to each other. Cheques in the post were unsatisfactory, given delays and unknown creditworthiness—and credit cards could not be used directly between individuals. PayPal offered instant confirmation of fund transfer, conveniently using the same medium (the internet) as that used to agree the transaction. It was recently bought by eBay.

Its 'viral' model, requiring payment recipients to join PayPal, worked strongly in its favour. Moreover, it spent money building a network of users—in its early days PayPal paid 'bonus' money into new accounts and similarly rewarded customers who attracted other

users. The growth of its business was accompanied by profit-oriented refinements: through pricing carrots and sticks they shifted users' account funding/defunding away from relatively expensive card-based sources and towards cheaper ACH (automated clearing house) transfers. They also charged for a wider range of services.

Most significant is PayPal's deliberate shift away from P2P payments (which it said was not a profitable sector), to centre its business on transactions involving merchants, who all pay fees (unlike personal customers). It now describes its typical customers as small, online merchants wanting to receive card or bank payments over the internet. PayPal says this market is not directly served by card companies as the merchants' transaction volumes are too low to be viable for them. For the merchants it means they can accept card payments without needing a relationship with a merchant-acquiring bank.

(1) See [www.paypal.com](http://www.paypal.com). PayPal is planning to launch a UK-based service in early 2004. There are also services competing with PayPal.

authorities. This section first discusses some of these policy issues in the specific context of e-payments, then considers which areas might potentially have implications for central banks' financial stability and monetary policy interests in the longer term.

### General policy towards e-payments

Given the rapid developments in e-payments, the plethora of initiatives from both the official and private sectors is unsurprising. The areas of standards, security, privacy, regulation and data are receiving particular scrutiny (see Annex 1, 'Initiatives on e-payments'). An underlying question is often that of whether and how to encourage the market. Some particular questions illustrate the policy debates.

- Should policy-makers promote interoperability between e-payment services? Little is seen to date, for example users of account-based e-payment services cannot typically make payments directly to users of other similar services, nor is there any significant interoperability between active e-purse schemes. If there were interoperability, each service would not face the hurdle of establishing its own network independently, and products collectively might be better placed to achieve a critical mass of users. This could be used as an

argument for public intervention to promote interoperability. However, the gains of 'imposing' this, especially in a rapidly developing market, may be offset by diminished product differentiation and stifled innovation.

- Should public authorities be involved in the security of payment means? There are obvious commercial incentives for payment providers themselves to ensure appropriate security—the risks of financial losses through fraud and reputational damage to the products. Inadequate security, however, also has market-wide externalities, since problems in just one area could reduce public confidence across the wider payments market. This consideration, often in conjunction with consumer protection responsibilities, leads some authorities to have a direct role in the security requirements of payment services/instruments.

Though there are arguments in favour of intervention to encourage these markets, more significant could be the risk of making the wrong choices. Inappropriate interventions at an early stage could constrain the natural development of these payment products. For this reason, policy-makers encourage co-operation between themselves and market participants and may

limit their role to, for example, facilitating industry co-ordination initiatives.

There are questions over what regulation should apply to e-payment products (or indeed, if any significant regulation should apply to small-scale services). Precisely which services meet the criteria for current regulatory arrangements is not always clear. For example, the definition of e-money used in the relatively recent EC Electronic Money Directive (the basis for the regulation of e-money issuers in the European Union) probably most closely relates to more 'traditional' e-purse type products.<sup>(1)</sup> In contrast, the online and mobile payment services that have since come to market look rather different and raise new questions for regulators. An example is whether pre-paid airtime on mobile phones should be classed as e-money if it can be used also to buy goods/services from third parties. (See Annex 2, 'E-money and e-payments—the regulatory position in the United Kingdom'.)

If e-payment services became widely used, it would raise the importance of these issues for all policy-makers with interests in the area. For central banks, any implications for payment systems and for monetary policy would be of direct interest; these are discussed next.

### E-payments and payment system policy

Central banks' approaches to payment systems are affected by their different institutional remits.<sup>(2)</sup> Some look in detail at retail payment systems, instruments and their security, and therefore have a close interest in e-payment developments. Others—including the Bank of England—focus mainly on financial stability issues, so they give greater policy and oversight attention to wholesale payment arrangements and those systems that might give rise to system-wide risks.<sup>(3)</sup> This role, however, includes monitoring payment market developments to anticipate issues that might arise in the future. From this perspective, the study of e-payments suggests two main areas of interest, although analysing them does not necessarily imply the associated risks

would be of concern even if the use of new services were to rise significantly.

The first area of interest is where transactions can move outside existing payment systems. Some e-payment models result in transfers taking place across the payment providers' books. Previously these would have occurred across existing payment systems, including card networks, where the forms of risks are understood and to varying degrees overseen. The wider use of e-payments could mean that different institutions (possibly from outside the financial services sector) may come to manage a larger volume and value of such transactions, with a role in aggregating, segregating and transferring obligations. This could raise questions about whether their risk management is appropriate to their new activities.

The second area of interest is where e-payment services interact with existing payment systems, such as through offering access channels to them, or relying on them for funding/defunding. These may change both the risks in and usage of the existing systems:

- Risks to existing payment systems could arise from associations with e-payment services. For example, if operational problems in an e-payment service that passed transactions to an existing payment system were to lead to failed payments, it could reflect badly on the existing system (or indeed, *vice versa*). The reputation of both systems could be damaged and there may be adverse effects on user confidence. These reputational and confidence effects could spread much wider than the original incident.
- Developments in e-payments could change usage of existing payment systems. Their volumes might rise if, say, an e-payments service which settled each transaction through an existing system attracted large numbers of transactions.<sup>(4)</sup> Higher values/volumes could increase the impact of any operational problems. Alternatively, volumes in

(1) A discussion of some definitional issues is at Kimmo, S and Hanssens, B (2003), 'E-payments: what are they and what makes them different?', *EPSO Discussion Starter no. 1*, May ([www.e-pso.info/epso/index.html](http://www.e-pso.info/epso/index.html)).

(2) The varied involvements of central banks in retail payments are described and discussed in the report Committee on Payment and Settlement Systems (2003), 'Policy issues for central banks in retail payments', Bank for International Settlements, Basel, *CPSS Publications No. 52*, March ([www.bis.org/publ/cpss52.htm](http://www.bis.org/publ/cpss52.htm)).

(3) Oversight of payment systems in the United Kingdom is carried out by the Bank of England. Its main objective is to ensure that systems give sufficient weight to risk reduction and risk management in their design and operation. The intensity of this oversight is proportionate to the assessment of the risks posed to the wider financial system. See 'Oversight of payment systems', Bank of England, November 2000 ([www.bankofengland.co.uk/financialstability/paymentsystems/oversight.htm](http://www.bankofengland.co.uk/financialstability/paymentsystems/oversight.htm)) and the 'Oversight of payment systems' annex to the 'Strengthening financial infrastructure' article of the Bank of England's semi-annual *Financial Stability Review*.

(4) That is, volumes would rise net of substitution effects—if a transaction through such an e-payment service simply substitutes for one that otherwise would have gone directly through the existing payment system, volumes would be unaffected.

existing systems could fall, for example if new services led to more aggregation arrangements (ie several underlying transactions settling by a single payment through an existing system). This might affect the commercial position of an existing system.

Were e-payments to grow significantly, any resulting changes in the distribution of risks might make it appropriate to adjust the form and extent of payment system oversight in this area. E-payments, however, are only one of the strands of developments of payment markets which need to be monitored to assess such effects. From the financial stability perspective, the most important consideration is to avoid any problems in one part of the process being transmitted through the financial system—to other institutions and perhaps even more widely to the users of the systems.

### E-payments and monetary policy

The possibility of e-payments having a significant impact in the monetary policy field has featured in debates about the future of money, monetary policy and the financial system. This section highlights some particular reasons why monetary policy makers will monitor the development of electronic payments.

Money and payments have constantly evolved as societies' needs have changed and enabling technology has become available.<sup>(1)</sup> Recently, many advances based on electronic communication technologies have come into mainstream payments use—such as interbank electronic transfers, payment cards and now e-payments. Against that background, the introduction of devices like the internet and mobile phones into mainstream retail payments can be seen as another addition to existing arrangements. But, like other innovations, they may have monetary effects.

Use of e-payments may affect the frequency of transactions and cause substitution between payment means. This may lead to changes in the relationships between different monetary measures and economic activity. An example would be increasing use of cash substitute products such as e-purses. In this case, since such products do not form part of M0 as currently

measured, the velocity of M0 would be likely to increase, altering the relationship between M0 and real economic variables. Hence, to the extent that M0 is used by policy-makers as an indicator of current or future economic activity, information content would be reduced. Of course, other payment developments (such as the widespread use of credit and debit cards) have over time similarly affected the velocity of M0 and other aggregates; the key for monetary policy makers is to be aware of developments and their likely impact on the different aggregates.

Such developments, however, do not affect the ability of the central bank to execute monetary policy since the issuers of these payment means still need ultimately to settle with each other across accounts held at the central bank. It is through their being the monopoly supplier of this facility that central banks have leverage over the value of transactions in the economy and influence on interest rates.<sup>(2)</sup>

Nevertheless, the effectiveness of central banks' monetary policy were cash to be displaced is a subject of considerable academic debate.<sup>(3)</sup> In particular, it is useful to consider the theoretical possibility that future sophisticated electronic means could allow final settlement to be made without recourse to a central bank. As explained by King (1999),<sup>(4)</sup> it is possible to imagine computers being used to agree settlement terms between parties and make the necessary wealth transfers across electronic accounts for all transactions in real time. These electronic systems would match supply and demand at market-clearing prices and there would be no requirement for a central bank in settlement. Central banks might retain a role as regulator of these different electronic systems and as an arbiter of whatever was chosen as the unit of account (acting like 'weights and measures' inspectors). To date, the prospect of such radical developments remains distant, but illustrating the substantial effect of e-payments in that model encourages us to consider the impact of current, much more limited, developments.

### Concluding remarks

Even though e-payments represent only a small fraction of all transactions at present, their usage could

(1) See, for example, Carl Menger's classic article 'Money', first published in German in 1892 and translated into English in Latzer, M and Schmitz, S W (eds) (2002), *Carl Menger and the evolution of payment systems*, Edward Elgar Publishing.

(2) For a discussion of this point, see Selgin, G A and White, L A (2002), 'Mengerian perspectives on the future of money', in Latzer, M and Schmitz, S W (eds) (2002), *Carl Menger and the evolution of payment systems*, Edward Elgar Publishing.

(3) For a recent summary of some debates, see Holthausen, C and Monnet, C (2005), 'Money and payments: a modern perspective', *ECB Working Paper no. 245*, July.

(4) King, M (1999), 'Challenges for monetary policy: new and old', paper for the Symposium on 'New challenges for monetary policy' sponsored by the Federal Reserve Bank of Kansas City at Jackson Hole, Wyoming, 26–28 August.

potentially grow quite rapidly. A significant increase in their usage would make more immediate the policy issues highlighted above, although precisely which—if any—would prove significant would depend on the nature of the successful new products. Central banks will therefore continue to follow this

changing and innovative area. But the current limited take-up of most of these services highlights the importance of maintaining a sense of proportion in considering policy responses, while acknowledging the possibility that the payments market could change significantly.

## Annex 1

### Initiatives on e-payments

Official initiatives include:

- **European Central Bank ‘E-payments in Europe’.** A conference and public consultation during 2002 Q4 discussed e-payment developments in Europe and raised policy issues. The ECB concluded it could have roles (such as monitoring and encouraging developments) in standards, security and statistical data. This year it relaunched the open forum of the ‘e-Payments Systems Observatory’ which aims to serve as a source of information and to foster an exchange of views on electronic payments between market participants (see [www.e-pso.info](http://www.e-pso.info)).
- **European Commission’s consultative document on a ‘New legal framework for payments in the internal market’.** Published on 2 December 2003, the paper consults on a wide range of proposals intended to bring the EU closer to being a single European payments area. This includes reviewing the regulatory framework of payment service providers in the context of questions about coverage and consistency raised by the range of new payment services. The consultation runs until 31 January 2004 (see [www.europa.eu.int/comm/internal\\_market/payments/framework/communication\\_en.htm](http://www.europa.eu.int/comm/internal_market/payments/framework/communication_en.htm)).
- **European Commission’s ‘EU blueprint on mobile payments’.** The EC is acting as a facilitator to bring together payment providers and phone companies to promote the deployment of mobile payment methods. Coverage includes standards/interoperability, security, legal matters. A draft report is available at [www.mellonrd.com/blueprint](http://www.mellonrd.com/blueprint): it is expected to be completed around end-2003.

Industry initiatives include:

- The **European Payments Council** is an industry grouping established in 2002 to provide the European payments industry with a single voice on payments issues, including in its discussions with the ECB, European Commission and national central banks. It is developing a vision of e/m-payments, in the context of wider plans to achieve a full single payments area in Europe.
- The **Electronic Money Association (EMA)** is a trade body representing electronic money issuers in the United Kingdom. Founded in 2001, EMA’s interests include liaising with regulators and government bodies, drafting industry guidelines and acting as a communication and education forum (see [www.electronicmoneyassociation.org](http://www.electronicmoneyassociation.org)).
- For **mobile payments**, industry groupings include the Mobey Forum, MeT (Mobile electronic Transactions), the Mobile Payment Forum, PayCircle and Radicchio.

## Annex 2

### E-money and e-payments—the regulatory position in the United Kingdom

**Regulatory framework:** The EC Electronic Money Directives (2000/28 and 2000/46) regulate e-money issuance by so-called 'ELMIs', electronic money institutions. These are a new category of non deposit taking credit institutions which, once authorised, benefit from a single passport to issue e-money throughout the European Union. Implemented in April 2002, the UK regime is administered by the Financial Services Authority (FSA). It places financial soundness requirements on ELMIs, including on the investment of their e-money float. Very small issuers of e-money can apply to be exempted from the requirements contained in the regulations although this results in the loss of the EU passport. Banks (ie traditional deposit-taking credit institutions) continue to be able to issue e-money under their existing supervisory regimes (as a passportable activity), which in the United Kingdom requires an explicit e-money permission from the FSA.

The first UK ELMI authorisations, of Moneybookers, then Splash Plastic, were made early this year. Several small schemes have been formally exempted from the regulatory requirements (13 at end-November 2003).

**Regulatory debate:** The regulatory definition of e-money now affects the wider field of e-payments. Essentially, services are captured within the EU regulatory definition where they are pre-paid; used to buy goods/services from a third party; and stored on an electronic device. However, definitions in the Electronic Money Directive were designed around 'traditional e-money' and are silent or ambiguous on the status of several products that have recently been launched.

There are inevitably difficulties in interpretation. For example, the view that certain account-based systems are e-money is not universally accepted. However, one practical motivation for treating them as e-money is that these services may otherwise end up unregulated. The table below summarises guidance from the FSA.

E-payments method	Regulated as e-money in United Kingdom?
Account-based e-payments services (pre-paid)	Probably, if it can be spent with a merchant; probably not if only for P2P money transmission
Mobile phone payments: access to existing payment means	No
Mobile phone payments: premium-rate services (PRS)	No, unless it involves the acceptance by third parties of pre-paid airtime as a means of payment
Mobile phone payments: pre-paid airtime	See mobile phone payments PRS above
Mobile phone payments: post-paid (eg <i>ex-post</i> billing)	No
Pre-paid cards/network tokens ('traditional e-money', e-purses)	Yes
FSA guidance is evolving. Judgments have to be made: for example products should 'look' like e-money and not like deposits—eg if users can draw directly on the funds by a traditional channel like cheques, it is unlikely to be e-money. See FSA Handbook of rules and guidance, AUTH App 3, <i>Guidance on the scope of the regulated activity of issuing e-money</i> .	

Even where there are definitions of what is and is not e-money, the implementation of regulation may not be straightforward. One current example is pre-paid airtime on mobile phones, where there is debate about how to segregate funds used to make third-party purchases (ie e-money) from funds used for normal mobile phone charges.

Within the European Union there remains an active debate over regulatory approaches (see Annex 1 'Initiatives on e-payments'). The Electronic Money Directive itself is due for review by 2005.

#### Further details:

*The regulation of electronic money issuers*, CP117 (12/01) and feedback (4/02), FSA ([www.fsa.gov.uk/pubs/cp/117/index.html](http://www.fsa.gov.uk/pubs/cp/117/index.html)).

*Electronic money: perimeter guidance*, CP172 (02/03), FSA ([www.fsa.gov.uk/pubs/cp/172/index.html](http://www.fsa.gov.uk/pubs/cp/172/index.html)).

*The implementation of the electronic money directive* (ConDoc of 10/01 and follow-up), HMT ([www.hm-treasury.gov.uk/documents/financial\\_services/regulating\\_financial\\_services/fin\\_rsf\\_emoney.cfm](http://www.hm-treasury.gov.uk/documents/financial_services/regulating_financial_services/fin_rsf_emoney.cfm)).

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# The macroeconomic impact of revitalising the Japanese banking sector

By Katie Farrant and Bojan Markovic of the Bank's International Economic Analysis Division and Gabriel Sterne of the Bank's Monetary Assessment and Strategy Division.

*In this article we assess the possible macroeconomic effects of proposals to revitalise the banking system in Japan. Our analysis is supported by a theoretical model that incorporates various interactions between the banking sector and the wider economy. In the long run, a planned reduction in the ratio of non-performing loans (NPLs) to total loans and the intended fall in the risk premium faced by Japanese banks may help to boost the level of investment. Achieving a revitalised banking system cannot be done costlessly, however, and our model suggests that there may be some negative short-run macroeconomic impact as credit growth is reduced.*

## Introduction

Long-standing difficulties in the Japanese banking system are widely perceived to have contributed to markedly weaker growth in the Japanese economy over recent years. In October 2002, Economics and Financial Services Minister Heizo Takenaka announced the government's 'Programme for Financial Revival', a set of policies intended to revitalise the banking system and to deal with the associated problems in the corporate sector. In this article, we assess the possible short and long-run macroeconomic impact of some of the elements of this programme, including improving the capital position of the major banks and increasing the pace of disposal of non-performing loans (NPLs).<sup>(1)</sup>

The analysis is supported by a theoretical model that incorporates various interactions between the banking sector and the wider economy.<sup>(2)</sup> In particular, we use the model to capture the effect of changes in the value of bank capital and the level of NPLs in banks' balance sheets on bank lending spreads, bank lending and investment. A healthier banking system will have a positive long-run impact on investment and growth. Implementation of the programme may, however, dampen investment and output in the short and medium term. In the model the channel operates because it is

costly for banks to raise the additional capital required to offset the effect of writing off NPLs. Such costs lead banks to tighten lending conditions temporarily.<sup>(3)</sup>

The extent to which output and investment are affected is subject to inevitable uncertainty; in the long run this uncertainty reflects the limited available evidence on how an improvement in the health of the banking sector affects lending conditions. In the short run there is uncertainty, amongst other things, about the amount of capital required to cover the write-off of NPLs fully. Initial evidence in Japan suggests that banks have been able to raise additional capital, in part by attracting funds from foreign banks.<sup>(4)</sup> This could partly limit the negative short-run effects on bank lending and, in turn, on investment. The analysis conducted here assumes that the programme does not involve an injection of public funds: this is in line with the programme's aims.

## The Programme for Financial Revival

An important element of the Programme for Financial Revival is that the Japanese Financial Service Authority (JFSA) aims to increase the rate at which banks write-off NPLs; the programme has an objective to halve the ratio of the major banks' NPLs relative to their loan book by March 2005. In April and November 2003, the JFSA

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(1) There was an injection of public funds into the Japanese banking system in 1998, but this article does not deal explicitly with its implications.

(2) See Markovic (2003) for details of the model.

(3) The channels are described in detail on page 443 of the article. An assumption in the model is that the decline in credit availability occurs through a price channel, ie banks raise the interest rate at which they are prepared to lend to firms. Alternatively it could occur through banks rationing the volume of loans. In both cases, investment would fall.

(4) See the Bank of England's *Financial Stability Review*, June 2003 for details.

## Banks' capital adequacy ratios

Capital adequacy ratios measure a bank's capital as a percentage of its risk-weighted credit exposures. Minimum ratios are set in line with the Basel Accord, to ensure banks can absorb a reasonable level of losses before becoming insolvent. The Accord was developed in order to strengthen the soundness and stability of the international banking system and to help standardise international regulatory practice. The Accord, which was first introduced in 1988, is currently in the process of being updated.

The Accord defines three *tiers* of regulatory capital. Tier 1 is defined as permanent shareholders' equity and disclosed reserves (which include certain minority interests). Individual countries have added to the Accord's definition of capital, and in Japan deferred tax assets can be counted towards Tier 1 capital. Tier 2 capital includes general provisions and certain subordinated long-term debt.

Tier 3 capital includes certain subordinated short-term debt and may only be used to meet a proportion of a bank's capital requirement for market risks.

In order to measure banks' credit exposures, assets are weighted according to their degree of 'riskiness'. For example, a loan to an OECD government entity would be given a 0% weighting, while a loan to an individual would receive a 100% weighting.

Currently, the minimum capital adequacy ratios that apply are:

- the ratio of Tier 1 capital to total risk-weighted credit exposures must be 4% or more;
- the ratio of total capital (Tier 1 plus Tier 2 less certain deductions) to total risk-weighted credit exposures must be 8% or more.<sup>(1)</sup>

(1) Japanese banks that only operate domestically are required to have a total capital ratio of 4% or more.

reported on two further rounds of special inspections of major banks' loans to large borrowers, which led to some increase in the estimated level of NPLs and associated loan-loss provisions on banks' balance sheets.<sup>(1)</sup>

The programme also includes the examination of:

- (a) The amount of deferred tax assets (DTAs) that banks can include in their Tier 1 capital (see the box above on capital adequacy ratios).<sup>(2)</sup>
- (b) The possible conversion of the government's holdings of preferred shares into common shares.
- (c) The use (by the major banks) of the discounted cash flow (DCF) method to calculate the appropriate level of reserves held against possible loan default.
- (d) The creation of an entity to help in the corporate workout process. The Industrial Revitalization Corporation was set up on 8 May 2003.

In this article we focus on two features of the programme that may prompt banks to try to raise further capital or

to reduce lending. In the first, banks expect that regulators will tighten their assessment of the quality of capital, for example through new DTA requirements and the use of the DCF method to calculate the appropriate level of reserves held against possible loan default (proposals (a) and (c) above). These changes may lead to a fall in banks' measured capital and so, in response, banks may try to increase their capital ratios either by raising fresh capital or by reducing risk-weighted assets.<sup>(3)</sup> In the second, banks may respond to the programme by disposing of NPLs at a faster rate than previously.<sup>(4)</sup> This may lead to some losses by the banks, depending on the extent to which existing provisions against NPLs are sufficient. Any such losses would affect banks' capital ratios.

## The difficulties in the Japanese banking sector

By way of background as to why the programme has been formulated, it is useful to recap on the problems facing the Japanese banking system. The Japanese economy has

(1) See the JFSA's 'Results of the Special Inspections and Other Measures', 25 April 2003 and 'Results of the follow-up of the special inspections', JFSA, 14 November 2003.

(2) At end September 2003, DTAs accounted for just under half of the Tier 1 capital of major banks. See the *Financial Stability Review*, June 2003 for further discussion of the implications of the DTA requirements.

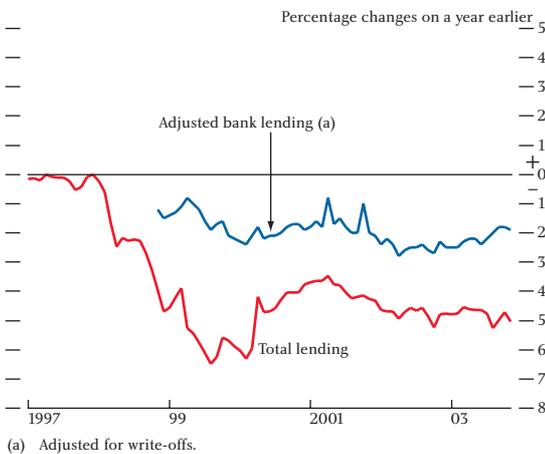
(3) Banks may also try to increase their capital ratios by reducing the dividends that they pay on their shares. If this is the route that they follow, it may make it increasingly difficult for the banks to raise additional capital.

(4) In fiscal year 2001, this rate was around ¥10 trillion.

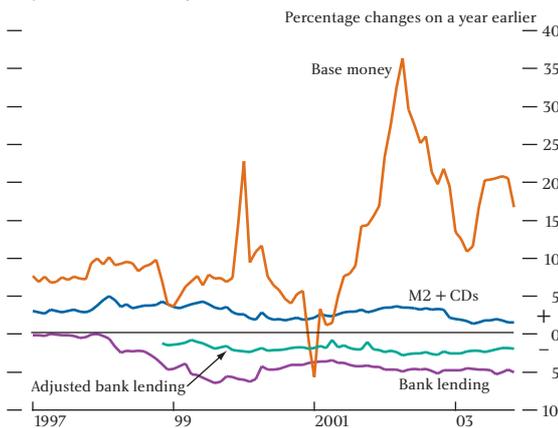
for many years been characterised by sluggish growth, rising unemployment and falling prices. Problems in the banking sector have been inextricably linked with the economy's poor performance.<sup>(1)</sup>

Weakness in the banking system has been associated with annual declines in bank lending for each of the past six years (see Chart 1). Total lending has been falling at rates of around 4% or more since 1999. Banks have, however, disposed of some NPLs and, after adjusting for write-offs, lending has been falling at rates of around 2% per annum.<sup>(2)</sup> Lending has continued to fall in spite of the monetary base increasing since 2002 at post-World War II record rates (see Chart 2).

**Chart 1**  
**Bank lending**



**Chart 2**  
**Japanese money growth**

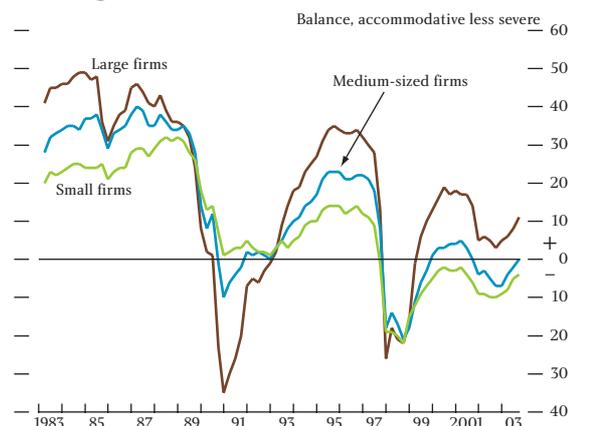


In the analysis conducted here, we seek to understand the extent to which the weakness in bank lending can be attributed to weakness in loan supply (and hence, where

the programme may have a direct impact) and the extent to which it is due to weakness in loan demand (where the effects from the programme may be more indirect). As highlighted earlier, since the early 1990s and until recently, Japan has underperformed most other G7 countries; annual GDP growth in Japan, for example, averaged 1.5% between 1990 and 2002, compared with 2.9% in the United States. This weakness in the macroeconomy is likely to be linked to low levels of loan demand in Japan, suggesting that this is at least part of the explanation for the decline in bank lending in Japan. And it is possible that the weak banking sector may be delaying the reallocation of capital by supporting weak companies and thereby holding back the demand for new loans even further.<sup>(3)</sup>

But weakness in loan supply is also likely to help to explain some of the decline in lending.<sup>(4)</sup> The Tankan survey shows that balances for the lending attitude of financial institutions have been persistently below historical averages in the past six years, though current balances are not extreme by the standards of the late 1990s and have, if anything, shown some modest improvement since the announcement of the programme (see Chart 3). Further support for the idea that loan supply problems have played a role comes from the contrasting lending behaviour of the major Japanese banks and the regional banks: lending by the major banks has been falling particularly rapidly whereas lending by regional banks has remained relatively

**Chart 3**  
**Lending attitude of financial institutions**



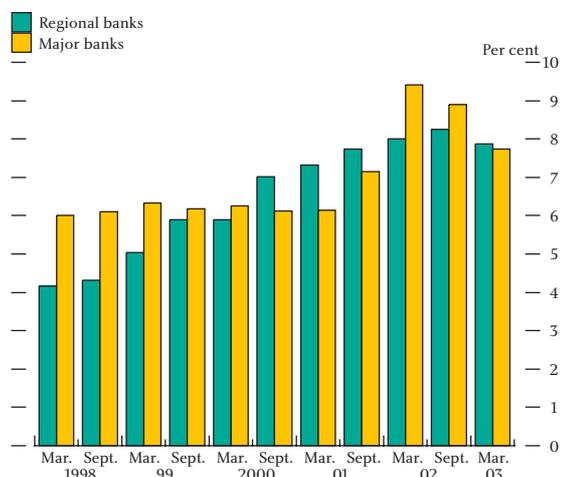
Note: Enterprises are asked if the current lending attitude of financial institutions is best described as 1. 'Accommodative', 2. 'Not so severe' or 3. 'Severe'.

Source: Bank of Japan Tankan survey.

(1) See for example Woo (1999), Hoggarth and Thomas (1999), Diamond (2001) and Kashyap (2002), among others.  
 (2) This includes loans that have been securitised and loans whose value has changed due to exchange rate movements.  
 (3) The Bank of Japan Senior Loan Officer Survey from October 2005 suggested some easing of the decline in corporate loan demand, see the *Financial Stability Review*, December 2005.  
 (4) Hoggarth and Thomas (1999), for example, argued that weak bank lending during the late 1990s was primarily attributable to weakness in loan supply.

static.<sup>(1)</sup> Lending behaviour may differ because the reported ratio of NPLs to total loans has generally been higher in the major banks (see Chart 4).

**Chart 4**  
Ratio of NPLs to total loans

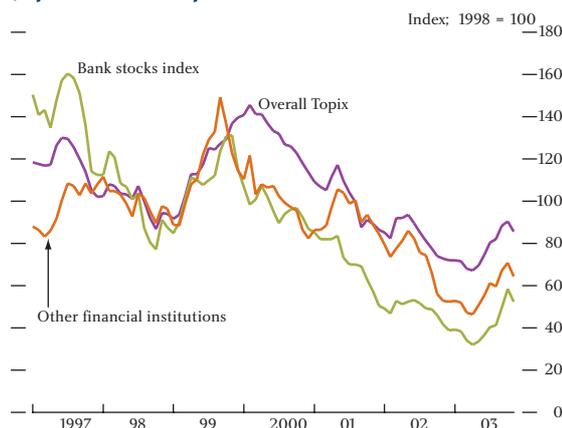


Note: NPLs are measured according to the official definition by the JFSA.

The rise in the ratio of NPLs to total loans in all banks is symptomatic of the problems in the banking system. According to the JFSA, the ratio for major banks was around 9% in 2002 (see Chart 4). This compares with around 1% in the United States. And some economists have argued that this ratio may be understated. Kashyap (2002) cites that Credit Suisse First Boston estimates the ratio of problem to total loans in Japanese banks' balance sheets at 27%.<sup>(2)</sup> Fukao (2002) also argues that disclosed figures understate the real situation, and points out that reported loans classified by the JFSA as being 'substandard', 'doubtful' or 'estimated-loss' loans are almost twice as high as NPLs.

The state of the Japanese banking system may be reflected in the decline in banks' share prices. Despite the recent volatility, between February 2000 and November 2003, the overall Topix has fallen by over 40%, with the bank stock index down by almost 50% over the same period (see Chart 5). Moody's also downgraded the major banks' financial strength to its lowest rating in July 2002. The weakness in the stock market has also contributed to banks' poor profitability: a number of banks have significant equity exposures, where losses have been incurred when positions are marked to market.

**Chart 5**  
Japanese stock prices



### Modelling credit and capital channels in the monetary transmission mechanism

In order to calibrate the impact on the Japanese banking system we use a theoretical model that extends that of Bernanke, Gertler and Gilchrist (BGG (1999)). BGG's model has been quite widely applied to assess the impact of credit channels that operate through corporate balance sheets in various countries.<sup>(3)</sup> Plans to restructure Japanese banks' balance sheets are likely to have an indirect effect on corporate balance sheets and hence economic activity. A more direct economic impact, however, is likely to come through a bank capital channel, and the BGG model is limited in its capacity to tackle the possible effects arising through this channel.

A number of studies have developed theoretical models that stress the role of banks in the transmission mechanism. The models include those focusing on a bank capital channel that occurs because of an increase in bank reserves (Bernanke and Blinder (1988)), or because banks face capital constraints now or in the future (Chami and Cosimano (2001), Chen (2001) and Van den Heuvel (2002), among others). For the purposes of simulating policy, such models should ideally (in no particular order): (a) be dynamic; (b) have a role for nominal and real variables; (c) be general equilibrium models; (d) have banks whose objectives are explicitly to maximise profitability; and (e) feature the interaction between the supply and the demand side of the credit market. All of the issues are modelled in the

(1) There are no particular demand factors that we can identify that would explain the difference between lending growth in the major and regional banks.

(2) Of course, there may be some differences in the definition of 'problem loans', which makes direct comparison of these numbers difficult. There has recently been some narrowing of the gap between official estimates of NPLs and analysts' estimates, see the *Financial Stability Review*, December 2003

(3) See for example Hall (2001a, 2001b) who applies the model to the United Kingdom, and Fukunaga (2002) who applies it to Japan.

literature, but we could not identify one tractable model that includes all of them.

Our model includes all of the above features except (d). In order to make the model tractable, banks are assumed to break even in each period rather than maximise profits. As a consequence, the price of bank shares is not modelled explicitly. Another limitation is that banks' capital ratios are not endogenously determined and the model is not able to address frictions arising from the heterogeneity between banks.

In spite of the model's limitations, it provides a means by which we are able to assess plausible channels through which changes in bank capital affect the macroeconomy. In particular, we are able to assess the implications for the demand and supply side of the credit market, both of which are affected by the programme. The theoretical model is calibrated to match characteristics of the Japanese economy, thus allowing us to assess how lender-specific financial positions may affect the transmission mechanism. In the model, any write-off of NPLs affects the economy through a distinct bank capital channel, as well as a corporate balance sheet channel and more traditional transmission channels: the last two are both modelled in BGG (1999).

In addition to the conventional interest rate channel, there are two distinct credit channels in the model, the first of which operates through firms' balance sheets, the latter—not modelled in the BGG model—through banks' balance sheets. These are detailed below:

- *The conventional interest rate channel* describes the effect of a monetary policy change on aggregate demand via real interest rates. A higher real interest rate (owing to a monetary tightening, for example) raises the cost of both firms' internal and external funds, further increasing the required return on firms' capital, thus implying that fewer investment projects become viable. Lower investment, in turn, reduces aggregate demand and real output in the economy.
- *The corporate balance sheet channel*, modelled in BGG (1999), is based on the information asymmetry between banks and firms. Following an increase in

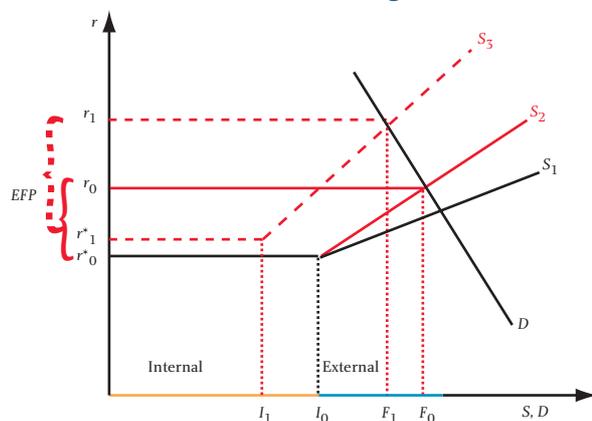
the real interest rate, firms' profits and thus their internal funds fall. Since banks use a firm's internal funds as a signal of its capacity to repay debt, any fall in internal funds increases the rates charged by banks on loans and therefore raises further the cost of firms' external funds.

- *The bank capital channel* operates because banks incur a cost whenever they need to raise additional capital. The cost arises first, because potential shareholders invest in bank shares only after incurring a search cost. Fees paid to credit-rating agencies are an example of such costs. The cost varies in proportion with banks' needs to raise new capital, and is therefore cyclical. Second, both new and existing bank shareholders demand an additional premium above the risk-free rate of return whenever they expect a fall in the value of banks' capital. The value of banks' capital is likely to fall due to the two elements of the programme detailed above. If new and existing bank shareholders do not expect further revisions to the value of bank capital, the second effect may not arise and the size of the calibrated effects, given later in Chart 6, may differ.

