



# Quarterly Bulletin

Summer 2004

Bank of England

Volume 44 Number 2



## Bank of England Quarterly Bulletin

### Summer 2004

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Volume 44 Number 2

## Quarterly Bulletin—Summer 2004

*Markets and operations* (pages 113–30)

**Research and analysis** (pages 131–87)

This article reviews developments since the Spring 2004 *Quarterly Bulletin* in sterling and global financial markets, in UK market structure and in the Bank's official operations.

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.

**Assessing the stability of narrow money demand in the United Kingdom** (by Kathryn Grant, Gertjan Vlieghe and Andrew Brigden of the Bank's Monetary Assessment and Strategy Division). It is widely accepted that the introduction of cash-saving technologies, such as credit and debit cards, and the growing network of automated teller machines (ATMs) contributed to a prolonged upward shift in narrow money velocity towards the end of the 20th century. This article considers whether this upward shift might plausibly have come to an end. First, it presents data on four distinct manifestations of financial innovation, and asks whether the pace of change in each might have slowed. Second, it uses time-series data stretching back more than 100 years to present estimates of the demand for narrow money during different time periods. It finds tentative evidence that, since the early 1990s, narrow money velocity has been a broadly stable function of the short-term rate of interest.

**Deriving a market-based measure of interest rate expectations** (by Christopher Peacock of the Bank's Monetary Instruments and Markets Division). Forward rates are perhaps the most common measure of expected future interest rates. But the existence of a risk premium can drive a wedge between forward rates and what the market expects future rates to be. In this article we use survey data to derive an estimate of the risk premium. We find that the survey-based risk premium implies a significant and time-varying difference between forward rates and expected future interest rates. Consequently, this article sets out a simple model of the survey-based risk premium that can be used to generate a path for expected future interest rates on any particular day.

The economics of retail banking—an empirical analysis of the UK market for personal current accounts (by Céline Gondat-Larralde and Erlend Nier of the Bank's Financial Industry and Regulation Division). Understanding the economics of retail banking is important for the Bank of England in carrying out both its monetary stability and its financial stability function. In this article, we study the dynamics of the UK market for personal current accounts between 1996 and 2001. Analysing the evolution of banks' market shares and their pricing strategies, two questions are addressed: (i) Do bank market shares respond to price differentials? (ii) If not, why not? Our results point to customer switching costs as a key determinant of the nature of competition in the market for personal current accounts during the 1996–2001 period. They are thus broadly supportive of a number of initiatives that have since been undertaken to reduce such costs.

**The financing of smaller quoted companies: a survey** (by Peter Brierley and Mike Young of the Bank's Financial Stability Area). This article summarises the results of a survey on the financing of smaller quoted companies (SQCs) conducted in February and March 2004 and builds on earlier work by the Bank and other organisations. It explores SQCs' recent and possible future use of external finance, their views on the availability of debt and equity finance and their views on possible constraints on such finance that are thought to be particularly relevant to SQCs. The results suggest that most SQCs are not currently experiencing any major difficulties in accessing either debt or equity finance.

**Recent developments in surveys of exchange rate forecasts** (by Sally Harrison and Caroline Mogford of the Bank's Foreign Exchange Division). Expectations of future exchange rates can influence moves in the current exchange rate. This article summarises recent developments in the mean forecasts for dollar/euro, dollar/sterling and sterling/euro bilateral exchange rates taken from the Reuters survey. The properties of these mean forecasts are evaluated and the article shows that they are not reliable predictors of future exchange rates.

**Sterling money market funds** (by Adrian Hilton of the Bank's Sterling Markets Division). Sterling institutional money market funds have, over the past five years, become an important feature of the sterling money market. This article looks at the characteristics of such funds and the instruments they invest in. It recognises that the growth of sterling institutional money market funds has the potential to change the flow of funds in the sterling money markets and to alter the composition of banks' balance sheets, but has no material implication for the implementation of monetary policy.

**The new Bank of England Quarterly Model.** The Bank of England has developed a new macroeconomic model to help prepare the Monetary Policy Committee's quarterly economic projections. The new model does not represent a change in the Committee's view of how the economy works or of the role of monetary policy. Rather, recent advances in economic understanding and computational power have been used to develop a macroeconomic model with a more clearly specified and coherent economic structure than in previous models used by the Committee. This article provides an overview of the new model and includes some simple simulations to illustrate its properties.

**Public attitudes to inflation** (by Norbert Janssen of the Bank's Inflation Report and Bulletin Division). Since November 1999 the market research agency NOP has carried out quarterly and annual surveys of public attitudes to inflation, on behalf of the Bank of England. As part of an annual series, this article analyses the results of the surveys from May 2003 to February 2004. Public opinion on most issues has changed little over the past year. Around one in five people thought retail price inflation had been between 2% and 3% over the past year and a similar proportion expected price increases in that range. Both in November and February, a large majority of respondents expected interest rates to rise over the next year, though nearly 40% thought the economy would fare best if rates stayed where they were. Just over half the sample population remained satisfied with the way the Bank is setting interest rates.

**Perfect partners or uncomfortable bedfellows? On the nature of the relationship between monetary policy and financial stability** (by Chay Fisher of the Bank's Financial Stability Assessment Division and Melanie Lund of the Bank's Centre for Central Banking Studies). The first annual Chief Economist Workshop, organised by the Bank of England's Centre for Central Banking Studies (CCBS), brought together economists from over 30 central banks. It marked a changing path for the CCBS as it increases its role in providing a forum where central bankers and academics can exchange views on central bank policies and share specialist technical knowledge. The topic for the inaugural meeting was the interplay between monetary policy and financial stability, an issue that has risen to prominence in international debate in recent years.

**A review of the work of the London Foreign Exchange Joint Standing Committee in 2003.** This note reviews the work undertaken by the London Foreign Exchange Joint Standing Committee during 2003.

**Reform of the Bank of England's operations in the sterling money markets A consultative paper by the Bank of England.** The Bank issued this paper for public consultation on 7 May 2004. It reviews the objectives and broad framework of the Bank of England's operations in the sterling money markets. Comments were invited by 11 June 2004.

#### **Reports**

(pages 188–227)

## **Markets and operations**

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

- Markets brought forward expectations of the timing of increases in US official rates, as the global economic upswing continued. International short-term rates rose, and in the United States longer-term forward rates also increased.
- The dollar appreciated in effective terms and after March there was no evidence of further intervention by the Bank of Japan. The sterling ERI was broadly unchanged and remained higher than during 2003.
- Equity markets fell slightly in the United States, the United Kingdom and the euro area, but rose in Japan.
- Revisions to views about the path of US official rates were associated with a sharp widening of credit spreads in emerging market economies and the high-yield corporate sector, leading some high-yield issues to be postponed. But, overall, the adjustment has been reasonably orderly, so far.
- The Bank of England issued a consultative paper on reform of its operations in the sterling money markets. The paper set out the Bank's objectives.

The global economic upswing continued and, in consequence, the main development in global financial markets was that expectations of the timing of increases in US official rates were brought forward. This has affected the expected paths of short rates in other countries, credit spreads, equity markets and exchange rates. This article reviews each in turn.

International short-term interest rates rose by between around 15 and 50 basis points (Table A). At longer maturities, US dollar forward rates rose by about 50 basis points, with a small increase in sterling rates, but little change in euro rates. The dollar appreciated against the euro by just over 2% and the sterling ERI was broadly unchanged. Equity markets fell in the United States, the United Kingdom and the euro area, but rose in Japan.

Changes in expectations for the path of official interest rates contributed to a widening of credit spreads on high-yield bonds. Overall the adjustment was orderly,

#### Table A

#### Summary of changes in market prices

	27 Feb.	28 May	Change
September 2004 three-month interbank			
interest rate (per cent)			
United Kingdom	4.57	5.08	51 bp
Euro area	2.03	2.19	16 bp
United States	1.43	1.93	50 bp
Ten-vear nominal forward rate (per cent) (a)			
United Kingdom	4.83	4.95	12 bn
Euro area	5 45	5 47	2 hn
United States	6.21	6.72	51 bp
Equity indices (domestic surronsy)			
Equity marces (domestic currency)	4 400	4 4 7 1	1 407
FISE 100 index	4492	4451	-1.4%
Euro Stoxx 50 index	2895	2/5/	-5.4%
S&P 500 index	1145	1121	-2.1%
Effective exchange rates			
Sterling effective exchange rate	105.7	105.8	0.1%
\$/€ exchange rate	1.25	1.22	-2.2%

Columns may not correspond exactly due to rounding.

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.

but with brief strains—manifested in sharp price changes—in some less liquid markets, including emerging market economies. Increased volatility in credit markets and the widening of credit spreads led to several companies postponing or scaling back issuance.

(1) The period under review is 27 February (the data cut-off for the previous Quarterly Bulletin) to 28 May.

#### Short-term interest rates

Market perceptions of the likely path of monetary policies were revised against a background of synchronised recovery in the world economy. In some countries, for example New Zealand, Canada and the United Kingdom, official rates were increased. The United Kingdom's Monetary Policy Committee (MPC) raised the official repo rate by 25 basis points to 4.25% at its meeting on 6 May. US dollar, euro and yen official interest rates, meanwhile, remained unchanged over the review period, but market interest rates rose. The increases in two-year nominal spot rates were most pronounced in the dollar market (Chart 1), with positive news about the outlook for the US economy; for example the April non-farm payrolls published on 7 May and associated revisions to previous months' data.

#### Chart 1





Casual observation of Chart 1 suggests that international short-term rates have been highly sensitive to moves in dollar rates. Closer examination confirms this (Chart 2). While sterling/dollar rate sensitivity was higher in the mid-1990s, euro/dollar sensitivity, compared with the previous decade, has been high since 2003.

In principle, positive correlation could be accounted for by synchronisation of business cycles, or by global developments that affect different economies in similar ways. The first of these explanations seems unlikely; while growth forecasts for the US and UK economies have been revised upwards or have been unchanged over recent months, forecasts for GDP growth in the euro area have become slightly more pessimistic (Chart 3). A more likely explanation is that, because of the integrated nature of financial markets, and the size of the US economy, the US data have had a global impact; real

#### Chart 2

Comovement of UK and euro-area short rates with US short rates (two-year nominal spot rates)<sup>(a)</sup>



(a) Two-year nominal spot rates derived from the Bank's government liability curve. The statistics are the one-year rolling regression coefficients of changes in sterling and euro rates on contemporaneous changes in dollar rates. Prior to 1999, the euro measure is based on German government interest rates.

#### Chart 3 Expected 2004 real GDP growth



Source: Consensus Economics.

#### Chart 4 Five-year real yields<sup>(a)</sup>



Sources: Bank of England and Bloomberg

(a) US and euro rates calculated from index-linked yields, maturities of which may vary.

yields in all three currencies rose following the US data releases, suggesting less loose monetary conditions ahead (Chart 4).

The dollar forward curve was already steeper than the euro curve at the time of the Spring *Quarterly Bulletin*, and it has since steepened further while the euro curve has flattened slightly (Chart 5). Information from options prices suggests that the probability attributed by the market to an imminent reduction in euro official interest rates fell following the ECB's April meeting and on various US data releases (Chart 6).

#### Chart 5 Short-term international nominal forward rates



(a) Three-month nominal forward rates implied by futures contracts.

#### Chart 6

## Probability that three-month Euribor will lie at or below 1.75% at different horizons



Sources: Bank of England and Bloomberg.

The profile for short-term sterling forward rates has shifted up by up to around 60 basis points (Chart 7). In the period prior to the April MPC meeting, market participants' views had hardened around a 25 basis point rise in either April or May. The April decision to

#### Chart 7 Sterling official and forward market interest rates



Sources: Bank of England and Bloomberg

(a) Two-week nominal forward rates implied by GC repo/gilt curve.

leave the sterling official rate unchanged meant that a rise in May became widely anticipated. Following May's increase, there was a modest rise in short-term sterling interest rates of just under 10 basis points.

Reuters polls City UK economists for their views on the timing and the level of the next peak in UK official interest rates. Chart 8 shows the results of the May poll, taken on 27 and 28 April. The mean result put the peak at around 5.0% in May 2005, some time before the peak of the forward curve which, at the time of the Reuters survey, was around 5.2% in 2008. The forward rate implied by market rates for May 2005 also lies below economists' rate expectations, unusually implying a negative term premium or risk premium.<sup>(1)</sup> Alternatively it could reflect differing views of economists and traders.



## Reuters poll of timing and level of next peak in UK official rates, and two-week nominal forward rate(a)



(1) For more on term premia, see 'Deriving a market-based measure of interest rate expectations', by Christopher Peacock, published in this Quarterly Bulletin.

#### **Uncertainty about interest rates**

Measures of uncertainty about dollar interest rates, derived from option prices, have risen. By contrast, uncertainty about sterling and euro short-term interest rates remained markedly lower (Chart 9). Six-month forward implied volatility six months ahead remains especially high for the United States.

#### Chart 9

## Six-month implied volatility from interest rate options<sup>(a)</sup>



The dots indicate the six-month forward implied volatility in basis points. ahead.

By looking at the prices of short-term interest rate options over a range of strike prices, it is possible to derive measures of skew, which describe the perceived balance of risks to short-term interest rates (Chart 10). While official dollar rates were declining, the balance of risks around the dollar forward curve remained on the downside until around mid-2003. Around the Autumn of 2003, although it was perceived that official dollar rates would remain low for some time, the skew indicated

#### Chart 10





that the balance of risks was that the Federal Open Market Committee (FOMC) would begin to raise rates sooner than indicated by the dollar forward curve. This balance of risks around the dollar forward curve has now returned to slightly negative as the dollar curve has shifted up. The balance of risks around both the sterling and euro forward curves was broadly neutral.

#### Long-term interest rates

Movements at the short end of the US dollar interest rate curve have contributed to increases in yields at longer maturities. This would happen even if longer maturity forward rates were unchanged. But long-term nominal forward interest rates also rose—by around 60 and 50 basis points at maturities of five and ten years respectively (Chart 11). Sterling and euro forward rates increased at medium maturities, but by less, and both fell at some longer maturities.

#### Chart 11





By historical standards, this rise in US dollar nominal forward rates at longer maturities was relatively large.<sup>(1)</sup> A pronounced rise over a three-month period also occurred between June and August 2003, when market contacts suggested that movements were being exaggerated by activity related to hedging of mortgage-backed securities (MBS).<sup>(2)</sup> In contrast, over the current review period, contacts indicated that MBS hedging was more muted, suggesting the forward rate rises might be more likely to persist.

Over the period, the largest rises in longer-term forward rates coincided with the macroeconomic data releases that contributed to rises at the short end of the curve. Statistically, this can be captured by an estimate of the

(1) Since 1991, absolute changes in the ten-year US dollar forward rate over a three-month period have tended to be less than 50 basis points, on average.

(2) See 'Markets and operations' (2003), Bank of England Quarterly Bulletin, Autumn, pages 258-59.

#### Chart 12







comovement between changes in long-term US dollar nominal forward rates and changes at the short end of the curve. This measure was unusually high over the review period (Chart 12).

That long forward rates should be so strongly correlated with changes at the short end is puzzling. While the increase in dollar rates at shorter maturities is consistent with investors bringing forward expectations of a US monetary policy tightening, medium-term policy expectations would not usually be expected to affect greatly longer-term forward rates, given that the monetary authority is perceived to be credible.<sup>(1)</sup> Rather, these should reflect long-term expectations of inflation and risk-free real interest rates, as well as associated risk premia.

A previous episode where changes in short-term dollar rates coincided with large movements in longer-term forward rates was during the policy tightening cycle that began in early 1994. In the nine months between February and November 1994, the federal funds target rate was raised from 3.0% to 4.75%.<sup>(2)</sup> Over the same period, two-year and ten-year forward rates increased by around 280 and 170 basis points respectively (Chart 13), with the latter reaching a peak of around 9.0% in mid-November.

Chart 13 shows that in the three months following the start of the 1994 tightening cycle, the rise in US dollar nominal forward rates was only slightly higher than the

#### Chart 13 Cumulative changes in US dollar forward rates(a)



(a) Instantaneous forward rates derived from the Bank's government liability curves.

rise observed recently. Should longer-term dollar interest rates increase further, repeating the 1994 experience, there could be an adverse effect on the global recovery, given the important role of long yields in the US economy and, in turn, the importance of the United States in the global economy. But the objectives of policymakers and their reaction to macroeconomic news may have been less well understood by investors in 1994 than now.

One explanation for the current increase in long-term US dollar forward rates could be that inflation expectations and risk premia have risen as well. This would be consistent with renewed focus on inflation risk, given that fears of deflation in the United States have receded. But this is unlikely to be the only factor that contributed to rises in long-term US dollar nominal forward rates; indeed, Chart 14 suggests that at least

#### Chart 14 US implied real forward rates(a)



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

<sup>(2)</sup> By end-November 1994, the federal funds target rate was 5.5% and eventually peaked at 6.0% in February 1995.

some of the rise could be accounted for by the real component of the nominal curve.

By contrast, the sterling real forward curve (derived from RPI-indexed gilts) has become more inverted, with real rates at shorter maturities rising over the period, while those at maturities beyond eight years fell (Chart 15). At the short end, this could be interpreted as reflecting changed expectations of the path of official interest rates. At the longer end the movements were smaller and, as mentioned in previous Quarterly Bulletins, strong demand for longer-maturity index-linked gilts by UK pension funds and life insurers can make it more difficult to relate movements in real yields to economic fundamentals. More specifically, since the real interest rate reflects agents' intertemporal consumption and investment decisions, there should be a link between the long-term (or equilibrium) real interest rate and the trend growth rate of the economy. But even ignoring risk premia, it is difficult to reconcile a long-term real forward rate of around 1.5% with plausible estimates of trend productivity growth.

#### Chart 15 UK real forward rates



To the extent that the index-linked gilt curve is distorted away from fundamentals, there may be an effect on the derivation of forward measures of RPI inflation from the difference between nominal and real sterling forward rates (Chart 16). Over the period, the forward inflation curve shifted upwards, with the largest moves for maturities around 2013. While this could reflect a rise in inflation expectations, it could also reflect a change in the inflation risk premium or simply inefficiencies in the relative pricing of conventional and index-linked gilts.

#### Chart 16 UK break-even RPI inflation curve



Sources: Bank of England and Bloomberg.

#### **Corporate credit conditions**

Another possible explanation for the recent rise in dollar nominal forward rates is that, reflecting changed expectations about the path of US monetary policy, there may have been some partial unwinding of the dollar yield curve carry trade that contacts suggest became widespread during 2003 and into this year.<sup>(1)</sup> Similar explanations have been offered by contacts for the compression of and, more recently, the widening of credit spreads.

Over the first half of the review period, credit spreads on emerging market bonds fell slightly, continuing the downward trend that began in early 2003. Market contacts reported that some investors had been investing in emerging market bonds to exploit yield differentials. Since mid-April, however, expectations that interest rates are set to rise, particularly in the United States, have contributed to a sharp rise in the spreads on emerging market debt—in the final week of April and the first week of May, emerging market spreads increased by more than 100 basis points (Chart 17). The sudden and sharp manner of the rise may suggest that the market was at times disorderly. Spreads subsequently fell back, however, consistent with a return to more normal market conditions.

Spreads on high-yield sterling, dollar and euro corporate bonds followed a similar pattern, rising sharply after mid-April, but falling back towards the end of the period (Chart 18). High-yield issuance was generally strong over the period, though this in large part reflected capital restructuring (eg leveraged buy-outs) rather than new investment. Towards the end of the period the

 A yield curve carry trade exploits a positive slope in the yield curve by borrowing at the short end, where yields are relatively low, and investing at the long end.

#### Chart 17 Emerging market and high-yield bond spreads



(a) Emerging Markets Bond Index.

#### Chart 18 High-yield option-adjusted corporate bond spreads



Source: Merrill Lynch

volatility in markets and the widening of credit spreads led several companies to scale back or postpone issuance.

In the investment-grade sector, spreads were little changed over the period, and credit conditions for highly rated issuers appeared to remain favourable. Fundamentally, actual default rates were low by historical standards and risk has probably been reduced by the synchronised recovery (Chart 19).

In the sterling market, there was a marked increase in issuance volumes during March, due largely to overseas issuers exploiting an apparent funding arbitrage opportunity arising from movements in basis swap rates (see the box on page 120). Globally, issuance in the investment-grade sector has been fairly low, while funds allocated to invest in credit are said to be plentiful.

#### Chart 19 Investment-grade option-adjusted corporate bond spreads<sup>(a)</sup> and global default rates



(a) Shown on right-hand scale.

Sterling and US dollar swap spreads both widened by around 9 basis points. In theory, if markets were perfectly efficient, this could be interpreted as a slight deterioration in the outlook for the banking sector. But consistent with credit conditions in the investment-grade sector remaining largely unchanged, contacts reported that these rises in part reflected strong demand to swap floating-rate liabilities for fixed rates, thereby locking in lower rates ahead of an expected policy tightening in the United States.

#### Chart 20 Ten-year swap spreads



#### **Equity markets**

With market interest rates rising, most equity markets fell; the FTSE All-Share and S&P 500 fell slightly between February and May and, in local-currency terms, the Euro Stoxx by rather more (Chart 21). Long-term real interest rates should be a key determinant of equity prices since they affect the rate at which claims on expected earnings streams are discounted. Equity prices

#### **Basis swaps**

Cross-currency basis swaps are exchanges of interest rate payments in two different currencies where the underlying reference rates are floating interbank interest rate indices such as the London interbank rate (Libor) and Euribor.

Such transactions can be illustrated by the following cross-currency basis swap example, based on a notional value of \$100 million, a tenor of two years, quarterly floating-rate payments, a basis swap rate of +3 basis points and an exchange rate of 1.20 dollars per euro, where one party:

- pays \$100 million and receives €83.3 million at initiation:
- pays three-month Euribor +3 basis points on €83.3 million and receives three-month USD Libor on \$100 million for two years; and
- receives \$100 million and pays €83.3 million at expiry.

In principle, the price (or 'basis') in cross-currency swaps should be zero, unless there are differences in credit risk embedded in the underlying reference rates of one currency relative to another. But such differences seem unlikely given the similarity of the various Libor and Euribor panels. Market contacts suggest that, in practice, movements in the basis away from zero are predominantly driven by flows of funds, in particular primary issuance flows. In the absence of market frictions, funding arbitrage should ensure that the cost of issuing debt domestically is the same as the cost of issuing debt in a foreign currency. In practice, however, issuers sometimes can borrow at a lower cost by issuing in a particular currency and swapping the liabilities to another.<sup>(1)</sup>

In addition to primary issuance flows, other activities that can affect basis swaps are asset/liability management (ALM), mergers and acquisitions activity, foreign-currency assets purchased by fund managers benchmarked to swaps<sup>(2)</sup> and cross-currency arbitrage trading by hedge funds. All of these involve the change in the foreign-currency component of an asset or liability, and hence have to float through the basis swap market.

The volatility of cross-currency basis swap markets has increased. This has been most pronounced in the sterling/dollar basis swap, which widened to a peak of 6.25 basis points (at the five-year tenor) in early March, having traded in a narrow -3 to +1.25 basis point range for much of the previous year.

The widening seems to have reflected an increase in demand to pay sterling and receive dollars which, until very recently, was not matched by offsetting flows. The source of this increased demand seems to have been primarily UK banks issuing US dollar mortgage-backed and other securities and swapping them back to sterling.<sup>(3)</sup>

#### **Chart A**





Source: Bloomberg

By late March, the rise in the sterling basis swap had attracted increased sterling issuance from non-UK issuers, particularly supranationals, agencies and non-UK financials. This increased demand to receive sterling (pay dollars) in swaps temporarily depressed the sterling dollar basis from +4 to +2 basis points before it rose again in April.

<sup>(1)</sup> Issuers are sometimes better known in one market than another and investors may have a preference for assets denominated in a particular currency. See for further detail the box 'International funding arbitrage' (2000), Bank of England Quarterly Bulletin, May, pages 130-31.

<sup>(2)</sup> These fund managers are commonly known as asset swappers because they swap the income stream from their foreign-currency asset holdings into short-term floating interest rate payments.

<sup>(3)</sup> For more on UK banks' foreign-currency funding activity, see Speight, G and Parkinson, S (2003), 'Large UK-owned banks' funding patterns: recent changes and implications', Bank of England Financial Stability Review, December, pages 135-42.

#### Chart 21 Selected equity indices (local currency)



should also reflect the expected growth rate of future corporate earnings. The S&P 500 fell despite many US companies announcing higher-than-expected earnings and a slight rise in expected earnings growth, consistent with the decline being driven by higher expected real interest rates as monetary accommodation is withdrawn.

Three-month implied volatilities of equity indices, a measure of equity market uncertainty, increased over the period. Following the Madrid attacks, there was a short-lived spike in uncertainty, most notably for the Euro Stoxx (Chart 22). Longer-maturity equity option prices suggest uncertainty was somewhat greater at six and twelve-month horizons—as illustrated by the dots in Chart 22—though by historical standards it remained low.

#### Chart 22 Three-month implied volatilities of selected equity indices<sup>(a)</sup>



(a) The solid mess show three-month implied volating in per cent. The dots indicate the three-month volatility three, six and nine months ahead respectively.

Information from options prices might suggest that the downside risk to equities has increased, particularly for the FTSE 100—the downside skew to the FTSE 100 is large by historical standards and greater than that to the S&P 500. Market contacts suggest that this may reflect not the probabilities attached to a fall, but rather moves by UK insurance companies to buy protection against large equity price falls which, were they to occur, could potentially raise solvency concerns.

#### Chart 23 Six-month skew of FTSE 100 and S&P 500 derived from options prices



#### **Exchange rates**

Just as the changed macroeconomic outlook and yield curve have affected emerging market and high-yield credit spreads, so have they affected foreign exchange markets.

Both the dollar ERI and the Federal Reserve's broad index rose by about 1.5% between 27 February and 28 May (Chart 24). The direction of this move was consistent with the upward revision to dollar interest rates relative to sterling, euro and yen rates across the curve. In particular, the dollar rose significantly in April

#### Chart 24

Cumulative changes in US dollar exchange rates since 1 September 2003



and May, following the strong US employment data in both months (Chart 24).

The sterling ERI was broadly unchanged between 27 February and 28 May. Sterling depreciated by just over 1% against the US dollar and rose slightly against the euro, having reached a 14-month high against the euro on 13 April. Between January 2004 and the end of May, the sterling ERI remained between 102 and 109. It previously traded in this range between 2000 and the start of February 2003. Compared with then, however, bilateral rates were different, with sterling being stronger against the dollar and weaker against the euro than during 2001–02 (Chart 25).

#### Chart 25 Sterling exchange rates



(a) Deutsche marks per pound before 1999.

Consensus surveys during the period suggested that not all the sterling ERI appreciation since January 2004 was expected to persist over the following year or two, though these surveys have underpredicted sterling strength in the past (Chart 26).

Realised volatility in the sterling/dollar exchange rate, measured by the annualised three-month standard deviations, increased sharply during the review period, reaching its highest level since the early 1990s. Realised volatility increased by about 3 percentage points between 27 February and 28 May, compared with an increase of around 0.5 percentage points in implied volatility from foreign exchange options. Market contacts suggest that this might reflect both demand for sterling as a high-yielding currency, and recent unwinding of these carry trades as the US rate outlook improved.

#### Chart 26 Sterling ERI, spot and Consensus Forecast



Sources: Bank of England and Consensus Economics

#### Chart 27 Implied and realised sterling/dollar volatility since 2 January 2003



Intervention by the Bank of Japan supported the dollar relative to the yen during the first half of March, but during the week beginning 15 March there was market and press speculation that the intervention policy was changing. Dollar/yen implied volatility (Chart 28) rose. Following the September G7 meeting the Bank of Japan's intervention policy was cited as accounting for the divergence between three-month and twelve-month dollar/yen risk reversals.<sup>(1)</sup> Twelve-month risk reversals had suggested that the balance of risks was weighted towards a further dollar depreciation against the yen, but intervention had reduced the risks of this happening in the short term, driving down the three-month risk reversal (Chart 29). The speculation about a change in intervention policy was associated with a brief spike up in three-month dollar/yen risk reversals.

Market contacts had reported that at longer maturities the magnitude of the dollar/yen risk reversal reflected

A risk reversal is a financial instrument for which the pay-off depends on the sign and magnitude of exchange rate moves. Its price, therefore, provides information about the perceived balance of risks around the forward exchange rate.

#### Chart 28 Twelve-month implied foreign exchange volatilities



Source: British Bankers' Association.

#### Chart 29

#### Foreign exchange risk reversals(a)



Sources: Bank of England and British Bankers' Association.

(a) A positive number indicates the balance of risk is towards a yen appreciation versus dollar.

purchases of insurance against large spot moves associated with hedging of another type of foreign exchange derivative called a power reverse dual-currency note.<sup>(1)</sup> These notes, which offer yield enhancement in exchange for exposure to dollar/yen currency risk, became popular during the period of low nominal interest rates and may be another manifestation of the search for yield. Going forward, as nominal yields rise, such yield-enhancing trades may become less popular and a key question is whether the unwinding of positions in such trades will be orderly.

#### **Developments in market structure**

This section provides an update on some significant structural developments in domestic and overseas

markets, as well as noting a new publication on the securities lending market.

#### International 'real' bond markets

In March 2004, Japan became the latest country to issue inflation-protected government debt, with a \$100 billion 'real' bond. The bond had a maturity of ten years, with an indexation lag of two to three months. The Bank of Japan has since announced plans to issue a \$300 billion 'real' bond on 3 June, with a further \$300 billion of issuance expected in December.

The issuance of Japan's first such bond comes against a background in which the market for inflation-protected debt (both government and non-government) has been growing significantly. The market capitalisation of major government real bond markets has now reached over US\$500 billion (Chart 30). The box on pages 124–25 discusses the development of government real bond markets in greater detail, and discusses similarities and differences between the bonds of different issuers.

Chart 30

## Market capitalisation of major government real bond markets



Sources: Barclays Capital inflation-linked bond indices and Bloomberg.

For central banks, the existence of real as well as nominal government bonds of different maturities is invaluable, as it makes it possible to derive term structures of real interest rates and implied measures of future inflation. Forward inflation can be a measure of whether inflation expectations are well anchored and therefore of the credibility of the monetary policy regime. Real interest rates can help policymakers to gauge the perceived stance of monetary policy.

(1) For more on these notes, see Rule, D, Garratt, A and Rummel, O, 'Structured note markets: products, participants and links to wholesale derivatives markets', (forthcoming in June *Bank of England Financial Stability Review*).

#### Inflation-protected bonds and swaps

In recent years, there has been significant growth in the market for inflation-linked bonds and derivatives. Growth has been particularly strong in the issuance of government bonds and the market for inflation swaps, both of which are discussed in further detail below. Non-government issuers have also issued an increasing amount of inflation-protected bonds-in the United Kingdom, for example, these have included utilities and private finance initiative (PFI) projects, where, in both cases, revenues are closely linked to consumer price inflation. And in the United States, in February 2004, the Chicago Mercantile Exchange launched its new CPI futures contracts out to three years, although open interest in this instrument is currently low at around 1,000 contracts.

#### Issuance of government inflation-protected bonds

The UK government issued its first index-linked gilt in 1981, becoming the first G7 country to issue inflation-protected or 'real' bonds. Since then, the governments of several other G7 and non-G7 countries have begun to issue real bonds, including: New Zealand (1983), Australia (1985), Canada (1991), Sweden (1994), the United States (1997), Greece (1997), France (1998), Italy (2003) and Japan (2004).

At end-2003, the amount outstanding of index-linked gilts was £78 billion, 27% of the total gilt market, in nominal terms (Table 1). The largest real government bond market in terms of the nominal amount outstanding is in the United States (\$ 176 billion at end-2003). However, as a percentage of all Treasury bonds, Treasury Inflation Protected Securities (TIPS) account for only 7% of the market. In the euro area, real bonds currently account for an even smaller proportion of the total market, as only three countries issue them.

#### Table 1

## Size of major government inflation-linked (IL) bond markets at end-2003

Country	Size (billions)	Size (£ billions)	Per cent of govt. bonds	No. of IL bonds
United Kingdom	£78	78.0	27	10
United States	\$176	98.7	7	11
France	51	35.9	6	5
Sweden	SEK171	13.3	25	6
Italy	10	7.0	1	1
Greece	1.3	0.9	1	1
Canada	C\$20	8.6	7	4
Australia	A\$6.6	2.8	15	4
New Zealand	NZ\$1.5	0.6	5	1

Sources: Barclays Capital, Deutsche Bank Research, and various government and central bank web sites.

#### Table 2

## Indexation conventions of different government inflation-linked bonds

Country	Index used	Indexation lag	Floor
United Kingdom	RPI	8 months	No
United States	US CPI-Urban NSA	2-3 months	Par
France (OATi)	French CPI excl. tobacco	2-3 months	Par
France (OATei)	Euro-area HICP excl. tobacco	2-3 months	Par
Sweden	CPI	2-3 months	Par
			(new issues)
Italy	Euro-area HICP excl. tobacco	2-3 months	Par
Greece	Euro-area HICP excl. tobacco	2-3 months	Par
Canada	CPI all groups, NSA	2-3 months	No
Australia	ACIF (CPI all groups)	6 months	Par (coupon and principal)
New Zealand	CPI all groups	6 months	No
Japan	CPI (excl. perishables)	2-3 months	No

Sources: Barclays Capital, Deutsche Bank Research, and various government and central bank web sites.

For most government inflation-protected bonds, the reference price index is a domestic measure of consumer prices (Table 2). But in France, while some bonds (OATi) are linked to a domestic measure (French CPI excluding tobacco), others (OATei) are linked to a euro area wide measure (euro-area HICP excluding tobacco). The latter has become the most common reference price index in the euro area, with the current Italian and Greek government inflation-protected bonds referenced to the same measure.

The calculation of the inflation element can also vary, with the markets established in the 1980s generally having a longer indexation lag than markets established more recently. In the United Kingdom, interest payments and the principal repayment depend on the level of RPI around eight months before the payment is made. Australian and New Zealand index-linked bonds have a six-month lag, while other major markets generally have a two to three-month indexation lag.

Another important design difference concerns whether, in the event of deflation over the life of the bond, investors receive nominal principal back in full (a par floor), or whether the nominal principal is reduced in line with the fall in the index (preserving its real value). There is no floor for any real bonds issued in the United Kingdom, Canada and New Zealand, for the first four bonds issued in Sweden and for the new Japanese government real bond. Meanwhile, Swedish bonds issued after the first four issues, as well as all bonds issued in France, the United States and Australia, do pay the nominal principal back in full when its real value has been eroded by deflation. Australian real bonds also provide a nominal par floor on coupons.

#### **Inflation swaps**

Turnover in inflation swap markets has grown rapidly, particularly in euros (Chart A). One driver for the growth of this market has been demand to hedge structured notes.

#### **Chart A**



(a) March 2004 data unavailable; 2004 Q1 data show January and February only.

A major benefit of inflation derivatives is that the pay-off structure can be matched to the exact needs of the counterparty, and hence their importance for dealers of tailor-made structured notes. They allow flexibility in terms of floors, caps or swaptions, as well as allowing for a wider variety of reference price indices than available in government bond markets. One of the more common uses of inflation swaps in relation to principal-protected structured notes is to exchange at maturity a payment linked to actual inflation over the life of the note for one linked to expected inflation at the outset, as derived from market prices (Diagram A).

#### **Diagram A**

## Break-even/zero-coupon inflation swap cash-flow structure



Expected inflation, the so-called break-even inflation rate (BEI) over the maturity of the swap can be derived from the difference between the rate implied by the nominal yield curve and the rate implied by an equivalent real yield curve, at the same point as the maturity of the swap. Hence, if inflation was higher than initially expected, the investor is compensated. A floor is sometimes added to the structure if investors want to protect themselves against a prolonged period of deflation.

With the pay-as-you-go swap (Diagram B), unlike for a typical inflation-linked bond, there is no inflation uplift added to the nominal amount repaid at maturity. Instead, the investor receives a guaranteed minimum fixed-rate coupon, plus an additional amount, typically floored at zero, dependent on the inflation over each coupon period.

#### Diagram B Pay-as-you-go inflation swap cash-flow structure



Finally, as the name suggests, a synthetic inflation-linked bond has a coupon and redemption pay-off structure similar to that of government inflation-linked bonds, and as such is sometimes known as a TIPS-style swap (Diagram C). As for many government inflation-linked bonds, there is usually a par floor on the nominal amount repaid at maturity.

#### **Diagram C**

## Synthetic inflation-linked bond with par floor cash-flow structure



Such inflation derivatives provide policymakers with another useful measure of market-implied inflation rates.

#### **Review of European collateral framework**

On 10 May, the ECB announced the results of its review of the Eurosystem's collateral framework. In a press release, the ECB noted that the Governing Council had approved the gradual replacement of the current two-tier system of eligible collateral with a single list, in order to 'enhance the level playing field in the euro area, to further promote equal treatment for counterparties and issuers, and increase the overall transparency of the collateral framework'.<sup>(1)</sup>

At present, the ECB maintains two lists of eligible collateral for Eurosystem operations, known as Tier 1 and Tier 2.<sup>(2)</sup> Eligibility criteria for securities on the Tier 1 list are specified by the ECB whereas, subject to approval by the ECB, eligibility criteria for assets on the Tier 2 list are specified by the relevant national central banks.<sup>(3)</sup> Tier 1 securities are euro-denominated marketable debt instruments of high credit quality. Tier 2 securities include equities and non-marketable assets such as bank loans.

The transition to the single list is scheduled for completion in May 2007. As well as all securities currently on the Tier 1 list, the single list will include euro-denominated securities issued by entities established in the G10 countries that are not part of the EEA (currently the United States, Canada, Japan and Switzerland), provided they are issued into a European settlement system. A final list of eligible assets, including the newly eligible G10 securities, will be published in May 2005. All the securities listed will be subject to a requirement that they are quoted on a regulated market, or specific non-regulated markets approved by the ECB; the ECB has altered the list of approved non-regulated markets to exclude some over-the-counter (OTC) markets. Assets traded on newly ineligible markets will be phased out before May 2007.

The Bank of England currently accepts ECB Tier 1 securities as collateral for intraday liquidity in CHAPS Euro (and in CHAPS Sterling). In the new framework, as now, national central banks that are not part of the euro area, including the Bank of England, will not be obliged to accept all collateral from the single list in their euro payments systems (such as CHAPS Euro in the United Kingdom) and, also as now, will be able to accept alternative collateral having at least the same quality as the single list.

#### Changes to the London gold fixing

The London Gold Fix is widely known as an international pricing benchmark. On 29 April 2004, the members of the Fix announced changes to its operation. Since 5 May, a telephone conference call has replaced the twice-daily physical meetings. A web-based application to allow viewing of the fixing process is to be introduced later in 2004.

ScotiaMocatta has taken over the chair of the Fix, following the withdrawal of NM Rothschild London, which had chaired the Fix since 1919. In future, the chairmanship will rotate annually. The other members are Deutsche, HSBC, Société Générale, and Barclays, which replaces Rothschild.

#### **Securities lending publication**

In March, the Securities Lending and Repo Committee (SLRC), chaired by the Bank of England, cosponsored the publication of 'An introduction to securities lending' with the Association of Corporate Treasurers, the British Bankers' Association, the International Securities Lending Association, the London Investment Banking Association and the London Stock Exchange. The publication was welcomed by the National Association of Pension Funds and the Association of British Insurers.

Securities lending provides liquidity to the equity, bond and money markets, making it central to the functioning of the financial system. The ability to borrow and lend securities supports many of the activities of dealers and asset managers. 'An introduction to securities lending' is available on the web sites of the sponsoring organisations, including www.bankofengland.co.uk/slrc.

#### **Bank of England official operations**

#### Changes in the Bank of England balance sheet

Table B summarises changes in the components of the Bank's balance sheet between 25 February 2004 and 26 May 2004.

<sup>(1)</sup> ECB press release, 10 May 2004.

<sup>(2)</sup> Both Tier 1 and Tier 2 securities are accepted as collateral in the Eurosystem's payments systems, open market operations and standing facilities, although Tier 2 securities are not normally used for outright transactions.

<sup>(3)</sup> For the specific eligibility criteria of Tier 1 and Tier 2 assets, refer to Chapter 6 of the ECB manual The

implementation of monetary policy in the euro area: general documentation on Eurosystem monetary policy instruments and procedures', February 2004, available at www.ecb.int/pub/pdf/gendoc2004en.pdf.

#### Table B Simplified version of Bank of England consolidated(a) balance sheet(b)

L DIIIONS					
Liabilities	26 May	25 Feb.	Assets	26 May	25 Feb.
Bank note issue Settlement bank balances Other sterling deposits, cash ratio deposits and the Bank of England's capital and re Foreign currency denominated liabilities	35 <0.1 serves 7 10	33 <0.1 6 9	Stock of refinancing Ways and Means advance Other sterling-denominated assets Foreign currency denominated assets	23 13 4 12	$21 \\ 13 \\ 4 \\ 10$
Total (c)	52	48	Total (c)	52	48

For accounting purposes the Bank of England's balance sheet is divided into two accounting entities: Issue Department and Banking Department. (a)

See 'Components of the Bank of England's balance sheet' (2003), Bank of England Quarterly Bulletin, Spring, page 18

Based on published weekly Bank Returns (b)Figures may not sum to totals due to rounding

C 1.:11: . .

(c)

There was an increase in the both the sterling and foreign-currency components of the Bank's balance sheet over the period. On 16 March 2004, the Bank auctioned a further €1 billion of the 2007 note as part of its euro-denominated notes programme. The auction was covered 2.2 times and the average accepted yield was 2.509%, 11.5 basis points below the prevailing three-year swap rate. This increased the total nominal value of the 2007 note outstanding in the market to  $\in 2$  billion, and the total nominal value of Bank euro notes outstanding in the market to €6 billion.