#### A graphical description of monetary transmission in the model

Figure 1 illustrates how these channels might affect the cost and availability of external funds to firms. For financing needs up to  $I_0$ , the firm uses internal funds at an opportunity cost of  $r^*_0$ . For financing beyond  $I_0$ , the firm borrows from a bank and pays a premium above the risk-free rate.<sup>(1)</sup> The premium reflects two factors. First, there are auditing costs paid by the lender in order to monitor firms. These costs increase in line with the

**Figure 1**  
Financial conditions and the marginal cost of finance



(1) The external finance premium (EFP) is defined as the spread of rates charged for firms' external funds over the risk-free interest rate.

firm's reliance on bank finance, since the bank uses firms' own contributions to their financial needs (firms' internal funds) as a signal of their incentives to act diligently. The finance supply schedule  $S_1$  is therefore upward-sloping.<sup>(1)</sup>

The extensions in our model relate to the explicit inclusion of banks in the model. These imply a further steepening of the finance supply schedule, since the possibility of bank default implies an additional risk premium which—in the model presented below—raises the cost for banks of their capital. Lending rates will increase further to the extent that banks are able to pass on the costs of holding NPLs in their portfolio. So in equilibrium, the loan supply schedule is given by  $S_2$ , and the firm borrows  $F_0 - I_0$  at an external finance premium of  $r_0 - r^*_0$ .

In the model, an increase in interest rates, for example to  $r^*_1$ , reduces current cash flow, implying the internal funds available to the firm are  $I_1$ , lower than previously, and the finance supply schedule shifts to  $S_3$ . Furthermore, higher interest rates affect the risk premium through each of the credit channels described above, thereby increasing the risk premium for any given level of borrowing. The finance supply schedule becomes even steeper beyond  $I_1$ , reducing total finance to  $F_1$  with the firm paying an interest rate  $r_1$  on bank loans. In this example, higher interest rates are associated with a greater recourse to bank borrowing ( $F_1 - I_1 > F_0 - I_0$ ), since the decline in the firm's internal funds has exceeded the decline in its total demand for finance.<sup>(2)</sup>

## Simulating the effects of the Programme for Financial Revival

In this section we use the model as a tool for helping to understand how corporate and bank capital channels may influence the transmission mechanism by running simple experiments aimed at capturing the two key features of the programme described previously.

### Calibration

In order to investigate the effects of the programme on the Japanese macroeconomy, we set parameters in the model equations to approximate actual structural features of the Japanese economy. There are a number

of financial parameters and variables in the model, each of which may affect the values of key economic variables in the steady state of the economy. To inform our judgment we compare our calibration with similar financial parameters and variables in the United States.

### The financial health of the corporate sector

The magnitude of the auditing costs incurred by banks depends in our model upon the business default rate. In the event of business default, banks retrieve only collateral (firms' remaining internal funds) less the auditing cost. We set key parameters in the model to deliver steady-state outcomes for the business default rate, the external finance premium paid by corporates on their debt, and the proportion of firms' investment that is externally financed. The Japanese corporate sector has experienced well-documented problems in recent years. Despite this, the business failure rate in Japan is broadly similar to that in the United States (see Table A). But this might understate the responsiveness of the Japanese economy to changes in the financial health of the corporate sector given the cross-shareholdings that exist between the corporate and banking sectors. Given this, for the purposes of our simulations we use a number close to that in row A.

**Table A**  
Indicators of the financial position of the corporate sector, in Japan and the United States

	Japan	United States
A. Average business termination rate (per cent)	4.5	9.7
B. Average business failure rate (per cent)	1.5	1.1
C. External finance premium (basis points)	200	200
D. Ratio of external to total finance	0.5	0.5

Sources: Japan A. Ministry of Public Management, Home Affairs, Posts and Telecommunications, B. Oyama and Tanaka (2003), C. Fukunaga (2002), D. Fukunaga (2002).  
United States A. US Small Business Administration, B. Thomson SDC and Board of Governors of the Federal Reserve System, C and D. Bernanke, Gertler, Gilchrist (1999).

### The financial position of the banking sector

Banks face intermediation costs, which they pass on to borrowers. In the model, these costs are affected by the ratio of a bank's capital to its loans, the risk premium in the banking sector, and the share of NPLs in total loans. Table B compares these data in Japan with similar data for the United States.

We set the ratio of bank capital to total risk-weighted assets (the capital ratio) equal to 10.2%, slightly higher

(1) The line  $S_1$  is analogous to the line  $S_1$  in Figure 1 in Hall (2001b, 2001c).

(2) Dale and Haldane (1995) provide empirical support for the proposition that the volume of bank lending to corporates may temporarily increase in the United Kingdom, following a tightening of monetary policy.

**Table B**  
**Indicators of the financial position of the banking sector in the model, in Japan and the United States**

	Japan	United States
A. Ratio of bank capital to loans (per cent)	10.2	9.2
B. Risk premium in the banking sector (basis points)	150	75
C. Share of NPLs in total loans (per cent)	9	1

Sources: Japan A. FSA\*, B. Nakaso (1999) and CreditTrade\*\*, C. Japanese FSA. United States A. FDIC, B. CreditTrade\*\*, C. FDIC.

\* Estimates based on financial figures (end-September 2002, 7 major banks).

\*\* Estimates based on credit default swaps in the banking sector.

than the US ratio of 9.2%.<sup>(1)</sup> Owners of bank capital receive a risk premium on their investment, so a higher capital ratio implies that banks need to charge higher loan rates to cover this premium. A higher ratio should also reduce the default risk and hence the risk premium banks pay on their capital, although this effect is not directly modelled (see pages 443–44).

We calibrate the banking sector risk premium at 150 basis points,<sup>(2)</sup> twice as high as our estimates for the United States, based on a similar method. In the model, this is equivalent to the assumption that the probability of default of Japanese banks is twice as high as that of banks in the United States. The share of NPLs in total loans is calibrated at 9%, in line with the official estimate of the JFSA. This is considerably higher than values for the United States (1%).

The calibrations of the model imply, relative to other major economies, a stronger simulated response of the Japanese economy to shocks that affect the financial position of banks.

We assume that the successful implementation of the programme will lead to a write-off of NPLs and a fall in the probability of default and thus the risk premium in the banking sector. We also assume that, in the short run, for the reasons explained on page 440, banks will have to raise additional fresh capital in order to comply with the regulatory capital requirement.

### Simulation 1: a decline in the long-run share of NPLs coupled with a fall in the value of the bank capital

#### Long-run effects

If successful, the programme should lead to a fall in the share of NPLs in total loans, and hence to a healthier

banking sector, with a lower probability of bank default. The latter is likely to reduce the risk premium in the banking sector (see Table C). The calibrated effects are illustrative rather than representing our firm predictions. As in all calibrated models, the quantitative results need to be interpreted with caution. The current structure of the Japanese economy differs from the historical averages we have adopted from other studies and used for the calibration of certain parameters.

**Table C**  
**Simulated long-run effects of a decline in the share of NPLs in total loans, coupled with a reduction in the risk premium in the banking sector<sup>(a)</sup>**

Share of NPLs in total loans	9% to 4.5% (b)
Risk premium in the banking sector (basis points)	150 to 100 (b)
Annual external finance premium in the corporate sector	2.02% to 1.96%
Bank lending	+1.2%
Investment	+1.0%
Output	+0.5%

(a) In the model, shocks lead to persistent deviations from the steady state. Investment, for example, takes between two and ten quarters to achieve 80% of the long-run adjustment following a shock to the value of bank capital.

(b) Exogenous shocks.

Table C shows how key variables in the model respond to a halving in the long-run share of NPLs in total loans from the official estimate of 9%, to 4.5%. This is coupled with a reduction in the risk premium in the banking sector from 150 basis points to 100 basis points. The write-off of NPLs implies a higher average return on the remaining stock of total loans. In this model, banks are therefore likely to charge lower lending rates. An accompanying fall in the banking risk premium, and thus the fall in the cost of bank capital, creates a further fall in banks' lending rates. Firms therefore increase their demand for loans and the share of external funds in total funds increases. In the long run, bank lending is estimated to rise.<sup>(3)</sup> A lower cost of finance reduces the required return on firms' capital, thus increasing investment in the economy. In the long run the level of output should be higher than would otherwise be the case.

#### Short-run effects

In the model, the movement from one steady state to another does not occur immediately. The dynamics of this transition are detailed below. The planned write-off of NPLs will reduce the share of NPLs in banks' assets and unless banks can costlessly raise additional finance to offset fully the value of the write-off (or receive public

(1) The ratio of total capital to unweighted assets is lower. Using this ratio might affect the exact magnitude of the calibrated results, but would not alter the intuition behind the analysis.

(2) This is broadly consistent with the evidence provided in Nakaso (1999). Our calibration falls towards the upper bound of the credit default swaps (CDS) rate presented in Chart 8. To inform our judgment, we compare our calibration with the upper bound of the CDS rate in the US banking sector.

(3) This is accompanied by a rise in firms' profitability and thus their net worth.

funds), bank capital will decline, and may lead to some decline in credit availability (through prices or even through banks rationing the volume of loans).

There are various estimates on how much fresh capital banks would have to raise in order to recapitalise fully. As explained on page 440, the need for the fresh capital depends on (1) the level of NPLs not covered by the existing provisions, and (2) the revision in the level of DTAs that banks can include in their Tier 1 capital or other changes in the method for calculating bank capital. At present, there is no clear indication about the size of (2), which adds to the uncertainty about the need for fresh capital, and thus the size of the shock. The greater the need for the additional fresh capital, the greater would be the dampening effect on credit growth.

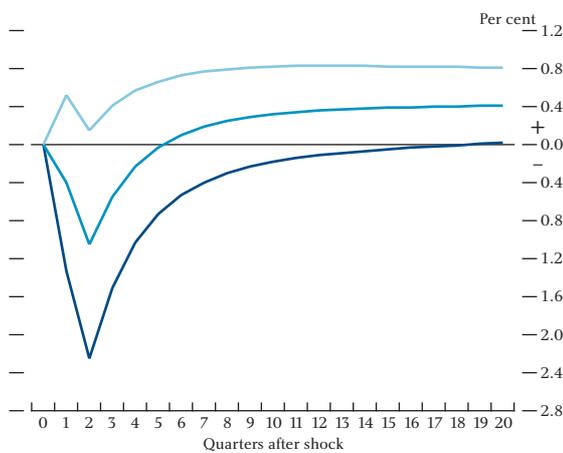
We simulate the short-run effects of the write-off of NPLs, coupled with the fall in the value of bank capital, and the consequent need for banks to raise fresh capital.

Reflecting some uncertainty about the volume of fresh capital that banks need to raise, we consider three illustrative scenarios with indicative numbers. In the scenarios, banks raise 11% of total capital (light blue line), 18% (blue line) and 25% (dark blue line). It is assumed that the fresh bank capital needs to be raised over eight quarters (the time period in the government's original announcement of the programme).

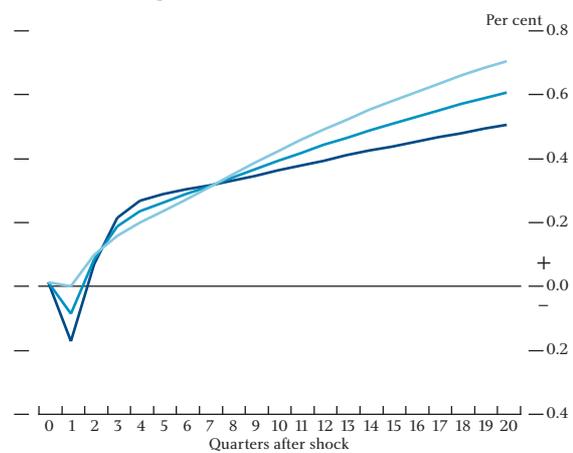
Chart 6 shows how key variables in the model respond to a simulated shock that describes some of the implications of the Programme for Financial Revival. Although the programme is likely to have a positive impact on investment and growth in the long run (see Table C), the transition to a new steady state may involve some costs. An initial reduction in the value of bank capital affects the ability of banks to raise the fresh capital in several ways. Due to a fall in the value of bank capital (and thus the expected capital loss), banks' shareholders will invest in banks' capital only if banks offer a higher dividend yield.<sup>(1)</sup> Moreover, banks may

**Chart 6**  
Simulations of the model in response to a change in the value of bank capital

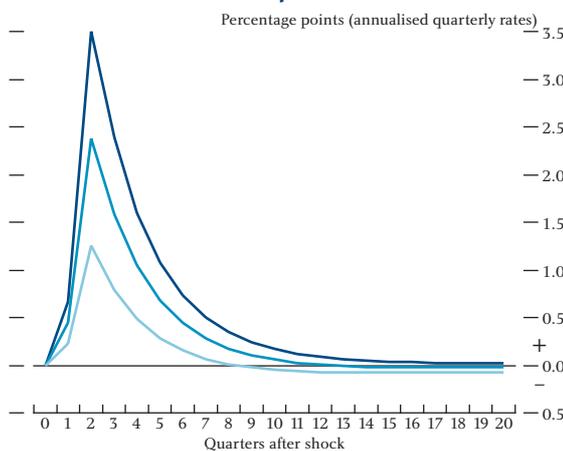
**Firms' net worth**



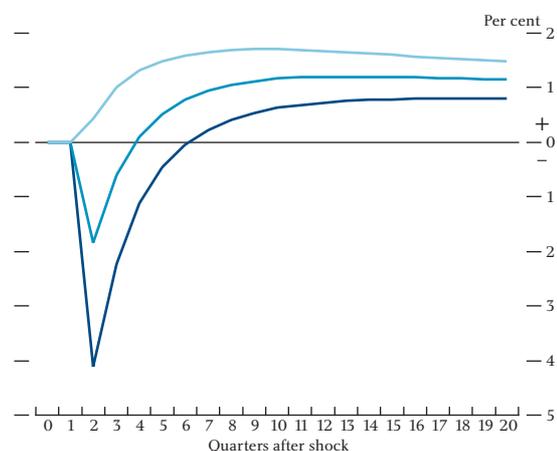
**Bank lending**



**Firms' external finance premium**



**Investment**



(1) As an alternative to higher dividend yields, banks could sell new shares with a discount.

face adjustment costs in their attempts to raise new capital, further increasing the cost of their liabilities. Banks pass on the higher cost of their liabilities to firms by increasing the external finance premium. This is the bank capital channel, as explained above. A rise in firms' funding costs leads to a fall in firms' profits and net worth and a reduction in the value of collateral firms are able to offer to banks. Banks thus raise further the external finance premium since the value of firms' collateral declines. This is the corporate balance sheet channel, as outlined in the BGG model.

The simulations suggest that bank lending may decline in the short run, then—provided that banks are able to raise fresh capital without incurring excessive costs—it increases above the initial level. The medium-term increase in bank lending occurs despite the temporary rise in the cost of firms' external finance, and thus lending rates. This is because a fall in firms' internal funds leads them to increase their demand for loans.

The short-run response of investment may go in either direction. The lower lines represent the case when the capital stock decreases, corresponding to the decline in firms' internal funds and in the total finance available for investment. The upper line represents the case in which the short-run declines in investment finance are outweighed by the impact of changes in economy-wide expectations of the positive effect of a future revitalised banking system and the corresponding reduced costs of financial intermediation.<sup>(1)</sup>

## Additional issues and uncertainties

The model-based analysis captures some key features of the Programme for Financial Revival but there are other factors that are not explicitly considered in our analysis.

### Employment effects

The accelerated disposal of NPLs may have short-run implications for employment and the capital stock of affected companies. The model will capture some employment effects, but possibly not fully. Following the announcement of the plans in October 2002, estimates from the Japanese Cabinet Office suggested that for every ¥12 trillion of NPLs that are disposed, between 50,000 and 70,000 people would lose their jobs. To the extent that the programme results in widespread redundancies, it is plausible that the elasticity of

demand for labour of affected firms may be higher than the average figure calibrated in the model, so our calibrations may understate the short-run impact on employment. Since the announcement of the programme, there has actually been little change in the level of employment. In the long run, any redeployment of labour to more profitable enterprises might imply increases in profitability and wages, over and above those that we have been able to capture in our model.

### Credit rationing

The model assumes that banks are always able to raise sufficient fresh capital to meet credit demand. In some circumstances, however, banks could choose to limit credit supply below the level of credit demand, without raising the fresh capital. This would mean that, in the model, we may be overestimating the response of bank lending and, in turn, of investment. As highlighted above, the initial evidence fails to indicate any severe dampening in credit growth (see Charts 1 and 3).

### The level of NPLs

As discussed above, some authors have estimated the level of NPLs to be higher than those considered here. So the eventual recapitalisation required to restore full health to the banking sector could be higher than indicated in the simulations. Conversely, the long-run improvements may be overestimated if the banks have already allowed for substantial provisions to cover for the write-off of NPLs.

### Injection of public funds

The analysis conducted here assumes that there is no injection of public funds. Such an injection may create expectations of tax increases and emphasise moral hazard problems in the banking sector. Conversely, an injection of public funds carries with it an implicit government guarantee and could dampen the cost of raising the fresh bank capital.

## Assessing developments since the plans in light of the model-based analysis

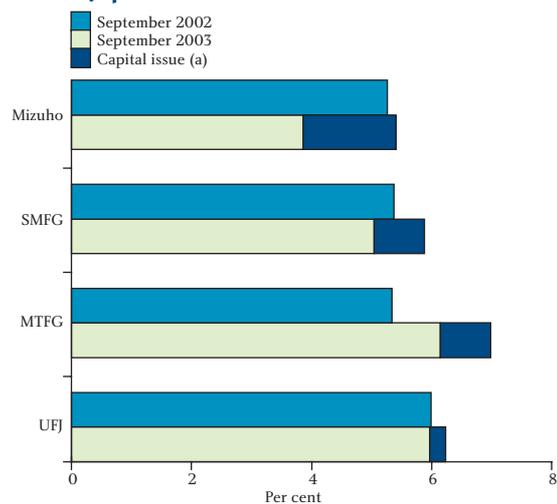
Since the announcement of the Programme for Financial Revival, the four major banks have raised an additional ¥2 trillion of Tier 1 capital (see Chart 7).<sup>(2)</sup> There has

(1) So far, the major Japanese banks have been able to raise capital equal to around 12.7% of their Tier 1 capital as at end-September 2003.

(2) Further details on the banks' capital raising can be found in the *Financial Stability Review*, June 2003.

been some injection of public capital into Resona Bank (in May 2003), and Ashikaga Bank has been temporarily nationalised, but there has been no injection of public funds into any of the four major banks in Japan.<sup>(1)</sup> Thus far, an internal solution to the problems has been possible, in line with our approach to modelling the problems.

**Chart 7**  
Tier 1 capital ratios for the major internationally active Japanese banks



Sources: Annual reports and Bank calculations.

(a) Capital raised between December 2002 and end-March 2003.

As highlighted earlier, raising capital may be costly and therefore may affect banks' loan supply. The extent to which recent developments in the macroeconomic and financial indicators can be associated with the announcement of the programme is unclear, since numerous other issues have affected the economy since October 2002.

The potential for the programme to lead to short-run declines in investment, because the costs of raising new capital are passed on to borrowers, does not appear to have been reflected in relevant indicators. There has been no significant change in credit conditions according to the Tankan (see Chart 3). Between October 2002, when the Programme for Financial Revival was announced, and November 2003, bank shares, along with the overall Topix, have risen by around 15%.<sup>(2)</sup> And credit conditions remain much less severe than during 1997–98, when Japan is widely considered to have experienced a credit crunch. Credit default swap spreads in the banking sector for example have not widened dramatically. After a short blip

immediately following the announcement of the Programme for Financial Revival, there has been no further widening of spreads, either in the banking sector (see Chart 8) or the corporate sector (see Chart 9); and small and medium-sized corporates' assessment of their financial position has shown no dramatic deterioration (see Chart 10).

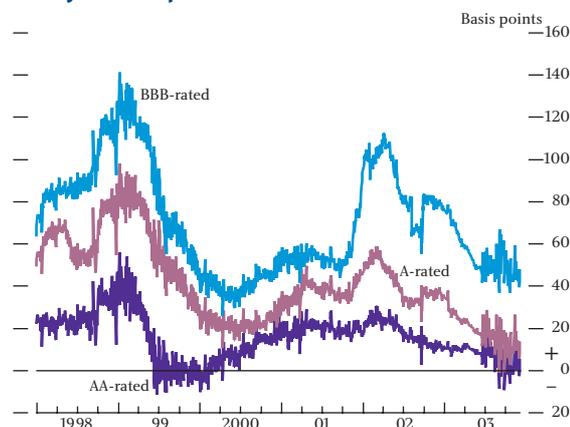
**Chart 8**  
Japanese banks' credit default swaps<sup>(a)</sup>



Source: CreditTrade.

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

**Chart 9**  
Japanese corporate bond spreads over five-year swap rates

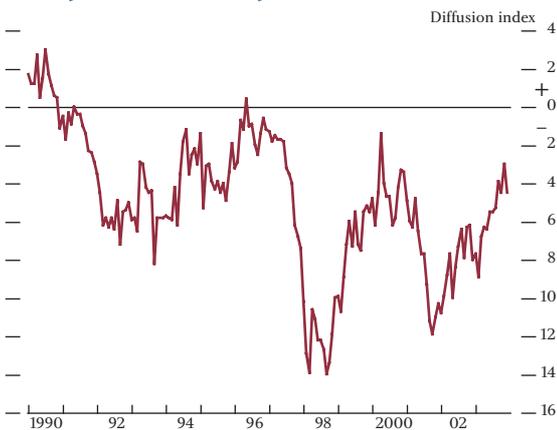


There are various possible explanations as to why there has been very little firm evidence of a tightening in credit conditions. First, it could be that the announcement of the programme has, by itself, had limited impact on the actions of lenders and borrowers. It is possible that a full implementation of the programme would have a more discernible impact on financial conditions. Second, implementation of the programme might be expected to have a limited impact

(1) For more details on the public capital injection into Resona Bank, see the *Financial Stability Review*, June 2003.

(2) As noted in the *Financial Stability Review*, December 2003, there has been heterogeneity in the performance of bank shares, with strong share-price performance of larger banks and falling share prices of many regional banks.

**Chart 10**  
**Shoko Chukin small and medium-sized enterprises' financial position**



compared with other short-run effects that have been observed during the past year, such as the recent global improvement in equity markets and growth prospects. Third, the simulations above suggest that the anticipation of beneficial long-run effects of recapitalising the banks could partially or fully offset short-run costs. Finally, it is possible that the cost of raising the fresh capital is lower than expected by the model.<sup>(1)</sup> Each of the candidate explanations remains, however, speculative.

## Interpretation and conclusions

This article has explored the potential effects of the Programme for Financial Revival that was formulated to try to resolve some of the problems in the Japanese banking sector. We use a macroeconomic model as a tool to provide illustrative calibrations of the long-term benefits and short-term costs to the Japanese economy of some of the key features of the programme. We have illustrated how the effects of the transition to a healthier banking sector will depend upon the magnitude of the injection of fresh capital required to restore health to the banking sector through a reduction in NPLs. We have also illustrated that a transition may be dominated by long-run expectations, if the confidence in the programme's success is sufficiently high. The model-based analysis is inevitably underpinned by numerous simplifying assumptions that abstract from some important practical issues, such as the direct impact on employment and the capital stock of affected firms. Furthermore the simulation ranges illustrated do not necessarily encompass the difference of opinions in the academic literature on the extent to which such injections of new capital could restore the banking system to full health.<sup>(2)</sup> Nevertheless, it is clear from our analysis that the programme has the potential to secure an improved long-run performance in the Japanese banking system, and therefore in the wider economy.

(1) This may have been influenced by the implicit government guarantee after the injection of public capital into Resona Bank.

(2) For example, Kashyap (2002) argues that institutional changes in banks, insurance companies and government financial agencies need to take place concurrently for reforms in Japan to be successful.

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# Estimating real interest rates for the United Kingdom

*Working Paper no. 200*

Jens Larsen, Ben May and James Talbot

The *ex-ante* real interest rate is a key variable in the transmission mechanism of monetary policy. Any change in the short-term nominal interest rate set by the monetary authority will—if prices are sluggish—lead to a change in real interest rates, which will affect demand, and subsequently inflation, via the consumption and savings or investment decisions of households and firms.

In general, there are few direct measures of the *ex-ante* real interest rate because almost all debt contracts are specified in nominal terms. So this paper explores a number of methods for calculating UK real interest rates. The pros and cons of each approach are evaluated carefully: after constructing a long and consistent time series of each measure, a rigorous sensitivity analysis is conducted and, where appropriate, error bands are constructed around the estimates in order to assess their accuracy.

The United Kingdom has a well-developed market for government bonds (gilts) that are indexed to the retail prices index (RPI), so the first approach considers real interest rates derived from these bond prices. But more recently, estimation has been complicated by the combined effect of limited supply and artificially price-inelastic demand on yields in this market.

A second approach uses yields on nominal gilts minus an appropriate measure of inflation expectations. But this method is also subject to several important problems. First, nominal bond yields will be subject to the same distortions identified above. Second, estimating inflation expectations is not an easy task. The paper adopts two approaches to devise inflation expectations: one is based on surveys and another one uses forecasts from a vector autoregressive model of inflation, unemployment and interest rates. Third, such estimates will include a measure of the inflation risk premium, and so are not directly comparable with those from index-linked gilts.

The third approach uses a ‘consumption-based’ measure—derived from manipulating the first-order condition of the standard household intertemporal optimisation problem. The basic (power utility) version of this model suffers from the standard problems outlined in the literature: the so-called ‘risk-free rate’ and ‘equity premium’ puzzles. So the basic framework is augmented to allow for (external) habit formation in consumption, and extended to estimate general *k*-period real interest rates.

Real interest rates at one, three and ten-year maturities derived using this approach look reasonably plausible: real interest rates peak during the recession of the early 1980s and fall during the economic expansions of the late 1980s and late 1990s. But because the model is based on a relatively simple process for consumption growth (a random walk), the term structure of interest rates contains less information, remaining relatively flat throughout the sample period.

Interestingly, although the different approaches outlined above can sometimes yield different estimates of real interest rates, all the measures move more closely together during the post-1992 inflation-targeting period than before. Before 1992, uncertainty about the monetary regime, coupled with persistent expectational errors, may have made it more difficult for agents to forecast real interest rates and inflation.

Another question is whether the fall in long real yields observed in the index-linked gilt market post 1997 is based on movements in real fundamentals? Evidence from the model with habit formation suggests that there has been some fall in the ten-year real interest rate since the mid-1990s. But it would appear that at least some of the decline observed in the index-linked market has been driven by the institutional factors described above, underlining the value of taking an eclectic approach when assessing movements in real interest rates.

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# Debt maturity structure with pre-emptive creditors

*Working Paper no. 201*

Prasanna Gai and Hyun Song Shin

Short-term liabilities play a central role in sovereign debt restructuring. Typically, the creditors of a debtor in distress must decide whether to extend further lines of short-term credit, or whether to cut their losses and refuse to lend. The greater the funding need that creditors must meet, the less likely it is that they will be persuaded to roll over their credit lines. This is because uncertainty about the assessments and actions of other creditors acts as a disincentive for an individual lender to extend credit. Thus, the greater the amount of short-term (immediate) debt outstanding, the more problematic the problem of coordinating creditors becomes.

In dealing with sovereign debt crises, policy-makers have proposed measures such as stays on creditor litigation, temporary payments suspensions, and concerted rollovers of credit lines, in an effort to target short-term debt. But following the use of concerted rollovers in Korea, creditors reacted pre-emptively to the crisis in Brazil—shortening maturities at the onset of crisis and cutting interbank lines sooner than might otherwise have been the case. This experience has led some to question the viability of rollovers and payments standstills as tools for crisis management. By encouraging creditors to ‘rush for the exits’, it is argued, such measures merely bring forward financial vulnerabilities by pushing debt maturities towards the shorter term.

This paper argues that such logic is not necessarily general. We model the ‘rush for exits’ as a pre-emption game among creditors. A debtor country undertakes an  $N$ -period project and creditors choose where, within the maturity spectrum, they prefer to extend credit. The fruits of the project, which are taken by long-term claimholders so long as premature liquidation is avoided, depend on the size of the funding gap and on the maturity structure of the debt—the shorter the maturity, the greater the probability of financial crisis.

Creditors face two conflicting incentives. First, there is the desire to be first in the queue (the shortest debt maturity) so as to be able to escape the losses associated with crisis. But if all creditors behave in this fashion, this maximises the chance of crisis. So some creditors choose longer maturities in the hope that funding problems do not arise. The balance of the two generates an equilibrium debt maturity profile for the project.

The analysis explores the effects of an orderly payments suspension on the creditor’s choice of maturity and, hence, on the term structure of debt. We show that if such measures can boost recovery values in the event of crisis, then creditors may not seek short-lived claims. This is because there is a direct effect in increasing incentives to holding longer-term claims since the returns to holding these are now higher. And there is an indirect and reinforcing ‘strategic’ effect, as higher recovery rates brought about by such policy measures reduce the desire to engage in pre-emption in the first place.

Comparative static results suggest that the overall implications for the term structure of debt depend on the effectiveness of the crisis management framework as well as the length of time that the restructuring is expected to take. If payments suspensions are short-lived and have a positive effect on recovery values, they are unlikely to generate a move towards shorter maturity debt. Longer-lived debt workouts can push maturities towards the shorter term, however. Indeed, for suitably lengthy workouts, it is even possible that there can be a hollowing out of middle maturities as creditors move to either end of the maturity spectrum. It is not typically possible therefore to draw firm conclusions, *a priori*, about the shape of debt maturity profiles when measures such as payments standstills and concerted rollovers are used as part of crisis management.

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# Credit spreads on sterling corporate bonds and the term structure of UK interest rates

*Working Paper no. 202*

Jeremy Leake

This paper explores the relationship between credit spreads on sterling corporate bonds and the term structure of UK interest rates. In doing so, it addresses the extent to which credit spreads are reliable indicators of default risk.

Finance theory has suggested that there is a relationship between interest rates and default risk, and hence a relationship between interest rates and credit spreads. However, the theoretical models conflict as to the nature of this relationship.

On the one hand, 'structural' models based on option pricing suggest that higher interest rates might be associated with lower credit spreads. Such models view equity as a call option on the value of the firm, with the strike price equal to the face value of the debt. For example, in such models, the firm defaults on debt repayment if the value of the firm is less than the face value of the debt on the debt repayment date. A higher risk-free rate in this static model corresponds to a higher expected growth rate in the value of the firm (other things equal) and so a lower level of default probability over any given horizon.

A second view can be derived from 'reduced-form' models. Such models do not attempt to model why firms default on their debt but instead assume that some bonds will default on the balance of probability. There are numerous types of reduced-form models; in the one used in this paper investors demand compensation for default risk by grossing up the coupon paid on a default-free bond by the expected default probability. If interest rates rise by 1 basis point, the gross-up effect increases the coupon by more than 1 basis point. Thus, the differential between the coupon on the corporate bond and the coupon on the risk-free bond increases in absolute terms with the size of the default-free coupon and credit spreads rise when the default-free interest rate rises.

This paper examines the empirical relationship between credit spreads on single-A and Aa-rated sterling corporate bonds and the level and slope of the UK yield curve for the period 1990 to 1998. The corporate bond price data are quotes rather than actual trades. Corporate bonds can be much less liquid than government bonds and it is possible for some corporate bonds not to trade for long periods of time. As a result, price quotes may not reflect all current information and so calculated credit

spreads might reflect delays in the arrival of information rather than economic factors. Any such bias is likely to be exacerbated at times when information arrives frequently—for example, when government bond prices move sharply over short periods of time.

The credit spread series calculated exhibits particularly high volatility during the second and third quarters of 1994, a period when prices in the gilt market fell sharply. This volatility could have been due to uncertainty in the corporate bond market or could have been a result of non-synchronous gilt and corporate bond data. The paper finds that, though the occurrence of unchanged prices was high in the data set, they were not particularly prevalent during the period of high credit spread volatility in 1994.

Due to the possibility of stale prices throughout the data set the paper runs two sets of regressions: one set using daily data with an adjustment for non-synchronous prices and a second set using weekly data with no such adjustment. The results of the two sets of regressions are similar: in both there is a negative correlation between credit spreads and the slope and level of the yield curve. However, most of the coefficients in the regressions using daily data are statistically insignificant, while the coefficients in the regressions using weekly data are more negative, and most are statistically significant. All results are economically small, in that a large change in the yield curve is required to produce measurable movements in spreads, suggesting the relationship is weak. The weak relationship between interest rates and credit spreads in this study gives us cause to doubt whether such credit spreads are reliable indicators of corporate bond credit risk. One potential explanation is that factors other than interest rates are more important in driving credit risk. More likely is the possibility that the credit risk component of credit spreads on investment-grade corporate bonds is small relative to factors such as liquidity and risk aversion. Studies using US data suggest that this latter explanation is correct. So an interesting extension to this work would be to undertake a similar study on sub investment-grade sterling corporate bonds, where one would expect the credit risk component of credit spreads to be greater. However, we will probably need to wait for more sterling sub investment-grade corporate bonds to be available and for a sufficiently long history of data before conclusions can be drawn from that market.

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# Analytics of sovereign debt restructuring

*Working Paper no. 203*

Andrew G Haldane, Adrian Penalver, Victoria Saporta and Hyun Song Shin

Recent years have seen an increasing incidence of sovereign debt crises, including Russia in 1998, Turkey in 2000 and 2001 and Argentina in 2001 and 2002. The costs of these crises imposed on debtors, creditors and the official sector have activated a heated debate on appropriate mechanisms for the restructuring of sovereign debt, particularly international bonds. Some commentators have argued in favour of market-based solutions, whereas others—most prominently the International Monetary Fund’s First Deputy Managing Director Anne Krueger—have advocated statutory approaches akin to an international bankruptcy court.

This paper develops a simple theoretical model of sovereign debt restructuring to analyse the merits of some of these proposals. In the model, a debtor country with an unsustainable stock of debt makes a write-down offer to its creditors. Creditors vote whether to accept or reject the offer. Two market-based arrangements are analysed: under the first, contractual provisions require unanimous consent for the offer to go through; under the second, collective action clauses (CACs) bind the minority to the will of the majority. These arrangements are compared with a first-best welfare benchmark.

In recent years, coordination problems among creditors have intensified as a large part of sovereign credit is now held by a diverse set of bondholders and sellers of credit protection rather than in the loan books of a few internationally active banks. Our results suggest that, when intra-creditor coordination problems are severe, voluntary market-based debt exchanges with unanimity clauses lead to inefficiencies by providing incentives for certain types of creditor to hold out. As a result, resources are unnecessarily expended on legal proceedings and costly renegotiations preventing the debtor from exerting the socially desirable amount of adjustment effort. CACs can resolve these inefficiencies, provided that all parties have complete information about each other’s preferences. In such a world, statutory mechanisms are unnecessary.

This conclusion, however, does not hold when the assumption that the debtor and its creditors have complete information about each other’s preferences is dropped. In this case, the inefficiencies induced by strategic behaviour—the debtor-creditor bargaining problem—cannot be resolved by the parties themselves. One way of removing these inefficiencies would be the intervention of a third party—for example, an international analogue of a domestic bankruptcy court.

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# The dynamics of consumers' expenditure: the UK consumption ECM redux

*Working Paper no. 204*

Emilio Fernandez-Corugedo, Simon Price and Andrew Blake

Over the past 25 years, innumerable consumption error correction mechanisms (ECMs) have been estimated. In the United Kingdom in particular, research has concentrated on the variables explaining consumption in the long and short run. With single-equation consumption ECMs, the implication is that deviations from the common trend in consumption, income and wealth are corrected only through consumption. This is despite the fact that in the simplest intertemporal models of household consumption, there should be no consumption ECM. Instead, equilibration should operate via the income or wealth drivers. The former result does not hold with all extensions, for example to habit persistence, but the latter does. This issue, introduced by John Campbell in the 1980s, has been revived with a number of papers on US data by Sydney Ludvigson and her co-authors. In those papers, deviations from common trends tend to be corrected via changes in wealth. In this set-up, deviations from the long-run relationship appear to lead to changes in income or wealth. But the causality here is from expected future events to current consumption and saving decisions; it is not that (eg) higher consumption causes higher income growth through, say, some aggregate demand mechanism. In this paper we examine the evidence for the United Kingdom.

We pay some attention to the treatment of non-durable consumption. We construct a simple model of the consumption of both durable and non-durable goods.

We construct appropriately defined data, and the short-run dynamics and long-run relationship between non-durable consumption, non-asset income, wealth and the relative price of durable goods are examined. One cointegrating relationship is found to exist. The relative price of durables to non-durables may play a role in this process. Estimating vector error correction mechanisms (VECMs), we find that adjustment towards the long-run common trend does indeed occur partly via changes in wealth. This is consistent with forward-looking behaviour by agents. It also means consumption can predict asset returns. This result is confirmed by a regression of excess returns to equities on the disequilibrium term from the long-run relationship.