The Bank maintained the nominal value of its three-month and six-month euro-denominated bills outstanding at €3.6 billion, by rolling over maturing bills at auctions held monthly during the period. Average three-month issuance spreads narrowed slightly and were 8.2 basis points below Euribor, compared with 9.7 basis points in the previous period (November-February); average six-month bills spreads were 10.5 basis points below Euribor, compared with 11.7 basis points previously.

Notes in circulation, by far the largest sterling liability on the Bank's balance sheet, increased over the period, driven by increased demand over the Easter and May Day Bank Holidays. Notes in circulation reached a peak of £38 billion prior to Good Friday.

The stock of refinancing, which comprises assets taken by the Bank in its open market operations (OMOs), moved broadly in line with the level of notes in circulation (Chart 31).

The Bank's counterparties made increased use of euro-denominated European Economic Area (EEA) government debt as collateral against the Bank's lending in OMOs during the latest quarter (Chart 32).

#### Chart 31 Bank notes in circulation, the stock of refinancing, and 'Ways and Means'(a)



Monthly averages. An illiquid advance to HM Government. This fluctuated prior to the transfer of responsibility for UK central government cash manageme to the UK Debt Management Office in April 2000. The Ways and Means is now usually constant, varying only very occasionally. management

#### Chart 32 Instruments used as OMO collateral<sup>(a)</sup>



(a) Monthly averages

In part, this reflected a fall in the cost of using euro-denominated collateral over the quarter relative to gilts (Chart 33). Another factor may have been less use of the Bank's overnight lending facilities (Chart 34). Due to settlement timetable constraints, EEA government debt securities cannot be delivered as

#### Chart 33 Relative cost and use in OMOs of euro-denominated EEA government securities

Euro-denominated securities (left-hand scale) Relative cost (right-hand scale) (a)



a) Relative cost calculated as difference between one-month BBA repo and Libor fixing spread and one-month European Banking Federation repo and Euribor spread. A larger spread indicates a lower cost of repoing euro-denominated debt relative to repoing gilts.

#### Chart 34 Refinancing provided in the Bank's open market operations<sup>(a)</sup>



collateral in the Bank's overnight dealing rounds unless pre-positioned by counterparties with the Bank as intraday collateral within the RTGS payments system.

From 4 May 2004, the Bank of England introduced a requirement that, in order to be eligible for use as collateral in OMOs, sterling and euro-denominated bonds issued by EEA sovereigns or international organisations should be rated Aa3 (on the Moody's scale) or higher by two or more of the major ratings agencies. This was to ensure that the Bank's collateral is always of high credit quality.

#### **Short-dated interest rates**

Volatility of sterling overnight interest rates fell sharply (Chart 35) following the publication by the Bank of

#### Chart 35 The sterling overnight interest rate and official repo rate



#### Chart 36 Volatility of the sterling overnight interest rate<sup>(a)</sup>



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

England of a consultative paper on its operations in the sterling money market (see the box opposite). The spread between the daily fixing for the overnight rate and the MPC's repo rate has also narrowed somewhat (Chart 36); since the publication of the consultative paper on 7 May, the average overnight rate has been 4.28%.

In the week leading up to the MPC's 5–6 May meeting, many market participants were expecting an increase in the Bank's repo rate to 4.25%, and demand to borrow in the Bank's two-week operations increased. The bid/cover ratio (the amount of bids divided by the size of the funds available) averaged 4.5. Expectations of a rate rise also led to a fall in overnight market interest rates. On 5 May, the intraday overnight interbank rate fell to a low of 3.375%, some 62.5 basis points below the then current policy rate.

#### Reform of the Bank of England's operations in the sterling money markets

In October 2003, the Governor announced a review of the Bank's operations in the sterling money markets.<sup>(1)</sup> Since then, the Bank has held discussions with more than 60 market participants and has studied the operational frameworks of many overseas central banks.

On 7 May 2004, the Bank published a consultative paper.<sup>(2)</sup> The paper set out the objectives of the Bank's operational framework, its reasons for reform and described various options for the architecture of a new framework. Comments were invited from any interested parties by 11 June.

The purpose of the Bank's operations in the sterling money markets is to implement the Monetary Policy Committee's (MPC's) interest rate decisions while meeting the liquidity needs, and so contributing to the stability, of the banking system. Under the terms of the review, this will not change. But in seeking to implement the MPC's interest rate decisions through its operations, the Bank will aim to control overnight interest rates much more closely, while improving the framework for banking system liquidity management. In particular, the Bank will have the following four objectives:

- Overnight market interest rates to be in line with the MPC's repo rate up to the next MPC decision date, with very limited day-to-day or intraday volatility.
- An efficient, safe and flexible framework for banking system liquidity management, both in normal and stressed conditions.

• A simple, straightforward and transparent operational framework.

• Competitive and fair sterling money markets.

The primary reason for change is that the current operational framework leaves sterling overnight interest rates considerably more volatile than is desirable, as illustrated by comparison with those of other major currencies (see Chart A).

#### Chart A International overnight interest rates and policy rates



The paper has already formed the basis of further discussions with market participants; the Bank has also received a number of written comments. In due course, the Bank will issue a further paper setting out its conclusions, and will consult, as necessary, on questions of detail and implementation.

See www.bankofengland.co.uk/pressreleases/2003/110.htm, and the box in the Winter 2003 *Quarterly Bulletin*.
 For the entire consultative paper, see pages 217–27 of this *Quarterly Bulletin*.

Such developments are referred to as 'pivoting' and reflect a process of normal market arbitrage, by which market rates ahead of the meeting adjust to equalise the cost of borrowing from the Bank at two weeks (so spanning the MPC meeting on 5–6 May) with the expected cost of rolling borrowing in the overnight market over the same period. In its recent consultative paper the Bank announced that it intends to cease lending at a fixed rate for maturities beyond the next MPC decision date as part of the planned reforms of its operations in the sterling money markets. This should eliminate such pivoting, and the associated distortion to overnight rates.

#### Table C Intraday forecasts versus actual shortages

Mean absolute difference (standard deviation), £ millions

	9.45 forecast	14.30 forecast	16.20 forecast
2002 2003 2003 Q1 2003 Q2 2003 Q3 2003 Q3	83 (107) 101 (123) 80 (74) 119 (131) 118 (170) 87 (91)	$\begin{array}{cccc} 43 & (79) \\ 61 & (96) \\ 45 & (54) \\ 54 & (76) \\ 92 & (154) \\ 52 & (57) \end{array}$	$\begin{array}{cccc} 30 & (73) \\ 51 & (85) \\ 33 & (31) \\ 38 & (43) \\ 85 & (150) \\ 46 & (36) \end{array}$
2004 Q1 April-May 2004	$\begin{array}{c} 120 \\ 120 \\ 134 \\ (137) \end{array}$	79 (77) 68 (96)	$55 (43) \\ 71 (91)$

#### Forecasting the liquidity shortage

There was a small deterioration in the accuracy of the Bank's daily liquidity forecast during the latest period





(Table C). In part, this reflected greater uncertainty over demand for bank notes around the Easter and May Day Bank Holidays.

There was some increase in use of both the End of Day Transfer Scheme (EoDTS) and the Late Transfer Window (LTW) by the settlement banks (Chart 37),<sup>(1)</sup> perhaps suggesting that they also saw some deterioration in the accuracy of their liquidity forecasting over the period. However, use remained lower than in 2003.

(1) For a description of the EoDTS, see page 163 of the Summer 2003 *Quarterly Bulletin*, or the APACS web site: www.apacs.org.uk/downloads/EoDT.pdf, and of the LTW, see page 406 of the Winter 2003 *Quarterly Bulletin*.

# Assessing the stability of narrow money demand in the United Kingdom

## By Kathryn Grant, Gertjan Vlieghe and Andrew Brigden of the Bank's Monetary Assessment and Strategy Division.<sup>(1)</sup>

It is widely accepted that the introduction of cash-saving technologies, such as credit and debit cards, and the growing network of automated teller machines (ATMs) contributed to a prolonged upward shift in narrow money velocity towards the end of the 20th century.<sup>(2)</sup> This article considers whether this upward shift might plausibly have come to an end. First, it presents data on four distinct manifestations of financial innovation, and asks whether the pace of change in each might have slowed. Second, it uses time-series data stretching back more than 100 years to present estimates of the demand for narrow money during different time periods. It finds tentative evidence that, since the early 1990s, narrow money velocity has been a broadly stable function of the short-term rate of interest.

#### Introduction

Monetary policy makers take a keen interest in the monetary aggregates. In comparison with most other economic statistics, the monetary aggregates are more timely and less prone to revision. They are also based on a complete population—in this case banks and building societies operating in the United Kingdom-rather than a population sample. These are some of the reasons why the Monetary Policy Committee (MPC) looks at the monetary aggregates, alongside many other pieces of data, when assembling its projections for nominal demand, and hence for inflation.<sup>(3)</sup> The M0 aggregate, which comprises notes and coin in circulation, and bankers' operational balances held at the Bank of England, is one of the narrowest measures of money. Because it pays no interest, it is a relatively unattractive form of wealth. Consequently, the quantity of MO might be more closely related to current nominal expenditure, on at least certain classes of goods and services, than broader measures of the money supply, such as M4.

Chart 1 confirms that, during the past 30 years or so, there has been a reasonably close relationship between the rate of growth of M0 and the rate of growth of nominal expenditure. All three series in the chart have followed a broadly similar pattern over the economic

Chart 1 Narrow money and nominal expenditure



cycle. It is nonetheless evident that, during the late 1970s and for most of the 1980s, M0 grew markedly less quickly than nominal expenditure. That means that the velocity of circulation of narrow money, defined as the ratio of nominal expenditure to M0, was rising. Since the late 1990s, the picture has changed somewhat, with M0 tending to grow more quickly than nominal expenditure, and velocity tending to fall.

In order to use data on the rate of growth of narrow money to draw inferences about the rate of growth of nominal expenditure, some view about the path of narrow money velocity is required. Chart 2 compares

<sup>(1)</sup> We are grateful to Zvi Eckstein for many useful discussions. He also provided us with the initial motivation for this project. We would also like to thank the Association for Payment Clearing Services (APACS), which provided us with all the means of payment data presented in this article.

<sup>(2)</sup> In this article, narrow money velocity is defined as nominal expenditure divided by M0.

<sup>(3)</sup> See Hauser and Brigden (2002) for a more detailed account of how the MPC makes use of the monetary aggregates.

#### Chart 2 Narrow money velocity and the short-term interest rate



(a) Quarterly expenditure data are annualised.
 (b) Discount rate on three-month eligible bills.

both the GDP and the consumption velocity of M0 with the discount rate on three-month eligible bills since 1970. A key identifying feature of cash, as a form of wealth, is that it pays no interest. Consequently, the opportunity cost of holding cash is the rate of interest that could be earned on an alternative asset. To the extent that the discount rate on three-month eligible bills is a suitable proxy for this rate of interest, then one should expect to see a positive relationship between the three series in Chart 2. But there appears to be no stable relationship of any kind. The most striking aspect of Chart 2 is the marked upward trend in narrow money velocity during the 1970s and the 1980s. At this time, the short-term interest rate was both unusually high and unusually volatile. Nonetheless, it reached a peak in 1980, and thereafter began to drift back down.

Much has been written about the upward trend in narrow money velocity during the 1970s and the 1980s. The analysis has often focused on the impact of financial innovations that have allowed people to economise on their cash holdings: see for example Trundle (1982) or Westaway and Walton (1991). These cash-saving innovations included the introduction of ATMs, as well as a number of alternatives to cash as a means of payment, such as plastic cards and electronic funds transfer at the point of sale (EFTPOS) technology. More recently, a number of authors have considered why the upward trend in velocity might have apparently ended so abruptly during the 1990s. One example, from an earlier edition of this Bulletin, is Janssen (1996). He surveyed a number of direct measures of cash-saving innovations, and concluded that the pace at which these were being introduced had slowed.

The second section of this article revisits some of the direct measures of cash-saving innovations discussed in Janssen (1996). The third section provides some econometric evidence on the relationship between velocity and the short-term rate of interest. Using a set of annual data that stretches back more than 100 years, we find evidence that a gradual upward shift in velocity occurred during the middle of the period shown in Chart 2. During the period from 1870 to 1980, there appeared to have been a stable long-run relationship between velocity and the short-term rate of interest. That relationship seemed to break down between 1981 and 1992, but might have reasserted itself more recently.

## Cash-saving financial innovations and narrow money velocity

Estimates suggest that the greater part of M0 (around 80%) is held in the form of notes and coin by the household sector. A small amount (around 20%) is held in the form of notes and coin by monetary financial institutions (MFIs) and private non-financial corporations (PNFCs). This will include cash held in tills at bank and building society branches, and at retail outlets. The amount of notes and coin held by other financial corporations (OFCs) and bankers' operational balances at the Bank of England are both negligible. Since most cash is held by private individuals, our analysis concentrates on trends in household sector expenditure, and in the payments industry that serves it.

Imagine that, for a price, new technology could be installed that would allow a smaller amount of cash balances to be held for a given amount of expenditure. Then the incentive to invest in this new technology would depend not just on the opportunity cost of holding cash today, but on the expected opportunity cost of holding cash in the future. To the extent that the unprecedented pickup in inflation during the 1970s caused individuals to revise upwards their expectations for inflation and nominal interest rates, then one might imagine that the incentive to develop cash-saving innovations was considerable at this time. Over the past ten years or so, expectations of inflation and nominal interest rates have moderated significantly. So it is likely that the incentives to invest in cash-saving technology have lessened. However, the capital stock is still in place: ATMs and electronic funds transfer technologies decay only slowly over time. There are no comparable disincentives to encourage the removal of this new technology. So a gradual upward shift in velocity, which

might now have come to an end, but is unlikely to be reversed, seems intuitively plausible. In this section, we review a number of direct measures of financial innovation.

#### Payment of wages in cash

One noticeable change has been a gradual movement away from payment of wages in cash. Chart 3 shows that, by 2003, only 7% of employees were paid in cash, down from more than 50% in the late 1970s. The high rates of interest during the late 1970s and the early 1980s would have made it very costly for firms to stockpile sufficient cash once a month, or in some cases once a week, to pay all of their workers. This, together with the fact that these high rates of interest were expected to persist, probably caused firms to seek other means of paying wages, such as through cheques or direct money transfer. Moreover, the statutory right of manual workers to demand payment in cash, enshrined in the Truck Acts, was removed in 1986. With so few employees now paid in cash, the scope for further upward shifts in narrow money velocity through an extension of payment by cheque, or by direct money transfer, is limited.

#### Chart 3 Percentage of employees paid in cash(a)



(a) Data for years not shown are not available.

## More widespread access to bank and building society current accounts

With fewer employees receiving wages in the form of cash then, almost by necessity, a greater proportion of adults now has access to bank and building society accounts. Chart 4 shows that the proportion of the UK adult population holding a current account at a bank or building society rose from below 50% in the mid-1970s to about 80% by the mid-1990s. It has remained



(a) Data for years not shown are not available

Chart 4

broadly stable since that time. Individuals with current accounts have access to a range of non-cash means of payment, such as cheques, direct debits and standing orders. Consequently, they are no longer obliged to withdraw cash in order to purchase goods and services, or to settle debts more generally.

#### Ability to make quick and easy cash withdrawals

Automated teller machines (ATMs) provide a convenient alternative to entering a bank or a building society branch in order to obtain cash 'across the counter'. Chart 5 shows that individual cash acquisitions from ATMs, or from cash-back transactions, are on average much smaller in value than any other method of obtaining cash. This is not surprising. These technologies allow individuals to obtain cash at little or

#### Chart 5

## Average value of cash acquired on each occasion, by different methods



Source: APACS

no cost, from a wide number of locations at any time of day or night. It is the fact that cash is available quickly and easily in this way that encourages individuals to make more frequent, smaller withdrawals, and consequently to hold smaller cash balances on average.

The first cash dispenser was introduced in 1967, and since that time the ATM network has grown rapidly. Machines are no longer situated only at banks and building societies, but are dispersed throughout the country: at supermarkets, convenience stores, petrol stations, and bars. These latter innovations—known as remote and independently operated ATMs—have kept the ATM network as a whole growing.

Chart 6 shows that the rate of growth of both the number of ATMs and the value of withdrawals made from them has slowed considerably from a peak in the early 1980s. The rate of growth of the value of cash withdrawals made from ATMs is now about the same as the rate of growth of M0 itself. And in each of the past two years, the average amount withdrawn from each ATM has fallen slightly, as the number of ATMs has continued to rise. It appears that the placing of new machines at more convenient locations is, to a degree, taking custom away from the existing network, rather than encouraging greater overall use.

#### Chart 6 Growth of the ATM network(a)



(a) Independently operated ATMs were first included in 2000, inflating the annual growth rate for that year.

(b) The real value of ATM transactions was constructed by deflating nominal values by the consumption deflator.

#### Introduction of alternative means of payment

Cheques have been in existence for many years. But plastic cards, and in particular debit cards, are a much more recent alternative to cash. Increased ownership and usage of plastic cards has been one of the most noticeable trends in payment systems over recent years. The proportions of adults holding credit or charge cards and of adults holding debit cards have both risen particularly strongly (see Charts 7 and 8).



## Percentage of adults holding a credit or charge card<sup>(a)</sup>



Source: APACS

(a) Data for years not shown are not available.



#### Chart 8 Percentage of adults holding a debit card<sup>(a)</sup>

(a) Data for years not shown are not available.

Data on the number of cards in circulation are not necessarily informative about card usage, which is what matters if we are interested in factors affecting narrow money velocity. A large number of credit card accounts are inactive (as many as 35% of Visa and MasterCard accounts are inactive, according to data from the British Bankers' Association). Chart 9 shows that, while expenditure on credit cards is still growing strongly, growth rates are well below the peaks seen in the 1970s and the 1980s.

The fact that the value of credit card transactions is growing faster than consumption tells us that the

#### Chart 9 Growth of credit card transactions(a)



(a) There is a break in both series in 1991 (prior to this, building society and travel/entertainment cards were excluded).

proportion of transactions completed by credit card must be rising. This is confirmed by Chart 10, which focuses on transactions above £1 in value at retail outlets. Between 1996 and 2002, the share of payments made by any form of plastic card rose by 16 percentage points, from 35% to 51%. But this was not entirely at the expense of payments by cash. The share of payments made by cheque fell by 10 percentage points, from 15% to just 5%, while the share of payments made by cash fell by 7 percentage points, from 50% to 43%.





Source: APACS Consumer Payments Survey.

In summary, it is widely accepted that a number of cash-saving innovations permitted a substantial rise in narrow money velocity, over and above that which would have been expected given fluctuations in the opportunity cost of holding cash. These innovations are thought to have been particularly prevalent during the 1980s. The main aim of this section has been to consider whether, for the time being at least, the increase in velocity has come to an end. We started by arguing that there were good theoretical reasons for believing that it had. The substantial rise in expected future nominal rates of interest during the 1970s, brought about by an unprecedented pickup in inflation, created a big incentive to invest in cash-saving technology. Although expected future nominal rates of interest, as measured by yields on long-dated government bonds, have fallen back sharply over the past ten years or so, the relevant capital, such as the ATM network, remains in place and will not decay rapidly.

We examined evidence on four different manifestations of financial innovation. Three out of the four were supportive of the hypothesis that the period of innovation was approaching an end. In particular, the proportion of employees paid in cash is now so low that it cannot fall much further. The proportion of adults with access to a current account has been broadly constant since the mid-1990s. The number of ATMs continues to rise. Nevertheless, the value of ATM withdrawals is now growing in line with M0, and the average value of withdrawals per ATM actually fell in 2002 and in 2003. Conversely, the proportion of transactions completed by credit and debit cards is still rising. This appears to be partly at the expense of cash, but largely at the expense of cheques.

In this section, we have necessarily focused on those types of financial innovation for which data are readily available. Other changes in payments technology might have affected narrow money velocity in the past, and may continue to do so in the future. A recent article in this *Bulletin* by Allen (2003) discussed so-called 'e-payments'—the settlement of debt using mobile phone or internet technology. And further processes may be at work, other than financial innovation, that will have a bearing on velocity. These include changes in the size of the hidden economy, which by its nature is cash intensive.

#### Modelling the demand for narrow money

In an environment where the prices of most goods and services are rising, and the returns to holding financial assets are on average positive, cash is a dominated asset, in the sense that it would appear preferable always to hold wealth in the form of some alternative asset, such as a savings account that pays a positive rate of interest. Why then do people in practice choose to hold non interest-bearing forms of money, such as MO? Over time, researchers have proposed a variety of solutions to this puzzle. In this article, we focus on just one solution, put forward by Sidrauski (1967). He argued that cash balances provide a flow of services, essentially by facilitating economic transactions. Individuals are able to obtain economic benefits simply by holding cash for a period of time. Models that adopt this approach are known as 'money in the utility function' (MIU) models.

In a technical appendix to this article, we describe an MIU model in some detail. We show that, when an individual maximises his or her welfare by choosing each period how much to consume, how much to hold in the form of an interest-bearing asset, such as a bank deposit, and how much to hold in the form of non interest-bearing narrow money, the demand for narrow money takes the following form:

$$\frac{m_t}{c_t} = \left(\frac{\delta}{1-\delta}\right) \left[\frac{1+R_t}{R_t}\right]^{\sigma}$$
(1)

where  $c_t$  is real consumption expenditure at time t,  $m_t$  is real money balances at time t and  $R_t$  is the nominal interest rate payable at time t on the interest-bearing asset.  $\delta$  and  $\sigma$  are parameters of the model.<sup>(1)</sup> Equation (1) says that the ratio of real money balances to real consumption, which is the same as the ratio of nominal money balances to nominal consumption or the inverse of velocity, depends on  $R_t$ . Of particular interest to policymakers is the interest elasticity of money demand (or  $\varepsilon_t$ ). This measures the percentage change in money demand that would occur following a given percentage change in the nominal rate of interest. After differentiating (1) with respect to  $R_t$ , multiplying by the ratio of  $R_t$  to  $m_t/c_t$  and rearranging, the following expression for  $\varepsilon_t$  can be obtained:

$$\varepsilon_t = -\sigma \left( \frac{1}{1 + R_t} \right) \tag{2}$$

We begin by estimating equation (1) over the period 1970 Q1 to 2002 Q4.<sup>(2)</sup> The results are shown in the first row of Table A. The central estimate of  $\sigma$  for the period 1970 Q1 to 2002 Q4 is negative. Using equation (2), it is clear that the interest elasticity of money demand would be positive if  $\sigma$  were negative. In other words, the demand for real money balances would

#### Table A

## Parameter estimates of the narrow money demand equation over three different sample periods

	C	7		5
Sample period	Central estimate	95% confidence interval (a)	Central estimate	95% confidence interval (a)
1970 Q1–2002 Q4 1870–1980 1992 Q4–2002 Q4	-0.283 0.198 0.178	(-0.593, -0.028) (0.118, 0.277) (0.150, 0.207)	0.129 0.067 0.030	(0.064, 0.242) (0.051, 0.086) (0.027, 0.032)

(a) We interpret (1) as a description of long-run equilibrium, rather than a condition that should hold period by period. This means that we should expect to find serially correlated error terms, which indeed we do. Consequently the standard errors have been corrected using the procedure of Newey and West (1987).

#### Chart 11 Mo to nominal consumption ratio since 1970 Q1



Sources: Bank of England and ONS.

rise following an increase in the rate of interest. This makes little economic sense. Chart 11 plots those combinations of the nominal interest rate and the M0 to nominal consumption ratio that have occurred since 1970 Q1, together with the line of best fit implied by the parameter estimates in the first row of Table A. This confirms that, since 1970 Q1, the demand for money curve has had a perverse upward slope. But it also shows that any relationship between nominal interest rates and the M0 to nominal consumption ratio during this period has been very weak. The line of best fit may be upward sloping, but many of the points lie some distance from it. Starting from 1970 Q1, the points in Chart 11 have a general tendency to drift to the left. In other words, the M0 to nominal consumption ratio has generally been falling, and velocity has generally been rising, irrespective of fluctuations in the rate of interest. The results in the first row of Table A merely provide statistical confirmation of what we should already have come to suspect. The gradual introduction of cash-saving financial innovations, perhaps starting in the late 1970s, but then continuing through the 1980s, means that conventional money demand equations, when fitted to data from this period, do not work well.

<sup>(1)</sup> More details are provided in the technical appendix.

<sup>(2)</sup> Although equation (1) is non-linear in  $(1+R_t)/R_t$ , it becomes linear after taking natural logarithms. Since  $R_t$  and  $m_t/c_t$ 

are both endogenous, we then apply the dynamic ordinary least squares technique of Stock and Watson (1993).

Chart 12 reproduces, as blue squares, the quarterly data from 1970 Q1 to 2003 Q4 shown in Chart 11. But, in addition, it includes annual data covering the period from 1870 to 1969, represented by blue circles. Arguably, these data cast a somewhat different light on the experience of the past three decades. Many of the points in Chart 12, including all of the blue circles, and a large number of the blue squares that relate to the 1970s, appear to fit quite neatly on the kind of downward-sloping money demand curve predicted by equation (1). There is undoubtedly a further cluster of blue squares that do not fit on this, or indeed any, downward-sloping money demand curve. But there is possibly a third set of blue squares, lying in the bottom left-hand corner of Chart 12, and relating to the most recent past, that lie on a second downward-sloping money demand curve, positioned further to the left than the first.

#### Chart 12 Mo to nominal consumption ratio since 1870



Sources: Bank of England; Mitchell, B R (1988), British historical statistics, Cambridge University Press; and ONS.

This scenario, of a prolonged leftward shift in the demand for money curve, would fit the hypothesis advanced earlier, that the introduction of cash-saving payments technology, most likely brought about by the high inflation and high nominal interest rate era of the 1970s, caused a prolonged upward shift in velocity. This shift took place over a number of years, and might now have come to an end. In order to investigate this hypothesis more formally, and because we wish to remain agnostic about the precise timing of the velocity shift, we adopted the following approach. First, we estimated equation **(1)** using annual data from 1870. The sample was gradually extended forwards in time until the

estimates for  $\sigma$  and  $\delta$  became unstable. This seemed to occur after 1980. Second, we estimated equation (1) using quarterly data up until 2002 Q4. The sample was gradually extended backwards in time until the estimates of  $\sigma$  and  $\delta$  became unstable. This seemed to occur before 1992 Q4. In this way we identified: an early period, running from 1870 to 1980, represented by green squares in Chart 13; a middle period running from 1981 Q1 to 1992 Q3, represented by blue crosses in Chart 13; and a late period running from 1992 Q4 to 2003 Q4, represented by red triangles in Chart 13. The parameter estimates we obtained for the early and the late periods are shown in the second and third rows of Table A. The associated lines of best fit are plotted in Chart 13.

#### Chart 13 Mo to nominal consumption ratio since 1870



Sources: Bank of England; Mitchell, B R (1988), British historical statistics, Cambridge University Press; and ONS.

The central estimate of  $\sigma$  is positive, for both the early and the late periods, giving a more conventional downward slope to the money demand curves. Moreover, the two central estimates of  $\sigma$  are reasonably close, at 0.198 for the early period and 0.178 for the late period. The 95% confidence intervals around the central estimates of  $\sigma$  for the early and late periods overlap, suggesting that one might not reject the null hypothesis that they are in fact the same.<sup>(1)</sup> It would appear that, during the period from 1992 Q4 to 2002 Q4, the demand for narrow money responded to changes in the rate of interest in more or less the same way as it had done during the period from 1870 to 1980. Conversely, the two central estimates of  $\delta$ , at 0.067 for the early period and 0.030 for the late period, look rather different. The 95% confidence intervals around these

(1) This is a rather informal line of reasoning. Under the null hypothesis, the estimates of  $\sigma$  taken from the quarterly and the annual data sets would come from different distributions, and so would not be directly comparable.

central estimates do not overlap. One interpretation of the change in the central estimate of the  $\delta$  parameter is that an individual would now require less than one half the quantity of narrow money balances to fund a given amount of consumption expenditure than had been necessary before the velocity shift.

It is relevant that the non-linear money demand equation obtained using the MIU model described in the technical appendix appears to cope well with the period of very low interest rates around the time of World War II. The five green squares in the bottom right-hand corner of Chart 13 cover the period from 1943 to 1947, when the eligible bill rate dropped below 1%. A feature of this specification is that the demand for money becomes infinite as the rate of interest approaches 0%. An alternative specification, which has often been estimated by researchers in the past, involves regressing the logarithm of the M0 to nominal consumption ratio on the level, rather than the logarithm, of the nominal interest rate. Known as the semi-logarithmic specification, this approach is associated with the work of Cagan (1956). Under the semi-logarithmic specification, the M0 to nominal consumption ratio has an upper bound and the line of best fit is forced to cut the horizontal axis. A more detailed consideration of alternative money demand equations is contained in Chadha, Haldane and Janssen (1998).

Can our econometric work shed any light on the recent behaviour of MO? In particular, can it account for the fact that, since the beginning of 1998, the M0 to nominal consumption ratio has risen, with M0 growing at an average annual rate of 7.1% and nominal consumption growing more slowly, at an average annual rate of 5.3%? Chart 14 compares the M0 to nominal consumption ratio predicted by the equation for the late period shown in the final row of Table A with the actual outturns. Owing to force of habit, individuals are likely to adjust their money balances only slowly over time. But our model makes no allowance for this. Instead, it assumes that individuals adjust their money balances immediately to the quantity implied by the prevailing level of nominal expenditure, and the prevailing nominal interest rate. Despite this potential shortcoming, the actual and predicted series shown in Chart 14 track each other quite closely. Between 1998 Q2, when the Bank of England repo rate reached a peak, and 2003 Q4, the discount rate on eligible bills fell from 7.5% to 3.9%. According to our equation, that implies that the ratio of

#### Chart 14 Actual and predicted values of $m_t/c_t$ since 1992 Q4



Sources: Bank of England calculations and ONS

(a) The predicted values for m<sub>t</sub>/c<sub>t</sub> should be regarded as estimates of the long-run equilibrium M0 to nominal consumption ratio. The dashed lines represent 95% confidence intervals around those estimates of long-run equilibrium.

M0 to nominal consumption ought to have risen by a little over 10%. As Chart 14 shows, this is more or less what happened. It seems probable that the approximate halving of nominal interest rates during that five and a half year period accounted for much of the pickup in the money to consumption ratio, or much of the slowdown in velocity.

Chart 14 uses data up until 2003 Q4. At that point in time, the M0 to nominal consumption ratio was a little above its estimated long-run equilibrium. Moreover, since the end of last year, short-term interest rates have tended to rise. Taken together, these two observations imply that the rate of growth of M0 could moderate during the second half of this year, without necessarily implying a slowdown in the rate of growth of nominal demand.

#### Summary

This article has used time-series data stretching back more than 100 years in an attempt to shed some light on the recent behaviour of M0. Modelling the demand for M0 in the United Kingdom is problematic, owing to a steady upward drift in velocity during the 1970s and the 1980s that cannot be explained by changes in the opportunity cost of holding cash, as measured by the short-term rate of interest. Rather than address this problem directly, we have avoided it. Casual inspection of the data suggested that, for much of the period since 1870, there appeared to have been a stable relationship between the M0 to nominal consumption ratio and the short-term rate of interest. It was clear that this relationship broke down towards the end of the 20th century, although it may have reasserted itself in recent years. After some experimentation, we divided our data set into three distinct time periods. During the middle period, which ran from 1981 Q1 to 1992 Q3, our money demand equation did not fit the data. By contrast, during the early and the late periods, our money demand equation fitted the data reasonably well. Moreover, although the quantity of MO used to finance a given amount of nominal consumption had approximately halved between the early and the late periods, the response to changes in the short-term rate of interest rate was little changed. For the past ten years or so, the M0 to nominal consumption ratio appears to have been a reasonably stable function of the short-term rate of interest. We have asserted that this might plausibly be because the rate at which cash-saving financial innovations are being introduced has slowed

somewhat, and we have provided some direct evidence on payment technologies to support this assertion.

It is always easier to identify stable money demand functions with the benefit of hindsight. One can imagine many different scenarios, such as an increase in the use of plastic cards for small purchases, perhaps following the implementation of 'chip and PIN' technology, or a change in the size of the hidden economy, that would cause another shift in narrow money velocity. The challenge for monetary policy makers, when next faced with a set of narrow money data that appear inconsistent with projections for nominal expenditure, will be, as always, to determine whether the surprising data contain genuine news about economic activity, or whether they are merely a sign that the stable money demand function has broken down once again.

#### **Technical appendix**

This technical appendix shows how the money demand equation on page 136 of the main text can be derived from the optimising behaviour of a representative individual.

Let the representative individual solve the following problem:

$$\max E_t \sum_{j=0}^{\infty} \beta^j u(c_{t+j}, m_{t+j})$$
(A1)

subject to:

 $\infty$ 

$$M_t + D_t = Y_t - p_t c_t + M_{t-1} + (1 + R_{t-1})D_{t-1}$$
(A2)

In (A1)  $\beta$  is the subjective discount factor measuring the individual's impatience to consume,  $c_t$  is real consumption expenditure at time t and  $m_t$  is real money balances at time t.  $u(c_t,m_t)$  expresses the individual's utility as a function of  $c_t$ and  $m_t$ . The fact that  $m_t$  is one of the arguments makes this a 'money in the utility function' (MIU) model. In (A2)  $M_t$ and  $D_t$  are nominal money balances and nominal bank deposits respectively at time t.  $Y_t$  is nominal labour income at time t and  $p_t$  is the price level at time t, so  $p_t c_t$  is nominal consumption expenditure at time t.  $R_t$  is the nominal interest rate on bank deposits at time t. (A2) is the nominal budget constraint. It says that the change in the stock of assets between time t-1 and time t is equal to savings during period t, where savings are defined as labour and interest income net of consumption expenditure.

The first stage in solving this problem is to rewrite (A2) in real terms. Dividing (A2) through by  $p_t$  we obtain:

$$m_t + d_t = y_t - c_t + m_{t-1} \left(\frac{p_{t-1}}{p_t}\right) + (1 + R_{t-1}) d_{t-1} \left(\frac{p_{t-1}}{p_t}\right)$$
(A3)

where lower-case letters are used to denote real variables. The Lagrangean for this problem can then be written as:

$$= E_{t} \sum_{j=0}^{\infty} \beta^{j} u(c_{t+j}, m_{t+j})$$

$$-E_{t} \sum_{j=0}^{\infty} \beta^{j} \lambda_{t+j} \left[ m_{t+j} + d_{t+j} - y_{t+j} + c_{t+j} - m_{t+j-1} \left( \frac{p_{t+j-1}}{p_{t+j}} \right) - \left( 1 + R_{t+j-1} \right) d_{t+j-1} \left( \frac{p_{t+j-1}}{p_{t+j}} \right) \right]$$
(A4)

Differentiating (A4) with respect to  $c_t$ ,  $m_t$  and then  $d_t$ , gives three first-order conditions:

$$u_{c,t} = \lambda_t \tag{A5}$$

$$u_{m,t} = \lambda_t - \beta E_t \lambda_{t+1} \left( \frac{p_t}{p_{t+1}} \right)$$
(A6)

$$\lambda_t = \beta E_t \left[ \lambda_{t+1} (1+R_t) \left( \frac{p_t}{p_{t+1}} \right) \right]$$
(A7)

After combining (A5), (A6) and (A7), the following expression for the ratio of the marginal utilities can be obtained:  $u_{c,t} = \lambda_t$ 

$$\frac{c_{t,t}}{u_{m,t}} = \frac{1}{\lambda_t - \lambda_t \left(\frac{1}{1 + R_t}\right)}$$

$$= \frac{1 + R_t}{R_t}$$
(A8)

We assume a constant elasticity of substitution (CES) utility function of the following form:

$$u(c_t, m_t) = \left[ \left( 1 - \delta \right)^{\rho+1} c_t^{-\rho} + \delta^{\rho+1} m_t^{-\rho} \right]^{-\frac{1}{\rho}}$$
(A9)

From (A9), the marginal utilities with respect to  $c_t$  and  $m_t$  are given by:

$$u_{c,t} = \frac{-1}{\rho} \left[ \left( 1 - \delta \right)^{\rho+1} c_t^{-\rho} + \delta^{\rho+1} m_t^{-\rho} \right]^{\frac{-1-\rho}{\rho}} \left( 1 - \delta \right)^{\rho+1} \left( -\rho \right) c_t^{-\rho-1}$$
(A10)

$$u_{m,t} = \frac{-1}{\rho} \left[ \left( 1 - \delta \right)^{\rho+1} c_t^{-\rho} + \delta^{\rho+1} m_t^{-\rho} \right]^{\frac{-1-\rho}{\rho}} \delta^{\rho+1} (-\rho) m_t^{-\rho-1}$$
(A11)

Finally, the money demand equation is obtained by using (A10) and (A11) in (A8):

$$\frac{m_t}{c_t} = \left(\frac{\delta}{1-\delta}\right) \left(\frac{1+R_t}{R_t}\right)^{\sigma}$$
(A12)

where  $\sigma = (1/(1+\rho))$  is the constant elasticity of substitution between real consumption expenditure and real money balances. Equation (A12) is equation (1) in the main text.

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## Deriving a market-based measure of interest rate expectations

#### By Christopher Peacock of the Bank's Monetary Instruments and Markets Division.

Forward rates are perhaps the most common measure of expected future interest rates. But the existence of a risk premium can drive a wedge between forward rates and what the market expects future rates to be. In this article we use survey data to derive an estimate of the risk premium. We find that the survey-based risk premium implies a significant and time-varying difference between forward rates and expected future interest rates. Consequently, this article sets out a simple model of the survey-based risk premium that can be used to generate a path for expected future interest rates on any particular day.

#### Introduction

In a speech two years ago, the then Governor urged: '... *if I could make just one comment on the current macroeconomic situation, ... it would be to caution you against placing too much weight on the steepness of the short-term interbank [forward] curve as an indicator of the likely course of official short-term interest rates* ....'(1) Chart 1 plots the forward curve on the eve of the Governor's speech.<sup>(2)(3)</sup> It shows the interbank forward rate rising from a little over 4% to around 5.4% a year later. But in a poll of financial market economists, published just one week earlier, the average expectation of the interbank rate a year ahead was 5.0%. In other words, there was a difference of some 0.4 percentage points between the market forward rate and what these economists, on average, expected the interbank rate to be.

This article begins by discussing why the presence of a risk premium can lead to forward rates being a biased measure of expected future interest rates. The third section shows how surveys of interest rate expectations can be used to derive an estimate of the risk premium. It finds that the survey-based risk premium implies a significant and time-varying difference between forward rates and expected interest rates. In light of this, the fourth section proposes a simple model of the survey-based risk premium that can be used to generate a path for future interest rate expectations on any

Chart 1 Short-term interbank forward curve at 18 February 2002



particular day. The fifth section applies this model to examine what the estimated profile for interest rate expectations would have been at 18 February 2002, and also at 28 May 2004.<sup>(4)</sup> The last section concludes.

## Forward rates and expectations of future interest rates

The premise that the forward curve represents the path of expected future interest rates is known as the *expectations hypothesis*. But in practice there are a number of factors that may drive a wedge between forward rates and what the market expects future rates to be. For instance, if market participants are risk averse

<sup>(1)</sup> See George (2002).

<sup>(2)</sup> These forward rates are available daily at www.bankofengland.co.uk/statistics/yieldcurve/main.htm.

<sup>(3)</sup> Forward rates are the interest rates for future periods that are implicitly incorporated within today's interest rates for loans of different maturities. For instance, suppose that the interest rate today for borrowing for six months is 6% per annum and that the rate for borrowing for twelve months is 7% per annum. Combined, these two interest rates contain an implicit interest rate for borrowing for a six-month period starting in six months' time of roughly 8% per annum.

<sup>(4)</sup> The data cut-off for the 'Markets and operations' article in this Quarterly Bulletin.

they are likely to require a *term premium* as compensation for the uncertainty about future interest rates. Participants may also demand a *liquidity premium* to hold instruments that are difficult to trade at times of market stress. Both these factors, which we collectively refer to as risk premia, will tend to push the forward curve above the path of expected future interest rates.

Ideally, one would test the expectations hypothesis by comparing forward rates directly with expectations. However, expectations are unobservable. To get round this problem, empirical studies often assume that expectations are *rational*.<sup>(1)</sup> In other words, that expectations of future interest rates do not differ systematically from subsequent interest rate outturns. By assuming rational expectations hold, any systematic difference between forward rates and outturns can be interpreted as reflecting the risk premium.

Chart 2 shows the differences between interbank forward rates and corresponding outturns for a range of horizons out to two years, over the period May 1993 to April 2004. Each bar shows the range of the differences at a particular horizon, with the average shown by a red square. As noted above, by assuming rational expectations, the expectations hypothesis suggests that these differences should average zero. By contrast, the chart shows that, on average, interbank forward rates have provided an upwardly biased forecast of future interbank rates. Over the period, the average differences at three months, one year and two years ahead were 14, 66 and 135 basis points respectively. The chart also makes clear the often large differences, both positive and negative, between interbank forward rates and subsequent outturns. Moreover, the range of these differences increases with the horizon, probably reflecting the greater level of uncertainty as market participants project further out into the future.

On this basis at least, it would appear that the expectations hypothesis can be rejected for the interbank market. But the above approach has one clear drawback. It assumes that expectations are rational. However, since expectations are unobservable, there is no way to test whether this assumption is valid. This means that the biases observed in Chart 2 may be due not only to the existence of a risk premium, but also to market participants making systematic expectational errors.<sup>(2)</sup>

#### Chart 2 Differences between interbank forward rates and subsequent outturns



#### **Survey expectations**

Other empirical studies have used surveys of expectations as a proxy for the market's true expectations.<sup>(3)</sup> It can be argued that there are a number of advantages to using survey data as a means of estimating the risk premium. First, *ex-post* measures, such as the one shown in Chart 2, only provide an estimate of the *average* risk premium at a particular horizon. By contrast, surveys provide a time-varying estimate. And, as we show later on, there is a good deal of evidence to suggest that the risk premium does vary significantly over time. Second, survey-based estimates of the risk premium are immune to the impact of shocks that might occur between the survey date and the outturn. Thus, unlike the differences plotted in Chart 2, they are not affected by expectational errors. Third, by using survey data one can test for, rather than simply assume, rational expectations.