We also perform a decomposition of shocks hitting the system into temporary and permanent components. Almost all of the variation in the consumption and income process can be ascribed to permanent shocks. Depending on the treatment of the relative price of durables, we find that between 30% and 90% of fluctuations in non-human wealth are transitory. Even if the lower figure applies, this means a substantial part of short-term fluctuations in wealth is decoupled from permanent consumption.

Our analysis implies that we can welcome the return of the UK consumption ECM, in the context of a complete VECM analysis of the system explaining the relationship between consumption and permanent income.

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# Empirical determinants of emerging market economies' sovereign bond spreads

*Working Paper no. 205*

Gianluigi Ferrucci

Yield spreads on emerging market economies' (EMEs') sovereign bonds are important indicators of financial fragility for country surveillance purposes. They are typically used as a measure of the markets' perception of the risk that a country might default and to assess EME external financing conditions. But EME spreads are influenced by a large number of determinants—credit risks, liquidity risks, and market risks—and inferring their exact information content is not straightforward.

This paper develops an empirical model relating secondary market sovereign spreads to a set of country-specific fundamentals, controlling for external factors, market risk and liquidity in bond markets. The aim is to explain the long-run determinants of EME bond spreads, together with some short-run dynamic behaviour. The estimated equation is reduced form, and posits that the fair-value spread is a function of the probability of default and the recovery rate in the event of default. In turn, the probability of default is linked to a set of macro-prudential indicators affecting the country's solvency and liquidity position. To underpin the selection of credit spread determinants (fundamentals), the paper discusses a simplified model of sovereign borrowing that formalises the consumption choices of an indebted small open economy. This model points to a set of variables that are important components of the internal and external constraints on government debt obligations. The data set for the estimation is a ragged-edge panel of secondary market spreads and a number of country-specific macro-prudential indicators obtained from a variety of sources. Estimates are obtained using the pooled mean group technique, which assumes a dynamic error correction equation with heterogeneous cross-sectional

coefficients in the short-run equations and homogeneous coefficients in the long-run relationship.

We use this model to address three main questions. First, we ask what proportion of the change in market spreads is explained by changes in the underlying fundamentals, controlling for external factors, liquidity and market risk. Second, we provide a benchmark measure of sovereign risk against which to compare actual market spreads. Finally, we use the model to explain patterns in spreads, from an *ex-post* perspective. As a case study we analyse the generalised fall in secondary market EME bond spreads experienced between 1995 and 1997.

Data limitations highlighted in the paper mean that the results have to be interpreted with caution.

Nevertheless, the model is informative and allows us to reach interesting conclusions. Our main finding is that market spreads broadly reflect fundamentals, but that non-fundamental factors also play an important role. Comparing market-based spreads against their fundamental-based counterparts we find that credit risk is typically priced fairly closely to a theoretical equilibrium level, based on the selected set of macro-prudential indicators. In the cases of large absolute misalignments, we identify whether the divergence is due to unmeasured fundamentals or is likely to depend on market imperfections. Finally, the model suggests that the fall in spreads between 1995 and 1997 cannot be explained solely in terms of improved fundamentals. Assuming that our model provides a fair picture of fundamental-based sovereign credit risk, the divergence must be due to capital market imperfections, such as higher investor risk appetite resulting from lower global interest rates.

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# The rise in US household debt: assessing its causes and sustainability

*Working Paper no. 206*

Sebastian Barnes and Garry Young

US households' debt relative to their income has increased to new highs in recent years, posing questions about the likely economic effects of this growth in indebtedness. This paper assesses possible causes of this rising indebtedness and considers how sustainable such borrowing behaviour might be.

The paper uses an overlapping generations model where differences between cohorts, ie households of different age, give rise to household sector borrowing and asset accumulation. Households borrow both because of a consumption-income motive, where young households with low current incomes borrow to raise their current consumption, and a housing-finance motive, where households borrow to fund owner-occupation of housing. Only the youngest households would choose to borrow due to the consumption-income motive but housing finance causes them to borrow more and later in their lives.

The model is calibrated to match a number of features of the US experience, both in aggregate and in the cross-section of the population. We also introduce an old-age borrowing constraint, which provides an alternative explanation for why older people choose not to borrow to finance owner-occupation towards the ends of their lives, even though this would allow them to consume more.

The debt to income ratio would have been stable if the economy were in steady state. So, we consider a number of shocks to the US economy that might possibly account for the rise in household debt over the past 30 years. Shocks to real interest rates and income growth expectations would affect the behaviour of individual households. Even with no change in household-level behaviour, demographic change such as the 'baby boom' might have affected total borrowing by altering the numbers of those most likely to borrow, ie the young, in the economy.

Combining observed shocks, we find that the rise in indebtedness during the 1990s is similar to that predicted by the calibrated model. However, the rise in debt during the 1980s is difficult to explain, as a number of factors suggest that it should have fallen during that time. This could reflect shortcomings in the model or the influence of other factors such as financial market liberalisation.

What does this imply for the sustainability of US household debt? The model suggests that household borrowing would be expected to increase further over coming years, reflecting the gradual adjustment to shocks during the 1990s, albeit at a slower rate. However, the sustainability of current behaviour depends critically on the realisation of the expectations on which households have made their borrowing decisions.

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# A quantitative framework for commercial property and its relationship to the analysis of the financial stability of the corporate sector

*Working Paper no. 207*

John Whitley and Richard Windram

In the past property-related lending has been a significant cause of losses for UK financial institutions and the property cycle has been assigned a role in accentuating the general business cycle. Whereas the role of residential property has been well documented in terms of the transmission of shocks and its relationship to the overall macroeconomy, this has not been the case for commercial property.

This paper sets out a quantitative framework for considering the implications of commercial property developments for the financial stability of the corporate sector. It builds on previous work extending the Bank of England's macroeconomic model to the household and corporate sector's balance sheets by constructing a model of real estate companies and linking this model into the aggregate corporate sector through the role of property as collateral. Previous modelling work on commercial property has focused on market studies or used single-equation relationships. Few studies have attempted to link the commercial property market to financial markets, and even fewer to the rest of the macroeconomy. Lack of suitable data has been a major constraint on attempts to model the commercial property sector.

In this paper we attempt to fill this gap. Data for more than 1,000 real estate companies are used to calibrate the financial accounts of real estate companies. We then combine various rules of thumb that are consistent with these accounts with econometric analysis to build an overall simple model of real estate companies' behaviour, related to macroeconomic factors. One of the reasons why previous modelling attempts have not been developed for practical forecasting and projections is that the models have required projections of other variables that are either related to the property market itself, or are difficult to project. The principal objective is to ensure that the model is capable of being used for both forecasting and simulation, either in isolation, or in combination with a wider macroeconomic model.

Econometric analysis of rental income and bank lending is the main behavioural element in the real estate model. The bank lending equation does not find a consistent

role for borrowing costs relative to returns from property over the whole sample period. However, the gap between property yields and the base rate appears to explain a large proportion of the growth of bank lending after 1999. Without allowing for this influence, the equation appears to break down. Sale and lease-back deals between non real estate and real estate companies also appear to have boosted bank lending after 1999. This model can be used to derive an estimated probability of default for real estate companies, drawing upon other research being developed within the Bank of England on corporate failure. Further work on data and on possible supply influences might help to resolve the puzzles highlighted in this paper.

A dynamic simulation of the property model starting in 1990 illustrates the overall performance of the model. The model fails to capture all the cyclicity of capital values and bank lending since 1990. This can be traced back to a failure to predict changes in the discount rate applied to rental income during this period, and may reflect a (temporary) change in risk premia. The model itself does not include an explicit treatment of expectations or risk premia. Future work might usefully examine the role of alternative expectations mechanisms.

An important feature of the work is that it enables the specification of the role of commercial property in influencing the financial health of the overall corporate sector. The key link between the real estate model and the rest of the corporate sector is through the capital value of commercial property. Capital values are derived from rental flows using a simple discount model. Changes in capital values are found to affect aggregate corporate liquidations, because they alter the collateral security that backs corporate loans. Simulations of changes in macro variables using the Bank of England's macroeconomic model illustrate the importance of this property link and the potential for adverse developments in the commercial property sector to amplify the sensitivity of corporate default to macroeconomic shocks. So, although there are no feedbacks to broader macroeconomic aggregates, the model enables further quantification of financial stability risks.

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# A matching model of non-employment and wage pressure

*Working Paper no. 208*

Andrew Brigden and Jonathan Thomas

In contrast to previous cyclical upswings where both the unemployment and inactivity rates have declined in tandem, the fall in the total non-employment since the mid-1990s has been almost completely accounted for by a decrease in the unemployment rate, while the inactivity rate has remained broadly flat.

The monetary policy implications of these developments are unclear. It is possible that the relatively stable inactivity rate has helped to moderate any extra wage pressure arising from the decline in unemployment. However, it is equally plausible to argue that the inactive are so detached from the labour market that they have no impact on wage bargaining.

In order to address these issues, this paper develops a model of the labour market that explicitly distinguishes between the unemployed and the inactive, rather than treating all those who are out of work as unemployed. The key difference between the groups is the value that they place on non-work related activities such as leisure. It is assumed that unemployed people have a relatively low valuation on such uses of their time. Consequently,

they search harder for jobs, are prepared to accept lower pay, and therefore enter employment more readily.

We then use the model to examine the behaviour of inactivity, unemployment and wage growth over 1994–2000. Specifically, we attempt to identify the underlying shocks that can explain the observed trends in unemployment and inactivity over this period. We consider shocks to the benefits received by the unemployed and the inactive, the costs incurred by the firm when hiring and firing workers, and the share of individuals with low search effort in the working-age population. The most plausible impulses involve a rise in the fraction of individuals with low search effort, and a reduction in benefits to the unemployed. The rise in the proportion of students in the working-age population over the 1990s could have raised the share of individuals with low search effort correspondingly, while the stricter benefit regime since the mid-1990s could have increased the attractiveness of working compared with being unemployed. Both these shocks imply movements in unemployment and inactivity that would not be accompanied by a rise in wage pressure.

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# Settlement bank behaviour and throughput rules in an RTGS payment system with collateralised intraday credit

*Working Paper no. 209*

Simon Buckle and Erin Campbell

High-value payment systems are critical elements of the economy and typically take one of two forms: deferred net settlement (DNS) and real-time gross settlement (RTGS). In a DNS system, banks make payments to each other during a specified period (usually one day) and then settle the net amounts at the end of that period. Until settlement is completed, banks are effectively extending unsecured and possibly unmonitored loans to each other. The amount of credit risk in such systems was one of the main drivers for the introduction of RTGS systems in Europe and elsewhere.

RTGS systems eliminate the counterparty credit risk present in DNS systems by requiring participants to settle payments on a gross basis in real time. But this credit risk reduction comes at the cost of a requirement for potentially expensive intraday liquidity. Central banks have sought to reduce liquidity costs for settlement banks, for example by providing collateralised intraday liquidity and good system design. Even so, intraday liquidity in RTGS systems is not in general free and unlimited.

An important determinant of the liquidity efficiency of an RTGS payment system is the extent to which the system design gives settlement banks an incentive to manage their payments in a socially efficient way. In an RTGS system, one bank's payments are a source of intraday liquidity for the recipient bank, which it may then subsequently use to make its own payments. If banks recycle liquidity sufficiently quickly, the aggregate requirement for intraday liquidity can be significantly reduced.

This paper provides a simple analytical model with which to study RTGS system design. In the context of this two-bank model, we show that banks will delay payments when they care about payment imbalances between them in the first period, leading to an inefficient degree of liquidity recycling. When banks do not care about first-period payments imbalances, there is no unique equilibrium outcome but one possible symmetric outcome is efficient—when each bank posts the same amount of collateral, equal to half of the value of payments each wants to make, and uses all its available liquidity to make payments in the first period. This results in the maximum possible degree of liquidity recycling and the lowest aggregate collateral requirement.

In practice, banks do care about payment imbalances between them during the day because of competitive and/or liquidity risk concerns. While some degree of liquidity recycling is likely to emerge even in these circumstances, in particular due

to the repeated nature of the interaction between settlement banks, we argue that full efficiency is not guaranteed, largely because of imperfect information and the competitive dynamics of the payment industry. Using the model, we show how regulation—in this case a throughput rule—can be used to achieve the efficient outcome even in this situation. Throughput rules, which stipulate the proportion of each settlement bank's usual daily payments that must be made by a certain cut-off time, substantially reduce the overall requirement for intraday liquidity in an RTGS system and may also increase the contestability of the payments market, encouraging a higher degree of direct access to payment systems. Consequently, throughput rules could have risk-reduction benefits if they help to reduce the level of tiering in the financial system.

We also address the question of how to design throughput rules in practice. Our model suggests that increasing the number of throughput rules would enhance efficiency indefinitely, although at an ever diminishing rate. It seems likely, however, that there is some upper limit to the efficient number of throughput rules, for at least two reasons. First, real payments have a finite size and are sometimes very large and urgent. If the value of payments required to be made in a given period was less than the size of a large, urgent payment, banks needing to make such payments would be forced to use more liquidity than they receive back from other banks—the original problem that throughput rules were designed to solve. The second reason why the feasible number of throughput rules will be bounded is that real payments between banks are stochastic and, at least in part, unknown at the start of the day. Assuming the throughput rules are based on the average value of payments, as the number of rules increases, eventually a point will be reached where, on a day when the demand for payments is low, one or more of the banks will just not have sufficient customer payments to meet the final throughput requirement.

A further potentially important design issue highlighted in this paper is that aggregate throughput rules may not be adequate in a payment system with more than two settlement banks, since they could not prevent banks from forming cartels to disadvantage other banks or new potential entrants. While we have no evidence of such behaviour within the UK high-value payments system, there may be merit in considering the feasibility of applying throughput rules on a bilateral basis or putting other equivalent incentive mechanisms in place.

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# Company accounts based modelling of business failures and the implications for financial stability

*Working Paper no. 210*

Philip Bunn and Victoria Redwood

Corporate failure poses a threat to financial stability if firms who fail default on their debt. Although the failure of an individual firm is unlikely to have systemic implications, if a number of firms with large amounts of outstanding debt fail simultaneously there may be systemic implications. Previous work in the Bank of England, which aimed at monitoring these risks to financial stability arising from corporate failure, has been relatively qualitative. The aim of this paper is to supplement that work with a more quantitative approach. We use firm-level data to develop a model of corporate failure, which we then use to analyse both the aggregate risks and the distribution of those risks.

The early literature used balance-sheet information and a discriminate-analysis method to try and predict firm failure. More recent articles have favoured probit models, and this is the approach we take. Most of the papers in the existing literature use a relatively small number of firms or a relatively short timescale. We attempt to address this problem by using a sample of over 100,000 observations from 29,361 public and private UK non-financial firms between 1991 and 2001.

We estimate a probit model for individual company failure using firm-level balance-sheet information and aggregate data on macroeconomic conditions. We find that there is a negative relationship between profitability and corporate failure, but this relationship is non-linear, with negative profitability being associated with the largest marginal effect on the probability of failure. There is a positive association between the debt to assets ratio and the likelihood of failure, and there is an additional positive impact on the probability of failure if above-average capital gearing coincides with the firm making a loss. The probability of a firm failing is found to be negatively related to its interest cover and liquidity.

If a firm is large and a subsidiary, it is less likely to fail, holding all other factors constant. Our model controls for industry: firms in the service sector are less likely to fail than those in manufacturing, primary industries and utilities. We incorporate macroeconomic effects into the model by including GDP growth and find a negative correlation between GDP growth and failure, even after controlling for all of the firm-level characteristics.

We use the firm-level probabilities of failure generated by the model and apply these to the analysis of risks to financial stability arising from the UK corporate sector. We do this by defining debt at risk: the probability of failure of an individual firm multiplied by its debt. To derive an aggregate measure of financial risk we sum debt at risk across all firms in each year. We find that this micro-based measure of financial risk performs better in predicting debt at risk of default than a macro-based approach, which involves multiplying the average probability of failure by the total stock of debt and therefore does not fully exploit the firm-level dimension of the data. Debt at risk, as a proportion of total debt, was at its highest in the early 1990s, and it has been relatively stable since 1993, although the stock of debt has risen over this period.

As well as analysing aggregate measures of debt at risk, the paper also looks at the distribution. The distribution appears heavily skewed, with debt at risk being concentrated among a small number of firms. The implication of this is that we should particularly focus on these firms in order to monitor what is happening to the aggregate measure. While debt at risk is concentrated among a relatively small number of firms, in general these are not the firms with the highest probabilities of failure. The firms with the highest probabilities of failure tend to be small firms, which do not hold large amounts of debt in absolute terms.

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# Financial stability and the United Kingdom's external balance sheet

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*This article, one in an annual series, examines the United Kingdom's financial transactions with the rest of the world, paying particular attention to the implications for financial stability. In recent years, the United Kingdom's stocks of external assets and liabilities have increased considerably, and each now exceeds £3.5 trillion. This is three times UK GDP and around a third of the United Kingdom's total financial assets. The monetary financial institutions (MFI) sector accounts for approximately half of the external balance sheet, reflecting both the international orientation of UK-owned banks and the cross-border activities of foreign-owned UK-resident banks. The article begins with a conceptual discussion of how external positions might affect financial stability, before turning to recent developments. The principal focus is on the MFI and private non-financial corporate (PNFC) sectors, in which the largest external positions exist. The discussion draws upon data from a variety of sources, including the Pink Book, sectoral financial balance sheets, the Bank of England and the IMF.*

## Why are external positions important?

The financial crises in the emerging economies in the late 1990s demonstrated that cross-border capital flows can have financial stability consequences. The benefits of such flows to both borrower and lender are well documented: improved resource allocation; the facility to smooth consumption over time; and increased opportunities to manage and diversify risks. However, the crises in East Asia, Russia and Latin America, although undoubtedly originating in shocks to the domestic economy, were exacerbated by a sharp reversal of capital inflows. A great deal of attention has focused on this topic in recent years. In one report, released in the Spring of 2000, the Capital Flows Working Group of the Financial Stability Forum drew attention to the destabilising effects of 'abrupt portfolio adjustments'. The report highlighted the potential loss of liquidity should non-resident lenders withdraw their funds or decline to refinance, with the consequences particularly stark for countries with large amounts of short-term external debt and small, but open, financial markets.

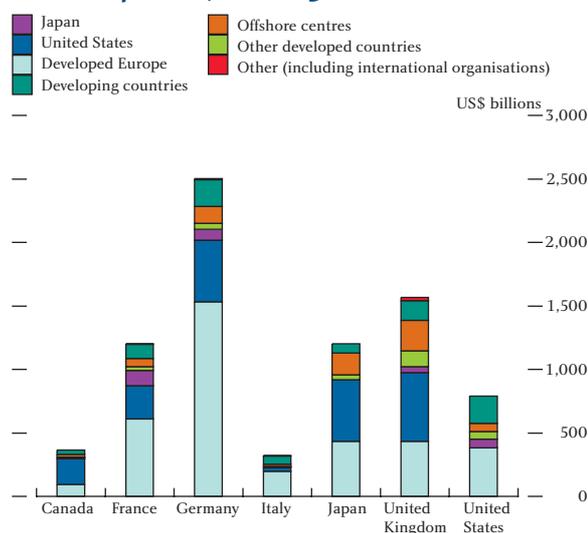
Advanced industrial economies, such as the United Kingdom, with deep, open and highly developed financial markets, and manageable external debt positions, do not exhibit the same vulnerabilities in this regard. But the United Kingdom's external assets and

liabilities each amounted to more than £3.5 trillion in 2003 Q2, up by approximately two thirds since 1998. At more than three times GDP, and a third of total financial assets, these positions are significant. Resident entities, notably monetary financial institutions (MFIs) and private non-financial corporations (PNFCs), have increasingly relied on external finance from non-resident investors, while also building up their stocks of external financial assets via foreign direct investment and portfolio diversification. Macroeconomic shocks occurring outside the United Kingdom can be transmitted rapidly to the domestic economy through the portfolio choices of both UK-resident asset holders and foreign lenders and investors, as well as through changes in the value of non-resident assets and fluctuations in the exchange rate. The effects of such shocks can thus be greater than would be implied by trade links alone.

These developments have also increased the potential for the international transmission of failures in national payments and settlements systems. And with London's status as a major international financial centre, and its position as host to more than 270 foreign-owned banks, the increasing interconnectedness of financial markets is particularly important to the United Kingdom. Indeed, the MFI sector in the United Kingdom is responsible for approximately half of the United Kingdom's total

external assets and liabilities. This international orientation is not due to foreign-owned UK-resident banks alone. As Chart 1 shows, the size of UK-owned banks' consolidated foreign claims is second only to those of Germany.

**Chart 1**  
Consolidated foreign claims by nationality of bank ownership—end-June 2003



Source: Bank for International Settlements.

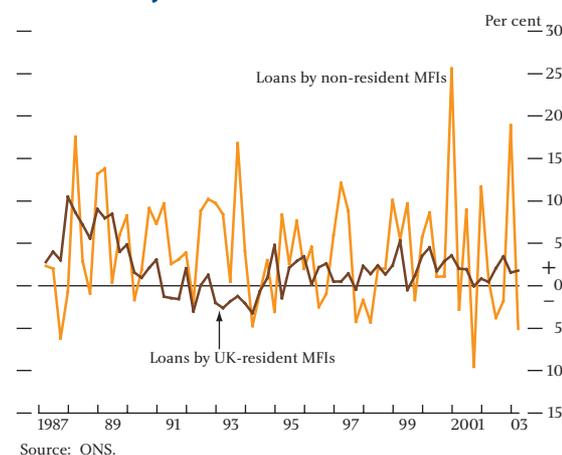
## Assessing the risks associated with external positions

What is it about external positions<sup>(1)</sup> that might cause their impact to differ from that of purely domestic exposures?

First, there is the question of domestic entities' reliance on non-resident sources of finance. Despite increased globalisation of the financial services industry, it remains the case that committed long-term relationships are more likely to become established between banks and borrowers of the same nationality. For example, even for the United Kingdom's largest and most internationally oriented banks, claims on domestic residents constitute on average 60% of total on-balance-sheet assets. To the extent that non-resident lending is not a 'core' part of a lender's business, the potential systemic externalities associated with a decision to withdraw funding are less likely to be taken into account. This may lead to greater volatility in the

provision of finance from non-resident lenders. Indeed, Chart 2 shows that lending to the UK PNFC sector by non-resident MFIs has been considerably more volatile than that by resident MFIs.<sup>(2)</sup>

**Chart 2**  
Quarterly growth in the stock of lending to UK PNFCs by domestic and external MFIs



Source: ONS.

This is related to the second key issue, which is that external positions naturally carry with them direct non-resident exposure. The implications of this for financial stability are not easy to assess. On the one hand, larger non-resident exposures allow domestic residents to diversify both their asset portfolios and their sources of finance. However, in so doing, domestic residents become exposed to a broader array of potential macroeconomic and other shocks, which may affect both asset values and access to finance. Furthermore, many non-resident positions will carry with them a higher institutional risk: in the extreme, the risk of currency controls or expropriation of assets.

A further issue often associated with external positions is currency risk.<sup>(3)</sup> Insofar as foreign currency positions are not perfectly hedged, currency changes will alter the value of external assets and liabilities, and associated cash flows. For example, depreciation of the domestic currency will increase both the sterling value of a domestic resident's foreign-currency obligations and the debt service associated with such obligations. A marked depreciation of the currency, combined with a sufficiently large net foreign currency liability, can have

(1) External positions are defined in this article, and by the Office for National Statistics, as assets and liabilities *vis-à-vis* non-UK-resident counterparties.

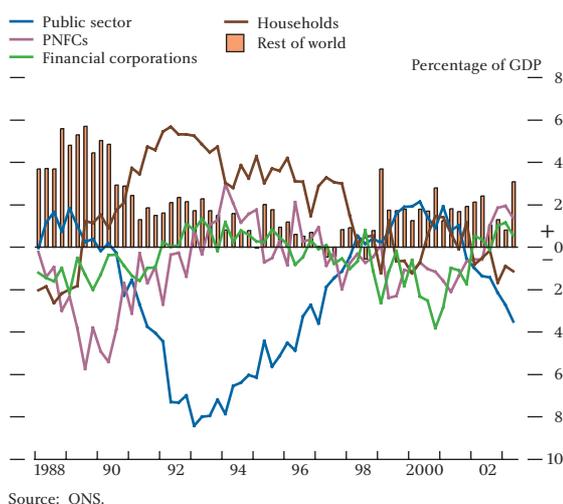
(2) The standard deviation of quarterly growth in the stock of lending by non-resident MFIs is 6.7% over the period March 1987 to June 2003, compared with 3.0% for resident MFIs. Nevertheless, as will be shown later in this article, non-resident lending to UK PNFCs has been on an upward trend in recent years, and hence the mean quarterly change is also higher.

(3) To the extent that domestic MFIs intermediate the foreign currency positions of domestic non-bank entities, not all foreign currency positions will be cross-border. Indeed, in the United Kingdom, around 15% of resident MFIs' foreign currency exposures are with resident non-bank entities.

stark implications for debt sustainability, increasing the value to borrowers of the option to default and undermining refinancing opportunities.

It should be emphasised that the external financial balance is necessarily the sum of internal sectoral balances. Very often net borrowing from non-residents may be explained in terms of the rational accumulation of positions by agents in a particular sector—eg investment by the private non-financial corporate sector, financed by an inflow of funds from abroad. Evidence of a growing external liability over a long period of time, however, will often raise questions about sustainability and potential instability in the face of shocks. Chart 3 illustrates financial balances to June 2003 for sectors of the UK economy (lines), as well as non-resident balances *vis-à-vis* the United Kingdom (bars). The balances shown are flows as percentages of GDP, reflecting net borrowing or lending by each sector in each quarter. It is clear from the chart that the United Kingdom has been a net borrower from abroad in almost every quarter covered by the chart. In recent periods, the household and public sectors have accumulated large net financial deficits. Although these sectors do not have large direct external positions, they have contributed to net external borrowing via their transactions with the UK financial sector. The issues associated with recent trends in the internal sectoral balances are discussed in the Bank's *Financial Stability Review*, December 2003.

**Chart 3**  
**UK sectoral financial balances, as a percentage of GDP**



## To what extent can balance of payments data assist in surveillance?

The *Pink Book*<sup>(1)</sup> is the principal source of data on the United Kingdom's external financial transactions. This publication provides a breakdown of both stocks and flows<sup>(2)</sup> of external assets and liabilities by instrument and sector, identifying the most significant external positions. Analysis of these data can also assist in assessing the net external wealth of the economy and the present value of future income owed to external lenders and investors.

### International investment position

The *Pink Book* decomposes the external balance sheet, or international investment position (IIP), into three principal categories: direct investment, portfolio investment (comprising cross-border positions in debt and equity securities) and other investment (essentially, cross-border loans and deposits in the banking system). Data on financial derivatives are also presented (but not included in the main IIP tables). Stock positions and financial account flows in each of these categories are also available by sector: ie monetary financial institutions, central government, local authorities, public corporations and 'other'.<sup>(3)</sup> The factors behind the accumulation of positions in each sector are likely to be very different and hence the aggregate position will generally, in itself, be uninformative. Furthermore, the disaggregation of these data is generally insufficient to allow strong conclusions to be drawn on financial stability questions. Ideally, one would wish to observe a full disaggregation by country, currency and maturity, so as to be able to identify concentrations of exposure and assess the risk of individual positions. While the instrument breakdown does distinguish between long and short-term loans and securities, allowing some judgment to be made on issues such as refinancing risk and the stability of particular sources of finance, no such disaggregation is available for country and currency exposures. However, the ONS published a geographical breakdown of total IIP assets and liabilities for 2001 data this year<sup>(4)</sup> and intends to include a functional breakdown of direct, portfolio and other investment next year.

- (1) 'United Kingdom Balance of Payments', published annually by the Office for National Statistics.
- (2) Stocks appear in the external balance sheet (or international investment position), while flows are recorded in the financial account. The latter flows mirror the sum of current and capital account flows and net errors and omissions.
- (3) For certain items, 'other' is disaggregated further, allowing PNFs and various non-bank financial companies to be separately identified. Households and non-profit institutions serving households (NPISH) are also separately identified on the asset side of the balance sheet and financial account.
- (4) 'Geographical breakdown of the UK International Investment Position', *ONS Economic Trends*, July 2003.

## Currency risk

The *Pink Book* provides some data on the extent to which cross-border exposures are denominated in sterling and foreign currency. Other positions may be inferred, either by the nature of the exposure or by observation of the contribution of revaluations to changes in the outstanding stock position.<sup>(1)</sup> But, even where the split between sterling and foreign currency is recorded, an explicit breakdown by currency is generally unavailable. And data on hedging are incomplete.

Positions may be hedged in one of three ways. First, offsetting positions may be held elsewhere. Given that the United Kingdom is defined by residence in the balance of payments data, one cannot observe potentially offsetting currency positions held by associated non-resident entities. Indeed, this is a more general problem in the analysis of financial stability risks, for which consolidated data are more appropriate than data based upon residency. Second, positions may be hedged explicitly using financial derivatives.<sup>(2)</sup> Finally, foreign-currency exposures may be hedged via the normal course of a company's business. For example, to the extent that debt service and debt repayment on a foreign-currency liability are met by cash flows generated in that currency, the position may be considered hedged. The *Pink Book* data cannot assist in this context; much greater disaggregation would be required to do so.

## Methodological issues

Recent articles in this series have highlighted a number of methodological issues which hinder interpretation of the data. First, the United Kingdom's net external asset position is generally subject to heavy revision, making analysis of longer-term trends and recent developments more difficult. Since 1990, the average revision between the first and second estimates of net assets has been £26 billion (although we should bear in mind that total assets and liabilities are over £3.5 trillion).

There is also some inconsistency in the way in which certain positions are valued. In particular, while portfolio assets and liabilities are marked to market, foreign direct investment is valued at book cost (see the box on page 467). If a UK company makes an overseas acquisition via an exchange of equity, the cost of the acquisition is reflected in an increase in direct-investment assets, while the equity of the new UK parent retained by the acquired company's shareholders appears as a portfolio investment liability. Although the former position remains at book value, the latter position is marked to market, potentially leading to a divergence of assets and liabilities over time.

We will consider below some additional data sources, which when combined with the *Pink Book* data provide a more detailed picture of external exposures and their possible implications for financial stability.

## Additional sources of data

Two additional sources offer a further geographical breakdown of country exposures and a disaggregation of currency positions, at least for certain sectors and instruments. First, in the case of the MFI sector, Bank of England data on the external business of UK-resident banks provide a currency and geographical breakdown of exposures. Second, the IMF's Coordinated Portfolio Investment Survey (CPIS) provides a geographical breakdown of all portfolio investment exposures. The survey was first carried out in 1998, for 1997 data, and then repeated in 2002, for 2001 data. In total, 67 countries reported a full geographical breakdown of their portfolio investment assets at end-2001. The IMF then aggregated the data by country to yield a table of claims on each country. In the most recent study, the United Kingdom had a net portfolio investment asset position of \$24 billion, with \$1.304 trillion of outward portfolio investment and \$1.280 trillion of inward portfolio investment.<sup>(3)</sup> The United Kingdom was second only to the United States in terms of the level of portfolio investment. The CPIS will be carried out annually in future and the data will become increasingly useful as a time series is built up.

(1) This will, however, not always be straightforward. For example, one might assume that an investment in foreign equity is denominated in foreign currency, and that foreign investment in a UK company's equity is a sterling liability. However, to the extent that foreign-listed securities are denominated in the currency of the country of listing, this will not necessarily be true.

(2) Although the IIP data do not yet include stock figures for financial derivative instruments, there is a project under way at the ONS to review data quality and integrate data on financial derivatives into the balance sheet. Initial coverage may be extended beyond banks and securities dealers to other categories of non-bank institution. Table FD in the *Pink Book* shows the estimated market value of total derivative assets and liabilities held by banks and securities dealers.

(3) The CPIS value for portfolio investment assets (converted to sterling at the end-2001 exchange rate) closely matches that in the 2001 *Pink Book*, while that for liabilities is slightly lower due to differences in coverage. This is discussed in 'IMF Coordinated Portfolio Investment Survey', *ONS Economic Trends*, May 2003.

## Estimating market values for foreign direct investment

Foreign direct investment, as noted above, is valued at book values in the external balance sheet. This box updates the estimates of foreign direct investment (FDI) published in previous articles in this series. These estimates are based on a study by Pratten,<sup>(1)</sup> in which the author established market to book value ratios for outward and inward direct investment at end-1991.<sup>(2)</sup> Time series have been generated backwards and forwards using changes in domestic and international equity market values and exchange rates to proxy for movements in the value of FDI.

Chart A extends Pratten's study to 2003 Q2. As equity markets rose throughout the 1990s the difference between the estimated market value and book value increased to a maximum of £570 billion at

**Chart A**  
Estimated values of UK net foreign direct investment: method A



Sources: ONS and Bank calculations.

end-1999. The difference then decreased as the market value estimate fell due to world stock market declines. The most recent observations show that the estimated market value has started to increase again with the recovery in domestic and international markets.

Another method of estimating the market value of FDI (shown in Chart B) is to use a combination of GDP growth and exchange rates (based on Pratten's initial market to book value ratios). This assumes that the value of a business in which an investment has been made should grow at the same rate as the GDP of the country in which it is based. Using this method, net FDI has grown at a slower pace than that implied by the first method, but remains higher than book value.

**Chart B**  
Estimated values of UK net foreign direct investment: method B



Sources: ONS and Bank calculations.

- (1) Pratten, C (1994), *The valuation of outward and inward direct investment: a report for the CSO*, Department of Applied Economics, University of Cambridge. The Central Statistical Office (CSO) was the predecessor to the ONS.
- (2) Pratten found that in 1991 the market value of outward direct investment was twice the book value and the market value of inward direct investment was 1.25 times the book value.

It is also instructive to consider *Pink Book* data alongside other ONS sources; in particular, internal sectoral financial accounts and balance sheets. This not only allows external positions to be considered in the context of each sector's total financial assets and liabilities, but also provides additional detail for those sectors, such as PNFs, for which separately identified external positions are not available for all items. It should be borne in mind, however, that analysis at the sectoral level will still mask heterogeneity at the level of the individual entity.

Finally, for international comparisons, BIS data and other IMF surveys are very useful. We draw upon IMF data on external debt in the box on page 468.

## Recent trends in the UK external balance sheet

The United Kingdom returned to a net external asset position of 2% of GDP in 2003 Q2 (Chart 4), having had net external liabilities of more than 15% of GDP in 1999 Q1. Nevertheless, the United Kingdom remained a net borrower from abroad (in flow terms) in each of the four quarters ending 2003 Q2, and hence the recent

## External debt statistics

This year the IMF published 'External debt statistics: guide for compilers and users', an updated version of its 1988 publication 'External debt: definitions, statistical coverage and methodology' (commonly known as the *Grey Book*). The Guide has been updated following the adoption of the System for National Accounts 1993 and the Balance of Payments Manual (BPM5). It also takes into account the dramatic increase in private sector international financial flows in the 1990s and the increased use of derivatives to manage risk.

Member countries of the IMF's Special Data Dissemination Standard (SDDS) were required to publish a new external debt table by end-September 2003. The new table covers gross external debt outstanding, split by economic sector, maturity and instrument. Additionally, two encouraged but not prescribed tables (which the United Kingdom will not be publishing) show prospective debt-service obligations and a domestic/foreign currency split of external debt.

The United Kingdom published its external debt table in United Kingdom Economic Accounts (UKEA), released alongside the *Pink Book*. This, reproduced in Table 1 alongside a sample of other developed and developing countries, shows that the United Kingdom had gross external debt of £2.95 trillion at end-June 2003. This confirms that debt instruments make up a high proportion of the United Kingdom's total external liabilities.<sup>(1)</sup> Approximately 60% of the United Kingdom's external debt consists of banks' short-term debt, with over 90% of banks' external debt being owed to

non-resident banks. This reflects London's status as an international financial centre and helps to explain why the United Kingdom's external debt appears large as a percentage of GDP compared with the other developed economies in Table 1. By contrast, just 50% of German banks' total external debt is short term.

**Table 1**  
**External debt**

£ billions, end-June 2003

	United Kingdom	Germany	United States	Japan	Argentina	Ecuador
General government	58	393	796	128	49	7
Central bank	9	7	187	5	9	0
Banks	1,849	993	896	396	7	0
Other	767	164	1,613	220	19	3
Direct investment	268	268	360	16	-	-
<b>Total</b>	<b>2,950</b>	<b>1,824</b>	<b>3,852</b>	<b>764</b>	<b>85</b>	<b>10</b>
<i>of which:</i>						
Short term	2,319	607	1,558	533	19	1
Long term	631	1,218	2,294	231	66	8
As a percentage of GDP	271	123	59	32	133 (a)	80 (a)

Source: IMF.

(a) These percentages are based upon the most recent values of GDP, due to the fact that these countries have not yet published GDP data for 2003 Q2.

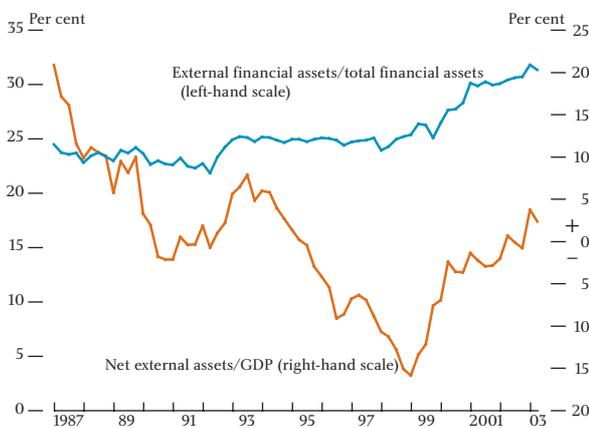
The United States and Japan have external debt valued at around two thirds and one third of annual GDP respectively. US banks account for 23% of their country's total external debt (with 85% short term), while in Japan banks account for 52% (with 87% short term). In the United States, the monetary authority accounts for 5% of total external debt, which compares with less than 1% in each of the three other developed countries in Table 1.

For the two developing countries in the table, external debt is much smaller in absolute terms, but larger as a percentage of GDP than that of two of the four developed countries. Furthermore, the public sector accounts for a greater proportion of their external debt than for the developed countries.

(1) The definition of debt in these calculations differs from that adopted in the *Pink Book*, due to the way in which the netting of assets and liabilities is carried out. Nevertheless, the comparison of £2.95 trillion in external debt with £3.5 trillion in total external liabilities provides an indication of the size of the debt component of the United Kingdom's external obligations.

improvement in the international investment position reflects positive implied revaluations, rather than a change in the direction of flows.<sup>(1)</sup> Although the net position is relatively small, the stocks of both assets and liabilities are substantial, each being more than £3.5 trillion (see Table A). This is more than three times the value of UK GDP, a much higher multiple than that for other developed countries.<sup>(2)</sup> Stocks of both assets and liabilities have continued to increase in recent quarters, each by approximately 10% since the end of 2002, taking external positions to more than 31% of total UK financial assets. This compares with 25% less than four years ago.

**Chart 4**  
UK net external assets as a percentage of GDP and external financial assets as a percentage of total financial assets

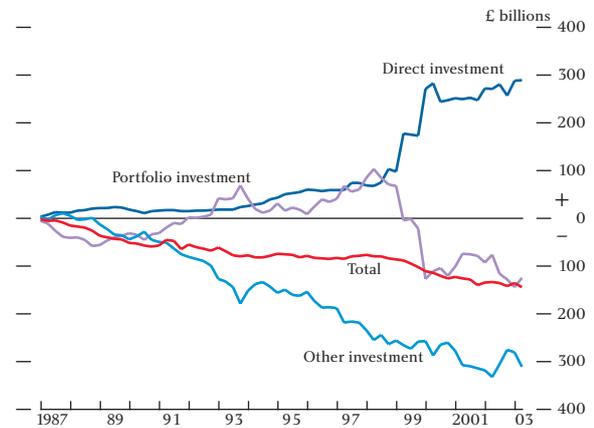


Source: ONS.

Chart 5 presents the cumulative effect on UK net assets arising from financial flows in each of the principal instrument categories of the external balance sheet. The

chart shows that, in recent years, the accumulation of net direct investment assets has been offset by a steady accumulation of net 'other investment' liabilities, and more recently net portfolio investment liabilities.

**Chart 5**  
Cumulative change in the UK net asset position due to financial flows



Sources: ONS and Bank calculations.

Implied revaluations, by contrast, have increased net external assets by some £224 billion since March 1999 (Chart 6). The most significant effect has come from portfolio investment revaluations, which tend to be driven by the relative performance of UK and world equity markets (in sterling terms). Revaluation effects on direct investment and other investment are primarily dependent upon exchange rate, as opposed to other asset price, effects. Chart 7 shows the recent paths of factors driving revaluations. It is clear that the sharp positive revaluation of portfolio investments will have been driven by the large excess return on foreign equities during 1999 and 2000. In the year to

**Table A**  
The UK external balance sheet

£ billions. Values at year-end unless otherwise stated.

	1999		2000		2001		2002		2003 Q2	
	Assets	Liabilities								
Direct investment	428	250	607	310	625	381	645	398	717	403
Portfolio investment										
Debt	420	510	429	604	410	530	334	410	389	438
Equity	418	319	477	394	533	425	532	483	541	508
Other investment	1,130	1,410	1,435	1,705	1,613	1,901	1,677	1,931	1,879	2,176
Reserve assets	22		29		26		25		24	
<b>Total</b>	<b>2,419</b>	<b>2,490</b>	<b>2,977</b>	<b>3,013</b>	<b>3,206</b>	<b>3,236</b>	<b>3,212</b>	<b>3,221</b>	<b>3,550</b>	<b>3,524</b>
<i>Memorandum items:</i>										
Total financial assets/liabilities	9,677	9,747	10,549	10,585	10,734	10,763	10,486	10,496	11,357	11,333
External positions as a percentage of total financial assets/liabilities	25.0	25.5	28.2	28.5	29.9	30.1	30.6	30.7	31.3	31.1

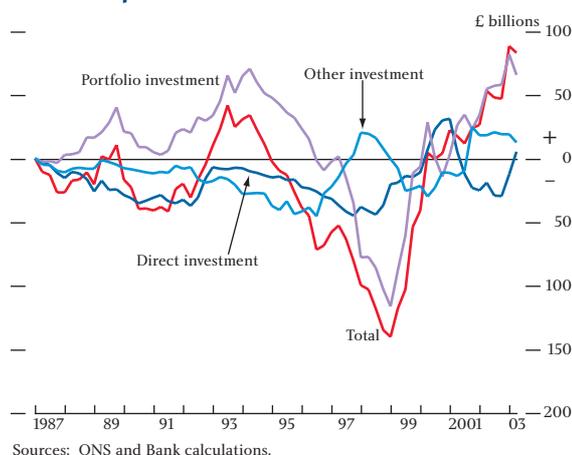
Source: ONS.

(1) In accordance with the method adopted in previous articles in this series, any change in the gross position that cannot be attributed to a financial flow is considered to be an implied revaluation.

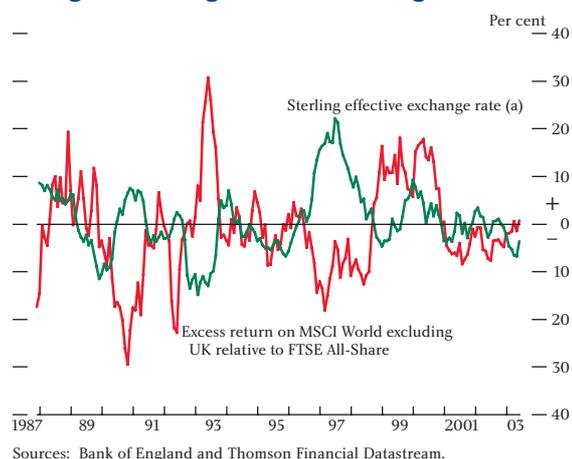
(2) See Senior, S and Westwood, R (2000), 'The external balance sheet of the United Kingdom: implications for financial stability?', *Bank of England Quarterly Bulletin*, November, pages 351–64.

June 2003, the 4% decline in the sterling effective exchange rate has been the principal driver, leading to a positive revaluation of direct investments and other assets denominated in foreign currency. Indeed, given that overall the United Kingdom's external assets are largely denominated in foreign currency, while a significant proportion of its liabilities is denominated in sterling, a depreciation of the domestic currency naturally leads to an improvement in the net asset position.

**Chart 6**  
Cumulative change in the UK net asset position due to implied revaluations



**Chart 7**  
Excess annual return on MSCI World excluding the United Kingdom relative to FTSE All-Share and annual change in sterling effective exchange rate

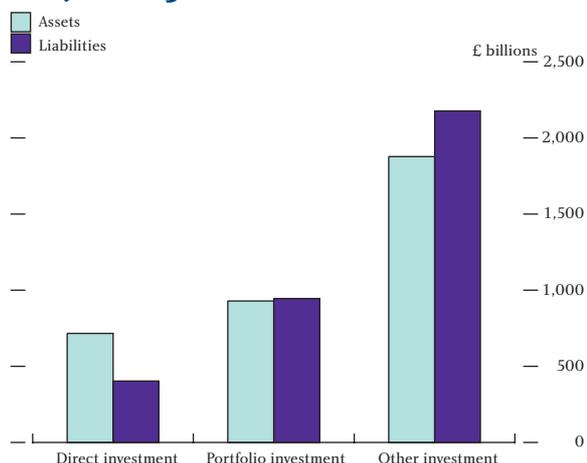


(a) Monthly average of Bank of England calculated effective exchange rate.

A closer look at the international investment position in Table A and Chart 8 reveals that the largest stock positions are held in 'other investment'. Indeed, in June 2003, gross other investment liabilities amounted to more than £2 trillion—almost two thirds of total liabilities—which largely reflects the size and international orientation of the UK financial sector. The

net liability in other investments is more modest, at around £300 billion, or 28% of GDP. The net asset position in direct investment is of a similar order of magnitude, but as noted above, this is estimated at book values.

**Chart 8**  
UK external assets and liabilities, by instrument—end-June 2003



Some 84% of the United Kingdom's direct investment assets, and 69% of its portfolio investment liabilities, are held by PNFCs, while 75% of other investment liabilities are held by MFIs. As the largest positions occur in these sectors, we consider them in greater depth in the following subsections.

### Private non-financial corporations

The external positions of UK PNFCs have increased substantially in recent years, with the accumulation of direct investment assets and equity investment liabilities through large-scale equity-financed merger and acquisition activity in the late 1990s, and an increase in external debt. This section generates a stylised PNFC balance sheet, using a combination of *Pink Book* data (and quarterly updates thereof) and the internal sectoral balance sheet, in order to illuminate the key exposures of this sector. It is the first time that has been done in this annual series of articles. Table B reveals a net external liability of more than £300 billion at mid-2003.

As the PNFC sector's net asset position in direct investment grew in the late 1990s, so did the sector's net portfolio investment liability. This has steadied more recently. Chart 9 shows clearly that the largest moves in both direct investment and portfolio investment occurred at the height of the merger and acquisition boom in 1999–2000, and the flattening of both series

**Table B**  
**A stylised balance sheet for the PNFC sector**  
**(unconsolidated)<sup>(a)</sup>**

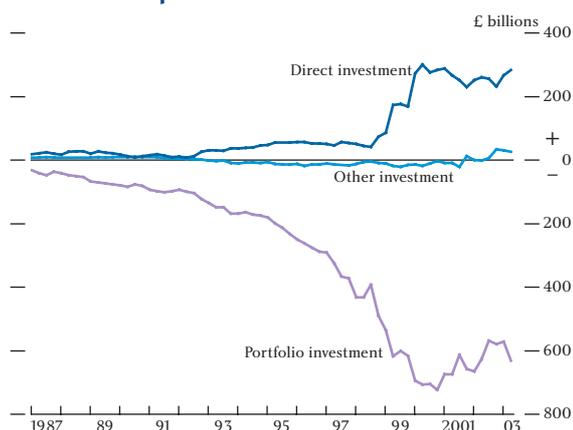
£ billions, end-June 2003

	Assets			Liabilities		
	Resident	Non-resident	Total	Resident	Non-resident	Total
<b>Portfolio investment</b>	<b>81</b>	<b>16</b>	<b>97</b>	<b>628</b>	<b>651</b>	<b>1,279</b>
Money market instruments	23	7	30	1	28	29
Bonds	6	2	8	47	187	234
Equities	52	7	59	580	436	1,016
<b>Direct investment</b>	<b>-</b>	<b>597</b>	<b>597</b>	<b>-</b>	<b>323</b>	<b>323</b>
Bonds	-	24	24	-	-	-
Equities	-	573	573	-	323	323
<b>Other investment</b>	<b>194</b>	<b>185</b>	<b>379</b>	<b>363</b>	<b>162</b>	<b>525</b>
Currency and deposits	186	185	371	-	-	-
Loans	8	-	8	363	162	525
Balancing item (b)	1,054	-	1,054	-	-	-
<b>Total</b>	<b>1,329</b>	<b>798</b>	<b>2,127</b>	<b>991</b>	<b>1,136</b>	<b>2,127</b>

Sources: ONS and Bank calculations.

- (a) This table combines data from the PNFC sector financial balance sheet in ONS *Financial Statistics*, Table 12.1D and the *Pink Book*. Where the PNFC sector is not separately identified in the *Pink Book*, data have been allocated to the PNFC sector either by reference to the sectoral financial balance sheet, or by assumption. The most significant assumption is that all 'other sectors' portfolio investment liabilities may be allocated to the PNFC sector.
- (b) This will comprise intra-group loans, current assets and liabilities and the value of the sector's non-financial assets.

**Chart 9**  
**Net external positions of UK PNFCs**



Source: ONS.

since then largely reflects the tail-off in such activity. Analysis of the geographical composition of portfolio investment, using the IMF's Coordinated Portfolio Investment Survey (CPIS), reveals that 50% of total overseas holdings of UK equity in 2001 were in the United States. EU residents held a further 31% of the total. This, again, is consistent with the pattern of overseas direct investment in recent years, which has included large acquisitions by UK companies in the United States and continental Europe in 1999–2000, financed by the exchange of shares. To the extent that foreign shareholders retain an equity investment in the new parent, the double entry for a cross-border acquisition by a UK company is an increase in direct investment assets, coupled with an increase in portfolio investment liabilities. A further significant factor in the

increase in foreign ownership of UK equities is the greater tendency of UK multinationals to obtain listings on stock exchanges in the United States and continental Europe. Some 52 UK companies now have a listing on the New York Stock Exchange, 22 of which have sought a listing only since the end of 1997.

Debt securities constitute a third of PNFCs' total portfolio investment liabilities. Indeed, recourse to overseas debt finance has also been increasing in recent years, and external debt is now almost half of total PNFC net debt (see the box on page 472).

### Monetary financial institutions

The largest external stock positions are in the MFI sector, although the net external liability was a more modest £150 billion at mid-2003. The cross-border activity of foreign-owned UK-resident banks is central to the development of this sector's external assets and liabilities. This section combines data from a variety of sources to construct a stylised balance sheet for the MFI sector, and then to examine the distribution of country and currency exposures. This analysis reveals that, although the sector has been increasingly borrowing from non-residents, currency positions are broadly matched and the lion's share of non-resident exposures is with other developed countries.

The stylised sectoral balance sheet in Table C reveals that the net liability position reflects an excess of inward over outward deposits, which is not fully offset by loans to non-residents and a net asset position in portfolio investments. Chart 10 shows that the net external

**Table C**  
**A stylised balance sheet for the MFI sector**  
**(unconsolidated)<sup>(a)</sup>**

£ billions, end-June 2003

	Assets			Liabilities		
	Resident	Non-resident	Total	Resident	Non-resident	Total
<b>Portfolio investment</b>	<b>240</b>	<b>402</b>	<b>642</b>	<b>287</b>	<b>239</b>	<b>526</b>
Money market instruments	128	46	174	172	128	300
Bonds	66	344	410	65	109	174
Equities	46	12	58	50	2	52
<b>Direct investment</b>	<b>-</b>	<b>28</b>	<b>28</b>	<b>-</b>	<b>28</b>	<b>28</b>
Equities	-	28	28	-	28	28
<b>Other investment</b>	<b>2,169</b>	<b>1,313</b>	<b>3,482</b>	<b>1,863</b>	<b>1,622</b>	<b>3,485</b>
Currency and deposits	685	927	1,612	1,861	1,622	3,483
Loans	1,484	386	1,870	2	-	2
Balancing item (b)	-	-	-	113	-	113
<b>Total</b>	<b>2,409</b>	<b>1,743</b>	<b>4,152</b>	<b>2,263</b>	<b>1,889</b>	<b>4,152</b>

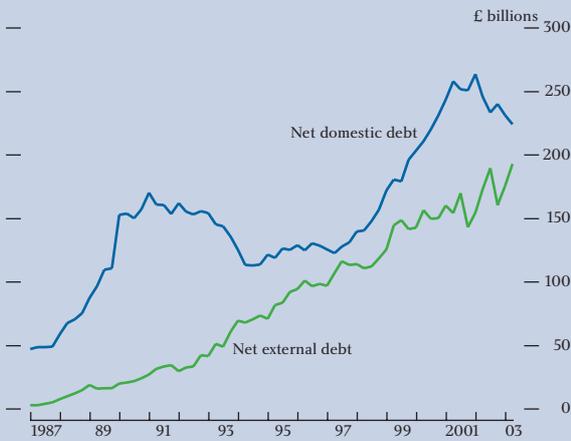
Sources: ONS and Bank calculations.

- (a) This table combines data from the MFI sector financial balance sheet in ONS *Financial Statistics*, Table 12.1F and the *Pink Book*.
- (b) This will comprise current assets and liabilities and the difference between the total values of financial assets and financial liabilities.

## Recent trends in PNFCs' external debt

The external debt liabilities of the United Kingdom's private non-financial corporate sector have increased significantly. Chart A shows that, while borrowing from domestic residents stalled during the recession years of the early 1990s, and has dipped again recently, net borrowing from non-residents has been increasing throughout the past decade. Notwithstanding some recent volatility, the trend in borrowing from non-residents remains upwards and net external debt currently accounts for just under half of total net debt.

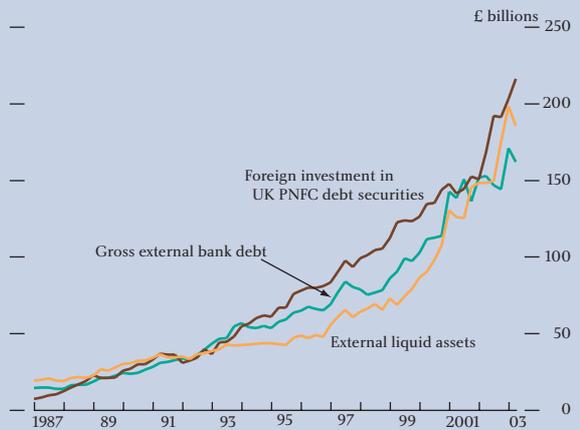
**Chart A**  
PNFCs' net domestic and external debt



Source: ONS.

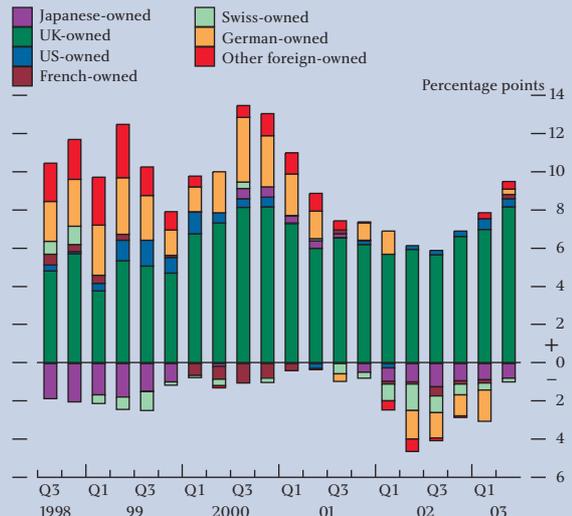
Until very recently, gross PNFC borrowing from non-resident banks had stalled for approximately two years. Given a sharp rise in external liquid assets during this period, UK PNFCs now have a net asset position with non-resident banks. Such growth as has been observed in net external debt has thus been due to an increase in foreign investment in UK PNFC debt securities (Chart B). At least for some countries, non-resident bank lending to the UK corporate sector may have been curtailed in response to adverse developments in their own domestic economies. Indeed, in the recent past, a similar trend has also been observed in lending to UK PNFCs by foreign-owned UK-resident banks. Chart C presents the contributions to the annual growth in UK-resident bank lending by banks of different nationalities, revealing that German, Japanese and Swiss banks, in particular, cut back their lending to UK PNFCs during 2002. Bond investors, on the other hand, may have increased exposure to the UK

**Chart B**  
Trends in external bank debt and overseas investment in UK PNFC debt securities



Source: ONS.

**Chart C**  
Contributions to annual growth in the stock of UK-resident bank lending to UK PNFCs, by nationality of bank

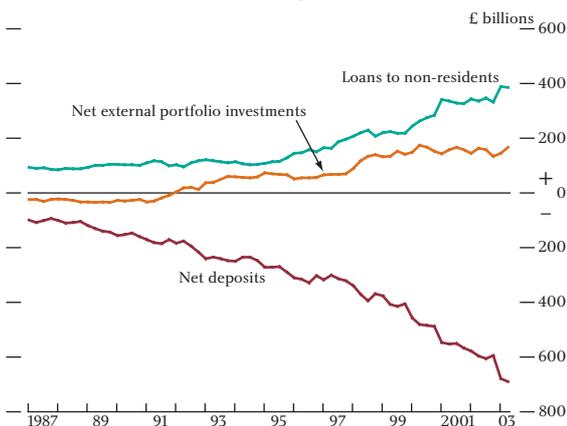


Source: Bank of England.

corporate sector in diversifying away from home markets.

Volatility in these series suggests that the PNFC sector may not always be able to rely on cross-border corporate finance. To the extent that non-resident lenders are constrained by the incidence of shocks in their domestic economies, the provision of finance from these sources might be considered less predictable (see Chart 2). Hence, increased dependence on such finance could constitute a future risk.

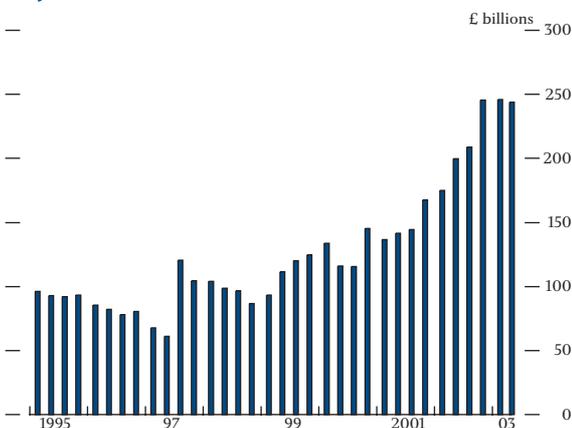
**Chart 10**  
MFI sector's net external positions



Source: ONS.

deposit liability has been accumulating over time, helping the UK MFI sector to fund a growing excess of loans relative to deposits in the UK non-bank sector (Chart 11).<sup>(1)</sup> Indeed, this excess of loans relative to deposits has accelerated in recent quarters, rising by some 22% in the four quarters from June 2002. It is thus via the net external deposit liability that the MFI sector has been intermediating a current account deficit that originated in the non-bank sector.

**Chart 11**  
Excess of UK-resident bank loans relative to deposits in the UK non-bank sector

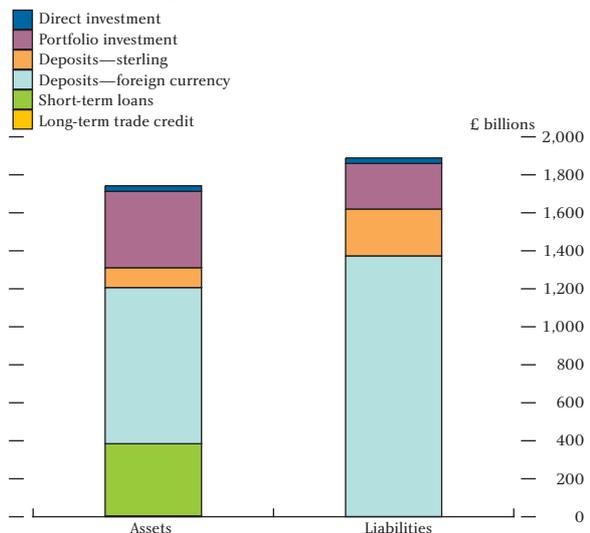


Source: Bank of England.

Chart 12 summarises some of the key data on the MFI sector's external positions. The most significant liability is in foreign-currency deposits, which is largely a reflection of the external banking activities of foreign-owned UK-resident financial institutions.

Indeed, the latter account for some 79% of these deposits. This net liability position in foreign-currency deposits currently exceeds £500 billion, although, with around £345 billion of UK-resident banks' cross-border loans also denominated in foreign currency, there is some offset to this position.

**Chart 12**  
Breakdown of MFI sector's external exposures—end-June 2003



Source: ONS.

Bank of England data allow non-resident exposures to be viewed within the context of the entire UK MFI balance sheet, and also provide a geographical and currency breakdown of bank exposures.<sup>(2)</sup> The data reveal that the bulk of the securities held by MFIs are denominated in foreign currency, while non-deposit liabilities tend to be denominated in sterling. If one then takes into account foreign-currency positions held *vis-à-vis* other UK residents, the net foreign-currency position of the MFI sector, as at mid-2003, was a small liability of less than £12 billion.<sup>(3)</sup>

Analysis of the composition of foreign-currency assets and liabilities allows one to determine the concentration of exposures. Charts 13 and 14 detail the currency composition of non-resident liabilities and claims. Exposures are concentrated in US dollars, which account for around 40% of both liabilities and claims. Euro exposures make up a further 32% of liabilities and 40% of claims, with 14% and 10% respectively denominated

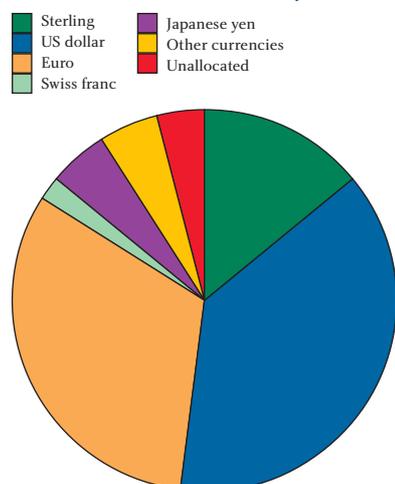
(1) This issue is discussed in Speight, G and Parkinson, S (2003), 'Large UK-owned banks' funding patterns: recent changes and implications', *Bank of England Financial Stability Review*, December.

(2) Although it is not possible to determine whether offsetting financial derivative positions or offsetting non-resident positions (eg UK-resident foreign-owned banks' non-resident positions) exist.

(3) It should be noted, however, that this conclusion is subject to interpretative difficulties associated with the residency-based definition of the UK MFI sector. In particular, positions held by the non-resident operations of UK-resident banks are not taken into account. Nor is it possible to establish whether offsetting financial derivatives positions exist.

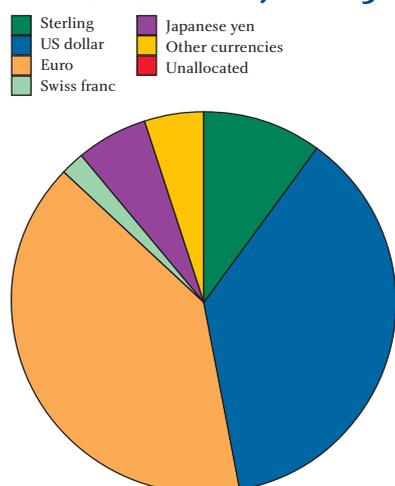
in sterling. Thus, even within the foreign-currency component of exposures, the MFI sector appears to be broadly currency-matched.

**Chart 13**  
Currency breakdown of UK resident banks' external liabilities—end-June 2003



Source: Bank of England.

**Chart 14**  
Currency breakdown of UK resident banks' external claims—end-June 2003



Source: Bank of England.

It is reasonable to believe that the domestic systemic implications of an externally generated shock would be more significant if the bank in question were UK-owned, as opposed to a foreign-owned UK-resident bank, reflecting the fact that the former remains of far greater importance to the UK payments system.<sup>(1)</sup> In this regard, one might wish to examine the geographical breakdown of UK-owned banks' consolidated worldwide claims,

including local claims by local subsidiaries. This is done in Table D below, using data from the Bank of England. With regard to institutional risks, one might take comfort from the predominance of lending to the developed world; just 10% of consolidated foreign claims are on developing countries.<sup>(2)</sup>

**Table D**  
Geographical distribution of UK-owned banks' consolidated foreign claims

£ billions, end-June 2003

	Consolidated claims	Percentage
Developed Europe	262.8	28
United States	326.7	34
Japan	30.1	3
Other developed countries	47.1	5
Offshore centres	146.0	15
Developing countries	92.6	10
Other (including international organisations)	45.2	5
	<b>950.5</b>	

Source: Bank of England.

## Overall assessment of financial stability risks

Financial transactions with the rest of the world yield undoubted benefits. Cross-border flows facilitate the smoothing of consumption over time; they allow lenders and investors to diversify their portfolios and reduce their dependence on the domestic economy; and they allow borrowers to access diverse sources of finance. However, this article has argued that external positions can also introduce additional sources of financial instability. Drawing on diverse data sources, including the Bank of England, the IMF and the Bank for International Settlements, as well as the ONS's *Pink Book* and sectoral balances, the volatility of cross-border flows, currency risk and country risk have all been considered.

It has been shown that the United Kingdom has recently moved into a net external asset position. However, this is entirely due to revaluation effects, for the United Kingdom remains a net external borrower (in flow terms). Furthermore, the aggregate position disguises some important sectoral trends, most notably in the PNFC and MFI sectors. Further examination reveals an increasing reliance on non-resident funding in both sectors. Indeed, external debt accounts for almost half of the total in the PNFC sector, and the accumulation of non-resident deposits has been helping UK-resident MFIs to fund an increasing excess of lending to the UK non-bank sector relative to deposits.

(1) Indeed, Bank of England data reveal that some two thirds of all loans outstanding to UK residents are by UK-owned, UK-resident banks.

(2) Almost half of the United Kingdom's developing-country claims are on the Asian region, with the remainder spread across Africa and Latin America, and to a lesser extent developing Europe. Lending slowed between 2000 and 2002, falling sharply in Latin America at the time of the Argentine financial crisis. More recently flows have resumed, rising almost 19% overall in the year to June 2003, mainly due to acquisitions.

Nevertheless, the increasing globalisation of the financial sector and investors' growing demands for international diversification suggest that the current external stock position of these sectors is sustainable. One concern might be that these imbalances carry with them a significant currency risk. In this regard, some comfort may be taken from the fact that much of the PNFC sector's liabilities are likely to be denominated in sterling, while the MFI sector's external positions seem to be broadly currency-matched if one takes into account foreign-currency exposures with both UK residents and non-residents.

Finally, in terms of country risk, an analysis of the geographical distribution of both portfolio investments and MFIs' external claims reveals that the largest positions are with the United States and developed Europe. Particularly in the MFI sector, these positions are sizable. The greatest source of country risk with regard to these positions would be intensifying macroeconomic weakness, and a concomitant erosion of credit quality. Developing-country exposures, although increasing after a lull in recent years, constitute a relatively small proportion of overall international positions.

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# The Governor's speech<sup>(1)</sup> at the East Midlands Development Agency/Bank of England dinner

The Bank of England is back in Leicester. Between 1844 and 1872 there was a branch of the Bank of England in Leicester, located in Gallowtree Gate. Sadly it operated at a loss, in part because the Agent lived in style driving about town in a carriage and pair with two men in livery, and the branch was closed. Only six years ago did we re-establish our links with the City through the creation of a new Agency in the East Midlands. The purpose of that Agency—staffed by four members of the Bank who work in rather less style than their predecessors—is to listen to you and other businesses about what is happening on the ground.

The reports of our Agents around the country are crucial to the Monetary Policy Committee. The information we receive from you, and our other 8,000 business contacts around the country, is a key piece in the large jigsaw puzzle of the UK economy that we assemble each month in order to see the big picture.

Some of the statistical fog hanging over the British economy lifted a week or so ago with the publication of a new picture of demand and output over a number of years. The official statisticians have redrawn the profile of growth in different sectors of the economy. In particular, the data for spending and output in the first half of this year now appear more consistent. But October is often a month in which fog turns into storms. So it is worth asking whether the remaining statistical fog enveloping the UK economy foreshadows stormy economic weather ahead. After a decade of unparalleled stability of both growth and inflation, it is time to take stock.

For much of the 60 years since the end of the Second World War, Britain experienced a succession of economic cycles—variously described as stop-go or boom-bust. On average these were larger than the fluctuations experienced by other major industrial economies. Not only was our growth rate lower, it was also more variable. But the past decade has seen a remarkable shift of fortunes. In the ten years from the second quarter of 1992, the average annual growth rate of GDP was 2.9%,

above the post-war average of 2.5%. Following the adoption of an inflation target in late 1992, inflation averaged 2.5%, the lowest for a generation, and never deviated more than 1 percentage point from that average. Unemployment fell from almost 10% to around 3% on the claimant count, its lowest level for almost three decades, and has now been virtually unchanged for 20 months, by far its longest period of stability. The terms of trade moved in Britain's favour, raising our national standard of living. And output has risen in every single quarter since the middle of 1992, something that is true of no other G7 economy.

Why were the 1990s so successful? And can that success continue? Four features of our economy lie behind this improved performance. First, the new monetary framework—based on an explicit target for inflation, a high degree of transparency, and, since 1997, independence of the Bank of England—made it clear to everyone that monetary policy was, and would continue to be, targeted on maintaining low and stable inflation. Second, a substantial fiscal consolidation turned a deficit of 8% of GDP in 1993 into a sustainable position for the public finances based on a set of clear rules for government debt. Third, a continuing programme of supply-side reforms, over a period of 20 years, made it possible to reduce unemployment without generating higher inflation. Fourth, although the unexpected twists and turns of the world economy did pose real challenges to monetary policy, especially in the latter half of the decade, those shocks tended to average out over time rather than cumulate in either an upward or downward spiral. In other words, the economic surprises alternated between good one year and bad the next, rather than adding up to 'one damn thing after another'. In that sense, Lady Luck smiled on us.

Of course, we were not alone in enjoying the 1990s. In the United States growth was so rapid that at least two authors wrote books entitled 'The Roaring Nineties' and another chose the title 'The Fabulous Decade'. In contrast, continental Europe experienced slow growth and heart-searching over structural reforms. As with

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(1) Given in Leicester on Tuesday 14 October. This speech can be found on the Bank's web site at [www.bankofengland.co.uk/speeches/speech204.htm](http://www.bankofengland.co.uk/speeches/speech204.htm).

much else, our economic performance lay somewhere between the excited exuberance of the United States and the relative disappointment of continental Europe. So the United Kingdom experienced a non-inflationary, consistently expansionary—or ‘nice’—decade; a decade in which growth was a little above trend, unemployment fell steadily, and, supported by the improved terms of trade, real take-home pay rose without adding to employers’ costs, thus allowing consumption to grow at above trend rates without putting upward pressure on inflation.

Will the next ten years be as nice? That is unlikely. The terms of trade will probably not rise as much in future as they have in recent years—about 10% since 1996 when sterling started to appreciate—not least because sterling’s effective exchange rate has fallen by around 7% since the turn of the year. Moreover, there is no longer the margin of spare capacity that has provided a buffer for policy over much of the past decade. So when shocks, as they will, hit our economy, it is almost inevitable that there will be somewhat greater volatility of both output and inflation than the remarkable stability to which we have become used in recent years.

But the case for realism about what we should expect is not a case for pessimism; rather the opposite. The macroeconomic framework in this country is sound and proven. And the real benefit from Britain’s new-found position of macroeconomic stability is that it provides an opportunity to improve our supply performance—to boost productivity, education and enterprise in order to generate the resources needed to raise living standards. Such improvements are, in the long run, both more important and more glamorous than the rather dull and repetitive role of the Bank of England in trying to maintain macroeconomic stability. The Bank of England is only the referee; you are the players.

Unlike in countries such as the United States, which has witnessed a significant and seemingly durable rise in productivity growth, in Britain the underlying rate of increase of output produced for each hour worked has remained broadly stable. We can take some comfort from the latest revisions to the National Accounts which show that productivity growth was not as depressed as previously thought, but it still remains close to its long-run trend of around 2% a year, insufficient to close the productivity gap between ourselves and our major competitors.

Of course the Bank of England has to look to improve the quality and professionalism of its own activities. And, together with the Court of the Bank, the new executive team is exploring ways to enhance the effectiveness of our operations. Improving our market intelligence, refocusing our financial stability role, and making central services more professional, are examples of ways in which the Bank aims, in all its activities, to pursue standards of excellence, as it has in monetary policy. There is one additional area where change could prove beneficial. After the Monetary Policy Committee decides on the level of interest rates, that decision must be implemented in the money markets. The Bank will be carrying out a review of its money market operations with a view to improving and simplifying them, and reducing overnight volatility in those markets. The Bank’s Markets Director, Paul Tucker, will be consulting the market shortly.