In this article we use surveys of short-term interbank rate expectations conducted by *Consensus Economics*. On a monthly basis it polls around 20 financial market economists on their expectations of the end-month interbank rate, both for three months and one year ahead. For instance, in the survey published on 8 April 2004, forecasts were reported for end-July 2004 and end-April 2005.

In terms of the survey data, rational expectations mean that survey respondents should not make systematic errors when formulating their expectations. The most

<sup>(1)</sup> See, among others, Fama and Bliss (1987) and Campbell and Shiller (1991).

<sup>(2)</sup> Another drawback is that, even if expectations are rational, it may be that the sample period is too short for

non-systematic expectational errors to average out to zero.

<sup>(3)</sup> See Froot (1989) and MacDonald and Macmillan (1994). For a survey of the literature see Maddala (1991).
obvious way respondents might make systematic errors is if, over a long enough time period, their forecast errors are biased. Chart 3 plots each set of survey expectations data against its corresponding outturn. If the surveys are unbiased, the scatter plot should be centred on a 45-degree line that passes through the origin. The chart shows that there is no apparent bias in the survey expectations at either horizon, a finding confirmed by the results of a formal test outlined in the Appendix.

# Chart 3 Survey expectations and outturns



Nevertheless, it is clear from the chart that, especially at the one-year horizon, there are a number of points where interbank outturns were considerably below survey expectations. But this finding may be misleading due to the *overlapping observations problem*. Overlapping observations occur when the time between survey dates is less than the forecast horizon. The result is that a shock to the variable being forecast will affect the forecast errors over several periods, and not just one. For instance, the terrorist attacks on the United States in September 2001 led to sharp falls in equity prices, and a decline in business and consumer confidence. In response, policymakers both at home and abroad reduced official policy rates. Though the impact of this unforeseen shock affected short-term interest rates in only one month, it meant that the expectations for one year ahead taken between the Septembers of 2000 and 2001 would, other things being equal, be too high. Indeed, this was the case, as the expectations plotted in red testify.

A second reason why survey respondents may make systematic errors is if they fail to use all the available information at hand when formulating their expectations. If this were the case, then their expectational errors may be systematically related to the information they ignored. In the Appendix we test this efficiency condition by examining whether expectational errors were related to the level and the slope of the forward curve at the time the survey expectations were set. We use information from the yield curve since it can be viewed as a summary measure of potentially relevant explanatory factors, such as expectations of future inflation and output growth. The results of the test suggest that survey expectations were indeed efficient with respect to this information. So, in conjunction with the finding that survey expectations are unbiased, there is no strong evidence to suggest that the survey expectations we use in this article were not rational.

From the survey data we can derive an estimate of the risk premium as simply the difference between the interbank forward rate and the survey expectation of the interbank rate. At this stage it is worth noting how different this measure of the risk premium can be compared with the measure shown in Chart 2, and thus one that assumes expectational errors were zero at all points in the past. By way of an example, Chart 4 shows time profiles for the survey-based risk premium and the difference between the interbank forward rate and subsequent outturn, both at the one-year horizon. It is clear from the chart that there are a number of major differences between the two measures. First, over most of the period shown, the variation of the survey-based risk premium across time is considerably less than the ex-post difference. Second, the two measures do not track each other particularly well. Looking over the sample as a whole, the correlation between the two series is negative and around 0.2. Third, the two measures can lead to very different conclusions about the size of the risk premium. For instance, since the beginning of 2000 the ex-post difference has averaged over 90 basis points, compared with just 5 basis points for the survey-based risk premium.

#### Chart 4

Survey-based risk premium and difference between interbank forward rate and subsequent outturn: one year ahead



The analysis above is somewhat informal, but it does illustrate the inherent problem in using *ex-post* measures of the risk premium. Put simply, expectational errors can often swamp the information contained in *ex-post* measures, even at relatively short horizons. Consequently, in this article we focus on deriving, and then modelling, a survey-based, *ex-ante* measure of the risk premium.

By assuming rational expectations, we found evidence that appeared to suggest that the expectations hypothesis does not hold in the interbank market. What conclusion do we draw if we use survey expectations? In the Appendix we present the results of a formal test of the expectations hypothesis. In short, our conclusion is the same-the expectations hypothesis appears not to hold. To provide some intuition for why this is the case, Chart 5 plots the survey-based risk premium at three months and one year ahead. At both horizons the estimated risk premium is, on average, positive, at 7 and 22 basis points respectively. More importantly, the survey-based risk premium displays considerable variation over time, with peaks over eight times the sample average. In particular, at both horizons the estimated risk premium widened markedly in the middle of 1994 and 1999. Perhaps surprisingly, the chart shows that just under a half of estimated risk premia outturns are negative. It may be that our survey expectations provide, on average, an overestimate of the market's true expectation. But, as we discuss later on, there may also

(1) See, among others, Fama and French (1989).

### Chart 5 Survey-based risk premium



be a theoretical basis for the negative risk premia we observe.

#### Modelling survey-based risk premia

The survey data we employ in this article provide us with a *monthly* estimate of the risk premium. But with fast-moving financial markets such estimates can become quickly out of date. Consequently, the aim of this section is to model the time variation in the risk premium using variables that are available to us on a *daily* basis. In turn, this will enable us to provide an estimate of the risk premium and, therefore, interest rate expectations on any particular day.

#### Slope of the yield curve

A number of studies have documented a close link between the slope of the yield curve and measures of the risk premium.<sup>(1)</sup> Empirically, the risk premium is found to be positive and high when the yield curve is steep, and low when the yield curve is flat. Moreover, measures of the risk premium are often observed to be negative when the yield curve is downward sloping.

One explanation for this relationship comes from the literature on habit formation.<sup>(2)</sup> In this literature, agents' risk preferences are affected by the economic cycle through its impact on aggregate consumption relative to some habit level. In particular, habit formation models suggest that at the bottom of the cycle, when consumption is relatively low, risk aversion and risk premia tend to be high. At the same time, the yield curve tends to be upward sloping in anticipation of future rises in short-term interest rates. At the top of the

<sup>(2)</sup> See Campbell and Cochrane (1999) and Wachter (2004).

cycle the reverse is true. When consumption is relatively high, risk aversion and risk premia are likely to be low. At the same time, the yield curve tends to slope downwards.

Another explanation comes from the impact that expected interest rate changes may have on investors' appetite for taking on *interest rate risk*. This is the risk that movements in the yield curve may lead to capital losses. Specifically, if, relative to their central expectation, investors place a larger probability on rises in future interest rates than on falls in interest rates when the yield curve is upward sloping, then they are likely to require a positive risk premium to compensate them for the greater risk of future capital losses.

Chart 6 plots the survey-based risk premium one year ahead together with the slope of the yield curve. The chart does imply a fairly close relationship. In particular, when the survey-based risk premium was negative, the yield curve also tended to be downward sloping.

#### Chart 6 Survey-based risk premium and slope of the yield curve<sup>(a)</sup>



(a) Calculated as the difference between the two-week end-of-month government forward rate one year ahead and the official repo rate.

# Interest rate uncertainty

It is likely that the more uncertain investors are about future asset returns, the greater the compensation they will require to hold risky assets. Indeed, this trade-off between risk and return is one of the key foundations of modern financial economics. Fortunately, the prices of some financial instruments, such as options, imply an expectation of the risks around future asset returns. Consequently, Chart 7 plots a measure of expected interest rate volatility three months ahead, derived from options prices. There does appear to be a close empirical link between the survey-based risk premium and expected volatility. In particular, the peaks in expected volatility seen in the middle of 1994 and at the end of 1999 were matched by relatively high levels of the survey-based risk premium.

### Chart 7

# Survey-based risk premium and expected volatility



#### Measures of liquidity premia

Investors are often willing to accept a lower yield on assets that are more liquid and, therefore, easier to trade at times of market stress. Consequently, the liquidity premia attached to illiquid assets, such as interbank deposits, may serve to push forward rates above expectations of future interest rates.

Empirical studies often measure the liquidity premium as simply the difference in yield between two assets that have different liquidity, but are otherwise closely matched in terms of maturity, cash flow and credit risk.<sup>(1)</sup> These studies find that liquidity premia often vary considerably over time, widening markedly at times of extreme market stress. Such episodes are commonly termed *flights to liquidity*, for example the developments in Autumn 1998 in response to the Russian debt default.

In our model, we include two measures of liquidity premia to account for possible distortions across the forward curve. To capture the impact of changes in liquidity premia on the underlying interbank rate, and thus on the short end of the forward curve, we use the

<sup>(1)</sup> Examples include the spread between Treasury bonds and Treasury bills (Kamara (1994)), and on-the-run and off-the-run government bonds (Krishnamurthy (2002)). On-the-run bonds are the most recently issued bonds of a particular maturity. As these bonds are more frequently traded than off-the-run bonds, they are typically more expensive and therefore carry a slightly lower yield.

difference in yield between three-month certificates of deposit (CDs) and interbank deposits. These two money market instruments are subject to the same credit risk, but, unlike interbank deposits, CDs are traded in secondary markets and so enjoy a small liquidity premium.

To account for the impact that flights to liquidity may have on the longer end of the forward curve we use a five-year swap spread.<sup>(1)</sup> Empirically, changes in liquidity premia are often found to be an important factor in explaining the path of swap spreads.<sup>(2)</sup> This is borne out by Chart 8. It shows that the five-year swap spread widened markedly in the wake of the Russian debt default and subsequent collapse of the Long Term Capital Management (LTCM) hedge fund in 1998.<sup>(3)</sup>

# Chart 8 Survey-based risk premium and swap spread



Following the discussion above, our model regresses the survey-based risk premium on the following four variables (together with a constant):

- the slope of the yield curve (denoted *Slope*);
- the expected volatility in the interbank rate three months ahead (denoted *Vol*);
- the spread between interbank deposit and three-month certificate of deposit rates (denoted *CD*); and
- the five-year swap spread (denoted Swap).

(1) A swap spread is the difference between a swap rate and a government bond yield of the same maturity.

(2) See Duffie and Singleton (1997) and Liu et al (2002).

(3) For a more detailed discussion of swap spreads and the factors that drive them, see Cortes (2003).

(4) Standard errors are calculated using Hansen's (1982) generalised method of moments to correct for overlapping observations.

(5) Bold variables are significant at the 10% level.

It is possible that use of the variables above will lead to an *endogeneity bias* in the model. For example, a positive shock to the risk premium will also tend to push up the slope of the yield curve. If this is the case, the slope of the yield curve will be positively correlated with the equation error, and the estimated regression coefficients will be biased. To account for possible endogeneity bias we use an estimation method known as *instrumental variables*. This method uses variables (called *instruments*) that are correlated with the endogenous variable, but are predetermined and thus uncorrelated with the equation error. This ensures that the regression coefficients are estimated consistently. In our model the instruments chosen are the regression variables lagged by one day.

Table A shows the results of the regression over the period May 1993 to April 2004, with standard errors in brackets, and significant parameters in bold.<sup>(4)(5)</sup> The model appears to provide a close fit, with the explanatory variables capturing over 70% of the variation in the survey-based risk premium, as measured by the regression correlation coefficient (denoted  $R^2$ ). All variables have the expected sign, and the slope and swap measures are significant at both horizons. By contrast, expected volatility is found not to be an important factor at the three-month horizon, while the CD spread is not found to be important at the longer horizon. Note that all variables are measured in percentage points. This means that a 1 percentage point increase in the slope of the yield curve will lead to an estimated increase in the survey-based risk premium of 0.26 percentage points at the three-month horizon, and 0.42 percentage points at the one-year horizon.

# Table A Modelling the survey-based risk premium

	Three months	Twelve months
Const.	-0.10 (0.08)	-0.52 (0.20)
Slope	0.26 (0.03)	0.42 (0.06)
Vol	0.03 (0.09)	0.44 (0.21)
CD	1.01 (0.52)	1.70 (1.17)
Swap	0.16 (0.08)	0.57 (0.14)
$\mathbb{R}^2$	0.74	0.72

Chart 9 shows the contribution of each explanatory variable to the survey-based risk premium at the one-year horizon. The residual indicates the extent to which the model fails to capture the survey-based risk premium exactly. It is clear that no single explanatory variable has dominated movements in the fitted risk premium. Nevertheless, Chart 9 shows that, across our two measures of liquidity premia, the swap spread has played an increasing role in the second half of the period. By contrast, the influence of the CD spread has diminished markedly.

#### Chart 9





(a) For ease of exposition only the contributions for June and December in eac year are shown. The constant is also not shown.

Simple regression models of the type outlined above are by their nature susceptible to instability resulting from changes in the underlying economic structure. For instance, it may be that the relationship outlined in our model is sensitive to changes in the level of the interest rate, or perhaps to the underlying monetary regime. To shed some light on the stability of the model, Chart 10 plots recursive estimates and standard error bands for the slope of the yield curve parameter.<sup>(1)</sup> The chart shows that, after an initial period of variability, the estimated relationship between the slope of the yield curve and the survey-based risk premium has been broadly stable since 1997.

One drawback of the model is that it allows us to adjust the forward curve only at two points, namely at three months and one year ahead. Fortunately, on a quarterly basis, Consensus Economics surveys expectations of the end-quarter interbank rate up to seven quarters ahead. For example, the quarterly survey published on 8 March 2004 reported end-quarter forecasts for 2004 Q1 through 2005 Q4.

#### Chart 10

# Recursive estimates of the slope of the yield curve parameter in the model



The Appendix reports the estimation results from regressing the survey-based quarterly risk premium on the explanatory variables. In short, the results are qualitatively unchanged: the quarterly model provides a good fit of the survey-based risk premium, and the explanatory variables are generally found to be significant and of a similar magnitude to those in the monthly model.

# Adjusting forward curves for risk premia

By combining the estimated parameters from the monthly and quarterly models we are able to generate a path for future interest rate expectations on any particular day. By way of an example, Chart 11 shows the market forward curve plotted in Chart 1 for 18 February 2002 together with the adjusted forward rates joined by a cubic spline.<sup>(2)</sup> The adjusted forward curve suggests a much shallower path for expectations of future interbank rates than that embodied in the market forward curve. In particular, it implies that the interbank rate was expected to be around 5% by end-February 2003, some 0.4 percentage points below the equivalent unadjusted rate, but in line with the average survey expectation. Further out, the adjusted curve indicates that the expected peak in interbank rates was around 5.1%, some way below the market forward curve.

<sup>(1)</sup> Recursive estimates are generated by estimating the model from May 1993 through May 1995 and then by sequentially

estimating the model with one more observation until the full sample period is used. (2) A cubic spline is a mathematical technique for fitting a curve through points where the slope of the curve and the

change in the slope are smooth everywhere.

#### Chart 11 Market and risk premia adjusted forward curves on 18 February 2002<sup>(a)</sup>



So what of the more recent picture? Chart 12 shows that the interpretation is similar. The market forward curve has short-term interbank rates rising from a little over 4.6% on 28 May 2004 to around 5.6% by the end of next year. By contrast, the adjusted path shows a more gradual rise in interest rate expectations to a little under 5.3%.

# Conclusion

Forward rates are perhaps the most common measure of expected future interest rates. But the presence of a risk premium can drive a wedge between forward rates and what the market expects future rates to be.

This article has used surveys of interest rate expectations to derive a measure of the risk premium. We find that

### Chart 12 Market and risk premia adjusted forward curves on 28 May 2004<sup>(a)</sup>



(a) The adjusted rates from the monthly model are depicted by green squares, and those from the quarterly model by pink squares.

the estimated risk premium implies a significant and time-varying difference between forward rates and survey expectations.

The survey data provide a *monthly* estimate of the risk premium and, therefore, expectations of future interest rates. But surveys are rarely timely, and with fast-moving financial markets they can become quickly out of date. Consequently, in this article we have also proposed a simple model of the survey-based risk premium using data available to us on a *daily* basis. This allows us to adjust the interbank forward curve on any particular day. To the extent that data observed on that day match historical experience, these adjusted curves should provide a closer reading of the market's expectation of the path of future short interbank interest rates than the forward curve alone.

# Appendix

#### Testing the expectations hypothesis

To test the expectations hypothesis using survey data we use the following regression:

 $S_t(y_{t+n}) - y_t = a_0 + a_1^*(f_t^n - y_t) + e_t$ 

where  $y_t$  denotes the three-month interbank rate at time t,  $S_t(y_{t+n})$  denotes the survey expectation of this rate n periods ahead,  $f_t^n$  denotes the three-month interbank forward rate n periods ahead, and  $e_t$  is a zero-mean error term. If the expectations hypothesis holds then the constant  $a_0$  and the slope coefficient  $a_1$  will be insignificantly different from zero and one respectively (the null hypothesis).

Table 1 reports the estimates of  $a_0$  and  $a_1$  with standard errors in brackets.<sup>(1)</sup> The table also reports the regression correlation coefficient ( $R^2$ ), and *p*-values for Wald coefficient restriction tests of the null hypothesis ( $\chi^2$ ). The sample period runs from May 1993 through April 2004. The table shows that, while the constants  $a_0$ are insignificantly different from zero, at both horizons the slope coefficient  $a_1$  is significantly different from its theoretical value under the null hypothesis. A joint test of the null hypothesis is decisively rejected with a *p*-value of less than 0.01. Thus, we reject the expectations hypothesis.

# Table 1

#### Testing the expectations hypothesis

Horizon	$a_0$	$a_1$	$\mathbb{R}^2$	$\chi^2$
Three months	-0.00 (0.03)	0.42 (0.10)	0.49	0.00
Twelve months	0.04 (0.12)	0.51 (0.12)	0.65	0.00

#### **Testing rational expectations**

#### (a) Testing unbiasedness using survey data

To test unbiasedness we use the following regression:

$$y_{t+n} - y_t = b_0 + b_1^* [S_t(y_{t+n}) - y_t] + v_t$$

If survey expectations are rational then  $b_0$  and  $b_1$ will be insignificantly different from zero and one respectively. Table 2 presents the estimation results over the full sample period. The table shows that at both horizons the constant  $b_0$  and slope coefficient  $b_1$  are insignificantly different from their theoretical values. A joint test of the null hypothesis also can not be rejected with a *p*-value of 0.47 at the three-month horizon and 0.13 at the one-year horizon. Consequently, we find that our survey expectations are unbiased.

# Table 2Testing rational expectations: unbiasedness

Horizon	$b_0$	$b_1$	$\mathbb{R}^2$	$\chi^2$
Three months	-0.07 (0.06)	0.97 (0.23)	0.21	0.47
One year	-0.40 (0.28)	0.79 (0.37)	0.15	0.13

### (b) Testing efficiency using survey data

To test efficiency we use the following regression:

$$y_{t+n} - S_t(y_{t+n}) = c_0 + c_1^* y_t + c_2^* (f_t^n - y_t) + w_t$$

If survey expectations are efficient then all the parameters  $c_0$ ,  $c_1$  and  $c_2$  will be insignificantly different from zero. Table 3 presents the estimation results over the full sample period. It shows that all parameters at both horizons are individually insignificantly different from zero. A joint test of the null hypothesis also cannot be rejected with a *p*-value of 0.64 at the three-month horizon, and 0.86 at the one-year horizon. Consequently, we find that our survey expectations are efficient.

# Table 3Testing rational expectations: efficiency

Horizon	$c_0$	$c_1$	$c_2$	$R^2$	$\chi^2$
Three months	0.14 (0.64)	-0.05 (0.11)	0.43 (0.35)	0.17	0.64
One year	0.20 (9.93)	-0.12 (1.45)	0.03 (1.04)	0.02	0.86

# Parameter estimates used to construct the adjusted forward curves

Table 4 reports the parameter estimates from the monthly model (shown in Table A) together with those from the quarterly model (in italics). Standard errors are

(1) Estimation is by OLS, with standard errors calculated using Hansen's (1982) generalised method of moments to correct for overlapping observations.

in brackets and significant variables are in bold. The sample period for the quarterly model is from May 1993 to March 2004. As the day of the survey changes from month to month, the horizon given in the table is to the nearest month.

# Table 4 Modelling the survey-based risk premium

#### <u>3 months</u> <u>7 months</u> <u>12 months</u> <u>16 months</u> <u>19 months</u> -0.10 (0.08) -0.58 (0.10) -0.54 (0.11) Const. -0.35 (0.18) -0.52 (0.20) 0.26 (0.03) 0.34 (0.05) 0.42 (0.06) 0.42 (0.05) 0.46 (0.04) Slope 0.03 (0.09) 0.61 (0.05) 0.60 (0.06) 0.11 (0.07) Vol 0.44 (0.21) 0.96 (0.44) 1.01 (0.52) 1.70 (1.17) -1.06 (1.95) -0.39 (2.53) CD0.16 (0.08) 0.40 (0.29) 0.57 (0.14) 0.58 (0.25) 0.65 (0.30) Swap $\mathbb{R}^2$ 0.74 0.72 0.69 0.72 0.78

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# The economics of retail banking—an empirical analysis of the UK market for personal current accounts

# By Céline Gondat-Larralde and Erlend Nier of the Bank's Financial Industry and Regulation Division.

Understanding the economics of retail banking is important for the Bank of England in carrying out both its monetary stability and its financial stability function. In this article, we study the dynamics of the UK market for personal current accounts between 1996 and 2001. Analysing the evolution of banks' market shares and their pricing strategies, two questions are addressed: (i) Do bank market shares respond to price differentials? (ii) If not, why not? Our results point to customer switching costs as a key determinant of the nature of competition in the market for personal current accounts during the 1996–2001 period. They are thus broadly supportive of a number of initiatives that have since been undertaken to reduce such costs.

# Introduction

Retail banking is a core activity and a source of strength for UK banks.<sup>(1)</sup> Arguably, current accounts play a pivotal role in the relationship between a bank and its retail customers: a current account offers access to deposit-holding services, money transmission through cheques and debit facilities, and potentially acts as a vehicle for credit through overdrafts. It may also serve as a gateway through which banks attempt to cross-sell other banking services, such as savings accounts.

This article analyses the competitive process in the UK market for personal current accounts between 1996 and 2001. In particular, it examines the speed with which the distribution of market shares changed in response to price differentials, taking into account the possibility that price differences may reflect differences in product characteristics. In order to distinguish further between several competing hypotheses as to why the adjustment in market shares may have been slow, a test based on the relationship between levels of market share and prices is employed. The results point to the importance of customer switching costs as a key determinant of the competitive process in this market.

### Analysis at the product level

Most of the empirical Industrial Organisation literature on banking attempts to assess the degree of competition for the industry as a whole, using data (eg total profits, total revenues) at a bank level, instead of focusing on specific product markets. Numerous studies are based on the Structure-Conduct-Performance (SCP) paradigm, which posits a causal relationship between an industry structure, the firms' conduct and ultimately industry performance. More recently, some authors have attempted to draw inferences from the link between firm revenue and cost schedules (Panzar and Rosse (1987)). As regards the level of competition in banking markets, overall these studies have not led to firm conclusions.<sup>(2)</sup> In particular, existing studies have not been able to distinguish between different sources of imperfect competition in any detail.

This article builds on Heffernan (2002), who analyses the pricing behaviour of British banks in several product markets and tests which model(s) of imperfect competition best describe each market. She finds that price dispersion has been an important feature of most retail banking markets. The stylised facts presented in this article support her findings. Her analysis is then extended by devising a test that allows for the possibility that bank customers' switching costs may have been a key driver of the competitive process in the market for personal current accounts.

# Potential frictions in the market for current accounts

Price dispersion is consistent with several different theoretical explanations. Price dispersion may simply

<sup>(1)</sup> Loans by banks to domestic households currently (2003 H1) account for 50% of total lending, compared with a euro-area average of 44%.

<sup>(2)</sup> See, among others, Gilbert (1984) for a survey on SCP studies and De Bandt and Davis (2000) on one of the first attempts to measure the Panzar-Rosse statistic for several European banking markets.

reflect differences in product characteristics. If products offered by different providers are not fully homogenous, prices may differ across providers. However, if prices are adequately adjusted for quality differences, then any remaining price dispersion may reflect frictions in the market that affect the competitive process. First, consumers may be facing search costs which prevent them from thoroughly examining all available offers in the market before purchasing a product. When search costs differ across consumers, providers may charge different prices. Second, once consumers have chosen a specific provider they may face switching costs which prevent them from purchasing from a cheaper seller in a later period. Switching costs can thus result in products becoming effectively differentiated after the purchase, even though the products on offer might have been perfectly homogenous before consumers decided to buy any one of them. In this situation, again, providers may choose different prices.

These types of frictions may potentially have macroeconomic consequences. In particular, they can influence the way monetary policy affects the economy in that they determine how policy interest rates are passed through to other markets.

# The UK market for personal current accounts stylised facts

#### **Changes in market concentration**

In this article, a bank's market share is defined in terms of the number of the bank's UK current account customers.<sup>(1)</sup> Measures of market concentration derived from the distribution of market shares show that in 2001 the UK market for personal current accounts was still relatively concentrated, even though market concentration gradually declined between 1996 and 2001.<sup>(2)</sup> However, this aggregate trend hides some contrasting developments at a bank peer group level. Chart 1 shows the combined market share for each peer group we have defined:<sup>(3)</sup>

• the 'big four' banks (Barclays, HSBC/Midland, Lloyds TSB and NatWest);

#### Chart 1 Bank peer group market shares, current account market



- the 'building societies': this peer group includes one current building society as well as those who demutualised (Abbey National, Alliance & Leicester, Halifax, Nationwide, Northern Rock and Woolwich);
- the 'direct' banks—this group comprises those banks that essentially operate via the phone or the Internet (Cahoot, Citibank, First Direct, First-e, Intelligent Finance, Smile and Virgin Direct); and
- the 'other' banks (Bank of Scotland, Clydesdale, the Co-operative Bank, Girobank, Royal Bank of Scotland, Safeway Bank and Yorkshire Bank).

Over the 1996–2001 period, the combined 'big four' banks lost customers at a slow but steady rate, while building societies—including those that demutualised—made successful inroads into the current account market. The 'direct banks' also increased their market shares, albeit from a very low base: at the end of 2001, they still accounted for only 2% of all current account holders. The remaining banks experienced a reduction in their combined market share over the sample period.

#### **Changes in prices**

To study bank pricing behaviour in the market for current accounts, three interest rates are considered

<sup>(1)</sup> The data on the number of customers per bank are obtained from the National Opinion Poll database (Financial Research Survey (NOP-FSR)) on a half-year basis. An alternative would have been to consider regional markets as in Cruickshank (2000). As further discussed in a forthcoming *Bank of England Working Paper* by Gondat-Larralde and Nier, the conclusions drawn in this article are qualitatively unaffected by this choice.

<sup>(2)</sup> The Herfindahl-Hirschman index records a gradual decrease from 1,425 to 1,217 over the period.

<sup>(3)</sup> Some of these banks may be related in terms of ownership. As a principle, we keep two related entities separate if they have retained strong, separate retail franchises. For instance, most 'direct' banks are owned by some other banks also included in our sample. But we choose to treat the 'bricks and mortar' parent as separate from its 'direct' bank subsidiary. Also, for example, Halifax and Bank of Scotland as well as Royal Bank of Scotland and NatWest are treated as separate entities, given that they continued to operate separate retail franchises over the sample period. Furthermore, in both of the latter two cases the merger occurred at the very end of the sample period.

over the 1996–2001 period:<sup>(1)</sup> the rate a bank offers on the positive balances on current accounts; the rate a bank charges on (pre-authorised) overdrafts; and the rate a bank pays on its instant access savings accounts. The latter rate is not paid on current accounts, but is included in the analysis to account for the possibility that banks may attempt to cross-sell savings products to their current account customers.





- (b) Cahoot, First-e and Intelligent Finance enter 'direct' banks.(c) Excluding Virgin Direct.
- (d) Excluding the Co-operative Bank and Safeway Bank

#### Chart 2b

#### Average instant access savings rates by peer group



<sup>(</sup>c) First-e and Intelligent Finance enter 'direct' banks

# Chart 2c Average overdraft rates by peer group



(c) Excluding Safeway Bank.

(d) Excluding Virgin Direct and First-e.

Charts 2a to 2c show the evolution of each of these three rates, averaged across each peer group between 1996 and 2001. The current account and the overdraft rates were not very sensitive to changes in the Bank of England base rate. But most importantly, price dispersion across banks appears to have persisted or increased over time.<sup>(2)</sup>

# Response of bank market shares to price differentials

In order to derive a measure of how fast bank market shares varied in response to price differentials the elasticity of bank-level demand with respect to each price was estimated, controlling for differences in current account non-price characteristics. The model is described in Table A. It allows us to study the relationship between a bank's average change in market share over the period 1996 H2 to 2001 H2 and the average differential over the period between a bank's price and the prices set by its competitors. No attempt was made to analyse further the dynamics of the changes in market share and their relationship with price differentials in sub-periods for two main reasons. First, price differentials do not appear to have varied much through time.<sup>(3)</sup> Second, the period of analysis-from 1996 to 2001-is too

 For each bank, these three different rates are obtained from the Moneyfacts database on quoted rates on a monthly basis and are averaged over half-years.

(2) As a way of analysing statistically the degree of price dispersion for each rate, its standard deviation was decomposed into a 'between group'—ie cross-sectional—component, and a 'within group'—ie time-series—component. The former component needed to be adjusted to take account of different means of the series. It turned out that the resulting 'between group' coefficient of variation was the largest for the current account rate (2.38) and the lowest for the overdraft rate (0.24).

(3) The lack of variation through time (seen in Charts 2a to 2c) is confirmed when the standard deviation of each variable of interest is decomposed into a 'between group' (ie cross-sectional) component and a 'within group' (ie time-series) component. For most variables, the former is much bigger than the latter. Therefore, the loss of information we incur by focusing on cross-sectional variations should be limited. We also conducted pooled OLS estimations using half-yearly series for each bank. The results are similar to those obtained for the cross-sections and are reported in a forthcoming *Bank of England Working Paper* by Gondat-Larralde and Nier.

<sup>(</sup>d) Excluding Cahoot.

<sup>(</sup>u) Excluding Calloot.

# Table AEstimation of price elasticities of bank-level demand

To measure how fast bank market shares respond to price differentials, the elasticity of the bank-level demand schedule with respect to the three prices (ie interest rates) is estimated using the following model:

 $\Delta MS_i = f\left(RD^j{}_i,\,Q^k{}_i\right)$ 

where:

- ΔMS<sub>i</sub> is the relative change (ie in per cent) in bank i's market share in the current account market measured on a half-year basis and averaged over the period 1996 H2–2001 H2;
- RDi<sub>j</sub> is the absolute difference (ie in percentage points) between bank i's rate and the average rate quoted by all its competitors, averaged over the period. Three different rates are analysed: the rate on positive balances on current accounts (j = CA); the pre-authorised overdraft rate (j = OD); and the rate on instant access savings accounts (j = IA); and
- Q<sup>k</sup><sub>i</sub> are three non-price characteristics measured at a bank level over time: the number of branches per customer; the logarithm of the number of automated teller machines (ATMs); and an index reflecting the range of transactions a current account customer can perform over the phone (the higher the number of transactions that can be performed over the phone, the higher the value of the index).

	$\Delta MS$			
	All banks	Excluding 'direct' banks	Excluding 'direct banks	
	(1)	(2)	(3)	
<i>RD<sup>CA</sup></i>	<b>9.92</b> * (0.054)	<b>7.12</b> *** (0.003)	<b>6.68</b> ** (0.025)	
RD <sup>IA</sup>	2.37 (0.226)	0.61 (0.186)	-0.67 (0.352)	
RD <sup>OD</sup>	-0.05 (0.902)	-0.21 (0.195)	-0.15 (0.118)	
Number of branches per customer			<b>5.11</b> ** (0.021)	
Log (number of ATMs)			<b>2.71</b> ** (0.012)	
Phone index			<b>0.34</b> *** (0.000)	
Adjusted R-squared	78.1%	81.1%	89.7%	
Number of observations	19	15	14	

\*\*\* denotes statistical significance at the 1% level, \*\* at the 5% level and \* at the 10% level. P-values are based on robust standard errors and are shown in parentheses.

short to estimate dynamics in a market in which adjustments in market shares appear to have been gradual.

The results suggest that changes in market share were moderately sensitive to differences in the current account rate across banks.<sup>(1)</sup> By contrast, the elasticities of bank-level demand with respect to the overdraft rate and to the rate offered on savings accounts were considerably lower and not significantly different from zero after controlling for non-price characteristics. The results are thus consistent with a moderate degree of imperfect competition in the market for personal current accounts during the sample period (1996–2001).

# **Different types of imperfect competition**

### Different explanations for price dispersion

Price dispersion is consistent with several models of imperfect competition. Price dispersion is a feature of the dynamic model of switching costs by Kim, Kliger and Vale (2003), the model of search costs developed by Salop and Stiglitz (1977), and the standard oligopoly model with differentiated products. One way to distinguish between the different possible explanations is to derive the implications of each of these (imperfect competition) models for the relationship between observable variables. In particular, it turns out that each of these models has a different implication for the relationship between individual bank market shares and prices.

# (a) Standard oligopoly with product differentiation

Under standard assumptions of perfect competition and Cournot oligopoly, there should not be any particular relationship between market share and price. In a perfectly competitive market, it is assumed that there are numerous firms, each being so small that it cannot influence other providers' actions. If the products offered are homogenous, firms are price-takers and all charge the same price, set to equate (marginal) costs. In such an environment, there should be no price dispersion and consequently no link between price and market share.

In an oligopolistic environment, a firm's action may influence its rivals' behaviour—ie there may be some strategic interdependence between the firms in the market. In a Cournot setting,<sup>(2)</sup> firms may choose to produce different quantities depending on their costs and taking into account the strategy chosen by their rivals, but the price set by each firm is read off the aggregate, industry demand schedule. If products are heterogeneous, price dispersion may emerge across different quality levels, but there is no reason why market shares and prices should be related.

# (b) Search cost explanation

Diamond (1971) has shown that in a market where all consumers face the same search costs, however small, firms will price at the monopoly level. However, if search

<sup>(1)</sup> Some of the 'direct' banks may have a significant impact on the measured relationship between market share changes and price differentials—ie they are potential outliers. Therefore we prefer to emphasise the results obtained for the sample of traditional banks only (when all 'direct' banks are excluded). The coefficient of *RDCA* in equation (3) implies that a traditional, bricks and mortar bank that offers a current account rate 30 basis points (ie one standard deviation) higher than its rivals would increase its market share by 2 percentage points over six months.

<sup>(2)</sup> In a Cournot setting, the larger (smaller) is the number of firms, the closer are aggregate output and price to the perfect competition (monopoly) level.

costs differ across consumers—one group of consumers faces a low search cost whereas the remaining consumers face a high search cost and choose to remain uninformed-then price dispersion can occur, as shown in the model by Salop and Stiglitz (1977). In this model, whereas some firms set the competitive price,<sup>(1)</sup> others charge a higher price, in an attempt to exploit the fact that a proportion of the consumers choose their provider at random, being uninformed about the prices on offer.<sup>(2)</sup> However, the firms that offer the better deal will attract the most customers, given that the uninformed consumers will choose their providers at random whereas the informed consumers will always choose the lowest price provider. Hence, for any distribution of informed and uninformed consumers, this model implies that a high market share should be associated with a low price in equilibrium. Finally, decreasing unit costs ensure that both types of firms earn the same profit in equilibrium.<sup>(3)</sup>

#### (c) Switching cost explanation

Current account holders rarely switch banks.<sup>(4)</sup> This may point to the importance of the cost of switching provider in this market. Switching current account providers may involve transaction costs for the customer. Such costs can arise from the need to reroute outgoing direct debits and to redirect inflowing payments. Since switching current account entails the customer leaving his established banking relationship, it may result in the information the incumbent bank has accumulated on its customers over time being lost. Switching providers may thus also result in an increase in asymmetric information between bank and customer.<sup>(5)</sup>

In a market with switching costs, a firm faces a trade-off:<sup>(6)</sup> it can raise the price it charges to its existing customers to raise its profits, but this lowers its chance of attracting new customers in the future—at worst the firm may also be losing some customers. It has been shown by Kim, Kliger and Vale (2003) that in this situation a firm will base its pricing decision on its level of market share. At the margin, for firms with bigger customer bases it is worthwhile to set a high price. For smaller firms, it is worthwhile to offer a low price to

attract new customers and to increase future profits. Whereas in the Salop and Stiglitz model, prices and market shares are negatively correlated, in a switching cost model price and market share should therefore be positively linked. Moreover, this positive relationship should be stronger, the lower the elasticity of demand with respect to price, that is the less sensitive consumers are with respect to price.

The implication of switching costs for industry profitability is, in theory, ambiguous. In the presence of switching costs, the market share becomes an important determinant of profitability. But this in turn can result in firms competing to retain or increase their market shares, lowering overall profitability (see Klemperer (1995)). In addition, as usual, profitability will depend on cost conditions.

#### **Determinants of prices**

The relationship between level of market share and level of price was studied focusing on variation between banks, using averages over the period for each bank's variables. Some of the models under study also have implications for the relationship between market shares and prices over time. For instance, in the switching cost model, both market shares and prices would be expected to converge over the long run. But since the period under study is quite short and changes in market shares are smooth over the period, averages across time of both the market shares and prices were used to estimate the relationship between the two.

The analysis suggests that, consistent with the switching cost model, there appears to have been a positive relationship between level of market share and price—ie a negative link in the case of the current account rate and a positive link in the case of the overdraft rate. That is, the higher a bank market share, the lower the interest rate it offered on current account and the higher the rate it charged on overdrafts. Moreover, we find that the relationship between level of market share and price was stronger for the overdraft rate for which we know the elasticity of bank-level demand was low. This is consistent with the fact that in a market with switching

<sup>(1)</sup> That is the price that would prevail in the absence of search costs.

<sup>(2)</sup> Ex ante, consumers are assumed to know the distribution of prices in the market, but they do not know which firm charges which price. A consumer decides to get informed if, and only if, his search cost is smaller than the difference between the average price and the lowest price in the market.

<sup>(3)</sup> In the Salop and Stiglitz model, it is assumed that entry occurs as long as rents are positive. Thus, in equilibrium, every firm earns zero rent.

<sup>(4)</sup> Data on current account switching behaviour from the NOP-FRS database imply that a representative current account holder would only change banks every 91 years, ie does not switch current account provider during her lifetime.

<sup>(5)</sup> The analysis presented here does not allow to distinguish between the different possible sources of switching costs.

Further analysis using more detailed data (ie at a customer level) may shed some more light on this.

<sup>(6)</sup> In the case when it cannot price discriminate between existing and new customers.

#### Table B Estimation of the relationship between level of prices and level of market shares

To distinguish between the different explanations for price dispersion, the link between a bank's level of market share and the price it sets is estimated using the following model:

 $R^{j}_{i}=f\left(MS_{i},\,Q^{k}_{i}\right)$ 

where:

- R<sup>j</sup><sub>i</sub> is the rate j quoted by bank i, averaged over half years and the whole period. Three different rates are analysed: the rate on positive balances on current accounts (j = CA); the pre-authorised overdraft rate (j = OD); and the rate on instant access savings accounts (j = IA);
- MS<sub>i</sub> is the level of bank i's market share in the current account market measured on a half-year basis and averaged over the period 1996 H1-2001 H2; and
- Q<sup>k</sup><sub>i</sub> are three non-price characteristics measured at a bank level over time: the number of branches per customer; the logarithm of the number of ATMs; and an index reflecting the range of transactions a current account customer can perform over the phone (the higher the number of transactions that can be performed over the phone, the higher the value of the index).

	$R^{CA}$		$R^{IA}$		ROD	
	All banks	Excluding 'direct' banks	All banks	Excluding 'direct' banks	All banks	Excluding 'direct' banks
	(4)	(5)	(6)	(7)	(8)	(9)
MS	- <b>0.11</b> ** (0.018)	-0.02 (0.129)	- <b>0.09</b> *** (0.006)	-0.03 (0.415)	<b>0.32</b> *** (0.004)	0.20 (0.126)
Number of branche per customer	- <b>2.47</b> *** (0.002)	0.89 (0.124)	- <b>1.79</b> ** (0.039)	-0.13 (0.874)	2.17 (0.268)	-5.76 (0.194)
Log (number of ATMs)	<b>0.66</b> * (0.092)	<b>0.53**</b> (0.011)	<b>1.36</b> *** (0.002)	0.79 (0.149)	-1.74 (0.140)	- <b>4.00</b> * (0.084)
Phone index	- <b>0.18</b> *** (0.000)	0.003 (0.900)	-0.06 (0.259)	0.06 (0.445)	<b>0.40</b> ** (0.013)	0.21 (0.619)
Adjusted R-squared	60.1%	43.2%	58.3%	37.8%	34.8%	44.1%
Number of observations	19	14	19	15	20	15
*** denotes statistical	significance	at the 1% lev	el, ** at the	5% level and	l * at the 109	% level.

P-values are based on robust standard errors and are shown in parentheses.

costs, the lower the price elasticity, the higher a firm's incentive to raise its price, given that its existing customers are relatively insensitive to an increase in price.

Interestingly, there does not seem to have been a strong relationship between the level of market share and rates on savings accounts. Taking this together with the finding that the cross-price elasticity between the demand for current accounts and the rate paid on savings accounts was essentially zero, the most plausible interpretation would appear to be that the current account market and the savings market were relatively segmented. Consumers' choice of current account providers and savings account providers seem to have been independent from each other—consumers appeared to have managed to unbundle these two types of products.

# Conclusion

The dynamics of the UK market for current accounts between 1996 and 2001 are consistent with the presence of switching costs in this market. The sensitivity of firm-level demand with respect to variations in price was moderate in the case of the current account rate and close to zero for the other rates (ie the overdraft and the instant access savings rates) examined here. In addition, as predicted by the switching cost model, the level of a bank's market share was a significant determinant of the price(s) it set, particularly in the case of the overdraft rate—for which bank-level demand was relatively inelastic.