For the United Kingdom as a whole, pressing on with reforms to raise productivity is essential to future prosperity. The strategy which the MPC has pursued in recent years—stimulating domestic demand to compensate for weak external demand in the face of a strong exchange rate—carries the risk that there could be a sharp correction to the level of consumer spending at some point in the future. That risk is exacerbated by the continued strength of the housing market and associated borrowing that we have seen in recent weeks. It is possible that such weakness of domestic demand might be offset by an improvement in productivity, although as yet few signs of that are observable.

Three lessons from past monetary policy experience are relevant to the present position. First, monetary policy can target only the aggregate price level. And inflation expectations are now firmly anchored on the inflation target. But the risk of a correction to consumer spending derives from the possibility of sharp movements in relative prices, particularly of assets. Expectations of the key relative prices within the economy, such as asset prices and the exchange rate, are volatile and difficult to measure, and changes in them are often desirable signals to producers and consumers alike. So it would be a mistake to target those relative prices. But understanding how they affect the expectations and spending decisions of the players in the economy is an essential part of monetary policy.

Second, it is easier to measure the money value of spending and output in the economy than to split it into

estimates of 'real' output, on the one hand, and price indices, on the other. That is why the latest data revisions have altered the picture of real growth over recent years, leaving estimated money spending and output broadly unchanged. In such circumstances it is sensible to focus on money spending. Indeed, the success of the new monetary framework can be seen in the stability not just of retail price inflation but also of the growth rate of domestic demand in money terms. Over the past few years the annualised growth rate of nominal domestic demand has remained in the range of 4<sup>1</sup>/<sub>2</sub>% to 5<sup>1</sup>/<sub>2</sub>%, a much greater degree of stability than experienced for many decades.

Third, it is extremely difficult to anticipate the future path of interest rates. That is because the Monetary Policy Committee sets rates in response to news in the economy, and that news is inherently difficult to forecast. Each month the Committee makes a careful assessment of the outlook for inflation, and it is that

which will guide our decisions on the appropriate level of interest rates. It is over 3<sup>1</sup>/<sub>2</sub> years since interest rates were last raised—the longest such period since the Bank Rate was held constant at 2% through the 1940s. At some point, reducing the present degree of monetary stimulus will be necessary in order to keep inflation on track to meet the target. The timing of any such decision will reflect our judgment of the outlook for inflation. Listening to our business contacts and learning from our visits around the United Kingdom is an important input into that judgment.

To retain the unrivalled degree of stability that we achieved during the 'nice' decade will be an even more difficult challenge for the future. The present monetary and fiscal frameworks provide a seaworthy policy vessel, but, as all sailors know, fog, especially statistical fog, can be dangerous. So we must hope that Lady Luck will continue to smile on us.

# Inflation targeting: the UK experience

*In this speech,<sup>(1)</sup> Charles Bean, Chief Economist and member of the Monetary Policy Committee, reviews the background to the adoption of an inflation target in 1992 and the subsequent development of the regime, in particular the delegation of operational responsibility for monetary policy to the Bank of England in 1997 and the associated institutional framework. He goes on to explain some aspects of the way policy is formulated and conducted at the Bank, relating it to some of the burgeoning literature on inflation targeting. He next reviews some aspects of performance since the Bank's independence and concludes with a discussion of the question of how monetary policy should respond to asset price booms and high rates of debt accumulation.*

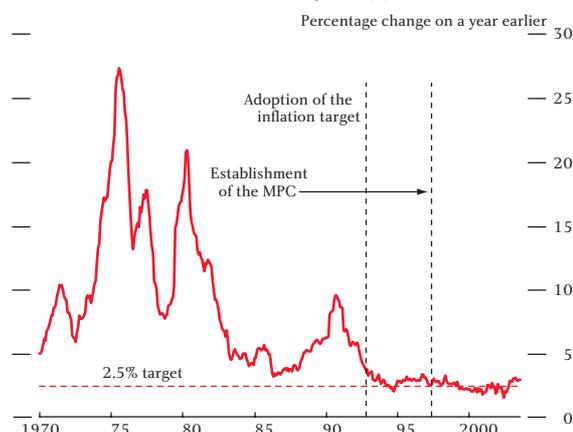
## Introduction

Over the past 15 years a growing number of central banks around the world have followed the lead of the Reserve Bank of New Zealand in adopting an inflation target as the objective of monetary policy. The United Kingdom was one of the early followers of this trend, introducing an inflation target in the aftermath of sterling's exit from the Exchange Rate Mechanism (ERM) in September 1992. Since then, as indicated in Chart 1, inflation has been both low and remarkably stable, especially when viewed in the context of the United Kingdom's past inflation performance. Moreover, that has not come at the expense of other macroeconomic indicators, for growth has also been remarkably steady and close to trend (see Chart 2), while unemployment has fallen almost continuously throughout the past decade, reaching levels last seen

in the early 1970s (see Chart 3). Given the experience of the previous 20 years, few commentators back in 1992 would have believed that the United Kingdom's economic performance could have turned out so well.

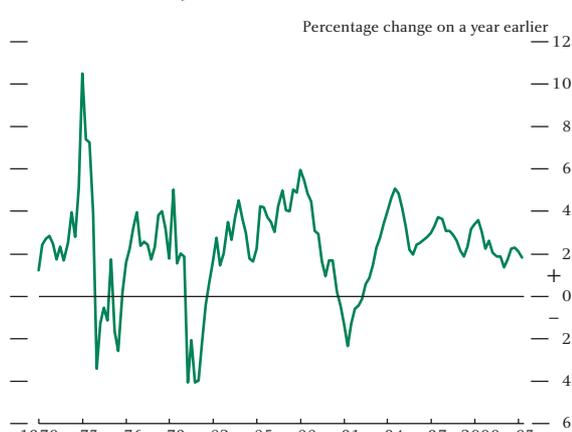
At the outset it should be stressed that this performance should not be solely attributed to the adoption of an inflation target. Major structural reforms to labour and product markets were carried out first by the Conservatives under Mrs Thatcher and consolidated in the 1990s by both political parties. There is little doubt that many of those reforms have improved the workings of the real economy. But the adoption of an inflation target has, I believe, made a real contribution to keeping inflation low and stable and helped to provide the right sort of environment in which to reap the benefit of those reforms.

**Chart 1**  
Annual RPIX inflation (RPI pre 1976)



Sources: Bank of England and ONS.

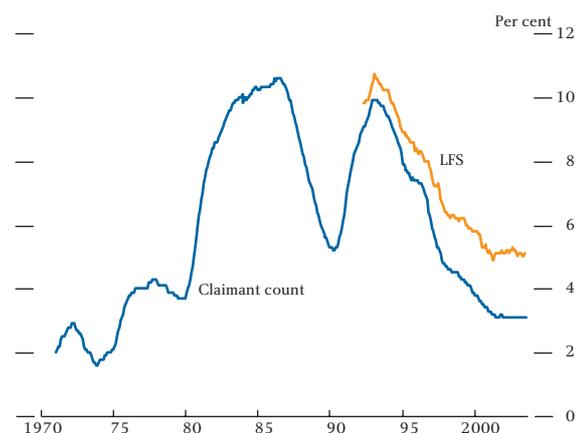
**Chart 2**  
GDP at market prices



Source: ONS.

(1) Given at the annual meeting of the German Economic Association, Zürich, 1–3 October 2003. This speech can be found on the Bank's web site at [www.bankofengland.co.uk/speeches/speech203.pdf](http://www.bankofengland.co.uk/speeches/speech203.pdf).

**Chart 3**  
**Unemployment rate**



Source: ONS.

In the remainder of this talk I first review the background to the adoption of an inflation target in 1992 and the subsequent development of the regime, in particular the delegation of operational responsibility for monetary policy to the Bank of England in 1997 and the associated institutional framework. I then go on to explain some aspects of the way the Bank's Monetary Policy Committee (MPC) formulates policy, relating it to the burgeoning literature on inflation targeting. I also review some aspects of performance since the Bank's independence. I conclude with a brief discussion of an issue that has recently preoccupied us, along with some other central banks, namely how policy-makers should respond to an asset price boom and/or high rates of private sector debt accumulation.

### Some history

In order to set the context, it is helpful to begin by briefly recalling the various UK monetary policy strategies that had preceded the adoption of an inflation target. For the first part of the post-war period, monetary policy was assigned only a marginal role in the control of aggregate demand. In line with Keynesian precepts, fiscal policy was seen as the primary tool of macroeconomic stabilisation, while interest rates were to be set low to encourage investment, and credit controls employed to restrain consumer borrowing. If excess demand pressures showed signs of spilling over into higher inflation and a deteriorating balance of payments, then incomes—rather than monetary—policy was the chosen tool to keep those pressures in check. When they turned out to be unsuccessful, resort would be made to devaluation in order to restore competitiveness. The demise of Bretton Woods and the move to a floating exchange rate removed the balance of

payments as a constraint, but in its place came an increased tendency towards higher inflation in the face of excess aggregate demand. The rise in the rate of inflation in 1974 and the failure of incomes policy to bottle up inflationary pressures in anything longer than the short term led to a growing awareness of the importance of monetary control in the management of aggregate demand. Monetary targets were first adopted by the Labour Chancellor, Denis Healey, in 1977, and in 1979 became the centrepiece of Mrs Thatcher's government's macroeconomic strategy. The latter was complemented during the ensuing decade by a sequence of market-oriented reforms to product and labour markets.

Monetary targets proved to be an unreliable guide to the conduct of monetary policy during the 1980s, however, on account of unpredictable movements in the velocity of circulation. The first chosen target aggregate was  $\text{M3}$ , a broad aggregate including sterling time deposits with the banking sector. In order to reduce inflation, the target ranges were set at 7%–11% for 1980 and 6%–10% for 1981; the outturns were 18.4% and 16.3% respectively. But other indicators did not point to monetary laxity, with narrow money growth slowing from 12.1% in 1979 to 2.6% in 1981. And monetary policy tightness was reflected in other developments in the economy: sterling rose by around a quarter, while output dipped more than 3% leading to a subsequent sharp fall in inflation.

That, and subsequent, experience led to considerable disenchantment with monetary targets within official circles, and a shift in focus onto the exchange rate as a suitable nominal anchor. Through the second half of the 1980s, the then Chancellor of the Exchequer, Nigel Lawson, pursued an informal exchange rate peg by shadowing the Deutsche Mark. This evolved into a formal exchange rate target when sterling entered the ERM in 1990 at 2.95DM/£, a rate that was felt in some quarters to be perhaps a little high. But that suited the government as it permitted lower interest rates—a sensitive matter in the United Kingdom on account of the prevalence of flexible-rate mortgages—while still restraining inflationary pressures. The risks inherent in this strategy were brought home when the economy subsequently slowed sharply at exactly the same time as the pressures of German re-unification were pushing European interest rates upwards. Eventually the tension between following a tight policy in order to maintain the exchange rate peg and the desire to limit the domestic

downturn by lowering interest rates became so great that the government's policy ceased to be credible, resulting in speculative attacks on sterling and the decision to quit the ERM on 16 September 1992.

There was now an urgent need for an alternative framework for the conduct of monetary policy. Monetary targets, and intermediate targets more generally, were seen to have failed because of the lack of a predictable relationship with the ultimate goal of policy. Shifts in the relationship between the intermediate target and the policy goal not only complicated the conduct of policy but also its communication. Furthermore, advances in economic understanding might well lead to a changed view on the most appropriate intermediate target. An inflation target offered a way out of this impasse. And by defining the framework in terms of the objectives of monetary policy, an inflation target allowed the strategy for its actual implementation to evolve without requiring continual respecification of the framework. The target measure chosen was the retail prices index excluding mortgage interest payments (RPIX), with a target range of 1%–4% and the intention that inflation should be in the lower half of that range by the end of that Parliament (scheduled to be in 1997).

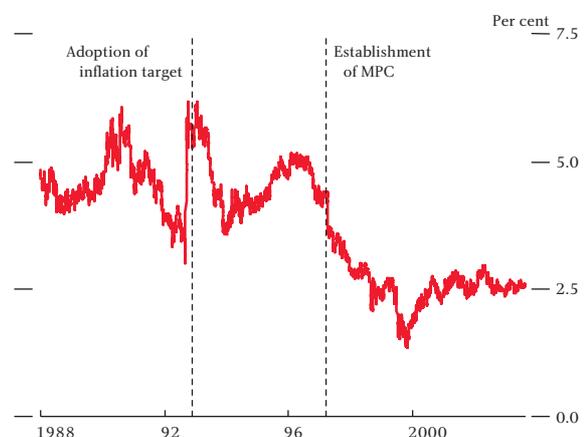
Now it is worth emphasising that the adoption of an inflation target was also accompanied by important institutional changes. For the achievement of macroeconomic stability in the subsequent decade has probably had less to do with the adoption of an inflation target *per se*, and more to do with the associated institutional changes. Prior to the adoption of an inflation target, interest rate decisions were often taken in response to a crisis or else with half an eye on political considerations. By instituting a regular monthly meeting between the Chancellor and the Governor of the Bank of England and their respective advisory teams, there was a greater chance that policy decisions might be made in a forward-looking rather than purely reactive way. More importantly, the decision to publish minutes of those meetings (dubbed the 'Ken and Eddie show' by the press) exposed the thinking behind decisions and thereby allowed the Governor to register disapproval if he thought the Chancellor's decisions inappropriate (the actual decision was purely in the hands of the Chancellor). This provided a highly visible public check on the monetary decisions of the executive, and was reinforced by the publication by the Bank of a quarterly *Inflation Report* containing analysis of

the inflationary trends in the economy, including conditional forecasts of inflation over a two-year period complete with estimates of margins of error.

## Bank of England independence

Though the post-1992 institutional changes placed some constraints on the ability of the Chancellor to base interest rate decisions on political rather than economic considerations, that discipline was inevitably only partial given the scope for differences in view about the prospects for inflation. Thus a Chancellor could judge that interest rates should be lower than the Governor either because of genuine differences in view about economic prospects or because of political considerations. As an outside observer could never be sure that it was the former rather than the latter, the new arrangements lacked full credibility. That lack of full credibility is evident in long-term (ten-year) inflation expectations implied by a comparison of the yields on nominal and indexed government debt. As Chart 4 reveals, inflation expectations in 1996 were close to 5%, and moreover had been tending to edge up as the date of the election drew nearer.

**Chart 4**  
**UK ten-year inflation expectations**



Note: This chart shows the ten-year ahead one-year inflation forward rate, defined as the difference between the ten-year ahead one-year nominal rate and the ten-year ahead one-year real rate, as calculated from nominal and index-linked government bonds.

Source: Bank of England.

A lack of counter-inflationary credibility in monetary policy was potentially even more of an issue for the incoming Labour government that took power on 1 May 1997. The economic record of the previous Labour government over the 1974–79 period had not proved a success and part of Labour's objective while in opposition had been to show that it could be trusted with the economy. To help to substantiate that, Chancellor Gordon Brown's first act was to hand over

operational responsibility for achieving the inflation target to the Bank of England, or more precisely a Monetary Policy Committee (MPC) that comprised five Bank officials and four external experts. But unlike some other central banks, responsibility for setting the inflation target remained with the Chancellor. This act generated an immediate credibility gain as long-term inflation expectations fell by more than half a percentage point (see Chart 4). That was followed by further gains over subsequent months as inflation expectations converged on the target of 2.5%.

Despite these credibility gains, it is worth noting that giving the Bank operational independence was nevertheless seen as a revolutionary step and did not immediately gain the wholehearted support of all sections of the parliamentary Labour party. This is important, as aspects of the UK model stem from the context in which it was forged. In particular, it would probably have been a step too far to allow the Bank also to set the target. It also explains the considerable stress placed on the accountability of the MPC.

The new regime required legislative changes and these are embodied in the Bank of England Act (1998). That charges the Bank 'to maintain price stability, and subject to that to support the economic policy of (the) government, including the objectives for growth and employment'. The lexicographic structure of this general objective imitates the wording in Article 105 of the Maastricht Treaty laying out the statutory objectives of the European Central Bank (ECB). But in contrast to the ECB which is free to choose exactly how it interprets its general objective, the MPC is each year provided with a Remit by the Chancellor which defines 'price stability' more precisely. So as to maintain continuity with the pre-1997 regime, that was chosen to be an annual rate of inflation of 2.5% for RPIX 'at all times'. The Remit has remained the same since then, though the Chancellor announced in his June 2003 statement on euro entry that the targeted measure would in due course be changed to the harmonised index of consumer prices (HICP)<sup>(1)</sup>—the measure corresponding to that used by the ECB. The Remit also fleshes out the 'economic policy of the government', namely the maintenance of high and stable levels of growth and employment.

From time to time this framework has been criticised for paying insufficient attention to economic objectives other than inflation (though the critics usually believe that the statement of objectives makes no reference whatsoever to growth, employment, etc, which is not the case). It is also sometimes suggested that the statement of objectives should put equal weight on inflation and activity, as is the case in the United States with the Federal Reserve.

Are there grounds for thinking the objective is overly focused on inflation? My own view is 'No'. The Chancellor's original letter to the Governor at the time of independence makes clear that, although the target is 2.5% 'at all times', we are not expected to achieve it continuously. Inevitably from time to time there will be shocks that drive inflation away from target. Given the lags inherent in the transmission mechanism of monetary policy, it may be difficult to offset such shocks if they are temporary and will have faded by the time the effect of any change in interest rates is starting to be felt. And even if some shocks could be offset in principle, there may nevertheless be a good case for allowing temporary slippage relative to target in order to avoid undue volatility in activity; that is particularly the case with some sorts of supply shock. In essence, we have a degree of 'constrained discretion' in deciding exactly how to deal with shocks and how quickly to plan to bring inflation back to target when it has moved away (see King (1997)).

The lexicographic structure of the objective is, I believe, a practical solution to the problem of how to instruct an agent (the central bank) to minimise (the expected value of) a discounted loss function of the general form:

$$L_t = \sum_{k=0}^{k=\infty} \beta^k L(\pi_{t+k} - \pi^*, y_{t+k} - y^*_{t+k}) \quad (1)$$

where  $L(\cdot)$  is concave in both its arguments (eg quadratic),  $\pi_t$  is inflation,  $\pi^*$  is the ideal inflation rate,  $y_t$  is output,  $y^*_t$  is the natural level of output (note that unlike  $\pi^*$  this is time-varying), and  $\beta$  is a discount factor. I do not think it is a practical option to legislate such an objective function into law, but the lexicographic structure in effect first describes the 'high-level' inflation objective and the associated bliss point,  $\pi^*$ , before going on to recognise the presence of activity in the loss function under the heading of supporting the

(1) It is likely that the numerical value of the target will change at the same time as the targeted measure is changed as the rate of inflation of HICP has on average run about three quarters of a percentage point below that of RPIX, reflecting differences in construction and the inclusion of a housing cost component in RPIX. The current (August 2003) difference of 1.5 percentage points is unusually wide, reflecting recent high house price inflation, but is likely to shrink as house price inflation subsides. For further details, see Bank of England (2003).

general economic policy of the government with respect to growth and employment.

One might be tempted to suggest that the principal ought to specify a 'high-level' target for output,  $y^*$ , as well. However, unlike  $\pi^*$  the natural level of output is not known with any certainty. Given the absence of any long-run trade-off between inflation and activity under the natural rate hypothesis—a common feature of many macroeconomic models—and the consequent inability of monetary policy to influence anything other than inflation in the long run, nothing is lost by this omission as output must gravitate to its natural level in the long run as expectations adjust and nominal rigidities work their way out.<sup>(1)</sup> Moreover, if the government were to set a 'high-level' target for output, it would reintroduce scope for the manipulation of interest rates for political ends. The lexicographic structure also helps to insulate the central bank from pressures to pursue a more accommodative monetary policy in the short run if that conflicts with keeping inflation close to target.

Of course, the Remit does not specify the relative weight we are supposed to place on deviations of inflation from target and output from its natural level. So the 'contract' between the government and the Bank is incomplete. Svensson (2003a) has argued that in the interests of transparency the members of the MPC ought to reveal their individual or collective objective function—and in particular the relative weight placed on deviations of inflation from target and output from potential. Though this might be of interest to academics and technicians, I suspect that it would not be very revealing, and quite possibly confusing, to the public at large. Moreover, I think that in practice it would make little difference. Empirical evidence suggests that the 'Taylor frontier' that traces out the minimum feasible inflation variance for a given output variance may be quite sharply curved. In that case a wide range of plausible loss functions lead to rather similar policy choices (Bean (1998)). More importantly, as detailed below, any deviation of inflation of more than 1 percentage point either side of the target triggers an Open Letter from the Governor to the Chancellor, which amongst other things is supposed to say how quickly the MPC expects to bring inflation back to target. The

Chancellor's (open) response to that letter would allow him to indicate whether that was too rapid, or not rapid enough, if he so wished.

A valuable feature of the current regime has, I believe, been the choice of a point target. That has given simplicity and clarity to the target and helped to anchor private sector inflation expectations in a way that would not necessarily be the case with a target band, particularly if that band were quite wide<sup>(2)</sup> as there could be ambiguity about exactly where in the band the central bank was aiming for.

Another feature of the UK model that is worth highlighting is the emphasis placed on accountability that accompanied the decision to delegate operational responsibility for monetary policy to the MPC. The primary channels are threefold. First, the MPC is accountable to the Court of the Bank,<sup>(3)</sup> whose job it is to oversee the Committee's processes though not its interest rate decisions. Second, members of the MPC appear before the appropriate Committee of Parliament, usually shortly after the publication of the *Inflation Report*, to be questioned about the reasoning behind interest rate decisions. Importantly, members are held individually accountable for their votes. Third, as already noted, if inflation deviates more than 1 percentage point from target, the Governor is expected to write an Open Letter to the Chancellor explaining why the deviation has occurred, what action the Committee is taking to bring inflation back to target, and how that is consistent with the government's general economic policies.

It is worth stressing that the Open Letter is part of the arrangements for public accountability, not an elaboration of the target into a *de facto* 1.5%–3.5% tolerance band. Sending an Open Letter is not therefore to be seen as a sign that we have 'failed'; rather it is a trigger for a public explanation as to why the deviation has occurred.

Effective accountability requires a degree of transparency and openness about our processes and deliberations. But transparency and openness also help outsiders to understand the thinking behind interest

(1) Of course there is a large literature, stemming from Kydland and Prescott (1977) and Barro and Gordon (1983), that assumes the policy-maker targets a level of output above the natural level. For the reasons explained in Bean (1998), I do not think this is an accurate description of what central banks are trying to do. See Blinder (1997) for a similar view.

(2) This is obviously not so much of a problem when the band is narrow. Thus the Reserve Bank of Australia targets a 'thick point' of 2%–3% inflation.

(3) This comprises the Governor, the two Deputy Governors and 16 non-executive directors, drawn from all sections of commerce and society.

rate decisions and thus allow them to build up a picture of our reaction function. As King (1997) remarked, our goal is to make monetary policy boring: if our reaction function is well understood, then markets will react only to the news in the economic data—there should be no news in our subsequent decision. Of course, perfect predictability is unachievable because outsiders can never know exactly what we will make of the latest data, but our intent is clear.

The two main channels for explaining our thinking are the minutes of the policy meeting, published two weeks later along with the individual votes, and the quarterly *Inflation Report*, produced by Bank staff with the approval of the MPC. Although we usually produce a press statement when rates are changed (or if they are not changed when it was expected they would be), we only seek to give a broad-brush indication of the reasons behind the decision, preferring to leave it until the minutes are published to give a more complete flavour of the pros and cons of the various arguments. Also we prefer to hold press conferences only quarterly, on the occasion of publication of the *Inflation Report*, rather than after every policy meeting, so as to ensure that markets and commentators get the full story, rather than a possibly incomplete one. Of course, other central banks choose to achieve transparency in different ways and I think it is important to recognise that there is no single best way—*chacun à son goût*.

## Process: the Committee

All independent central banks—whether they are inflation targeters or not—have broadly similar processes, involving regular briefing of the policy board (or policy-maker if it is a singleton) by the staff, and usually involving the periodic production of a forecast to help to guide the decision-maker(s) (for more details on the specifics of the Bank's and the MPC's processes, see Bean and Jenkinson (2001)). But there are a number of aspects about the way the MPC functions that mark us out, or at least put us at one end of the spectrum of approaches. These follow in large part from the make-up of the Committee.

First, as noted earlier, the Bank of England's MPC comprises five members of the Bank's staff<sup>(1)</sup> *ex officio* and four external members, appointed by the Chancellor. The role envisaged for the externals was to keep the

Bank on its toes and inject fresh thinking; this they have certainly achieved. Importantly, the Chancellor took the decision that these external members should be experts who brought knowledge relevant to the setting of monetary policy to the Committee. While only a minority have been monetary specialists, all the appointees have been economically literate. And that is also generally true of the internal members. In fact, of the 20 past and present members of the Committee, no fewer than nine have held academic positions in economics at some time in their career and the remainder have either been professional economists or acquired considerable economic expertise in the course of their former occupations.

So the degree of economic literacy on the Committee is high. That is not the case with all central bank policy boards, which sometimes have a preponderance of representatives of business and commerce.<sup>(2)</sup> The creation of the MPC has thus not only taken politics out of monetary policy, but it has also put economics firmly into it. Now obviously that is not a guarantee that the Committee will always make the right decision, but given that the setting of monetary policy is a technical matter that requires an understanding of how economies behave, I believe economists have a better chance of getting it right than do those untutored in the dismal science.

Second, by appointing strong-minded individuals who are willing to take an independent stand, it has fostered healthy debate. That has been immeasurably helped by the Chair, in the person of the Governor, who refrains from seeking to impose his own views on the rest of the Committee. There is no attempt to seek a consensus. Indeed, that is a consequence of our individual accountability under the legislation. So we each vote according to our interpretation of the data, our view of economic prospects and the various issues that might guide the policy decision. That is reflected in the diversity in the voting patterns which has displayed just about every combination imaginable.

Now it should be said that the willingness to reveal disagreements—often amplified through members' speeches—could have backfired in that it could have led to confusing messages. That would have especially been the case if the Committee sought to take decisions by

(1) The Governor, the two Deputy Governors, and the Executive Directors for Monetary Analysis and for Market Operations. The three Governors are all Crown appointments.

(2) For instance the nine-person Board of the Reserve Bank of Australia includes the Governor, Deputy Governor, a (voting) Treasury representative and six externals, of whom typically only one is a professional economist.

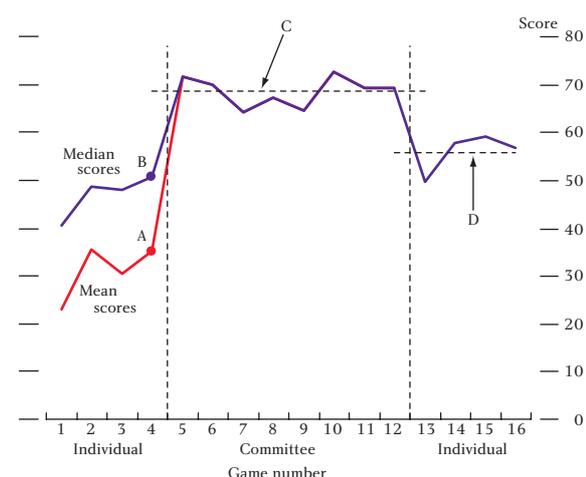
consensus. But once market participants and commentators had grasped that the Committee comprised nine independent individuals, this willingness to disagree has, I believe, turned out to be a strength in that it reinforces the point that the future—not to mention the past—is uncertain and it is reasonable for there to be (usually slight) differences in interpretation.

This naturally raises the question of whether having a Committee also leads to better decisions. My personal view is ‘Yes’—I certainly find the discussion with my colleagues on the MPC invaluable in forming my own view. But it is not easy to test the proposition that having a Committee has improved the quality of decision-making. However, some of our staff have recently conducted an interesting experiment with 170 economics students at the London School of Economics as guinea pigs, which suggests that having a Committee indeed adds value (Lombardelli, Talbot and Proudman (2002)).

In this experiment, the students were asked to act as monetary policy makers by attempting to control a simple macroeconomic model—comprising an IS curve and a Phillips curve—that was subject to random shocks each period, as well as a structural shock that occurred at some point during the game. In each period, participants chose the interest rate observing only the previous period’s realisations of output and inflation. So over the course of the game, participants could learn about the structure of the model. Participants were also paid according to a pay-off function that depended on their ability to stabilise output and inflation.

The students were divided into 34 groups of five, each playing 16 rounds, with each round consisting of 10 periods. In the first and last four rounds, participants made their decisions in isolation, but in the middle eight they came together as a committee, with their joint decision set equal to the median of their individual recommendations (as a proxy for majority voting). Chart 5 shows the evolution of the average across the 34 groups of the mean and median scores within each group. A number of points are worth noting. First, there is a general upward trend in scores that is associated with learning about the structure of the economy. Second, there is a large rise in scores when the switch is made to decision-making by committee. This gain comes from two sources: the distance AB reflects the neutralising impact of committee decisions on the effect of weak players; and the distance BC

**Chart 5**  
Effect of committees



Source: Lombardelli, Talbot and Proudman (2002).

reflects the additional gain from the sharing of information. Third, there is a large downward movement in scores, when players revert to playing individually. That again indicates the value of a committee decision, as it cannot be attributable to learning. Another interesting finding—not displayed in the chart—is that the mean committee score is somewhat higher than the mean score of the best individual playing alone. That suggests that the committee process involves more than the person with the best understanding sharing their knowledge with others—even the best player benefits. Of course, the environment here is a long way from that inhabited by the MPC, but the results are certainly consistent with my own perception of the value of having a committee make the monetary policy decision.

### Process: the forecast

A notable feature of our procedures is the central role played by the quarterly forecast. As already noted, in many central banks the staff produces a forecast that is an input into the policy decision, along with a range of other data and indicators. That is the case for instance with the ECB, where the first pillar of the monetary strategy rests on a broad-based assessment of inflation prospects, including econometrically based forecasts, while the second pillar rests on an assessment of monetary developments. But those forecasts often remain purely a staff view. By contrast, at the Bank of England the forecasts published in the quarterly *Inflation Report* are those of the Committee, rather than the staff, and their production involves a considerable amount of active input on the part of the Committee.

Thus each forecast round starts with the preparation of a ‘benchmark forecast’ by the staff, incorporating new

data, etc, onto the previous forecast. That is discussed with the Committee and a series of 'key issues' are identified. These are issues where judgment is required and which have a material effect on the expected inflation profile. In a series of meetings with the staff, the Committee discusses and debates those issues, intermediated through one or more of the Bank's 'suite' of economic models, and arrives at a best collective judgment on each key issue. These are then incorporated in a revised set of projections, followed by a further two or three meetings, at which the forecasts are compared with those of outsiders, with forecasts produced from other models in the Bank's suite, and if necessary further tuned. In all, there are usually six or seven substantial meetings between the Committee and the staff during each forecast round before a final forecast is produced that embodies the overall best collective judgment of the Committee.

It should be clear that this approach to the forecast would not be possible without, first, a high degree of economic literacy on the part of members of the Committee; and, second, Committee members who spend a substantial amount of time in the Bank—it would be more difficult to operate in this way in federal systems, such as the Federal Reserve or the European System of Central Banks, for instance.

The quarterly forecast round plays a dual role in our process. First, it is the period when we discuss most intensively how the various pieces of data fit together, and the associated key economic issues, within an explicitly quantitative framework. That means the model(s) of the economy that we employ need to have a theoretical structure that embodies the Committee's economic paradigm reasonably closely if the discussions are to be fruitful. A model that fitted the data well, but did not have a recognisable theoretical basis would not be particularly useful for such a function. Consequently, though we use VARs, factor analytic models, and the like as a cross-check on the projections, they are not so useful in constructing 'stories', a function that is essential for an effective forecast process. In order to improve our ability to tell such stories in a way that matches the Committee's thinking, we are currently in the throes of adding a new model to our suite. This model is built around a dynamic stochastic general equilibrium core that includes both real and nominal rigidities, augmented with some additional terms to

improve its coherence with the data, and contains explicit expectations terms enabling a variety of 'what if?' simulations to be easily conducted.

The second function of the forecast is as an aid to communicating the rationale for our interest rate decisions to the outside world. Lags in the transmission mechanism of monetary policy mean that all central bankers, and especially those with explicit inflation targets, need to be forward-looking, focusing not on the current rate of inflation which may be subject to all sort of transient influences that the central bank is powerless to affect. Instead, the policy-maker needs to focus on inflationary prospects into the medium term and beyond. Our forecasts for growth and inflation, over a two-year period, presented as explicit probability distributions (the 'fan charts') rather than as point forecasts,<sup>(1)</sup> help to set the context in which interest rate decisions are made.

The publication of forecasts, and the linking of interest rate decisions to those forecasts, has certainly helped outside commentators to understand that we aim to be forward-looking and pre-emptive, rather than simply responding to the current rate of inflation. However, an unfortunate by-product has been that some commentators have come to believe that in setting interest rates we follow a rather mechanistic approach, namely adjusting the current official interest rate until the central projection (mode) for inflation at the forecast horizon is on target. That is true not only of some financial commentators, but also of some academic writers (see eg Giannoni and Woodford (2002)), and in a number of academic studies inflation targeting is characterised by an instrument rule relating the nominal interest rate,  $i_t$ , to expected inflation at a fixed horizon in the future and (possibly) a Taylor-style output gap term:

$$i_t = i^*_t + \gamma(E_t\pi_{t+k} - \pi^*) + \delta(y_t - y^*_t) \quad (2)$$

where  $\gamma$  and  $\delta$  are positive constants, with  $\gamma \rightarrow \infty$  giving 'strict' inflation targeting of the sort the MPC is said to follow. This view of what inflation targeting is about has also led some people to argue that it leaves insufficient room for discretion.

Svensson (2003b) has argued persuasively that this approach to implementing inflation targets is seriously

(1) It is worth noting that they are not true unconditional forecasts, but rather forecasts conditioned on an assumed path for official interest rates—either unchanged rates or the path implied by the profile of market interest rates. For that reason we often refer to them as 'projections' to emphasise their hypothetical nature.

flawed and offers an alternative view that characterises ‘flexible’ inflation targeting as the policy that implements the first-order condition obtained from a suitable optimisation problem (see also Svensson and Woodford (1999); and Giannoni and Woodford (2002)). Specifically, to take a simple example, suppose that the loss function is quadratic:

$$L_t = E_t \left[ \sum_{k=0}^{k=\infty} \beta^k \{ (\pi_{t+k} - \pi^*)^2 + \lambda (y_{t+k} - y_{t+k}^*)^2 \} / 2 \right] \quad (3)$$

and the supply side is given by a New Keynesian Phillips curve:

$$\pi_t = \beta E_t \pi_{t+1} + \kappa (y_t - y_t^*) + u_t \quad (4)$$

where  $u_t$  is a supply shock. Then the optimum policy (under commitment from the ‘timeless perspective’) satisfies the first-order conditions (for all  $k \geq 0$ ):

$$E_t \pi_{t+k} = -(\lambda/\kappa) E_t [(y_{t+k} - y_{t+k}^*) - (y_{t+k-1} - y_{t+k-1}^*)] \quad (5)$$

The optimal plan thus equates the marginal rate of transformation between output and inflation that is embodied in the supply schedule with the marginal rate of substitution that is embodied in the loss function. It ensures that inflation will be brought back to target, but at a rate that recognises the consequences for activity.

So which is the better characterisation of how the MPC behaves? On the face of it, the sequence of published fan charts since independence, in which the central projection has almost always been quite close to target at the two-year horizon, might appear to support the first characterisation of our behaviour. However, as stated earlier, I see inflation targeting as really being a statement about the objectives of the monetary policy maker, rather than a detailed description of how it is achieved. The Remit itself says nothing about a two-year horizon—it enjoins us to target 2.5% inflation at all times, but to take on board the implications for growth and employment in deciding how we pursue our primary objective. As most of the impact of a change in interest rates will have worked its way through the economy after two years, the two-year point makes a convenient reference point for the purposes of communication. But as the Committee has explained on a number of occasions there is no mechanical link between the central projection at the forecast horizon and the policy decision. The latter may also be affected by ‘the balance

of risks’, ie the skewness of the probability distribution, what is happening to inflation both before and beyond the two-year horizon and what is happening to activity (see eg Bank of England (2000)).

The fact that the central projection for inflation two years out has usually been quite close to 2.5% is, I think, a straightforward consequence of the fact that inflation has rarely strayed very far from target—an Open Letter has so far not been triggered despite expectations in 1997 that they might be triggered nearly half the time—and output has been quite close to potential with growth close to trend. But if inflation had strayed far from target, then the Committee would surely have needed to consider how quickly to bring it back, and might well have chosen to do so over a longer time horizon than two years.

## Performance

As noted at the outset, macroeconomic performance since the inception of inflation targeting in October 1992 has probably exceeded the expectations of most commentators. RPIX inflation has averaged 2.6%, and GDP growth<sup>(1)</sup> has averaged 2.8%; since Bank independence the corresponding figures are 2.4% and 2.5%. Given previous experience, both growth and inflation have also been remarkably stable, as a glance at Charts 1 and 2 reveals.

Should any significance be attached to the slight tendency for inflation to undershoot the target since independence? First, it should be said that this was not the result of a conscious decision by the Committee because, as already noted, the published forecasts usually showed the central projection close to target by the end of the forecast period. Rather it was the consequence of forecast error. Table A provides information on the average forecast error (relative to the mean of the fan chart probability distribution), the average absolute forecast error and the dispersion of forecast outturns relative to the fan chart probability distributions. These indeed show a slight bias in the forecasts of inflation two years ahead, though the average error is not large.<sup>(2)</sup> It turns out that there are two main factors behind the tendency to overforecast inflation during the 1998–2002 period. The first is the sharp appreciation of sterling that occurred in 1996, which both the Committee and outside commentators

(1) Calculated on a 1995 price basis.

(2) The fact that these forecast errors were serially correlated also attracted attention, though Pagan (2003) points out that, since inflation is highly serially correlated and the observations are overlapping, this is not an unlikely occurrence.

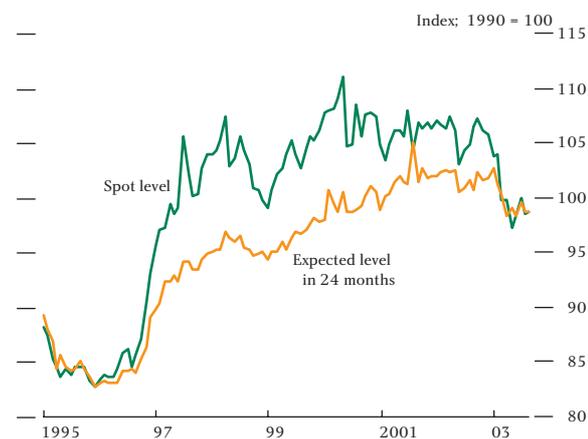
**Table A**  
**MPC's forecasting record**

	Mean error	Mean absolute error	Fraction (a) in central 30%	Fraction (a) in central 50%
<b>RPIX inflation</b>				
One year ahead	0.0	0.3	8/18	11/18
Two years ahead	-0.3	0.4	6/14	11/14
<b>GDP growth</b>				
One year ahead	0.3	0.7	4/18	11/18
Two years ahead	-0.3	0.5	4/14	10/14

(a) Denominator is sample size. Based on *Inflation Reports* from February 1998 to May 2002.

thought likely to be temporary, but ultimately proved to be more permanent (see Chart 6). Consequently, externally driven inflationary pressures were overestimated. Second, the United Kingdom's supply-side performance turned out to be rather better than expected—in particular falling unemployment did not lead to any marked pickup in wage inflation.

**Chart 6**  
**Sterling ERI and Consensus forecasts**



Sources: Bank of England and Consensus Economics.

The high degree of stability in inflation is more interesting, and is reflected in the fact that outturns have tended to be closer to the centre of the forecast probability distributions than the Committee would have expected—for instance, three quarters of the outturns have been within the central 50% of their respective two-year ahead distributions. This stability is not unique to the United Kingdom, and most other industrialised countries—some, but not all, of whom are inflation targeters—have experienced a similar phenomenon during the 1990s. And it is also true that growth rates have tended to exhibit greater stability than in previous decades.

There are at least three possible explanations for this greater stability. First, smaller shocks, or a particularly benign sequence of shocks. Second, structural changes in the economy, possibly associated with the IT

revolution and the advent of just-in-time production processes that have attenuated the amplification and propagation induced by the inventory cycle. And, third, improved macroeconomic policies leading to reduced cyclical variability and better anchoring of inflation expectations. All three are likely to have played a part, though the relative importance of individual factors is still a matter for debate. For instance, Cecchetti, Flores-Lagunes and Krause (2001) argue that better monetary policy should take the lion's share of the credit, whereas Stock and Watson (2003) argue that the role of policy is negligible. This is an area where further research would be useful.

### Asset prices, debt and inflation targets

To conclude, I want to turn to an issue that is a matter of current debate amongst central bankers and monetary economists, namely the appropriate response of monetary policy to asset price bubbles and any associated rapid expansion of credit. In the aftermath of the collapse of the dot-com bubble and the more recent wider correction to international share values, a number of commentators have argued that the achievement of price stability by central banks may be associated with heightened risks of financial instability. They argue that central banks should not focus solely on inflation prospects, but also take account of developments in asset prices, debt and other indicators that may be symptomatic of incipient financial imbalances. That view is neatly summarised by Crockett (2003; *italics in original*):

'(I)n a monetary regime in which the central bank's operational objective is expressed *exclusively* in terms of short-term inflation, there may be insufficient protection against the build up of financial imbalances that lies at the root of much of the financial instability we observe. This could be so if the focus on short-term inflation control meant that the authorities did not tighten monetary policy sufficiently pre-emptively to lean against excessive credit expansion and asset price increases. In jargon, if the monetary policy reaction function does not incorporate financial imbalances, the monetary anchor may fail to deliver financial stability.'

According to this view, policy should be tightened if the policy-maker believes that an asset price bubble is developing, or if balance sheets show signs of becoming stretched through excessive debt accumulation, even

though inflation may be well under control. Failing to do this may raise the likelihood of financial instability further down the road.

This argument is developed at greater length by Borio and Lowe (2002) who emphasise that it is not asset price bubbles *per se* that central bankers should be concerned about, but rather the broader set of symptoms that usually accompany asset price booms, namely a build-up of debt and a high rate of capital accumulation. During the asset price boom—which may initially be prompted by an improvement in economic fundamentals, such as an increase in total factor productivity growth occasioned by a new technology—balance sheets may look healthy as the appreciation in asset values offsets the build-up of debt. But when optimism turns to pessimism, the correction in asset values results in a sharp deterioration in net worth, stretched balance sheets, retrenchment and possible financial instability. This process may be further aggravated if banks respond to the deterioration in balance sheets by restricting lending, ie a credit crunch.

But others are more sceptical about the usefulness of using monetary policy in this way. Raising interest rates to ‘prick’ an apparent bubble may simply produce the sort of economic collapse one wants to avoid. The best that one can do is deal with the consequences as the bubble bursts or financial imbalances unwind. This more orthodox view is well summarised by Chairman Greenspan (2002):

‘Such data suggest that nothing short of a sharp increase in short-term rates that engenders a significant economic retrenchment is sufficient to check a nascent bubble. The notion that a well-timed incremental tightening could have been calibrated to prevent the late 1990s bubble is almost surely an illusion. Instead, we ... need to focus on policies to mitigate the fallout when it occurs and, hopefully, ease the transition to the next expansion.’

This debate revolves around the desirability and feasibility of pre-emptive monetary policy tightening in order to prevent subsequent financial instability, and there is a growing literature examining this question. Much of this literature focuses on stochastic asset price bubbles (see eg Bernanke and Gertler (1999, 2001); Cecchetti, Genberg, Lipsky and Wadhvani (2000); Cecchetti, Genberg and Wadhvani (2002); and

Gruen, Plumb and Stone (2003)), and analyses the implications in a suitably calibrated macroeconomic model of following either a simple Taylor rule or an inflation-forecast-targeting rule augmented with the asset price. The bottom line of this literature seems to be that the results hinge on the particular stochastic assumptions regarding the asset price (as well as other shocks that might provide a fundamental explanation for the asset price movements) and above all on the information available to the policy-maker. Gruen, Plumb and Stone, in particular, argue that the policy-maker needs to know rather a lot about the nature of the bubble, and needs to know it early, if a pre-emptive activist policy is to be effective.

Suppose, for the sake of the argument, that policy-makers do have the information that Gruen, Plumb and Stone find is required. What does that say about the pursuit of inflation targets? This debate is often couched in language that appears to suggest that inflation targets are not enough, eg the quote above from Crockett. And that would indeed be the case if one assumed that the inflation target was implemented through the adoption of an instrument rule in which the interest rate is adjusted in line with the expected deviation of inflation from target (say) two years ahead, as in equation (2). But, as noted above, that is not what inflation targeting is all about, in the United Kingdom at least. Our Remit dictates that we should target annual RPIX inflation of 2.5% at all times, and that we should be mindful of the implications for growth and employment in achieving that. There is nothing in our Remit that tells us to focus on inflation exclusively at the two-year horizon. In fact doing so would actually run counter to the Remit!

Now Borio and Lowe, Crockett, and Cecchetti *et al* are concerned about asset price booms and the associated credit expansion because of the instability that may result when the boom later turns to bust, balance sheets become stretched and agents then seek to rebuild them by cutting back on expenditure. Financial instability in the shape of failures of financial intermediaries may or may not be the result, but there is certain to be a fall in aggregate demand, resulting in a reduction in inflationary pressures unless there is an appropriate policy response. In other words asset price booms and debt accumulation based on overoptimism about the future are likely to lead to future macroeconomic instability when expectations adjust and an increased likelihood of deviating from the inflation target in the

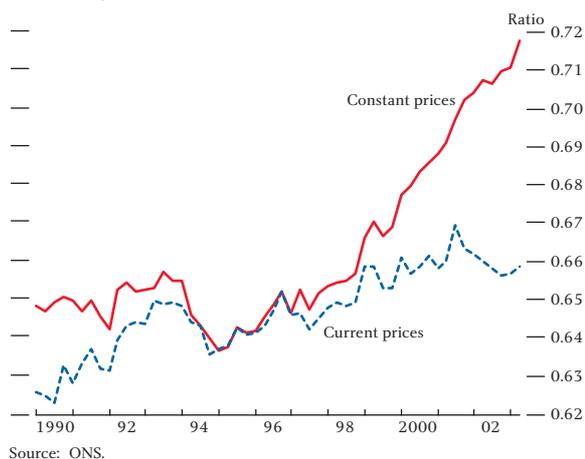
future. Accordingly a tighter policy to moderate an asset boom that led to a near-term undershoot of the inflation target would nevertheless be in accordance with our Remit, if it also sufficiently increased the likelihood of staying close to target further down the road.

I therefore do not see any difficulty in principle in taking on board the implications of concerns about asset price bubbles, incipient financial imbalances, etc, within an inflation-targeting framework. And indeed Cecchetti *et al*, who do advocate an activist response to asset price movements, stress that their recommendations are entirely consistent with a framework of inflation targets. But taking on board the sort of concerns that are raised by Borio and Lowe, Crockett and Cecchetti *et al* would require a change in rhetoric to emphasise that current interest rate decisions were motivated by considerations that had an impact beyond the normal two-year horizon for which forecasts are published. For further discussion of this general issue, see Bean (2003).

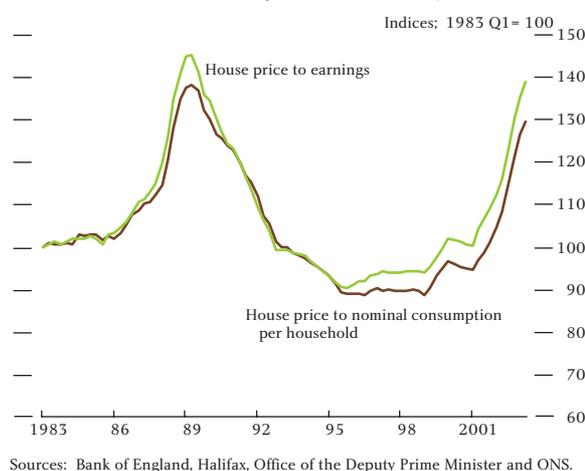
The far harder problem is to diagnose what should be done in a particular circumstance. That can usefully be illustrated by recent developments in the UK household sector. Over the period since 1997, consumption growth in real terms has consistently outstripped that of output, though the difference is rather less marked in current-price terms because of the marked improvement in the terms of trade (see Chart 7). And that discrepancy has become somewhat more pronounced during the post-2000 global slowdown as the MPC has deliberately sought to bolster domestic demand through lower interest rates in order to offset the impact of the slowdown on overall spending on UK goods and services. That policy has been reasonably successful in so far as it has avoided recession, kept inflation close to the target and prevented any substantial rise in unemployment (see Charts 1–3). However, the consistent strength of consumer spending has been accompanied by high rates of house price inflation (see Chart 8) and rapid debt accumulation (see Chart 9). Some commentators have consequently warned that this strategy could end in tears with a house price crash and/or retrenchment by consumers in the face of excessive debt levels (see eg International Monetary Fund (2003)).

There are two questions that need to be addressed here. First, what is the likelihood of a future sharp correction to house prices and to consumer spending? Second, if a

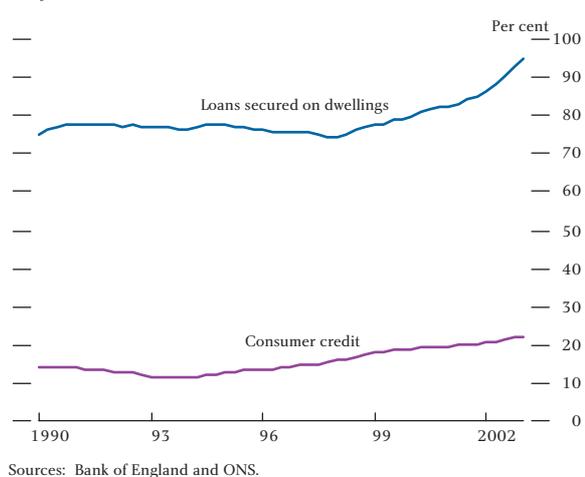
**Chart 7**  
Consumption to GDP ratio



**Chart 8**  
Ratio of house price to nominal consumption per household and house price to earnings ratio



**Chart 9**  
Outstanding household debt as a percentage of post-tax income



future correction is likely, how should policy be modified now to take account of that?

The likelihood of a future correction is in part bound up with whether the movements in house prices and debt

are warranted by fundamentals or instead reflect unwarranted optimism. A sharp drop in aggregate demand would be more likely in the latter case. So why might the price of houses have risen?

The demand for housing services (at given permanent income) is likely to have risen for at least three reasons. First, the transition to a low inflation environment implies that nominal interest rates should also be lower on average. As standard mortgages entail an even flow of nominal payments over the life of the mortgage, the initial real payments on a given nominal debt are smaller than they would be if inflation and interest rates were high, with the real burden of payments towards the end of the loan period being correspondingly greater. Shifting the pattern of real payments into the future makes credit-constrained households more willing and able to borrow to finance house purchase, thus driving up the demand for housing. Second, increased competition amongst lenders and the application of better credit-scoring techniques appear to have increased the supply of loans. And third, population growth and demographic developments—more people wanting to live alone and an increased desire for second homes—have also boosted demand. Finally, the rate of construction of new dwellings has lagged behind the expansion in the number of households, in part because of a shortage of land and the impact of planning constraints, so that the supply of housing has also been restricted.

In sum, there are good structural reasons why the ratio of house prices to income should have risen. Inevitably there is considerable uncertainty about what the underlying equilibrium value of this ratio is, but a comparison of the rental yield with the long-term real interest rate suggests that the former is not unusually low, as would be the case if speculative buying in the anticipation of further capital gains had driven house prices up (see Chart 10).

The evolution of household debt is in large part a reflection of what has been going on in the housing market. Some four fifths of household debt is secured against housing (see Chart 9) and an increase in the debt to income ratio is a natural by-product of an increase in house prices as households take out bigger mortgages to buy more expensive properties. As a consequence the build-up of debt has not been associated with a deterioration in household net worth:

**Chart 10**  
Rental yield less ten-year real interest rate



Sources: Bank of England and ONS.

total net wealth has almost doubled since 1995. And we also know from the British Household Panel Survey (BHPS) that, at the microeconomic level, those households with high debt levels also tend to have a lot of assets—which is hardly surprising as people usually take out large mortgages in order to buy expensive houses. Finally, the number of owner-occupiers has been rising steadily over the past decade, imparting an underlying upward trend to the aggregate debt to income ratio even in the absence of any change in the average debt per indebted household (see Hamilton (2003)).

But it is, of course, possible not only that house price inflation may have been greater than warranted by fundamentals, but also that some household borrowing may have been based on overoptimistic assessments of future prospects or else failed to factor in the possibility of job loss or increases in interest rates. Now according to the BHPS roughly a third of indebted households have no liquid assets to speak of. If those households have already borrowed up to the limit, then a future adverse shock to disposable income would lead those households to cut back spending sharply. And a period of rapid debt accumulation driven by overoptimism is also likely to be associated with an increase in the fraction of households that could find themselves in such a position. As a consequence, stretched household balance sheets may act to amplify the impact of adverse shocks. But the extent to which this is likely to be a problem is hard to judge in the absence of detailed information on the circumstances of individual households. Nevertheless, prudence dictates that such a possibility should be factored into the policy decision.

But how much tighter should policy today be given these concerns? That is not a straightforward question to answer. First, policy can always be relaxed if and when an adverse shock occurs, though some pre-emptive action to reduce the consequences of such a shock would seem to be warranted. Second, it is not clear that an increase in interest rates would have much effect on future debt levels—it all depends on whether the semi-elasticity of the debt stock with respect to the interest rate is greater or less than unity; households' expectations about their future circumstances are probably more important, and they may be impervious to changes in official interest rates. Finally, even if one is confident that an interest rate increase today would reduce debt accumulation and the amplitude of an asset price bubble, one has to balance the relatively certain short-term costs in terms of foregone output and an undershoot of the inflation target against the more uncertain medium to long-term gains. In sum, calibrating an appropriate pre-emptive policy response is extraordinarily difficult.

## Concluding remarks

Britain's monetary policy regime seems to have been in a state of perpetual revolution for much of the post-war period. However, learning from the experience of other countries, we now seem to have found a set of institutional arrangements and a monetary policy framework that have served to bring a degree of macroeconomic stability to the United Kingdom that could never have been envisaged in 1992. Of the two ingredients—the operational independence of the Bank and an inflation target—the former is perhaps more fundamental. But the latter has also been important in helping cement low and stable inflation and in anchoring inflation expectations. No doubt the world will continue to throw up new challenges to monetary policy makers, in the United Kingdom and elsewhere. Our application of inflation targets will need to evolve to meet those challenges, but the current structure does, I believe, offer a robust and flexible apparatus in which to address them.

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# UK monetary policy in a changing world

*In this speech,<sup>(1)</sup> Kate Barker, member of the Bank's Monetary Policy Committee, discusses the impact of the changing pattern of world trade and growth on the UK economy, and the implications for monetary policy. She points out that, although China is set to have a major effect on the global economy, changes on this scale are not unprecedented, and in the long term the United Kingdom should continue to benefit as more countries open up to world trade. Discussing the November 2003 0.25 percentage point increase in interest rates, she explains that, for her, the decision reflected optimism about the UK economy (and therefore upward pressure on inflation from higher growth), rather than worries over the rising household debt level.*

It is a great pleasure to be here, and to have been invited to give the Annual Business School lecture. My connection with the University of Teesside has mainly been through the previous Vice Chancellor, Professor Derek Fraser, and my meetings here at the University to date have mainly concerned the subject of football—so it is quite a change this evening to be here about UK monetary policy.

## Introduction

I often remark that one of the great benefits of my present job on the Monetary Policy Committee is that it has only one objective—achieving the Chancellor's target for the inflation rate—in contrast to all of my previous posts in which there were usually multiple objectives and perpetual uncertainty about which one to prioritise. This simplicity may be about to become a little more complicated, with a change in the target definition, and probably the target rate, due to be announced by the Chancellor in the Pre-Budget Report in three weeks' time. In practice this may well not make a great deal of difference. The real complication that we face in carrying out this apparently simple task is the very wide range of data and trends which we need to take into account in considering how to achieve the inflation target, however defined.

Our discussions on the Monetary Policy Committee range over a wide number of topics. But the starting point, in the meeting which takes place each month on

the Wednesday before we take our monthly decision on interest rates, is almost always a consideration of the latest situation in the world economy, setting the background for the more detailed debate about the United Kingdom. In this speech, I want to discuss some issues related to the world economy, partly in the context of how the present global situation affects our decisions now and over the coming months, and partly trying to answer questions about the United Kingdom's competitive position which are often raised in the regular meetings we have with business contacts across the United Kingdom.

The issues I am going to talk about are:

- the emerging role of China in the world economy, aiming to set the recent developments in trade flows into a more historical context;
- whether the MPC should be worried about the shift of jobs out of the United Kingdom to low labour cost locations;
- the potential risks to the UK outlook from any unwinding of the large US trade deficit;
- how the prospects for euro-area growth affect us, and in particular whether it matters for the United Kingdom that, over the medium term, GDP growth in the euro area may be relatively sluggish; and
- finally, I will comment briefly from my own perspective on the MPC's recent decision to raise UK interest rates.

(1) Given at the University of Teesside Business School Annual Lecture on 20 November 2003. I am extremely grateful to Imran Contractor, Rebecca Driver and Miles Parker for assistance and useful discussions in the course of the preparation of this paper, and to Andrew Bailey, Charlie Bean, Marian Bell and Sally Reid for helpful comments. The views expressed here are personal and should not be interpreted as those of the Bank of England or other members of the Monetary Policy Committee. This speech can be found on the Bank's web site at [www.bankofengland.co.uk/speeches/speech206.pdf](http://www.bankofengland.co.uk/speeches/speech206.pdf).

## Global imbalances

Since I first became a member of the MPC in the Summer of 2001, our regular commentaries on the UK economy have expressed concern about a range of imbalances. This term has been used very widely—for example in the United Kingdom we have discussed differing trends in domestic and foreign demand, differing trends in the manufacturing and service sectors, rising consumer debt and the current account deficit. In previous speeches I have tended to argue that not all of these imbalances, as identified, are necessarily reasons for concern from the monetary policy perspective. The relative decline of the UK manufacturing sector, for example, is largely the continuation of a long-term trend, while the rise in consumer debt is probably explicable to a great extent as part of a broader transition to the new low inflation, low interest rate regime, in a country where the majority of households are owner-occupiers. So in terms of the wider debate about the overall health of the economy, the term imbalance is rather overused—it tends to suggest problems needing to be resolved, when often there is no problem as such, but merely the effects of a more structural change in the economy showing up in the ongoing data. This does not mean, of course, that there are no problems at all arising from these trends, and at the more microeconomic level there are considerable policy challenges from both, and indeed adverse consequences for individuals.

Recently, one major focus for this type of concern has been on trends outside, rather than within, the United Kingdom, and more specifically the US current account deficit. It is of course difficult not to notice this deficit, given its size, not just in relation to US GDP (the deficit has averaged 3.6% of US GDP over the past five years, reaching 4.6% in 2002), but also in global terms, representing around 1.5% of world GDP at current exchange rates. This sheer scale means that in the event of this deficit being unwound abruptly, the potential impact on the world economy as a whole, and on the United Kingdom in particular, could be significant.

In thinking about the US deficit, however, as with trends in the UK economy, the nature of our concern about it should relate to an analysis of the cause. In a rather trivial sense this is obvious—America is having a good time consuming more than it is producing. But the corollary of that is that the rest of the world is kindly consuming less than it is producing, enabling the United States to have this good time. And this is taking place

not only in Europe, but also of course in Asia. I will discuss the US current account deficit, and how and why it might unwind, later. But now I want to look at the first of the topics I have raised, which is about China.

## The emergence of China

Several months ago, when I was first thinking about the topic for this lecture, China seemed an attractive central theme. It was clearly of more and more importance to many of the businesses visited by MPC members. Since then coverage in the media of the impact of China on the rest of the world economy, and on the United Kingdom, has risen sharply. Much of this debate has focused around the question of the value of the renminbi, and the desire of some US policymakers to persuade Chinese policymakers that they should allow their currency to appreciate. Indeed, some reports suggested that this topic was a key focus of the G7 Dubai meeting in September, which resulted in a communiqué calling for more flexible exchange rates. But how important has China really become, and what is the likely impact on the United Kingdom?

The most significant trend in the recent data has been the rapid rise in China's integration into the world economy, as exports of goods and services rose from 6.7% of Chinese GDP in 1980, to 29.6% in 2002. Imports rose almost equally steeply, but China has moved into a trade surplus of over \$30 billion (2.5% of GDP). (For comparison, the US trade deficit was \$131 billion last year.) Over the same 20 years or so, China's share of world goods exports rose from 0.9% to just over 5%. Asia, in particular Japan, is the main market, taking 45% of Chinese exports, with 22% going to the United States and 15% to the European Union. Again using 2002 data, around 18% of Japanese imports came from China, and 11% of US imports (just above the Japanese share). China is a much less significant trading partner for the United Kingdom, accounting last year for less than 1% of exports and 2.5% of imports. To put this into perspective, this import share is well behind that of countries such as Belgium (5%) or the Netherlands (6.5%).

These trade data need to be interpreted with some care. A significant portion of China's exports is of goods that were shipped there for reworking or assembly, so that the raw export data tend to give an overstated picture. In addition, there are problems in some data series about the inclusion of re-exports to and from Hong Kong. Nevertheless, it is clear that the Chinese economy

has opened up rapidly to trade, cemented by its accession to the World Trade Organisation in 2001. While the pace of growth in China apparently continues around the 8%–9% per annum rate recently established (and only temporarily dented even by SARS), the impact of this new major trading partner is set to increase for a significant period.

In a longer-run perspective, this is part of a wider shift of trade towards South-East Asia. If the United States, Canada, Japan and Western Europe are taken to represent the old industrialised world, these countries' share of world exports, by value, has stayed broadly around 60% for the past four decades (although there have been some fluctuations due to changes in oil and commodity prices, and indeed these comparisons generally need to be treated carefully because of changing relative goods prices). Over the same period, the one noticeable feature of changing shares has been the rise of South-East Asia (excluding China), marching steadily ahead, from 4% in 1960, to 6% in 1980, 10% in 1990 and 13.5% in 2002.

A comparison could be drawn with the impact of Japan's arrival as a major global player in the late 1960s and early 1970s. Japan's export share of world trade rose from 3% in 1960, to around 6% in 1975 to over 9% in 1985, and this trend was associated, by the mid-1980s, with large current account surpluses. As this was a period of relatively poor performance in the European Union and the United States, there was much concern about the Japanese advance into key sectors. Today, looking at subsequent developments, it is easy to see that this process of trade gain was bound to come to an end (though the recent lengthy period of Japanese domestic stagnation was not an inevitable consequence).

But given the sheer size of China's population, 1.29 billion, compared with Japan's 127 million, the potential is for both a much bigger and more pervasive effect in the long run. A number of estimates have been made of when China will move up the ladder of rankings in terms of being a world economic power. For example, Wilson and Purushothaman (2003) recently predicted that China could be the second largest world economy in less than 15 years. (In the same piece, India was projected as the world's third largest economy by around 2030.)

Taking a long historical context, the shift in economic power today could be seen as reversing another major shift that took place much earlier. In 1820, Japan,

China, India and the rest of East Asia accounted for around 55% of world GDP and 60% of world industrial production. However, these shares declined as industrialisation came sooner to other countries and regions. By around 1875, the share of world industrial production of the above Asian countries was less than 20%, about the same as that of the United Kingdom. At the same time, the United Kingdom accounted for over a third of world manufacturing exports, a startlingly high share (see CEPR (2002)).

When commentators worry today about the United Kingdom losing share of world trade, it is worth recalling that this process has gone on since the late 19th century, in what looks like an inexorable trend. Yet of course at the same time the UK economy has continued to grow and our income per head has risen many times over. The emergence of other trading partners has boosted, not damaged, our growth. Our decline, such as it has been, is in relative terms, and even there it is worth recalling that in terms of GDP per head, while we are around 30% behind the United States, a big gap, we are ten times better off than India.

### Changes in the United Kingdom's pattern of production

So probably there is nothing new, or indeed unusual relative to historical experience, about the shifts in economic significance and in trade flows that are taking place at present. However, this does not mean that they are unimportant in considering the outlook for the world economy, or in looking at geopolitical pressures. Much more parochially, these trends give rise to what may be the most asked question of MPC members on our regular visits to firms around the country. This is: are we not worried about the steady, or possibly increasing, loss of production (especially manufacturing production) from the United Kingdom to low-cost locations?

Indeed, on one of my recent regional visits, a low-loader was visible through the office window, engaged in loading up capital equipment to take some of the production overseas. I did wonder if that was carrying the desire to bring reality home to MPC members just that bit too far!

Concern about the loss of production has been enhanced by a recent spate of announcements, exemplified by the HSBC decision to shift 4,000 call centre jobs to China, India and Malaysia. This has been

followed, among others, by a similar decision from Lloyds TSB and the National Rail Enquiries line. This of course signals the departure of some service sector, perhaps particularly financial sector, jobs from the United Kingdom, rather than manufacturing jobs which have generally been thought of as more vulnerable in this respect. It has increased for some the sense that the United Kingdom's economy is increasingly fragile, with every activity now contested by low-cost competition.

However, I would argue that there are good reasons why these trends, though very difficult for the firms and individuals concerned, are not worrying at the level of the whole economy. This is not just because an issue like this is not one that monetary policy can address (though clearly it is not). More importantly it is because I consider that, although particular jobs may be lost to these alternative locations, there is no reason to think that employment in the United Kingdom will necessarily suffer in the long term. Indeed, on the contrary, the opening up of trade flows should have positive effects.

The more obvious, though less fundamental, reason for believing the United Kingdom can maintain a high level of employment is that, alongside the trend for more of the service sector to be contested by foreign competition, there is also a relative rise in demand for goods and services that involve an inevitably high level of local employment—construction (public and private), education, health, many forms of leisure services and retailing activity. So there is a large proportion, probably around 60% of economic activity, which is unlikely to move a big share of its employment abroad.

But the more theoretical, and more powerful, reason is the basic economic insight that countries will always be able to export successfully the products in which they have a comparative advantage. This means that, even if another country is more efficient than the United Kingdom at making every tradable product, there will be some products where the advantage is less significant. Trade flows and exchange rates will adjust (not only in theory but typically in practice) to enable the less efficient country to specialise in these.

The obvious follow-up question to this proposition, from any business person struggling to understand how the United Kingdom can survive the onslaught of low-cost competition, given the huge gap in wage levels between here and China or India, is to ask what these products might be for the United Kingdom? This is a question I at least am happy to duck. It is probably sensible to do

so, as even if it is clear what those products are today, it is uncertain how long the advantage will remain. The risk is that any prediction about the right sector will be remembered for longer than the sector itself remains strong. Call centre jobs are only the most widespread example of activities which have come here, and then started to depart, over the past decade. Perhaps it is not so much sectors as characteristics that build advantage; for example in the United Kingdom these might include design expertise and the use of the English language. But it is surely true that the United Kingdom will be relatively efficient, compared to other EU countries, or to China and India, in a large number of product areas.

The power of the theory is that we do not have to know what exactly the goods and services are in which we will specialise successfully in the future, although there may be some benefit from policies that seek to build on the advantages that exist today. But one possible indication of where this might be at present is suggested by the recent improvement in the United Kingdom's relative export prices for services. And as I suggested by pointing out how far in terms of losing trade share the United Kingdom has gone, this loss of share is certainly not necessarily accompanied by economic decline. It seems unlikely that in the 1880s, or for that matter the 1920s or 1950s, the United Kingdom's sources of comparative advantage were known at the time, or that the future sectors could have been accurately predicted. Yet despite concerns over the loss or diminution of industries ranging from corn to steel to cars to financial services, the long-term trend is that we have become wealthier, more productive and (at least recently) more employed. Trade has contributed to this—by giving consumers access to cheaper goods and services.

Economists frequently strive, as I have just done, to describe this theory of comparative advantage, but it is doubtful that we have always been entirely successful, as it is a theory which does not appeal readily to common sense. There is in fact a story that the leading economist Samuelson was asked if there was any part of economics that was both true, and also not trivial—not simply common sense. He suggested comparative advantage as the key powerful, counterintuitive insight which the subject provided, and commented in his reply on the difficulty of persuading others to believe it. (The effect of this story, however, may be a little diminished by the fact that most of you might more commonly wonder if any of economics could be described as common sense.)

Also, like many theories, this one can seem a bit thin when set against events in the real world. It implies no need to take any account whatever of the shifting patterns of trade from the monetary policy standpoint, or from any other macroeconomic view. Any tensions would simply be dealt with through changes in relative prices and, if necessary, changes in exchange rates, to deliver an overall satisfactory and Panglossian outcome. However, of course this theory is about the long run—whereas monetary policy is set with regard to the more immediate prospects for the economy, and we are concerned with managing the path to this long run.

Reality therefore is inevitably more complicated. Even if, in the United Kingdom today, it is possible to dismiss the concerns about low-wage competition, by pointing to the sustained low level of unemployment, these concerns did at first sight appear to be more appropriate as unemployment rose in the 1970s and 1980s, when the threat to our economic well-being was believed by some to come from Japan. And in the United States now, where unemployment rose from 3.8% in Spring 2000 to around 6% in 2002, the idea that globalisation is a painless process would not go uncontested.

There are three considerations which can help in thinking about this apparent gap between theory and reality. First, even if it is accepted that world trade is not a zero-sum game, but rather one that creates growth, this does not necessarily hold for all of the participants all of the time. The problems in agreeing ways forward on world trade liberalisation are certainly not irrational, from each individual country's viewpoint. The World Trade Organisation is necessary to police the way in which trade is conducted and to resist dumping or other trade practices. When these negotiations fail, as they did in Cancun recently, the result is irrational, in the sense that the welfare outcome is probably second-best for the global economy.

Second, while the eventual outcome of the process may be favourable, there are obviously many losers initially—sectors, companies, and individuals who find they are no longer able to compete, either at all, or not in that locality. Adjusting to different industrial structures as the nature of comparative advantage changes is a costly process—skills and infrastructure become redundant and need to be redeveloped. Here in the North East it is probably self-evident that whole regions can be adversely affected for long periods—but I hope it is now becoming clear that decline can be put into reverse. However, the general problem is that on the whole it is

difficult to compensate effectively losers from this adjustment process, and this is not just an issue of slow-growing regions. With the faster pace of sectoral change, this can make a nonsense of attempts to craft industrial strategies over the medium term.

There may also be implications for the type of job that is available. A recent academic study (Goos and Manning (2003)) suggested that, in the United Kingdom, the introduction of technology has had the effect of job polarisation, with the share of employment rising for the best-paid occupations (such as software engineers, management consultants) and also for the worst-paid occupations (such as care assistants, educational assistants, hotel porters). While the study attributes this to the nature of new technology, foreign trade pressures may be part of the story. One result may be that, if closures or redundancies (as production moves abroad) bring middle-paid earners into the jobs market, the only way for them to go may be down. This might have an implication for monetary policy if the shifts in distribution of income were sufficient to affect the way in which interest rate changes feed through to the economy.

The third point follows on naturally from the second. It is often easier for policymakers, and indeed sometimes for firms, to suggest that the cause of their economic difficulties lies abroad, rather than at home. But in fact there may be few cases where this is true. Rather, it is necessary for individual countries to ensure that their domestic policies enable them to deal with the structural change which inevitably occurs. In fact, to return to an earlier comment, structural problems in the United Kingdom's labour market probably contributed as much to our difficulties in the 1970s and 1980s as the emergence of Japan. And in the United States, post-September 2001 effects coupled with corporate accounting problems have probably contributed as much as China. China's biggest impact may be less on the United States itself than on the other low-cost sources for US imports, such as Mexico and other Asian countries. The sectors that have contributed most to US manufacturing job losses are in fact those with low levels of imports from China, such as computers and electronic equipment (see Mankiw (2003)).

## Risks in the world economy

How does all this bear on what is probably the biggest uncertainty in the world economy at present—the question of whether, when and how the large US external

deficit will start to correct? There are two main ways in which this might come about, but neither is by any means certain. The first might be through adjustments in the US domestic economy—for example, a shift in the behaviour of US consumers. Private savings remain at a low level, around 3.5% of disposable income, and an increase in savings would tend to reduce imports. It could be that the weak labour market, due in (some) part to the shift of production to China, will prove the trigger to a consumer slowdown. (Although the US labour market now seems to be recovering, and perhaps the behaviour of US consumers could be justified in terms of their income expectations.)