Since the end of our sample period, there have been several initiatives to facilitate switching. In response to the Cruickshank report (2000), the government asked a group led by DeAnne Julius to review the Banking Code. One set of recommendations in the report (see Julius (2001)) that has since been implemented specifically focuses on ways to facilitate switching account. Steps have also been taken to increase consumer awareness of the potential benefits of changing banks (see eg Financial Services Authority (2002)). Finally, the banks have implemented improvements to the logistics of the switching processie the exchange of information between the switchers' old and the new banks-to improve the speed and the accuracy of the account transfer. Even though it may be too early to assess the impact of these initiatives empirically, the results of this study would appear broadly supportive of such initiatives, in that they point to the existence of switching costs in the UK market for personal current accounts in recent years.

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# The financing of smaller quoted companies: a survey

# By Peter Brierley and Mike Young of the Bank's Financial Stability Area.

This article summarises the results of a survey on the financing of smaller quoted companies (SQCs) conducted in February and March 2004 and builds on earlier work by the Bank and other organisations. It explores SQCs' recent and possible future use of external finance, their views on the availability of debt and equity finance and their views on possible constraints on such finance that are thought to be particularly relevant to SQCs. The results suggest that most SQCs are not currently experiencing any major difficulties in accessing either debt or equity finance.

# Introduction

This article summarises the results of a survey commissioned by the Bank, relating to the financing of UK smaller quoted companies (SQCs).<sup>(1)</sup> It updates and extends the findings reported in the Quarterly Bulletin of Spring 2002, which were based on a more limited survey of SQCs and a series of liaison meetings with selected companies.<sup>(2)</sup> It also throws further light on possible constraints on the provision of debt and equity finance to SQCs, an issue highlighted in the Bank's tenth annual report on finance for small firms as meriting further investigation.<sup>(3)</sup> In recent years, several official working groups have drawn attention to possible barriers to the financing of SQCs.<sup>(4)</sup> Their reports have highlighted in particular possible difficulties in raising equity finance, attributed to such factors as persistent secondary market illiquidity in SQC shares, consolidation in the fund management industry and an associated increased emphasis of market analysis, research and investment strategy on larger companies.

The Bank's previous work focused more on the debt side. It found that, by reason of their size, SQCs do not generally have access to bond markets and, partly in consequence, are more dependent than FTSE 350 companies on short-term finance. Their relative lack of usage of longer-term finance was partly attributed to supply constraints, with banks being less willing to extend them long-term than medium or short-term loans, and partly to demand factors, with longer-term commitments viewed by SQCs themselves as reducing flexibility. But the research did not find evidence of any general problem with access to debt finance. Most SQCs surveyed were able to achieve desired levels of gearing and used a wide variety of debt instruments. Gearing levels were generally lower than those of FTSE 350 companies, having remained fairly stable over recent years while gearing levels at large companies have risen substantially. At first sight, this difference appears surprising. If SQCs do face greater difficulties in raising equity finance, it might be expected, other things being equal, that they would be more geared than large companies. It may, however, reflect greater risk aversion on the part of SQCs, rather than any major problems with access to debt finance. On the equity side, the Bank's liaison meetings with SQCs have suggested that a significant number of companies are able to raise additional equity but choose not to do so in order to retain family control.

# The new survey

As noted above, the Bank's earlier research was based on small surveys and a limited number of contacts in the SQC sector. And the work was carried out during a period of unusual weakness in equity markets, which was making it more difficult for all companies to raise additional equity. The new survey was designed to overcome these problems by covering a much larger

<sup>(1)</sup> The authors are grateful to Shiona Davies and David Chilvers of Continental Research, who conducted the survey and who provided helpful comments on the article, and to Emma Murphy of the Bank's Financial Industry and Regulation Division and Clive Jackson of the Bank's Macro-Prudential Risks Division for their assistance in the survey design.

<sup>(2)</sup> See Kearns, A and Young, J E (2002).

<sup>(3)</sup> See Cahill, J M and Whitley, J D (2003).

<sup>(4)</sup> See in particular HM Treasury (1998), DTI Innovation Unit (1999), CBI (2001) and Jaffe Associates Ltd (2002).

group of SQCs and by asking a more detailed set of questions about their current usage of different financing instruments and their longer-term access and attitudes to different types of debt and equity finance. The definition of SQCs used in the survey includes those non-financial companies<sup>(1)</sup> with a full listing on the London Stock Exchange, whose market capitalisation is below that of companies in the FTSE 350 index (in other words, companies in the FTSE SmallCap and FTSE Fledgling indices), and those companies quoted on the Alternative Investment Market (AIM). As at 31 January 2004, some 1,110 non-financial companies were included in the SQC sector on this definition.

The survey was carried out for the Bank by Continental Research. They conducted telephone interviews with the main financial decision makers in 257 SQCs, generally at Finance Director level, during the period 4 February to 31 March 2004. Companies were selected to provide a representative sample by industrial sector, region, size, profitability and age. Results were grossed up using a weighting scheme based on the full distribution of non-financial SQCs by size, sector, age and profitability. This procedure was designed to ensure that any skew or bias in the make-up of the sample was adjusted so that the results reflected the true population. In what follows, responses to questions are expressed by reference to percentages of this weighted base of the sample companies.

Charts 1 and 2 summarise the key characteristics of the companies covered. It should be noted that the sample can be roughly divided into three subgroups by size,

#### Chart 1





Sources: Bank of England and Continental Research.

(a) Sample results were weighted to correspond to the distribution of non-financial SQCs by size, sector, age and profitability. Chart 2



Sources: Bank of England and Continental Research.

(a) Sample results were weighted to correspond to the distribution of non-financial SQCs by size, sector, age and profitability.

whether that is measured by sales turnover, market capitalisation or number of employees, corresponding to small, medium-sized and large SQCs. The sample is fairly evenly divided between profitable and loss-making companies and also includes a range of companies by year of incorporation.

The survey included questions on shareholder and board composition; dividend policy; access to and types of debt finance used; attitudes to debt finance; liquidity policy; access to equity finance; and attitudes to equity finance. These are covered in turn in what follows.

# Shareholder and board composition

Shareholders include current management and institutional investors in the great majority of SQCs (94% and 87% respectively), but the family of the company founder or current owner also features in 64% of cases. This group tends to be more important the smaller the company (see Chart 3). Venture capitalists and business angels are much more important in the financing of private companies, often using flotation as a means of realising their investment. They appear as shareholders of only 17% of SQCs and are more important for smaller companies.

On average, SQCs have six board members, varying from five for companies with market capitalisation below  $\pounds 10$  million to seven to eight for those with market

(1) Banks, investment firms and insurance companies are subject to rather different financing constraints compared with industrial and commercial companies, so all companies in the financial services sector are excluded from the sample.





Source: Continental Research.

capitalisation above £50 million. The average number of non-executive directors at SQCs is three and this number also varies positively with size of company.

The survey provides little evidence that board composition has any effect on financing, although smaller boards seem less likely to shop around for debt finance and are more concerned about the regulatory burden involved in raising equity. Later questions on attitudes to debt and equity finance (see below) did not elicit any particular indications that the composition of the shareholder base affected preferences for or against particular types of finance, except on some issues for SQCs with significant family shareholdings.

# **Dividend policy**

Some interesting differences emerged between SQCs when asked about their dividend policy (see Chart 4). Overall, nearly half either have no earnings to distribute (28%) or have a policy to retain all their earnings (20%). Both these proportions are inversely related to company size. Newly incorporated companies (post-1995) are more likely either to have no earnings to distribute (39%) or to retain all earnings (31%) than the oldest SQCs (up to 1980) (where the corresponding proportions are 18% and 7% respectively). SQCs with an annual turnover of more than £50 million are most likely to pay dividends: some 59% do so, compared with 24% of SQCs with an annual turnover of less than £10 million.

Dividend policy is closely related to underlying profitability and on average the smallest and

#### Chart 4 Dividend policies of SQCs by company turnover Up to £10 million £10 million to £50 million £50 million + All SOCs Per cent No earnings to distribute 28 All earnings retained 20 Most earnings retained 110 Some earnings retained 43 Mininum amount always 17 6 paid to shareholders 110 All earnings to shareholders

Source: Continental Research.

Other/no set policy

(particularly) youngest SQCs tend also to be the least profitable. As many as 72% of SQCs incorporated since 1995 are currently loss-making, compared with only 18% of SQCs incorporated prior to 1981. The differences in dividend policy by size of SQC noted above also appear to apply in a comparison of the SQC sector in aggregate with larger quoted companies (LQCs), defined as FTSE 350 companies. The Bank's previous work has found that SQCs have on average been less profitable than LQCs over the past 30 years, but have retained a much greater proportion of their (lower) earnings.<sup>(1)</sup> This may help to explain why SQCs tend to have lower gearing than LQCs: notwithstanding their relatively low profitability, greater retentions mean they are still able to have proportionately more recourse to internal rather than external finance.

# Access to debt finance

The Bank's previous work on the provision of finance to SQCs found no evidence of any general problem with access to debt finance, although some SQCs appeared to face barriers in access to longer-term debt.<sup>(2)</sup> Clearly, by reasons of their size and the fact that most SQCs are not rated, they have much less access to bond markets than do FTSE 350 companies. There were also some suggestions from the Bank's earlier work that banks were less willing to extend them long-term loans except on a secured basis, although there was evidence that this also reflected SQCs' own preferences for shorter-term finance, which could be renegotiated more frequently.

The current survey throws further light on these issues. Companies were asked to what extent they regard

<sup>(1)</sup> See Cahill, J M and Whitley, J D (2003).

<sup>(2)</sup> See Kearns, A and Young, J E (2002).

themselves as debt-constrained. This was defined as a situation where the plans they have for the company cannot be achieved because the debt finance required cannot be put in place. The proportions regarding themselves as not at all, slightly, somewhat or definitely debt-constrained were 63%, 14%, 17% and 6% respectively. There are no significant differences by size of company, but loss-making companies are, perhaps unsurprisingly, more likely to regard themselves as more debt-constrained. Some 87% of the SQCs claiming to be definitely debt-constrained are unprofitable (compared with 47% of the whole population). None of the definitely debt-constrained SQCs are old-established (ie incorporated prior to 1981); 44% were incorporated between 1981 and 1995 and the other 56% since 1995.

Companies were asked to give reasons for the extent to which they are debt-constrained. The responses tend to support our earlier conclusion that access to debt finance is not a major problem for SQCs in aggregate. The largest groups of companies were those reporting no or few problems, either because they are cash-rich or because they have never been turned down for finance. This may indicate that recent improvements in corporate profitability have eased financing constraints on SQCs. A small minority did, however, report that it is still difficult to raise finance in their sector or that they are constrained because they are making losses or because lenders are unwilling to lend or seeking to tighten lending terms and conditions. The small number of such companies makes it difficult to draw strong conclusions on whether they exhibit any common characteristics, but overall this does not appear to be the case.

As in the Bank's earlier survey,<sup>(1)</sup> overdraft finance was once again quoted as the most common form of debt instrument used, with 62% of SQCs saying they have an overdraft facility. Larger (see Chart 5), older-established and more profitable companies are more likely to have an overdraft facility than smaller, newer and less profitable ones. Only 24% of SQCs with an overdraft facility said they are currently using at least half of it and some 42% claimed to be making no use of it at all. The proportion of all SQCs actually borrowing on overdraft at the time of the survey was therefore only 36%. A fair proportion of those not using their overdraft facility are likely to be cash-generative companies, but the low current usage could also reflect recent improvements in corporate profitability, which might

(1) See Kearns, A and Young, J E (2002).

mean that more companies are currently able to finance working capital and investment plans from internal finance. Other factors that might explain the relatively low usage of overdraft facilities are seasonal issues and the existence of some companies whose working capital or investment needs are so modest that they do not need to make use of their overdraft (ie their facility is largely a contingency provision).

As for term loans, like the previous Bank study the current survey finds much greater usage of short-term bank loans (less than five years by original maturity) than medium-term loans (six to ten years by original maturity) and especially long-term loans (more than ten years). As with overdraft facilities, both short-term and medium-term loans are more likely among larger (see Chart 5), profitable and more established companies. Long-term loans seem to be uniformly rare among all types of SQC, although they are most common at old-established companies. Leasing and hire purchase are much more heavily used by SQCs than invoice finance (usage rates are 46% and 10% respectively). Some 56% of those using leasing say they do so because it frees up banking facilities for other uses, while only 12% say they do so because bank finance is not available. Invoice finance appears more likely to be a substitute for bank finance if that is less easily accessible: some 19% of SQCs that are definitely or somewhat debt-constrained use invoice finance. compared with 10% of SQCs overall.

### Chart 5 Types of debt finance used by SQCs, by size of company



Source: Continental Research

Companies were asked about the size of or amounts outstanding under differing borrowing facilities. Mean

borrowing<sup>(1)</sup> is greatest for bond finance and lowest for overdrafts, with term loans generally in between (see Chart 6). Over 70% of SQCs with an overdraft facility have one of less than £5 million, while only 8% have a limit of more than £25 million. Unsurprisingly, larger companies tend to be able to borrow most on overdraft: for example, of FTSE SmallCap companies that have an overdraft facility 20% have one of more than £25 million.

# Chart 6 Amounts currently owed by SQCs(a)



Source: Continental Research

(a) Percentages relate to SQCs with corresponding debt facility or instrument.

Some 26% of SQCs currently have no borrowings. The proportion of non-borrowers varies inversely with size, ranging from 42% of SQCs with an annual turnover of less than £10 million to 22% of those turning over between £10 million and £50 million and 12% of the high-turnover companies. An investigation of the characteristics of these companies and their replies to other questions suggests that this group is composed of two very different types of company: those who have no need or do not wish to borrow, either because they are cash-rich or risk-averse; and those who do find it difficult to access debt finance, mainly because of relatively poor performance. The former group seems to be larger-for example, 46% of non-borrower responses on the availability of debt quoted being cash-rich or having all necessary facilities in place, while only 16% quoted supply-side issues such as lender unwillingness, sectoral constraints or being loss-making.

Some 60% of SQCs overall have applied for new debt finance or had existing facilities renewed in the past two

years. These were more likely to be larger, profitable, old-established companies in the retail/wholesale sectors; applications from smaller, loss-making, newer, manufacturing companies were less common. As many as 95% of those who have applied in the past two years for debt finance have had their application approved in full (see Chart 7). And not all loss-making companies appear to be constrained; although a majority of the most unprofitable SQCs has not recently applied for debt finance, a remarkable 89% of those that have said their application was approved in full. This does not indicate that banks engage in credit rationing by quantity rather than price in financing SQCs.



# Attitudes to debt finance

Statistics on, for example, gearing levels cannot determine whether these differ because of supply-side constraints on the provision of finance or whether they mainly reflect demand-side factors, perhaps associated with the degree of risk aversion. The survey attempted to throw some light on this by seeking to gauge companies' attitudes to debt finance.<sup>(2)</sup> The responses are summarised in Table A. There were relatively high levels of agreement with the propositions that banks are willing to lend more if required and that companies' plans have never had to be changed because debt finance could not be agreed. Companies also generally acknowledged that they can shop around until they obtain the debt finance required. There were lower levels of agreement with the propositions that it has recently become more difficult to get good deals from

<sup>(1)</sup> The figures quoted for mean borrowing on overdraft in the text and in Chart 6 relate to the size of the overdraft facility rather than the amount actually borrowed.

<sup>(2)</sup> Data in this section and in Table A refer only to SQCs that are currently borrowing or that have borrowed in the past two years (199 out of 257 respondents).

banks or that it can be a real struggle to obtain necessary finance. These replies suggest that SQCs in aggregate do not face widespread supply constraints in accessing debt finance, as does the fact that 78% of SQCs said they had received in the past two years an unsolicited approach from banks they did not use about providing the company with banking services.

### Table A SQCs' attitudes to debt finance

	Average score	Strongly agree	Strongly disagree	Index
SQC has firm views on amount of debt				
incurred	7.8	70	5	+65
Banks willing to lend more if required	6.5	46	20	+26
Never had to change plans because debt				
finance not agreed	6.5	54	29	+25
Prefer to remain loyal to small number of				
finance providers	6.3	40	16	+24
Shop around until get deal required	6.2	35	14	+21
Prefer internal to external finance	5.5	27	31	-4
Recently more difficult to get good deal				
from banks	4.7	16	38	-22
Banks proactively provide advice	4.6	11	36	-25
Although always get finance, can be struggle	4.2	12	49	-37
Too highly geared to raise further finance	3.0	10	72	-62

Notes: Average score is average of range of responses from 1 (least agreement) to 10 (most agreement). "Strongly agree' covers percentage of responses in 8–10 range; 'strongly disagree' covers percentage of responses in 1–3 range. Index is 'strongly agree' less 'strongly disagree'.

Source: Continental Research.

The evidence on the demand side is less clear-cut. Across all types of SQC opinions were fairly evenly divided when asked whether their company preferred to fund internally or rely on external finance. The lowest level of agreement was recorded for the assertion that companies are currently too highly geared to raise further debt finance, again across all types of SQC. This is consistent with the fact that the recent rise in gearing to very high levels by historical standards is concentrated among LQCs rather than SQCs. It does not point to any particular aversion among SQCs to debt finance on prudential grounds.

Although there is little indication that SQCs overall feel they need to reduce gearing on prudential grounds, some 37% said they are currently borrowing less than in recent years, compared with only 23% borrowing more. The excess of those borrowing less over those borrowing more is greater for unprofitable than profitable SQCs, and is also significantly more marked for manufacturing than for other companies. This appears broadly consistent with official data suggesting that manufacturing companies overall have been repaying bank debt in recent years. It may reflect either a lack of demand for external finance, perhaps associated with declining activity in the manufacturing sector, or that a larger proportion of companies in that sector is seeking to improve their balance sheets.

The Bank's past contacts with SQCs noted a relative aversion among them for secured borrowing, which was thought to restrict business options. But the previous survey evidence suggested that the banks tend to require security, especially on longer-term loans to SQCs. The current survey confirms this latter point, with only 18% of those SQCs that borrow doing so on an unsecured basis. Very profitable companies<sup>(1)</sup> appear more able to borrow unsecured (some 40% of such borrowers do so, although the sample size in this case is small). In general some 59% of SQC borrowers provided a fixed charge on debt facilities and almost as many (58%) provided a floating charge. Security seems to be more valued by banks than covenants: only 52% of SQC borrowers are subject to an interest cover covenant, 43% provide a capital gearing covenant and 40% a material adverse change (MAC) clause. Some 26% of borrowers are not subject to any covenants and surprisingly this proportion is higher among the smallest companies by sales turnover (50%) and among the heaviest loss-makers (41%). This perhaps suggests that banks are more likely to insist on security when lending to riskier SQCs, which in turn may make them unduly relaxed about the degree of covenant protection.

# **Liquidity policy**

Replies to the questions on SQCs' liquidity policy may throw further light on the extent to which their relatively low usage of longer-term debt and modest overall gearing (compared with FTSE 350 companies) may reflect a conservative financial policy and high degree of risk aversion. The Bank's previous research found that SQCs generally hold more cash than do other companies.<sup>(2)</sup> The current survey points to high cash holdings<sup>(3)</sup> relative to total assets at smaller, less profitable, newer SQCs. Some 18% of SQCs in aggregate hold more than half their total assets in cash, but this proportion rises to 33% for companies with a turnover of less than £10 million, to 32% for companies with a profit/assets ratio below -10% and to 30% for companies incorporated since 1995. But it is unclear whether holding cash represents a conscious decision on the part of these SQCs: some 82% of sample respondents did not know whether their company has a specific

<sup>(1) &#</sup>x27;Very profitable' means average profits/assets over the past three years were greater than 10%.

<sup>(2)</sup> See Cahill, J M and Whitley, J D (2003).

<sup>(3) &#</sup>x27;Cash' is defined to include balances in current and deposit accounts, including money market accounts, irrespective of whether these accounts were interest bearing or not.

policy on holding cash. When prompted, 72% said it was to finance working capital and 58% to finance future investment. Risk aversion might be a factor among the 47% of SQCs who said they hold cash as a buffer against adverse trading conditions and the 19% who quoted a reluctance to borrow as a reason for holding cash. These latter proportions do not vary substantially among different types of SQC. They suggest that liquidity policy is guided principally by debt aversion at only a minority of SQCs.

# Access to equity finance

Turning to equity finance, recent studies have concluded that SQCs can face significant barriers in raising such finance. This has been variously ascribed to secondary market illiquidity in SQC shares, consolidation in the fund management industry leading to a lack of interest in and research on smaller companies, and a desire on the part of existing owners not to dilute their equity stakes. But, as also noted above, if equity finance were indeed difficult for SQCs to raise, their gearing levels should, if anything, be relatively high in consequence. That does not appear to be the case.

The survey does not provide any very strong evidence that there are major barriers to raising equity finance for the broad majority of SQCs, but it does point to difficulties for a minority of companies. More than two thirds of SQCs said they are either not at all equity-constrained (46%) or only slightly constrained (23%).<sup>(1)</sup> There were no major variations by company size, other than a rather greater proportion of FTSE SmallCap companies (59%) saying they are definitely not equity-constrained than AIM (45%) or FTSE Fledgling (37%) companies.