The second obvious potential trigger for deficit correction would be a change in perceptions abroad. For example, a loss of confidence in the sustainability of the US deficit might trigger a fall in the US dollar. However, it can be argued that such a correction is not inevitable. The United States is more able than other countries to run a large deficit, due to the dollar's role as the international reserve currency, which means that there is a continual desire by other countries to hold dollar assets. In terms of the stock of dollar assets, many commentators have noted the increased holdings by some Asian countries, particularly China. However, this seems to be a strategic choice, and therefore unlikely to be much affected by concerns about relatively short-term dollar movements. In this context it may be worth noting that Chinese agents hold less than 5% of the stock of US Treasuries, less than a third of the share held from Japan. Additionally, despite its large and persistent deficit, and having net foreign liabilities, the United States has only recently moved into a position where its net international income from financial holdings has become negative (Bank for International Settlements (2003)). So it is not clear that financing concerns are likely to trigger a flight from US dollar assets.

Based on historical experience, a dollar fall would have to be very large to reduce significantly the foreign deficit (the real effective dollar correction in the mid-1980s was almost 30%). And, looking at this in bilateral terms, it is also hard to see what would bring this about. The dollar has already fallen against the euro, from a peak of close to 0.85 dollars per euro in the middle of 2001, to 1.17 dollars on average in October 2003, a depreciation of around 30%. Given the persistently weak outlook for euro-area growth, it is not easy to see why the euro should, in the short term, attract financing flows away from the US dollar and strengthen further. The dollar

depreciation already seen is having some effect on trade flows, and will itself tend to prevent a further rise in the US deficit.

A dollar decline might be in the United States's interests, if the positive impact on net trade offsets the negative impact on consumer incomes due to higher import prices. But if it occurred against the euro, it would mean that the efforts of EU policymakers to get growth up to a reasonable level would be badly set back. If the Asian currencies abandoned their dollar pegs, the need to adjust trade flows and the loss of export income would place strain on potentially frail banking systems in some countries, notably China, bringing the period of rapid growth to a halt. It is therefore easy to see why the US concerns about the weak renminbi have not been strongly supported by other countries.

The uncertainties about whether and how the US current account deficit might correct are thus considerable. And in interpreting what it would mean for the United Kingdom, there is the further complication of how the sterling exchange rate might react to either type of shock (either a sudden adjustment by US consumers, or a dollar fall). If sterling fell with the dollar, for example, the impact on growth might be less as a result of depressed exports, but there would be upward pressure on inflation.

These risks have been identified in recent *Bank of England Inflation Reports* as some of the MPC's major concerns about the world economy. But there may also be risks, although probably rather smaller ones, related to the emerging importance of China. It is important to have good projections of the growth in China itself, and an understanding of how this will affect global developments. Over the past few weeks, there have been headlines about steel prices rising because of demand from China (I appreciate that, if true, this might be seen as good news for some in the North East), similar projections about oil prices, and a significant China-related rise in freight costs. These stories are unlikely to have quite the dramatic effects suggested, but still indicate that China's scale is such that a more rapid pace of growth there would be a small upward risk to our inflation forecast (although this could be offset if the increased production from China bore down further on trade prices of manufactured goods).

On the other hand there is also a downside risk—that the pace of growth in China might not just falter, but fall significantly, due to possible overinvestment in the

present wave of optimism, and given the weaknesses of the Chinese banking system. In this case, the impact on the rest of the world would come through both knock-on effects in the rest of South-East Asia due to the interdependence of the region, and through adverse impacts on the many multinational firms who are heavily invested there. In 2000, US corporate revenues from China reached \$7.2 billion (see Hale and Hale (2003)).

The final source of risk for the United Kingdom at present from the world outlook is different. It is that euro-area growth may again disappoint. In the short term it is straightforward to see how this would tend to depress the prospects for UK exporters, and, relevant for the MPC, bring downward pressure on inflation. A further issue might be whether, given that trend growth in the euro area is estimated to be lower than in the United Kingdom, partially for reasons of slow population growth, this would tend to limit our own prospects.

The answer to this question is generally no. Growth in any single economy is fundamentally determined by factors within that economy—the supply of labour, the availability of capital, and the efficiency with which these are used. Over a longer period, other markets would tend to replace the euro area for UK exporters, as opportunities in these faster-growing areas are exploited. But there is one sense in which there may be a constraint on the United Kingdom. Expanding world trade is generally helpful for all economies, and if the euro area grows more slowly because of slow productivity growth, at the margin this is bad news for the rest of us. I have laboured this point a little, in order to suggest that we should be more concerned about weak growth abroad than about the rise of new competitors.

### Why rates were raised in November

These various international risks formed part of the backdrop to the policy discussion in the MPC at the beginning of this month, and the decision at that meeting to raise UK base rates by 0.25 percentage points. I wanted to use this opportunity to say a little about the rationale for that rate rise. Interest rate decisions are always believed to be the right choice in order to achieve the inflation target. In this case, the fundamental reason was that growth prospects were brighter, both abroad and in the United Kingdom, and this was expected to put upward pressure on inflation. The issues of increased house prices and of the rising debt of the consumer sector were looked at, of course, in terms of their impact on the outlook for inflation. So

the continued growth of debt was highly relevant to that decision, because it suggested that the consumer was spending more freely than we had expected, given the squeeze on real post-tax wage incomes that has been under way in recent months. But for me certainly, there was no implication that the rise was needed to reduce the growth of debt *per se*, and equally no implication of seeking to control the rate of increase in house prices.

I have argued before that the balance of evidence at present suggests that, while there is a proportion of households who have unduly high debt burdens, and may run into problems, this is more likely to be a problem at the micro, than at the macro, level. Interest rates would have to rise much more significantly before creating problems for most mortgage borrowers, as mortgage interest payments, relative to income, are now at a historically low level. And unsecured borrowing rates are much higher than base rates—a quarter-point change in these rates will have a relatively small effect on the size of the interest bills. Of course this is only part of the picture of household gearing, as capital also has to be repaid, but the point is that small changes in interest rates alone are unlikely to have a significant adverse impact on the household sector.

I want to stress this point, to be clear in advance that if the next month's data for consumer debt show a further rise, as is likely, this would not suggest either that the interest rate rise had in some sense failed to work, nor that the MPC would immediately be looking to raise rates again. The change in rates was aimed at longer-term considerations, and of course at managing the economy as a whole. This is what drives our thinking, and also our individual monthly votes. And these votes are cast in line with our individual views on what should happen in each month, rather than attempting to set the scene for future decisions. The latter is an inherently risky course, since any view about next month's decision is always conditional on the next month's data, and any indication of bias can readily be confounded by events.

### Conclusion

In these remarks, I have tried to give some sense of how economists think about the present changing patterns of world trade and growth, and to point out that these changes are not unprecedented. In response to an imaginary business contact, I have explained that the arrival of significant low-cost competitors with increasing skill levels does not mean long-term decline

for the UK economy, but will rather increase the benefits from trade (although it will undoubtedly bring sectoral and regional difficulties, and raise new challenges for microeconomic policy).

In addition, some of the major risks that face the MPC today, and that have made recent decisions very finely balanced, stem from concerns about how the world is coping with the inevitable transition as a group of new economic powers emerges. But in the longer term, it is more likely to hold back the UK economy if our trading partners are inefficient and slow-growing, than if they are dynamic, provided we continue with our present stable policy framework.

I want to finish with two optimistic observations. The first is that the recent decision to raise interest

rates, as our *Inflation Report* published last week made clear, did not reflect worries about rising debt, but rather optimism about the economy. It should be taken as good news that the MPC feels able to move interest rates back towards the long-term neutral level, and that the economy no longer needs such a large monetary stimulus. The second is that I hope trade worries do not end with China and India. Already in China and other Asian economies a middle-class is emerging, and China will not always be such a low-cost source. Indeed, the day I really look forward to is when businesses are worried about the emergence of a trade threat from the African countries that today are so desperately poor. Then I really would know that globalisation had worked for everyone. My optimism here is tempered by regret that this day seems a very long way off.

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# Two current monetary policy issues

*In this speech,<sup>(1)</sup> Stephen Nickell, member of the Bank's Monetary Policy Committee, looks at two issues: first, the impending switch to targeting the HICP inflation rate and, second, the implications of the steady rise in household debt. The key conclusion on the first issue is that a switch to an HICP target of 2% today should have little or no impact on the current stance of monetary policy despite the large gap between RPIX and HICP inflation. On the second issue, he dismisses the argument that interest rates should be set above the level required to hit the inflation target in order to discourage further household debt accumulation.*

## Introduction

In recent months, two issues associated with UK monetary policy have given rise to much debate. These are the impending switch to targeting the inflation rate of the harmonised index of consumer prices (HICP) and the continuing anxiety associated with the inexorable rise in household debt.

In what follows, consideration is given to both of these topics. Concerning the switch to HICP, we look at the difference between the HICP and the RPIX measures of inflation and then discuss the changes which would occur in the economy generally were HICP to become the standard measure of the cost of living. We follow this by looking at the consequences for monetary policy. We note that in the long run, the stance of monetary policy would be unaffected and even in the short run there would be little noticeable difference. Finally, we consider the particular consequences arising from the absence of any housing depreciation element in the HICP index.

Turning to the ever rising levels of household debt, we first consider why it is increasing so fast. In this context we distinguish between secured debt (mortgages), which is the bulk of total debt (around 80%), and unsecured debt (credit cards, overdrafts etc). We find that the long-term increase in secured debt is driven fundamentally by the rising number of households and the increasing proportion of these that are owner-occupiers. Unsecured debt, on the other hand, has risen not because of a rapid rise in the number of

unsecured debtors but because of a continuing increase in the levels of unsecured debt for each debtor, perhaps encouraged by the rapid trend decline in interest rates on unsecured debt over the past five years.

Next we look at the relationship between rising debt and consumption, noting that in recent years rising borrowing has, in fact, corresponded to rising rates of accumulation of financial assets. The overall balance sheet position of households has not been worsening rapidly. Finally, we discuss whether high levels of debt will cause problems in the future. While there is some uncertainty here, our overall conclusion is 'probably not'.

## The switch to HICP

The Chancellor has announced that, at some point, the MPC will switch to an inflation target using the HICP measure. Before looking closely at the implications of all this for monetary policy, it is important to understand what it means for everyday economic life.

### What is the difference between HICP and RPIX inflation?

The main differences between the HICP and RPIX measures of inflation are as follows.

- (i) *In the HICP, the geometric mean is used to aggregate price changes at the most basic level whereas the RPIX uses the arithmetic mean.*

Since the geometric mean of a group of different numbers is always less than the arithmetic mean of the

(1) Prepared for a Market News International Seminar on 16 September 2003. I am most grateful to Ryan Banerjee, Giulia Faggio and Amit Kara for their assistance in the preparation of this paper. My thanks are also due to Peter Andrews, Kate Barker, Nicoletta Batini, Charles Bean, Marian Bell and Ian Bond for helpful comments on an earlier draft. This speech can be found on the Bank's web site at [www.bankofengland.co.uk/speeches/speech202.pdf](http://www.bankofengland.co.uk/speeches/speech202.pdf).

same group of numbers,<sup>(1)</sup> this difference in the construction of the two measures will always tend to make HICP inflation lower than RPIX inflation. This is the formula effect which, on average, makes HICP inflation 0.5 percentage points per annum lower than RPIX inflation.

(ii) *HICP excludes housing depreciation, Council Tax and dwellings insurance. RPIX includes these.*

The housing depreciation element and Council Taxes have tended to rise faster than the other elements of RPIX, on average. Their exclusion will therefore tend, in the long run, to lower measured inflation assuming that house prices track earnings over the long term and Council Tax rates continue to rise faster than 2.5% per annum. The long-run impact of these housing cost elements is likely to make HICP inflation around 0.3 percentage points per annum lower than RPIX inflation.<sup>(2)</sup>

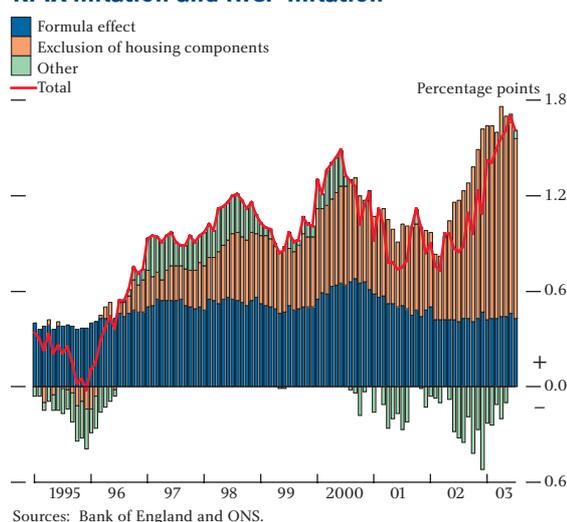
(iii) *HICP includes university accommodation fees, foreign students' tuition fees, stockbrokers' charges. RPIX excludes these. There are also numerous other minor differences.*

On average, these differences between HICP and RPIX contribute nothing to long-run average inflation rate differences between the two measures.

The differences under points (i) and (ii), when combined, suggest a long-run average difference between RPIX and HICP inflation of 0.8 percentage points per annum. In the shorter term, there is a great deal of variation in the difference as we can see from Chart 1. While the formula effect is relatively stable, the housing and other elements of the difference are highly volatile. Currently, the difference is very large because the housing depreciation element, depending as it does on recent rates of house price inflation, is making such a

large contribution to RPIX inflation.<sup>(3)</sup> But even the long-run average difference of 0.8 percentage points is large. So the proposed switch to the HICP measure of inflation will mean that measured inflation will be considerably lower, on average, than it would have been had we stuck to RPIX. So what difference will this make?

**Chart 1**  
Contributions to the difference between annual RPIX inflation and HICP inflation



### The changes in the economy following a switch to HICP

Suppose, for the sake of argument, that HICP gradually takes over from RPI(X) as the index used in economic life. Under HICP, on average, the measured cost of living goes up by 0.8 percentage points per annum less than under RPI(X). This change makes no difference whatever to the rate of increase of the true cost of living, of which HICP and RPI(X) are different measures.

So one important implication of the switch to HICP is that, for given nominal wage growth, real wage growth will be measured to be 0.8 percentage points per annum higher after the switch. True real wage growth will, however, be unchanged. If people understand this, they will understand that the measured increase in real wage

(1) If there are two numbers,  $a_1, a_2$ , the arithmetic mean (AM) is  $\frac{1}{2}(a_1 + a_2)$  and the geometric mean (GM) is  $(a_1 a_2)^{1/2}$ . If there are  $n$  numbers  $a_1, a_2, \dots, a_n$ , the AM is  $\frac{1}{n}(a_1 + a_2 + \dots + a_n)$  and the GM is  $(a_1 a_2 a_3 \dots a_n)^{1/n}$ . So long as the numbers are all positive and not all the same, a famous theorem in mathematics states that the GM is less than the AM. For example if  $a_1 = 1, a_2 = 4$ , the AM is  $\frac{1}{2}(1 + 4) = 2\frac{1}{2}$  and the GM is  $(1 \times 4)^{1/2} = 2$ .

(2) This is based on a long-run rate of house price inflation of 4.5% (in line with trend average earnings growth) and Council Tax rises of 6.5% a year (the average gap between Council Tax rises and RPIX inflation over the past seven years is around 4 percentage points).

(3) The housing depreciation element of RPIX is supposed to capture the contribution to the cost of living of the costs associated with maintaining homes in response to their natural tendency to depreciate over time—eg replacing the roof when necessary. This element was only introduced into the RPI in 1995 as a consequence of the majority recommendation of the RPI Advisory Committee (see CSO (1994)). This majority recommendation suggested that the costs associated with putting right the deprecations of ageing in homes was best measured by a distributed lag on house prices. As the closely argued minority view expressed by Michael Fleming, Rita Maurice and Ralph Turvey noted, there was a serious problem here, namely that a substantial proportion of the rise in the price of housing reflects a rise in the price of land. Since land does not depreciate, the price of housing does not accurately reflect housing depreciation costs, indeed it typically overstates them (although not always; it probably understates them when house prices are falling). Arguably, some index of building costs would probably have been a better indicator of housing depreciation costs.

growth of 0.8 percentage points per annum, after the switch, is a mirage. So, for example, if negotiations for pay increases are currently based on long-run RPIX inflation plus  $x$  percentage points (for productivity growth etc), then after the switch they will have to be based on long-run HICP inflation plus 0.8 percentage points plus  $x$  percentage points, if they are to be unaffected by the switch. The thing to remember is that the RPIX inflation rate and the HICP inflation rate plus 0.8 percentage points represent the same rate of cost of living increase over the long term.

Suppose that this does not happen. For example, suppose instead that after the switch, unions and firms negotiate on the basis of long-run HICP inflation plus  $x$  percentage points, where  $x$  is the same productivity etc effect as above. Then nominal wage growth and true real wage growth will tend to be lower and this will tend to exert downward pressure on inflation in the long run (on either measure).

Exactly as with real wage growth, the switch has the same implications for measured real interest rates. For given nominal interest rates, after the switch to HICP, measured (*ex post*) real interest rates will be, on average, 0.8 percentage points higher. However, the true real interest rate will be unaffected. Agents in the economy will need to get used to the fact that measured real interest rates will be higher by roughly 0.8 percentage points, *ceteris paribus*. So what are the implications of all this for monetary policy?

### The implications of the switch to HICP for monetary policy

The most important point to recognise is that the long-run stance of monetary policy should not be gauged by the nominal interest rate but by the real interest rate. And the switch from an RPIX target to an HICP target, whatever the level of either target, should have no long-run real impact on the economy, including on the real interest rate. So the long-run stance of monetary policy will be unaffected. So we have, **Implication 1.** *The long-run stance of monetary policy will be unaffected by the switch to an HICP target.*

In order to go further, we have to make some assumption about the new target. For the purposes of this exposition, suppose that the HICP inflation target is 2%. This is equivalent to a long-run RPIX target of 2.8%, so

it represents a genuine change to the inflation target facing the MPC. As we have already noted, the long-run stance of monetary policy and the true long-run real interest rate are unaffected. Since, when measured in terms of RPIX inflation, the real interest rate will switch from  $(r-2.5)$  to  $(r-2.8)$ , where  $r$  is the nominal rate, it is obvious that, to keep the real rate unchanged, the long-run nominal rate must be 0.3 percentage points higher.<sup>(1)</sup> This leads to, **Implication 2.** *If the HICP target is set at 2.0%, this is equivalent, in the long run, to a switch from an RPIX target of 2.5% to an RPIX target of 2.8%. Since the long-run real interest rate is unaffected by the switch (see Implication 1), the long-run nominal interest rate will be 0.3 percentage points higher after the switch.*

What about the consequences for monetary policy in the short run? Since the switch involves a *de facto* rise in the inflation target from 2.5% to 2.8% in RPIX terms or from 1.7% to 2.0% in HICP terms, it is the job of the MPC to ensure that long-term inflation is 0.3 percentage points higher than it would otherwise have been. This involves slightly looser monetary policy than would otherwise have been the case, for a limited period, in order to generate the small rise in the longer-term inflation rate. However, it would be a mistake to make too much of this. Given the large variations in the gap between HICP inflation and RPIX inflation (see Chart 1) and the frequent shocks to which the economy is subject, such a slight loosening of monetary policy (relative to the counterfactual of no switch in target) would be small relative to its normal variation. So we have, **Implication 3.** *If the HICP target is set at 2.0%, this implies that the short-term monetary policy stance has to be such as to raise the longer-term inflation rate by 0.3 percentage points. This involves slightly looser monetary policy for a limited period than would otherwise be the case. However, given the large variations in the gap between HICP and RPIX inflation and the frequent shocks to which the economy is subject, this temporary loosening would be barely noticeable in practice.*

So far, it appears that if there were a switch to HICP with a target of 2%, this would not make much odds. Until now, however, we have only looked at the implications of the switch when the RPIX/HICP difference is at its long-run average level of 0.8 percentage points. But today it is at around twice its long-run level at 1.6 percentage points. What, then, would be the consequences of the switch taking place when the gap is

(1) In terms of HICP inflation, we currently have a target which is 1.7 (2.5 less 0.8). This is moved up to 2.0 after the switch. So if  $r$  is the nominal rate, the real rate shifts from  $(r-1.7)$  to  $(r-2.0)$ . If the real rate is to remain unchanged, the nominal rate must be 0.3 percentage points higher after the switch.

at a very high level? The key point is that monetary policy decisions are based not on where inflation is today but on where inflation is expected to be a year or two hence. Looking at the RPIX inflation projection for August 2003 (see Chart 2), the large 'bump' which may be observed stretching from the last part of 2002 to the end of 2003 is generated, in the main, by the impact of the house price boom on RPIX inflation via the housing depreciation component. The path of HICP inflation would not exhibit such a 'bump' and that is the main reason why the current gap is so wide as we have already noted. But as the housing boom fades in our forecast, the bump disappears and the RPIX/HICP gap narrows. Indeed, because the rate of house price inflation is projected to fall below the average rate of earnings growth, the gap may well fall below its average level of 0.8 percentage points. Because of this, the level of HICP inflation corresponding to the RPIX projection in 2005 is not going to be very different from 2%. This implies that monetary policy decisions taken today, were we using an HICP target of 2%, would probably be much the same as those we are actually taking. This leads to,

**Implication 4.** *A switch to an HICP target of 2% today should have little or no impact on the current stance of monetary policy despite the large gap between RPIX and HICP inflation. This is because this large gap is only temporary, generated by the recent surge in house price inflation which affects RPIX inflation via the housing depreciation element but not HICP inflation. As this surge fades away, the gap will narrow to more normal levels and given the structure of the August RPIX inflation projection, the corresponding HICP inflation projection would not be very different from 2% towards the end of the forecast period.*

Two further implications of a switch to an HICP target are worth commenting on. First, suppose wage setters do not follow the rules set out earlier in this section. For example, suppose they base negotiations on long-run HICP inflation plus  $x$  percentage points. This will tend to lead to lower nominal wage growth than we have now, lower real income growth and ultimately downward pressure on inflation. This would then affect monetary policy.

The second, and perhaps more interesting, implication of the switch to an HICP target arises from the fact that the housing depreciation element is excluded from the HICP. We have already noted the history of this element (see footnote 3 on page 505), so what would be the implications of its absence? The housing depreciation element in RPIX has a weight of around 4.4% and is

based on a distributed lag of the ODPM measure of house prices. What this means is that a significant surge in house price inflation, such as we saw in 2002, leads to a subsequent surge in RPIX inflation, such as we saw from mid-2002. No such surge would be seen in HICP inflation. At first sight, it might be thought that this would have a significant impact on monetary policy. In practice, however, this would only be true if the MPC were capable of forecasting the surge in house prices well in advance, for recall that monetary policy tends to be influenced not by current inflation but movements in inflation which are forecast some one to two years ahead.

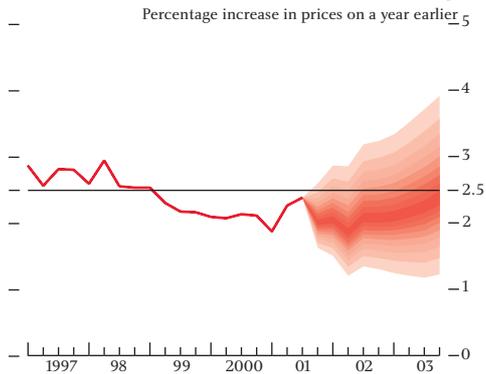
Looking at recent history as evidenced by the recent *Inflation Report* projections presented in Chart 2, the MPC completely failed to forecast the house price surge of 2002 either two years or even one year before it happened (as, incidentally, did everyone else). The house price surge generates the 'bump' in the RPIX inflation projection in 2002–03 faintly visible in Chart 2 only from May 2002 and clearly visible from November 2002 onwards. Consequently, by the time the surge in RPIX inflation generated by the house price explosion was expected to come about, it was too late to do anything about its implications for inflation. Thus, in November 2002, the MPC expected the surge would disappear within a year and, since monetary policy typically takes 18 months to two years to have its full impact on inflation, the house price surge had little effect on policy via its direct impact on the depreciation element of RPIX. Of course, the house price explosion strongly affected monetary policy because of its impact on debt, consumption and aggregate demand further out. But this would have been the case even had HICP inflation been targeted. The argument here is that the direct inclusion of house prices in the RPIX via the housing depreciation element only affects monetary policy if the MPC can forecast surges in house price inflation well in advance. Recent history indicates this is unlikely. So excluding this element from the cost of living index will probably have little consequence for monetary policy in practice.

### Household debt: causes and consequences

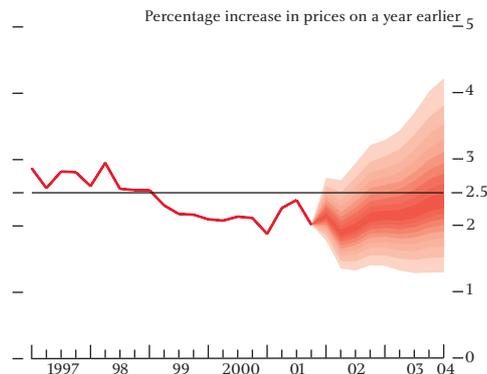
In recent months, there has been much discussion of the inexorable rise in household debt with many dire warnings. In a relatively mild example, Philip Thornton in *The Independent* (30 July 2003) notes that 'Britons piled on an all-time record amount of debt last month (June 2003), triggering fears that consumers have embarked on an

**Chart 2**

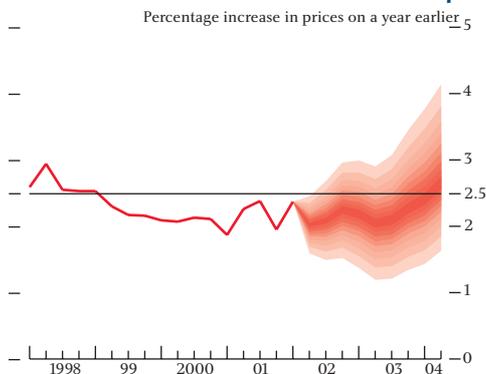
**November 2001 RPIX inflation projection based on constant nominal interest rates at 4%**



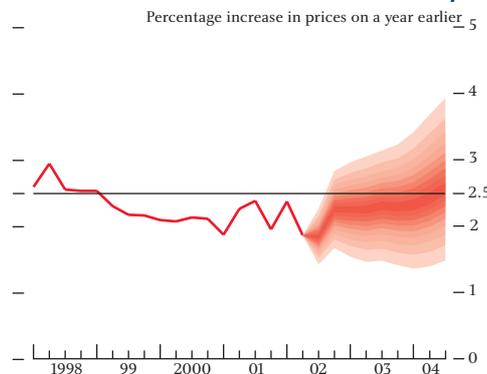
**February 2002 RPIX inflation projection based on constant nominal interest rates at 4%**



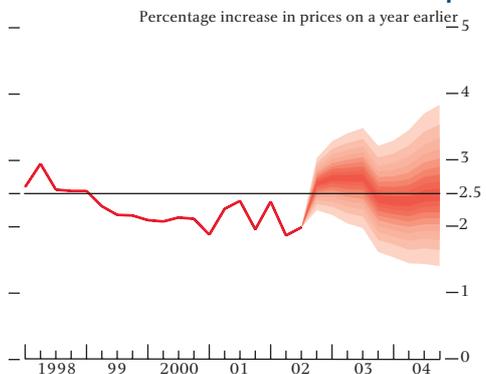
**May 2002 RPIX inflation projection based on constant nominal interest rates at 4%**



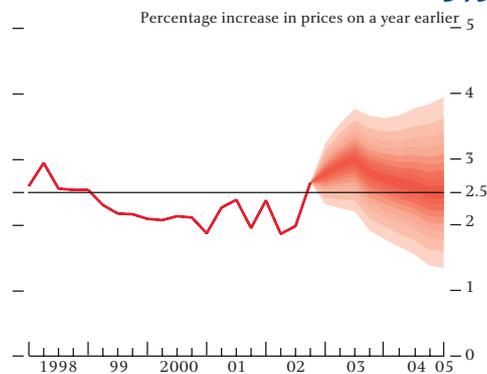
**August 2002 RPIX inflation projection based on constant nominal interest rates at 4%**



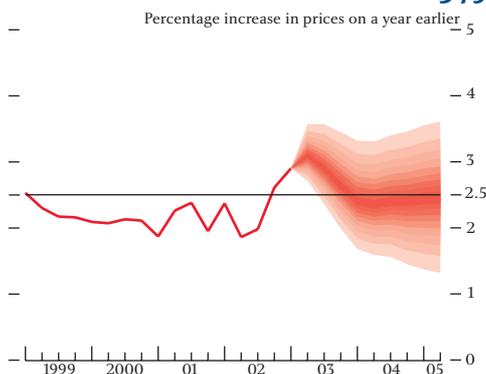
**November 2002 RPIX inflation projection based on constant nominal interest rates at 4%**



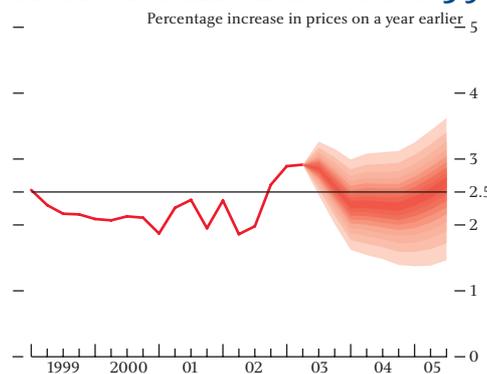
**February 2003 RPIX inflation projection based on constant nominal interest rates at 3.75%**



**May 2003 RPIX inflation projection based on constant nominal interest rates at 3.75%**



**August 2003 RPIX inflation projection based on constant nominal interest rates at 3.5%**



Source: Bank of England.

unsustainable borrowing binge that will end in a crash reminiscent of the early 1990s'.

Here we look more closely at the rise in household debt, first to try and understand why it has happened and second to look at the dangers inherent in the current position.

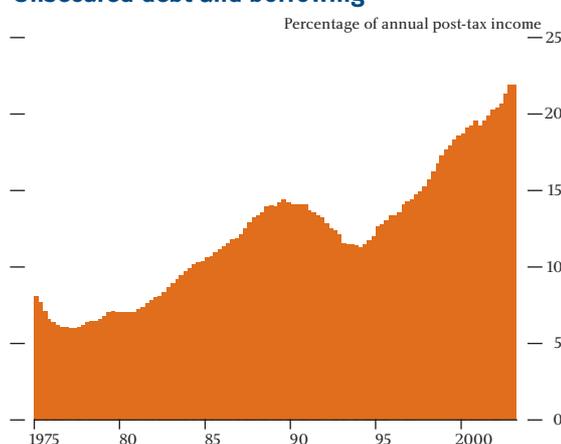
### Why is household debt rising so rapidly?

In order to analyse household debt, it is important to distinguish between secured debt (mortgages secured on property) and unsecured debt (credit card debt, overdrafts, personal loans, hire purchase, student loans, DSS social fund loans, and others). Around four fifths of all household debt is secured on dwellings and so, in the macroeconomic context, the level of secured debt is more significant. However, in terms of personal and social problems, unsecured debt is very important. Let us consider each in turn.

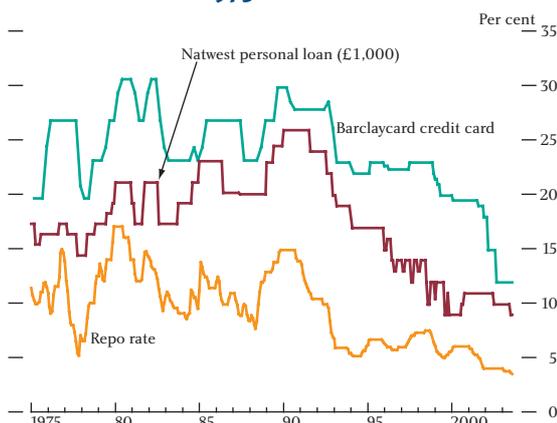
### Unsecured debt

As we can see from Chart 3, unsecured debt has been rising steadily as a proportion of total post-tax household income since the mid-1990s. By and large, this reflects increasing debt levels per unsecured debtor, not rising numbers of unsecured debtors.<sup>(1)</sup> Part of this rise may be due to the increasing ease with which unsecured credit may be obtained, but a key factor is likely to have been the dramatic trend fall in unsecured borrowing rates in recent years (see Chart 4). Given the stability of inflation during this period, this represents a significant fall in real rates. Much of this decline is unrelated to monetary policy changes, with unsecured rates falling by far more than the repo rate in the past

**Chart 3**  
Unsecured debt and borrowing



**Chart 4**  
Loan rates since 1975

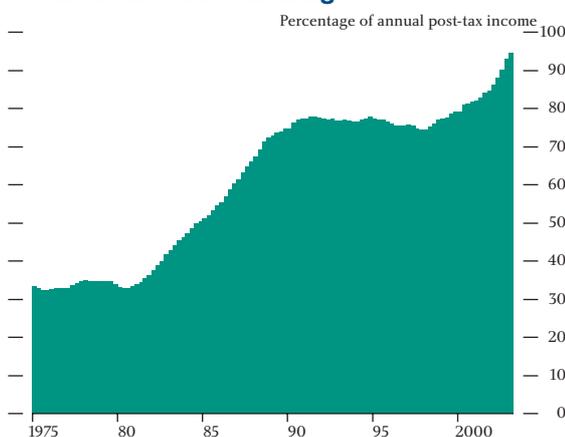


few years. This may have been the consequence of increasing competition in the unsecured lending market.

### Secured debt

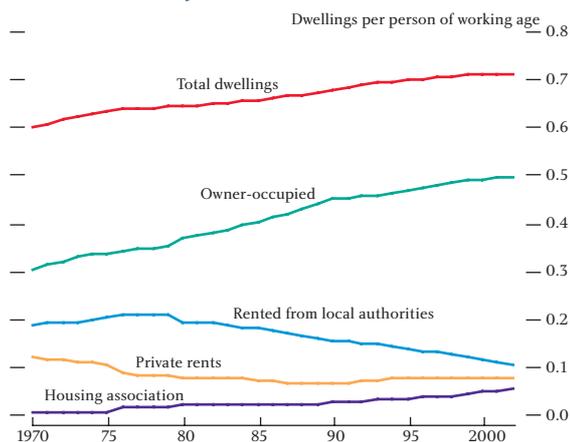
As we can see in Chart 5, the ratio of household secured debt to disposable income was flat in the 1970s, then rose rapidly throughout the 1980s and started rising again in the later 1990s. So what are the driving forces behind this long-term increase? Probably the most important factor has been the trend increase in the number of owner-occupied dwellings per person of working age (see Chart 6). This is partly due to the rise in the total number of occupied dwellings, reflecting smaller households, and partly to the increasing owner-occupation rate, broadly offsetting the decline in the local authority renting sector due to council house sales. So from 1970, the number of owner-occupied dwellings per person of working age has increased by around 75%. Each new owner-occupied dwelling is a potential new mortgage, so, over the longer term, we

**Chart 5**  
Secured debt and borrowing



(1) See Cox *et al* (2002) for data up to 2000. A recent survey by NMG research suggests that this has remained more or less true up to 2003.

**Chart 6**  
**Homeownership rates**



Source: Bank of England.

would expect the secured debt to income ratio to rise in the same proportion. This is because of the way the secured debt to income ratio is measured. The numerator refers to the sum of the secured debts of all the households with secured debt and the denominator is the sum of the disposable incomes of all households, not just those with secured debt.

Interestingly, despite the fact that the number of owner-occupied dwellings was rising steadily from 1970, the debt to income ratio did not start rising until 1980. This was because the very high rates of inflation in the 1970s were eroding real debt very rapidly. Thus the debt to income ratios of individual mortgage holders were declining fast enough to offset the increase in their numbers, so the aggregate debt to income ratio remained flat. When overall inflation rates declined in the 1980s, the increase in the number of mortgage holders began to dominate, so the aggregate secured debt to income ratio started to rise. And, apart from a break in the early 1990s, it has been doing so ever since. Furthermore, given that the demographic trends in Chart 6 may be expected to continue, the rise in the secured debt to income ratio may also be expected to continue. Indeed, even if the number of owner-occupied dwellings per person of working age suddenly stopped increasing, because of the lags built into the process we would expect the secured debt to income ratio to continue to rise to new record levels for some years to come (see Hamilton (2003) for a full analysis of all these issues).

While these demographic factors are the key to understanding long-term trends in the secured debt to income ratio, they are not the only ones. In a

world of low inflation, nominal interest rates are low. This means that mortgage interest and repayments are no longer heavily 'front end loaded' and so even with unchanged real interest rates, lenders and borrowers are happy with higher initial debt to income ratios when starting new mortgages.<sup>(1)</sup> So since the 1970s, we have seen a significant rise in the income multiples allowed by mortgage lenders and a consequent rise in the average loan to income ratios of first-time buyers. This has been reinforced by the rise over the same period in the proportion of two-earner households. A second factor, which is important in determining short-run fluctuations in the secured debt to income ratio, is mortgage equity withdrawal. This always tends to rise when there is a surge in house prices such as we have recently experienced, because, for some households, such a surge opens up the option of further borrowing at the secured real interest rate which still tends to be 6 percentage points or more below the unsecured rate. This response to a lower effective real rate is entirely consistent with prudent behaviour and does not, of itself, reflect irresponsibility on the part of either borrowers or lenders. So having set out the forces underlying increases in household debt, we must now look at the dangers inherent in the current situation.

### Consumer borrowing, debt and consumption

The general impression given by much of the discussion on household borrowing is that rapidly rising debt to income ratios are inextricably linked to high rates of household consumption growth. This is obviously wrong because households may simply spend their borrowings on assets, not on consumption. Indeed, even when they appear (in the data) to be spending their borrowings on consumption, they may in fact be spending them on assets if, for example, their 'consumption' consists of buying new kitchen units. In the light of this, it is also obvious that we could observe high levels of borrowing even when consumption growth is very depressed. So let us look at what has been happening in recent years. Since 1997 Q4, real household consumption growth has averaged 3.8% per annum whereas the real growth of GDP has been 2.6% per annum. So consumption has been growing much faster than GDP over this period. This suggests that the build-up of household debt over the same period has been spent on consumption. Yet amazingly enough, the proportion of nominal GDP spent on household consumption was 62.6% in 1996 Q4 and 63.2% in 2003 Q2, almost exactly the same! This is despite the fact that

(1) See Nickell (2002) for a detailed analysis.

consumption has been growing much faster than GDP throughout the period. So how can this be?

The trick is in the prices. The price of consumption goods and services has been rising more slowly than the price of GDP over this period. Now GDP can be thought of as the net output of goods and services produced by the UK economy whereas consumption is what UK households consume. Some of the output produced by the UK economy is exported and some of the output consumed by UK households is imported. And it so happens that throughout this period goods imported by the United Kingdom have become increasingly cheaper relative to goods exported. This improvement in the terms of trade since the mid-1990s (see Chart 7) has therefore been of continuing benefit to UK households and explains why the price of consumption goods has grown more slowly than the price of GDP. This, in its turn, explains how real consumption growth can be much higher than real GDP growth for many years with barely any change in the proportion of nominal GDP being spent on household consumption.

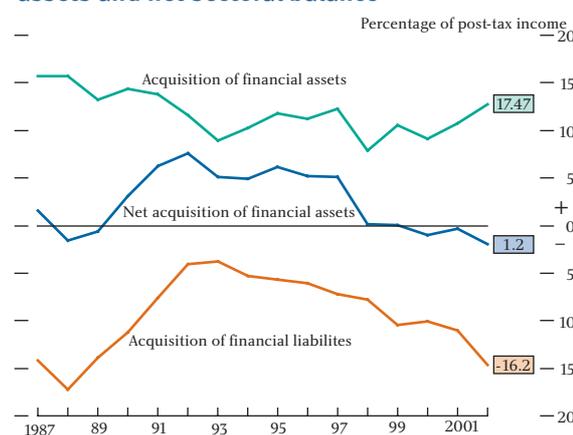
**Chart 7**  
Terms of trade



So where does the rise in household debt come into this story? In Chart 8, we see that, by and large, the increased borrowing corresponds closely to the acquisition of financial assets.<sup>(1)</sup> In Table A, we see precisely what these assets are. Basically they include cash and deposits as well as savings vehicles of various kinds (mainly pension funds and life insurance). Equity flows have generally been negative. So over recent years,

the rapid increase in loans has been almost exactly balanced by a rapid increase in the purchase of financial assets, a fact which is rarely mentioned when household debt is discussed.<sup>(2)</sup> Of course, the people purchasing the assets may not be the same people as those accumulating the liabilities. So will it all end in tears?

**Chart 8**  
Household borrowing, acquisition of financial assets and net sectoral balance<sup>(a)</sup>



(a) Chart reports annual averages. Numbers in boxes report average of Q1 and Q2 2003 data.

**Table A**  
Household borrowing, acquisition of financial assets and the net sectoral balance

	Percentage of post-tax income						
	1998	1999	2000	2001	2002	2003 Q1	2003 Q2
Acquisition of financial assets	7.9	10.5	9.1	10.8	12.7	17.7	17.1
of which: (a)							
Currency and deposits	5.5	5.1	5.4	6.8	7.0	9.9	9.8
Shares and equity	-4.1	-2.4	-2.2	-1.6	0.8	0.9	1.1
Total insurance technical services (b)	7.0	6.0	5.2	4.7	5.7	4.4	3.9
Acquisition of financial liabilities	7.8	10.4	10.0	11.0	14.7	16.2	16.2
of which: (a)							
Total loans	7.3	10.2	10.3	10.8	14.2	14.9	15.6
Net acquisition of financial assets	0.1	0.1	-1.0	-0.3	-2.0	1.5	0.9

Source: ONS.

(a) Totals do not add up due to the exclusion of minor items.

(b) Mainly net equity of households in pension funds and life insurance.

### Is household debt too high?

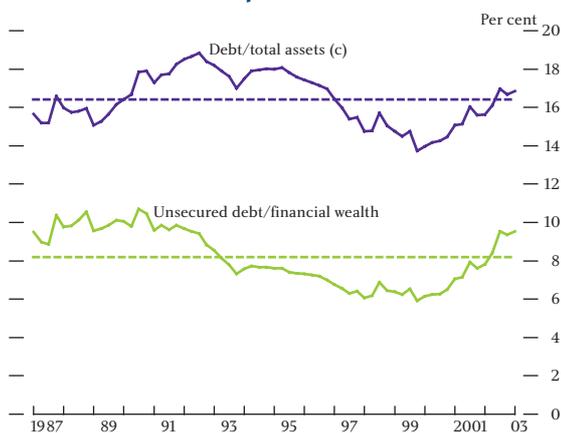
To answer this question, the best place to start is the overall household balance sheet position. This is summarised in Chart 9. What we observe is that the ratio of total household debt to total household assets (financial assets plus housing wealth) is just below 17% and is very close to its average value over the past

(1) Simply to clarify, household savings are equal to their net acquisition of financial assets shown in Chart 8 plus their net acquisition of real assets, basically housing.

(2) This is not a new point. Robert Barrie, UK economist at CSFB, is quoted in Philip Thornton's 30 July *The Independent* article as saying precisely this. As he notes, 'those who focussed on debt liabilities often forgot to mention the fact that households had also bought piles of assets.'

16 years. So while this ratio has risen over the past few years, mainly because of the fall in the stock market since 2000, it is hardly at dangerous levels. Similarly, looking at the ratio of unsecured debt to financial wealth, we see that, while the number is higher than the 16-year average, it is not very high by historical standards.

**Chart 9**  
**Household sector capital<sup>(a)(b)</sup>**



Sources: Bank of England and ONS.

- (a) Dashed lines indicate average of series from 1987 Q1 to 2002 Q4.
- (b) Data are not seasonally adjusted except for housing wealth.
- (c) Financial plus housing wealth.

So while there appears to be nothing very dangerous in these overall numbers, have the high rates of mortgage equity withdrawal produced excessive secured debt levels relative to housing wealth? In fact, as Chart 10 makes clear, mortgage equity withdrawal has not kept up with rising house prices, so that undrawn housing equity is now in excess of three quarters of total housing wealth. And finally, the cost of servicing all this household debt, even if we include regular repayments of mortgage principal, is currently at an historically low level relative

**Chart 10**  
**Undrawn housing equity<sup>(a)</sup>**

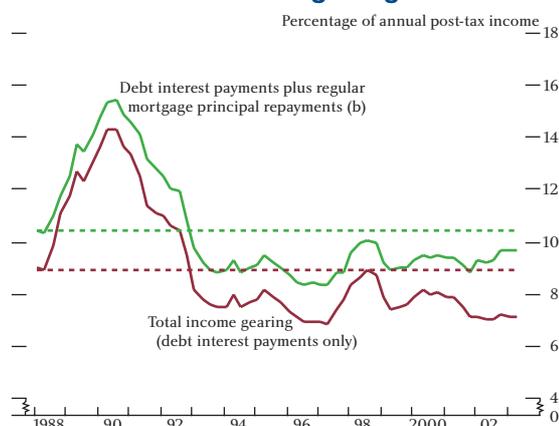


Sources: Bank of England and ONS.

- (a) As a percentage of total housing wealth.

to household income (see Chart 11). Of course, this is due to very low interest rates. But these would have to rise to around 10% to push household income gearing up to its average level in the early 1990s.

**Chart 11**  
**Household sector income gearing<sup>(a)</sup>**



Sources: Bank of England and ONS.

- (a) Dashed lines indicate averages for the series over the period from 1988 Q1 to 2003 Q2.
- (b) See page 82 of the June 2002 *Financial Stability Review* for details of how this series is constructed.

So the overall average picture remains benign despite the rapid accumulation of debt. And it will remain benign even if further debt is accumulated, as we expect it to be for the reasons already discussed. But the aggregate picture may be misleading. Maybe those with high debts are not the same households as those with high assets. In fact, broadly speaking, this is not true. Almost inevitably, those with high debts tend to have big mortgages and those with big mortgages tend to have expensive properties. But this does not mean that debt does not cause serious problems to many households. There are many low-income households in severe difficulty with unsecured debt. The evidence on whether there has been an increase in these difficulties is mixed (see Cox *et al* (2002) and Bank of England (2003), Section 2.3). But whether or not the situation is getting worse, unsecured debt problems there are, and these are bad for the individuals concerned and form an important issue for social policy. Nevertheless, because the volume of unsecured debt is relatively small, this is unlikely to be a particularly significant macroeconomic issue, so this leaves us with the question of secured debt.

**More on the secured debt picture**

Any case being made for the dangers of household debt usually starts from the rising debt to income ratio. And it is clear from Chart 5 that the secured debt-to-income ratio is higher than it has ever been and, as we have seen, it is expected to go still higher. But, as a measure

of danger, or sustainability, the debt-to-income ratio is almost worthless since the debt refers to the sum of the debts of debtors and the income refers to the income of everybody. What we need in this context is the total debt of secured debt holders (or mortgage holders) normalised on the total income of secured debt holders. Unfortunately, it is hard to get up-to-date numbers but as we can see from Table B, there has been no upward trend in this ratio from 1998 to 2001. This was a period when the aggregate secured debt to income ratio rose by around 8 percentage points. This, of course, simply reflects the fact that much of the overall increase in debt arises from the increasing number of people with mortgages because more and more people own their home. It is also consistent with the fact that in 2001 only 5% of mortgage holders reported any form of distress, well down on the levels in the early 1990s. Of course, since 2001, it is possible that mortgage holders have seen a significant increase in debt relative to their income and that an increased proportion of them have been imprudent. We don't know. But such evidence as we have, for example historically low levels of arrears, suggests that there is no sign that mortgage holders, who hold the vast bulk of household debt, are facing increasing problems—indeed, lenders typically argue the reverse. More sophisticated credit scoring has generated a reduction in problems. One thing we do know, however, is that the mere existence of more mortgage debt in total does not necessarily mean any increase in danger to the macroeconomy. And given the low levels of mortgage arrears, evidence of such an increase in danger is hard to find.

**Table B**  
**Secured debt to income ratio among mortgage holders**

1994	1995	1996	1997	1998	1999	2000	2001
1.45	1.41	1.41	1.44	1.48	1.48	1.48	1.47

Note: These data are three-year centred moving averages to smooth out the sampling variation. The 2001 number is an average of 2000 and 2001. The data refer to Great Britain.

Source: British Household Panel Survey.

### Will high levels of debt cause problems in the future?

As we have seen, total household debt is at a record level and is highly likely to reach even higher levels over the coming years. Despite this, household balance sheets are not seriously stretched. Nevertheless, could these record levels of debt cause serious macroeconomic problems in the future?

There are three distinct arguments here. The first is based on the possibility that households have

underestimated the true real interest rate they face. So it is sometimes argued that debtors will collectively 'wake up' to the fact that their debts have not been eroded, and will then take fright and cut their consumption dramatically causing severe macroeconomic problems. In the light of our previous discussion, why households, particularly mortgage holders who have the bulk of the debt, should do this is not at all clear. It is true that in the era of high inflation, which ended in 1992, debts were rapidly eroded. But the mortgage holders with the highest debts relative to income, namely the young, have no adult experience of the high-inflation era. Furthermore, they are the group with the fastest real earnings growth. So while they might behave in the irrational fashion described above, there seems no obvious reason why they should.

The second argument concerns the behaviour of the economy in response to shocks if households have high, as opposed to low, levels of debt. Suppose there is a future adverse shock to the UK economy—for example, the major European economies do not recover. This will lead to a rise in UK unemployment and a fall in consumption whatever the debt levels. The argument here is that higher debt levels will make things substantially worse. That is because more people will be in a position where they are unable to extend their borrowing. If they become unemployed, or are threatened with unemployment, they will significantly reduce consumption because they will be, or will have the prospect of being, unable to service their debts.

The first question is, will higher debt levels put substantially more people in this position? In aggregate, there appears to be 'plenty of room'. As we have seen, secured debt is only around one quarter of gross housing wealth, a substantially lower level than throughout the 1990s (see Chart 10). But the aggregate hides a wide variation across the population and it is the numbers on the margin that count. Comfort may perhaps be taken from the fact that data from the Survey of Mortgage Lenders indicate that loan to value ratios on new mortgages are modest by historical standards and are falling (see Bank of England (2003), Chart 119). Furthermore, there has been a significant demographic shift towards two-earner households over the past two decades and these households have a greater cushion against unemployment.

Another point worth noting is that, because one of the key issues in this argument is the cost of debt service, this will be moderated by the easing of monetary policy

following the adverse shock. Back in the early 1990s, of course, this option was unavailable because of the ERM constraint. However, the excessive debt may still induce greater precautionary saving and a larger drop in consumption. Overall, it is hard to tell whether higher debt levels will generate a significant additional cutback in consumption which cannot be modified by easier monetary policy.

The third argument is very simple. More people with mortgages means more trouble if there is a really serious collapse in the housing market. If house prices fall by 30% or 40%, more people with mortgages means more people in negative equity. Of course, the consequences of this depend to some extent on the behaviour of lenders. If the mortgage debt continues to be treated as secured, even though some is not, then debt-service costs remain unchanged. So a lot will then depend on the collateral damage associated with the collapse in the housing market and what caused it in the first place. For example, the house price correction in the late 1980s and early 1990s was basically a consequence of the 15% interest rates required to control inflation. The tight monetary policy also generated a big rise in unemployment and all this together had a big macroeconomic impact. This particular scenario seems unlikely today. But what causes the collapse in house prices is not the main question. The issue is, if some disaster happens in the housing market, does the fact that more people have mortgages make the consequences very much worse? So much worse, indeed, that monetary policy should be used today to discourage individuals from taking out mortgages. In my view, this should not be a target of monetary policy.

This leads to the final question, namely, should we keep interest rates higher than would be required to hit the inflation target in the medium term in order not to encourage further debt accumulation, because this will add to the risk of sharper falls in consumption generating an even bigger undershoot of the inflation target further out? In the light of all the previous discussion, my judgment, at present, would be 'no'.

## Summary and conclusions

We have looked at two issues, first the impending switch to targeting the HICP inflation rate and second the implications of the steady rise in household debt. The following is a summary of the discussion, starting with the switch to HICP targeting.

1. In the longer run, thanks to differences in computational methods and the absence of the housing depreciation and Council Tax elements, the HICP inflation rate is likely, on average, to be around 0.8 percentage points lower than the RPIX inflation rate. In the short run, the gap between the two rates is highly volatile.
2. The long-run stance of monetary policy should be gauged by the real interest rate. Since the switch from an RPIX target to an HICP target should have no long-run real impact on the economy, the long-run stance of monetary policy will be unaffected.
3. If the HICP target is set at 2.0%, this is equivalent, in the long run, to a switch from an RPIX target of 2.5% to an RPIX target of 2.8%, because the long-run gap is 0.8 percentage points. Since the long-run real interest rate is unaffected by the switch, the long-run nominal interest rate will be 0.3 percentage points higher after the switch.
4. If the HICP target is set at 2.0%, this is equivalent to a rise of 0.3 percentage points in the longer-term inflation rate (ie a switch from an RPIX target of 2.5% to an RPIX target of 2.8% or a switch from an HICP target of 1.7% to an HICP target of 2%, making use of the 0.8 percentage points long-run gap between RPIX and HICP inflation). This will involve slightly looser monetary policy for a limited period than would otherwise be the case. However, given the volatility in the gap between HICP and RPIX inflation and the frequent shocks to which the economy is subject, the temporary loosening would be barely noticeable in practice.
5. A switch to an HICP target of 2% today would have little or no impact on the current stance of monetary policy despite the large gap between RPIX and HICP inflation at present. This is because this large gap is only temporary, having been generated by the recent surge in house price inflation which affects RPIX, via the housing depreciation element, but not HICP. As this surge fades, the gap will narrow to normal levels and given the structure of the August RPIX inflation projection, the corresponding HICP projection would not be far from 2% towards the end of the forecast period.
6. The direct inclusion of house prices in RPIX, via the housing depreciation element, only affected

monetary policy to the extent that the MPC was able to forecast surges in house price inflation well in advance. History indicates that it was not able to do this. So excluding this element from the cost of living index will probably have little consequence for monetary policy in practice. (Of course house price booms will continue to affect monetary policy via their impact on debt, consumption and aggregate demand further out. This is equally true whether we have an RPIX or an HICP target.)

Turning next to the issue of household debt, we considered both the causes and consequences of its dramatic increase.

7. Household secured debt (mortgages) is around 80% of total household debt and is thus more significant than unsecured debt in the macroeconomic context. The secured debt to income ratio rose rapidly throughout the 1980s and from the middle of the 1990s, so it is now more than double its level in 1980. The most important factor underlying this change has been the trend increase in the number of owner-occupied dwellings per person of working age. This trend has been generated by the shrinking average size of households and the increasing owner-occupation rate (strongly boosted by council house sales). Other factors include the somewhat higher loan to income ratios offered to first-time buyers in the period of low inflation since 1992, as mortgages are no longer heavily 'front end loaded', and the short-term burst of mortgage equity withdrawal following the recent housing boom as homeowners have greater access to secured borrowing at lower real interest rates.
8. Household unsecured debt has also risen rapidly relative to income in recent years. By and large, this has reflected increasing debt levels per unsecured debtor, not rising numbers of unsecured debtors. A key factor explaining this is likely to have been the rapid trend fall in unsecured borrowing rates since the late 1990s, a vastly greater fall than in the Bank of England repo rate, probably due to increasing competition in the unsecured lending market.
9. The connection between household borrowing and consumption is a tenuous one. The proportion of nominal GDP spent on household consumption was almost the same in 2003 Q2 (63.2%) as in 1996 Q4 (62.6%), despite the vastly greater rate of new household borrowing in the more recent period. What has happened is that the rapid increase in new borrowing in recent years has been almost exactly balanced by a rapid increase in net purchases of financial assets, a fact that is rarely mentioned when household debt is discussed.
10. Looking at household balance sheets, we find that today the ratio of total household debt to total household assets (financial assets plus housing wealth) is just below 17%, very close to its average value over the past 16 years. Furthermore, despite the recent burst of mortgage equity withdrawal, undrawn housing equity is rising and is now in excess of three quarters of total housing wealth. So overall, household balance sheets are relatively healthy.
11. Despite the health of average household balance sheets, there are many households, particularly with low incomes, that are in severe difficulties with unsecured debt. The evidence on whether this situation is getting worse is mixed, but, in any event, unsecured debt is such a small proportion of the total that the macroeconomic impact of such problems is not large.
12. While the published secured debt to income ratio has been rising rapidly since 1997, this is not a very helpful piece of information when it comes to analysing issues of sustainability. The problem is that the numerator of the ratio refers to the sum total of mortgage debt whereas the denominator refers to the total disposable income of all households. To be informative, the denominator should be the total disposable income of households with mortgages. Up-to-date data using this measure are unavailable but we know that the ratio of total secured debt to total income of secured debt holders exhibited no upward trend from 1998 to 2001.
13. Despite the above, could record levels of household debt cause serious macroeconomic problems in the future? There are three frequently used arguments. The first is based on the possibility that households have underestimated true real interest rates. In the high-inflation era prior to 1993, debts were rapidly eroded. This no longer happens and perhaps households do not fully recognise this fact. However, the young, who tend to be the most indebted (relative to their income and assets) and

hence the most endangered, were not financially aware in the pre-1993 era, so there is little reason to think they are not making sensible judgments on this score. Indeed, overall, there are no strong reasons why households, or indeed lenders, should be behaving particularly imprudently. Nor is there any persuasive evidence that they are doing so.

14. The second argument is that the economy will be a more fragile place in the future if households have very high levels of debt. In particular, in response to a future adverse shock, higher debt levels would lead to bigger falls in consumption and a bigger economic slowdown. However, since debt-service charges are the problem here, in a higher-debt world adverse shocks could be offset by a more vigorous monetary policy response.
15. The third argument is very simple. If more people have big mortgages, a collapse in the housing market has more serious macroeconomic consequences. Of course, if this were thought to be a serious issue, one solution would be a policy to reduce the size of the owner-occupied sector. More council houses, perhaps. But, in the present situation, does this mean we should use policy to discourage people from taking out mortgages? In my view, this should not be the target of monetary policy.
16. This leads to the final question, should we keep interest rates higher than would be required to hit the inflation target in the medium term in order not to encourage further debt accumulation? In the light of all the previous points, my answer, at present, would be 'no'.

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**Bank of England (2003)**, *Financial Stability Review*, Issue 14, June.

**Cox, P, Whitley, J D and Brierley, P G (2002)**, 'Financial pressures in the UK household sector: evidence from the British Household Panel Survey', *Bank of England Quarterly Bulletin*, Winter, pages 410–19.

**CSO (1994)**, *Treatment of owner occupiers' housing costs in the retail prices index*, Retail Prices Index Advisory Committee, London, HMSO, December, CM 2717.

**Hamilton, R (2003)**, 'Trends in household aggregate secured debt', *Bank of England Quarterly Bulletin*, Autumn, pages 271–80.

**Nickell, S (2002)**, 'Monetary policy issues: past, present, future', *Bank of England Quarterly Bulletin*, Autumn, pages 329–44.

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# Bank of England speeches

Speeches made by Bank personnel since publication of the previous *Bulletin* are listed below.

**UK monetary policy in a changing world.**

Speech by Kate Barker, member of the Monetary Policy Committee, at the Teesside Business School Annual Lecture on 20 November 2003. [www.bankofengland.co.uk/speeches/speech206.pdf](http://www.bankofengland.co.uk/speeches/speech206.pdf). Reproduced on pages 495–503 of this *Bulletin*.

**Financial Stability: maintaining confidence in a complex world.**

Speech by Sir Andrew Large, Deputy Governor, at City of London Central Banking Conference, National Liberal Club on 17 November 2003. [www.bankofengland.co.uk/speeches/speech205.htm](http://www.bankofengland.co.uk/speeches/speech205.htm).

**East Midlands Development Agency/Bank of England Dinner.**

Speech by Mervyn King, Governor, in Leicester on 14 October 2003. [www.bankofengland.co.uk/speeches/speech204.htm](http://www.bankofengland.co.uk/speeches/speech204.htm). Reproduced on pages 476–78 of this *Bulletin*.

**Inflation targeting: the UK experience.**

Speech by Charles Bean, Chief Economist and member of the Monetary Policy Committee, at the Annual Congress of the German Economic Association, University Zürich-Irchel in Switzerland on 1 October 2003. [www.bankofengland.co.uk/speeches/speech203.pdf](http://www.bankofengland.co.uk/speeches/speech203.pdf). Reproduced on pages 479–94 of this *Bulletin*.

**Two current monetary policy issues.**

Speech by Stephen Nickell, member of the Monetary Policy Committee and Professor at the London School of Economics, at a Market News International Seminar on 16 September 2003. [www.bankofengland.co.uk/speeches/speech202.pdf](http://www.bankofengland.co.uk/speeches/speech202.pdf). Reproduced on pages 504–17 of this *Bulletin*.

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# Contents of recent Quarterly Bulletins

The articles and speeches which have been published recently in the *Quarterly Bulletin* are listed below. Articles from November 1998 onwards are available on the Bank's web site at [www.bankofengland.co.uk/qbcontents/index.html](http://www.bankofengland.co.uk/qbcontents/index.html).

## Articles and speeches (indicated S)

### *Autumn 2001*

Public attitudes about inflation: a comparative analysis  
Measuring capital services in the United Kingdom  
Capital flows and exchange rates  
Balancing domestic and external demand (S)  
The international financial system: a new partnership (S)  
'Hanes Dwy Ddinas' or 'A Tale of Two Cities' (S)  
Has UK labour market performance changed? (S)  
Some reflections on the MPC (S)

### *Winter 2001*

The external balance sheet of the United Kingdom: implications for financial stability  
Public sector debt: end-March 2001  
The foreign exchange and over-the-counter derivatives markets in the United Kingdom  
The Bank's contacts with the money, repo and stock lending markets  
The formulation of monetary policy at the Bank of England  
Credit channel effects in the monetary transmission mechanism  
Financial effects on corporate investment in UK business cycles  
Why house prices matter  
The prospects for the UK and world economies (S)  
Maintaining financial stability in a rapidly changing world: some threats and opportunities (S)  
Monetary policy: addressing the uncertainties (S)  
Economic imbalances and UK monetary policy (S)  
Do we have a new economy? (S)

### *Spring 2002*

The London Foreign Exchange Joint Standing Committee: a review of 2001  
Provision of finance to smaller quoted companies: some evidence from survey responses and liaison meetings  
Explaining trends in UK business investment  
Building a real-time database for GDP(E)  
Electronic trading in wholesale financial markets: its wider impact and policy issues  
Analysts' earnings forecasts and equity valuations

### *Spring 2002 (continued)*

On market-based measures of inflation expectations  
Equity wealth and consumption—the experience of Germany, France and Italy in an international context  
Monetary policy, the global economy and prospects for the United Kingdom (S)  
Three questions and a forecast (S)  
Twenty-first century markets (S)  
The stock market, capacity uncertainties and the outlook for UK inflation (S)

### *Summer 2002*

Public attitudes to inflation  
The Bank of England's operations in the sterling money markets  
No money, no inflation—the role of money in the economy  
Asset prices and inflation  
Durables and the recent strength of household spending  
Working time in the United Kingdom: evidence from the Labour Force Survey  
Why are UK imports so cyclical?  
Monetary challenges (S)  
The Monetary Policy Committee: five years on (S)  
Household indebtedness, the exchange rate and risks to the UK economy (S)

### *Autumn 2002*

Committees versus individuals: an experimental analysis of monetary policy decision-making  
Parliamentary scrutiny of central banks in the United Kingdom and overseas  
Ageing and the UK economy  
The balance-sheet information content of UK company profit warnings  
Money and credit in an inflation-targeting regime  
International Financial Architecture: the Central Bank Governors' Symposium 2002  
The monetary policy dilemma in the context of the international environment (S)  
Monetary policy issues: past, present, future (S)

### *Winter 2002*

What do measures of core inflation really tell us?

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*Winter 2002 (continued)*

Estimating the impact of changes in employers' National Insurance Contributions on wages, prices and employment  
Equity valuation measures: what can they tell us?  
Profit expectations and investment  
Financial pressures in the UK household sector: evidence from the British Household Panel Survey  
Money market operations and volatility in UK money market rates  
The Centre for Central Banking Studies  
The external balance sheet of the United Kingdom: recent developments  
Public sector debt: end-March 2002  
Speech at the Northwest Development Agency/Bank of England Dinner (S)  
The inflation target ten years on (S)  
The MPC and the UK economy: should we fear the D-words? (S)  
Macroeconomic policy rules in theory and in practice (S)

*Spring 2003*

Market-based estimates of expected future UK output growth  
Monetary policy and the zero bound to nominal interest rates  
The measurement of house prices  
Report on modelling and forecasting at the Bank of England  
The Bank's regional Agencies  
A review of the work of the London Foreign Exchange Joint Standing Committee in 2002  
Speech at the Chartered Institute of Bankers in Scotland Biennial Dinner (S)  
Economists and the real world (S)  
Adjusting to low inflation—issues for policy-makers (S)  
Six months on the MPC: a reflection on monetary policy (S)  
House prices, household debt and monetary policy (S)

*Summer 2003*

What caused the rise in the UK terms of trade?  
Long-run equilibrium ratios of business investment to output in the United Kingdom  
An analysis of the UK gold auctions 1999–2002  
Assessing the extent of labour hoarding  
Asset finance  
Public attitudes to inflation  
Foreign Exchange Joint Standing Committee e-commerce subgroup report  
The Governor's speech at the Islamic Home Finance seminar on 27 March 2003 (S)  
The role of the Bank of England in the gold market (S)

*Autumn 2003*

Trends in households' aggregate secured debt  
Public expectations of UK inflation  
Non-employment and labour availability  
The information content of regional house prices: can they be used to improve national house price forecasts?  
Balance sheet adjustment by UK companies  
Inflation targeting and the fiscal policy regime: the experience in Brazil  
The optimal rate of inflation: an academic perspective  
The EU Financial Services Action Plan: a guide  
Credit conditions and monetary policy (S)

*Winter 2003*

Understanding and modelling swap spreads  
The distribution of unsecured debt in the United Kingdom: survey evidence  
Innovations in retail payments: e-payments  
The macroeconomic impact of revitalising the Japanese banking sector  
Financial stability and the United Kingdom's external balance sheet  
The Governor's speech at the East Midlands Development Agency/Bank of England dinner (S)  
Inflation targeting: the UK experience (S)  
UK monetary policy in a changing world (S)  
Two current monetary policy issues (S)

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# Bank of England publications

The Bank of England publishes information on all aspects of its work in many formats. Listed below are some of the main Bank of England publications. For a full list, please refer to our web site [www.bankofengland.co.uk/publications](http://www.bankofengland.co.uk/publications).

## Working papers

Working papers are free of charge; a complete list is available from the address below. An up-to-date list of working papers is also maintained on the Bank of England's web site at [www.bankofengland.co.uk/wp/index.html](http://www.bankofengland.co.uk/wp/index.html), where abstracts of all papers may be found. Papers published since January 1997 are available in full, in PDF.

No.	Title	Author
194	A Merton-model approach to assessing the default risk of UK public companies (June 2003)	Merxe Tudela Garry Young
195	Forecasting inflation using labour market indicators (July 2003)	Vincenzo Cassino Michael Joyce
196	UK business investment: long-run elasticities and short-run dynamics (July 2003)	Colin Ellis Simon Price
197	E-barter versus fiat money: will central banks survive? (August 2003)	F H Capie Dimitrios P Tsomocos Geoffrey E Wood
198	Non-interest income and total income stability (August 2003)	Rosie Smith Christos Staikouras Geoffrey Wood
199	Credit risk diversification: evidence from the eurobond market (September 2003)	Simone Varotto
200	Estimating real interest rates for the United Kingdom (September 2003)	Jens Larsen Ben May James Talbot
201	Debt maturity structure with pre-emptive creditors (September 2003)	Prasanna Gai Hyun Song Shin
202	Credit spreads on sterling corporate bonds and the term structure of UK interest rates (October 2003)	Jeremy Leake
203	Analytics of sovereign debt restructuring (October 2003)	Andrew G Haldane Adrian Penalver Victoria Saporta Hyun Song Shin
204	The dynamics of consumers' expenditure: the UK consumption ECM redux (November 2003)	Emilio Fernandez-Corugedo Simon Price Andrew Blake
205	Empirical determinants of emerging market economies' sovereign bond spreads (November 2003)	Gianluigi Ferrucci
206	The rise in US household debt: assessing its causes and sustainability (November 2003)	Sebastian Barnes Garry Young
207	A quantitative framework for commercial property and its relationship to the analysis of the financial stability of the corporate sector (November 2003)	John Whitley Richard Windram
208	A matching model of non-employment and wage pressure (November 2003)	Andrew Brigden Jonathan Thomas
209	Settlement bank behaviour and throughput rules in an RTGS payment system with collateralised intraday credit (November 2003)	Simon Buckle Erin Campbell
210	Company accounts based modelling of business failures and the implications for financial stability (December 2003)	Philip Bunn Victoria Redwood

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## External MPC Unit discussion papers

The MPC Unit discussion paper series reports on research carried out by, or under supervision of, the external members of the Monetary Policy Committee. Papers are available from the Bank's web site at [www.bankofengland.co.uk/mpc/extmpcpaper0000n.pdf](http://www.bankofengland.co.uk/mpc/extmpcpaper0000n.pdf) (where n refers to the paper number). The following papers have been published recently.

No.	Title	Author
9	The pricing behaviour of UK firms ( <i>April 2002</i> )	Nicoletta Batini Brian Jackson Stephen Nickell
10	Macroeconomic policy rules in theory and in practice ( <i>October 2002</i> )	Christopher Allsopp
11	The exchange rate and inflation in the UK ( <i>October 2002</i> )	Amit Kara Edward Nelson
12	Measuring the UK short-run NAIRU ( <i>April 2003</i> )	Nicoletta Batini Jennifer Greenslade
13	UK consumers' habits ( <i>May 2003</i> )	Ryan Banerjee Nicoletta Batini

## Monetary and Financial Statistics

*Monetary and Financial Statistics (Bankstats)* contains detailed information on money and lending, monetary and financial institutions' balance sheets, Banks' income and expenditure, analyses of bank deposits and lending, external business of banks, public sector debt, money markets, issues of securities, financial derivatives, interest and exchange rates, explanatory notes to tables and occasional related articles.

From 2004 *Bankstats* will continue to be published monthly on the Internet but paper copies will be available on a twice-yearly basis. Paper copies will be published for the January and July editions on hard copy on Monday 2 February 2004 and Friday 30 July 2004 respectively, the price per annum in the United Kingdom will be £40, or £20 per copy. It is available on a monthly basis free of charge from the Bank web site at: [www.bankofengland.co.uk/mfsd/latest.htm](http://www.bankofengland.co.uk/mfsd/latest.htm)

Further details are available from: Daxa Khilosia, Monetary and Financial Statistics Division, Bank of England: telephone 020 7601 5353; fax 020 7601 3208; e-mail [daxa.khilosia@bankofengland.co.uk](mailto:daxa.khilosia@bankofengland.co.uk).

The following articles have been published in recent issues of *Monetary and Financial Statistics*. They may also be found on the Bank of England web site at [www.bankofengland.co.uk/mfsd/030901/aug03articles.htm](http://www.bankofengland.co.uk/mfsd/030901/aug03articles.htm).

Title	Author	Month of issue	Page numbers
Calculation of holders of marketable securities: UK approach	Richard Walton	October	1–2
Changes to Bank of England series identifiers	Karen Westley	August	3–4
Surveying issuing and paying agents (IPAs) of securities in the UK	Bruce Devile	August	5–6

## Financial Stability Review

The *Financial Stability Review* is published twice a year, in June and December. Its purpose is to encourage informed debate on financial stability; survey potential risks to financial stability; and analyse ways to promote and maintain a stable financial system. The Bank of England intends this publication to be read by those who are responsible for, or have interest in, maintaining and promoting financial stability at a national or international level. It is of especial interest to policy-makers in the United Kingdom and abroad; international financial institutions; academics; journalists; market infrastructure providers; and financial market participants. It is available from Financial Stability Review, Bank of England HO-3, Threadneedle Street, London, EC2R 8AH and on the Bank's web site at: [www.bankofengland.co.uk/fsr/index.htm](http://www.bankofengland.co.uk/fsr/index.htm).

## Practical issues arising from the euro

This is a series of booklets providing a London perspective on the development of euro-denominated financial markets and the supporting financial infrastructure, and describing the planning and preparation for possible future UK entry. Recent editions have focused on the completion of the transition from the former national currencies to the euro in early 2002, and the lessons that may be drawn from it. Copies are available from Public Enquiries Group, Bank of England, Threadneedle Street, London, EC2R 8AH and at the Bank's web site at: [www.bankofengland.co.uk/euro/piq.htm](http://www.bankofengland.co.uk/euro/piq.htm).

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## Economic models at the Bank of England

The *Economic models at the Bank of England* book, published in April 1999, contains details of the economic modelling tools that help the Monetary Policy Committee in its work. The price of the book is £10.00. An update was published in September 2000 and is available free of charge.

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An index of the *Quarterly Bulletin* is also available to customers free of charge. It is produced annually, and lists alphabetically terms used in the *Bulletin* and articles written by named authors.

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Summer	18 June	May	12 May
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