Nonetheless, that does leave a significant minority overall claiming to be definitely (9%) or, more commonly, somewhat (21%) equity-constrained, and these proportions are above those claiming they are definitely or somewhat debt-constrained (see Chart 8). Indeed, nearly 80% of SQCs that claim to be definitely or somewhat debt-constrained say they are also definitely or somewhat equity-constrained. This suggests, as does the earlier evidence, that a minority of SQCs face general difficulties raising all types of finance, mainly because of their relatively poor performance.<sup>(2)</sup>

#### Chart 8 Proportion of SQCs feeling debt or equity-constrained



The reasons given for the existence of equity constraints, like those underlying debt constraints, reflect a mix of lack of demand by the company (eg in the case of equity finance because of shareholders' fears of dilution) or lack of supply (in the case of equity finance because of a perception by the company that it is out of favour with potential investors or because the company's share price is depressed). However, the most frequently cited reasons were on the supply side.

When asked about the number of secondary market equity issues made in the past ten years (or since flotation if that was more recent), further support is provided for the notion that the majority of SQCs currently faces no major difficulties in raising equity finance, while a minority generally does not seek or finds it difficult to access equity, for either demand or supply-related reasons. Some 53% of SQCs have made two or more secondary equity issues in this period, but a significant number (28%) have not made any. The proportion of companies raising equity to finance expansion or to invest in new assets (see Chart 9) has increased in recent years, perhaps suggestive of some current and prospective recovery in investment spending. It is consistent with the point made in the Bank's latest Inflation Report that the financial climate has become more supportive of corporate investment, with the recovery in equity prices and the reduction in corporate bond spreads since early 2003.<sup>(3)</sup> The proportion raising equity to reduce gearing has also

 <sup>&#</sup>x27;Equity constrained' is defined as the company feels that plans it had could not be achieved because the appropriate amount of equity could not be raised, for either internal or external reasons.

<sup>(2)</sup> The survey did not investigate the possibility that causality may also run the opposite way, ie some companies may

perform poorly partly because of their inability to access finance (or the right form of finance).

<sup>(3)</sup> See Bank of England (2004), pages 14-15.

increased, suggesting that balance sheet adjustment has been a motivating factor for a small number of SQCs. Not surprisingly, in view of the decline in M&A activity in recent years from the levels of the 1999–2001 boom, the proportion of SQCs raising equity to finance a takeover has fallen substantially (although there are signs of some revival this year).

#### Chart 9 Main reasons for SQCs' most recent equity issues, by year



Source: Continental Research.

If SQCs faced major problems in raising equity finance, it might be expected that they would opt for any issues to be underwritten (although underwriters might be wary, for the same reasons, and raise their charges). In fact, the proportion of equity issues by SQCs that were underwritten fell from over half in 1999 to only a quarter so far in 2004 (see Chart 10). This certainly reflects to some extent the decline in M&A-related issues, for which certainty of proceeds is required. But it does not provide much support for the thesis that there exist

#### Chart 10 Equity issuance by SQCs, by year



Source: Continental Research

major barriers to SQCs in general raising equity finance, especially given that 92% of non-underwritten equity issues did in fact raise 100% of the intended proceeds. The proportion of total secondary market issues that did not raise all the intended proceeds has also fallen between 1999 and 2004. In the small number of cases where this happened, it was attributed to market conditions and a lack of suitable investors, but in most cases it nevertheless was said to have had no or minimal effect on the company.

# Attitudes to equity finance

The survey asked a number of questions designed to tease out SQCs' attitudes to equity finance. These are summarised in Table B and provide some guidance on the relative importance of supply and demand constraints on raising equity. Interestingly, the comment that elicited the most agreement was that the costs of an issue are off-putting. This suggests that another reason for the decline in the proportion of underwritten issues is a desire to save on the costs.

#### **Table B**

#### SQCs' attitudes to equity finance

	Average score	Strongly agree	Strongly disagree	Index
Costs of issue off-putting	6.4	36	17	+19
Being listed means can raise other finance				
more easily	5.8	26	19	+7
Markets feel amounts wish to raise too small	5.2	20	31	- 11
Better ways to raise finance than share issue	5.1	12	24	-12
Existing shareholders reluctant to issue				
more shares	4.8	17	34	-17
Current market conditions mean less likely				
to consider	4.8	21	41	-20
Markets do not like as company not fast-grow	th 4.2	15	50	-35
Markets do not like sector	4.2	13	48	-35
Markets do not like due to dominant				
shareholder base	4.2	15	53	-38
Directors reluctant to issue more shares	4.1	12	49	-37
Put off by regulatory requirements	3.9	10	51	-41

Notes: Average score is average of range of responses from 1 (least agreement) to 10 (most agreement). 'Strongly agree' covers percentage of responses in 8–10 range; 'strongly disagree' covers percentage of responses in 1–3 range. Index is 'strongly agree' less 'strongly disagree'.

Source: Continental Research.

Other evidence does not point to major demand constraints on issuing equity. Fears of dilution on the part of existing shareholders do not appear to be widespread: only 17% of SQCs strongly agreed that existing shareholders are reluctant to issue more shares, whereas 34% strongly disagreed. However, among companies with a family shareholding above 30% of the total, 29% strongly agreed that their shareholders are reluctant to make further issues. This may reflect greater concerns on the part of family shareholders about dilution. An even smaller overall proportion (12%) of SQCs strongly agreed that directors are reluctant to issue more shares, although, again, the proportion was higher (24%) among those with a large family shareholding. There was general acknowledgement that being listed enables other forms of finance, including debt, to be raised more easily.

Turning to possible supply constraints, there was generally substantial disagreement with propositions asserting the importance of factors traditionally regarded as a brake on SQCs issuing equity, although unfortunately the survey did not include a reference to secondary market illiquidity among these (though, unprompted, only 3% of respondents cited illiquidity as a reason for being equity-constrained). The proposition that attracted most support was that the amounts SQCs seek are thought to be too small to interest the equity markets. This could be consistent with the consolidation trend in the fund management industry. Concerns that the market may not favour SQCs with dominant shareholder groupings seemed less acute: only 15% strongly agreed that this is an obstacle to raising equity, although this rose to 31% of companies where there was a family shareholding of more than 30% of the total. The proportions strongly agreeing that various market obstacles to SQCs based on their sector, lack of growth or current conditions are major deterrents varied between only 13% and 21% of SQCs.

Companies were also asked whether they had considered delisting or moving to another market. Replies to this question were perhaps indicative of more dissatisfaction than the other responses. FTSE Fledgling companies appeared to be the most discontented: some 62% had considered one or both of these options, compared with 44% of FTSE SmallCap and 34% of AIM companies. This may indicate that the very smallest companies on the official list perceive the fewest advantages from being listed; certainly, the costs of listing and the associated regulation were argued to be more of a deterrent than falling share prices or small size themselves. Such companies may view the lower costs and less extensive regulation of the AIM market as significant advantages.

The absence of major concerns about difficulties in raising equity finance also arose when SQCs were asked about their plans over the next two to three years (see Table C) and about how they would finance any major new business opportunity. The most popular idea amongst future plans was to issue more shares: some 62% of companies said they might do that in that period. The smallest companies were particularly likely to want to issue more shares. Medium-sized and large SQCs, by contrast, were more likely than small SQCs to want to buy back shares. Also, newer firms were more likely to want to increase their equity base than older ones.

# Table C SQCs' financial plans in the next two to three years

Per cent

	Number of employees		Year of	incorpor	ation		
	All SQCs	<100	$\tfrac{100-}{500}$	>500	Up to 1980	1981 – 95	Since 1995
Reduce current debt Increase current debt Issue more shares Buy back shares	39 45 62 24	29 47 78 17	46 36 46 33	47 53 56 25	43 48 51 30	39 47 64 23	37 42 68 21

Source: Continental Research

When asked about how a major new business opportunity<sup>(1)</sup> would be financed if it arose tomorrow, some 52% said it would be mainly through an equity issue, compared with just 23% who said it would be mainly by increasing debt finance. Neither supply nor demand factors were quoted as possible obstacles to taking advantage of such an opportunity. Only 7% of SQCs thought they would struggle to raise the external finance needed, while only 2% said they would not want to take on more debt at present and only 1% said directors or shareholders would not sanction an increase in debt or a share issue in the event of such an opportunity. This also does not point to any substantial equity or debt aversion on the part of SQCs.

# Conclusions

This article has reported the results of a comprehensive survey designed to answer questions and test hypotheses concerning the financial policies of a wide cross-section of mid-market companies in the United Kingdom. It suggests that the broad generality of UK smaller quoted companies is not currently experiencing any major difficulties in accessing either debt or equity finance. They appear to be able to rely on banks and equity investors to meet their financing needs, although generally security has to be offered to banks and loans tend to be of shorter maturity than for LQCs. Companies have rarely had to alter their financial strategy because required finance was not forthcoming, and most have confidence in their ability to finance a major new business opportunity should it present itself. In such circumstances, more would opt for equity than debt finance, suggesting that financial policy tends to be

(1) 'A major new business opportunity' is defined as one for which the company would need to raise external finance.

more conservative than at larger companies, perhaps motivated by greater aversion to the risks of heavy borrowing. But only a minority of SQCs seems deliberately to hold cash because of an aversion to borrowing. The survey also suggests that only a small minority of SQCs appears to face problems in accessing all types of finance, mainly in consequence of their relatively poor performance.

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# Recent developments in surveys of exchange rate forecasts

# By Sally Harrison and Caroline Mogford of the Bank's Foreign Exchange Division.

Expectations of future exchange rates can influence moves in the current exchange rate. This article summarises recent developments in the mean forecasts for dollar/euro, dollar/sterling and sterling/euro bilateral exchange rates taken from the Reuters survey. The properties of these mean forecasts are evaluated and the article shows that they are not reliable predictors of future exchange rates.

# Introduction

Expectations about the future play an important role in financial markets. The current price of an asset will depend on the expected rate of return, including the expected capital gain or loss from a change in its price. Understanding changes in market expectations can therefore help in interpreting moves in current financial prices.

In practice, it is difficult to obtain true measures of market expectations. In order to proxy these expectations the Bank often uses surveys of market participants in its analysis. Such surveys will not be perfect: results are often collected over a number of days, the average person filling in the survey may not hold precisely the same views as the average person taking positions in the market, and different people may interpret a survey question in different ways. So it is important to analyse the informational content of these surveys, rather than take them at face value.

This article looks at the foreign exchange market, and one measure of the expectation of future levels of the exchange rate, given by the Reuters survey.<sup>(1)</sup> This survey is of interest because it surveys foreign exchange traders and analysts, who might be expected to approximate the views of the market as a whole. The aim is to investigate the forecast accuracy of this survey. In practice, it does not seem that this survey is a very reliable predictor of future exchange rates. This is not a feature peculiar to the Reuters survey, as exchange rates are notoriously difficult to predict accurately.

# **The Reuters survey**

Reuters surveys around 50 financial institutions for their forecasts of several bilateral rates, including dollar/euro and dollar/sterling exchange rates. The survey polls foreign exchange traders and analysts in the City of London. Those surveyed work at major investment banks, commercial banks, and other financial institutions in the City. The survey is taken on the first Monday and Tuesday of every month and asks for forecasts of the exchange rates one, three, six and twelve months ahead.<sup>(2)</sup>

Reuters survey data are available from November 1997 for the dollar/sterling exchange rate and from January 1999 for dollar/euro. A projection for sterling/euro can be calculated by dividing each forecaster's dollar/euro forecast by their dollar/sterling forecast.

# Recent changes in the mean forecasts

Charts 1 to 3 show the evolution of the mean of the Reuters forecasts and the spot exchange rate for the three currency pairs. The sample period provides an interesting case study, covering some large moves in spot exchange rates. During the appreciation of sterling and the dollar versus the euro in 1999 and 2000, the Reuters survey suggested that the weakness of the euro was not expected to persist. But by the start of 2001 the survey indicated a less rapid depreciation of sterling and dollar versus the euro over the subsequent twelve months than was suggested before 2001. The level of the survey rates was much closer to the spot rates during the appreciation of the euro after 2002, perhaps indicating

<sup>(1)</sup> The Bank also uses other surveys, such as the Consensus survey, for reference purposes.

<sup>(2)</sup> Strictly, the survey horizon is slightly less than one, three, six and twelve months. For example, the January survey

would ask for forecasts of the exchange rates at the end of January, March, June and December.

#### Chart 1 Dollar/euro spot and one, three, six and twelve-month forecasts



#### Chart 2

# Dollar/sterling spot and one, three, six and twelve-month forecasts



### Chart 3

# Sterling/euro spot and one, three, six and twelve-month forecasts



Sources: Bank of England and Reuters.

that some euro appreciation was then seen as sustainable. The dollar/sterling survey has moved more closely with the spot rate throughout the sample period.

# Changes in the forecast dispersion

The mean forecast of a market survey is often considered to be a measure of the market forecast. But there can be considerable dispersion within any survey. Chart 4 shows two histograms of dollar/euro forecasts. In June 2002 over two thirds of respondents were forecasting between 0.925 and 1.025 dollars per euro. By April 2004, not only had the mean of the distribution shifted up—in line with the higher spot exchange rate but the shape had also changed.

# Chart 4

### Dispersion of twelve-month dollar/euro forecasts



The x-axis labels refer to the centres of the histogram's ranges. The ranges are all of width \$0.05.

Source: Reuters.

### Chart 5

# Rolling three-month average of standard deviations of analysts' three-month forecasts



Chart 5 shows forecast dispersion: the period covers episodes of both sterling stability (2000–02) and sharp sterling movements (for example in the first half of 2003). The main feature is a peak in dispersion of all the bilaterals at the start of 2001, otherwise the standard deviations appear to have been relatively stable.

# Forecast dispersion and exchange rate uncertainty

It is important to recognise that forecast dispersion is not the same as the market's uncertainty about future exchange rates. This is because the survey collects each respondent's 'best guess' of the exchange rate, which does not capture the individual's subjective uncertainty. To emphasise this point, consider a survey where all the respondents forecast the same outcome, for example that dollar/euro will be 1.20 dollars per euro in twelve months' time. In this situation there is no dispersion. But there may be considerable uncertainty in each forecaster's mind about this forecast being realised; each forecaster may believe the dollar/euro bilateral rate could be anywhere between 1.00 and 1.40 in a year's time, with 1.20 as their best estimate. Nevertheless, we do observe a correlation between dispersion and uncertainty.

Charts 6 to 8 show the standard deviations of the forecasts against each exchange rate's implied volatility (which is a forward-looking measure of exchange rate uncertainty derived from option prices). There is some association evident between the distribution of forecasts and implied volatility for dollar/euro and sterling/euro (see Charts 7 and 8), although for dollar/sterling the association is weaker. The standard deviations are lower than the implied volatilities for all three currency pairs.

# Do the mean survey forecasts follow the spot rate?

One way to assess the information in exchange rate surveys is to examine how 'good' the survey mean is at predicting the future exchange rate. Although it does not reflect the forecast of any individual respondent, it is likely that the mean forecast will average out idiosyncratic views.

A frequent criticism of surveys of exchange rate forecasts is that the forecasts appear to follow merely the spot exchange rate. The following regression was run to test this:

### Chart 6

# **Dollar/sterling twelve-month implied volatility and twelve-month forecast standard deviation**



# Chart 7

# Dollar/euro twelve-month implied volatility and twelve-month forecast standard deviation



#### Chart 8

# Sterling/euro twelve-month implied volatility and twelve-month forecast standard deviation



Sources: Reuters and UBS.

$$E_t(s_{t+h}) - E_{t-1}(s_{t-1+h}) = \alpha + \beta(s_t - s_{t-1}) + \varepsilon_t$$
 (1)

In equation (1),  $E_t(s_{t+h})$  is the log of the mean forecast at time *t* of the exchange rate in *h* months' time, and  $s_t$  is the log exchange rate at time *t*.

The interpretation of this equation is that revisions to the *h* month ahead forecast between time t - 1 and time *t* are linearly related to the actual change in the exchange rate between t - 1 and *t*.

We examine the joint hypothesis that  $\alpha = 0$  and  $\beta = 1$ . This would imply both that the change in the forecasts maps one for one with that in the spot rate on average  $(\beta = 1)$  and that the change in the forecasts does not diverge from that in spot exchange rates over time  $(\alpha = 0)$ . Of course, it might be entirely rational for the forecast and the spot rate to move together, as the spot rate is forward looking.

Table A shows the regression coefficients ( $\beta$ ), the probabilities of  $\alpha = 0$  and  $\beta = 1$  (using an F-test), and the R-squared statistics of the regressions.<sup>(1)</sup> It shows the extent to which forecast revisions are related to recent changes in the exchange rate. All coefficients on changes in the spot rate are positive and significantly different from zero—changes in exchange rate forecasts are correlated with changes in the spot rate. The results support the hypothesis that changes in short-horizon forecasts are highly responsive to changes in the spot rate from zero rate from the spot rate from spot from the spot rate from the spot from the spot rate from spot from the spot rate from spot from the spot from spot from the spot from the spot from the spot from the spot from spot from the spot from the spot from spot from the spot from the spot from the spot from spot from the spot from spot from the spot from the spot from spot from the spot from spot fro

#### Table A Regressi

# Regression coefficients on the change in the Reuters forecast

	Dollar/sterling	Dollar/euro	Sterling/euro
One-month:			
$eta \ p$ -value (a) $\mathbb{R}^2$	0.88 (0.00) 0.84	0.97 (0.68) 0.90	0.90 (0.17) 0.85
Three-month:			
$eta \ p$ -value (a) $\mathbb{R}^2$	0.76 (0.00) 0.76	0.85 (0.01) 0.81	0.76 (0.00) 0.77
Six-month:			
β p-value (a) R <sup>2</sup>	0.67 (0.00) 0.71	0.72 (0.00) 0.76	0.64 (0.00) 0.67
Twelve-month:			
$eta \ p$ -value (a) R <sup>2</sup>	0.55 (0.00) 0.56	0.54 (0.00) 0.70	0.49 (0.00) 0.66

(a) P-value of F-test of joint hypothesis H<sub>0</sub>:  $\alpha = 0$ ,  $\beta = 1$ .

However, we reject the joint hypothesis  $\alpha = 0$  and  $\beta = 1$  for all but the dollar/euro and sterling/euro one-month forecasts; so a change in the exchange rate does feed through to a change in the forecast, but not to an equivalent change. The responsiveness of forecasts to changes in the spot rate declines for longer horizons, suggesting that respondents may hold stronger convictions about longer-term expectations. The R-squared statistics of the regressions are high, more so at the shorter maturities, so that a high proportion of the revision to the forecast can be explained by the change in the spot rate.

# Is there any predictive power contained in the mean survey forecasts?

To investigate the predictive power of the Reuters surveys, we compare the forecast accuracy of the mean survey forecast to the forecast accuracy of the random-walk model. The simple random-walk model predicts that the current spot rate is the best estimate of the future exchange rate and is quite widely accepted as one of the best predictors of future exchange rates.

Random-walk forecasts are calculated using financial market data, so they can be taken on any trading day. We simulate these forecasts monthly on the dates of the Reuters survey.

A root mean squared error (RMSE) criterion can be used to evaluate the predictive power of the forecasts relative to the simple random-walk model. The RMSE statistic is

$$RMSE = \sqrt{\frac{\sum_{t=1}^{n} (E_t(s_{t+h}) - s_{t+h})^2}{n}}$$
(2)

As before,  $E_t(s_{t+h})$  gives the forecast, so  $E_t(s_{t+h}) - s_{t+h}$  gives the forecast error, and *n* is the number of forecasts available. The more accurate the forecast, the smaller the RMSE.

The results are shown in Table B. The Diebold and Mariano<sup>(2)</sup> test statistic was used to determine whether there was a statistically significant difference between the RMSEs. We found that the Reuters forecast RMSEs were significantly larger than the random-walk RMSEs for sterling/euro and dollar/euro at all horizons. Hence, for these bilateral exchange rates, we conclude that the

(1) To account for the overlapping error structure in the regressions (which occurs when the forecast horizon is greater than the frequency of the forecasts), the Newey-West correction was used.

(2) See Diebold, F and Mariano, R (1995), 'Comparing predictive accuracy', Journal of Business and Economic Statistics, Vol. 13 No. 3, pages 253-63.

### Table B RMSE of the mean forecast versus random-walk forecast (RW)

	Dollar/sterling	Dollar/euro	Sterling/euro
One-month:			
Reuters	0.0327	0.0318	0.0146
Random Walk	0.0332	0.0291	0.0131
Three-month:			
Reuters	0.0547	0.0657	0.0277
Random Walk	0.0559	0.0573	0.0237
Six-month:			
Reuters	0.0831	0.0936	0.0392
Random Walk	0.0804	0.0773	0.0295
Twelve-month:			
Reuters	0.1204	0.1603	0.0607
Random Walk	0.1159	0.1330	0.0454

Bold: RMSE is statistically significantly smaller.

mean forecasts are less accurate predictors of exchange rate movements than a simple random-walk model.

# Can the survey forecasts predict the direction of exchange rate moves?

It may be the case that survey respondents are more focused on the direction of the exchange rate than its scale. Also, if respondents form their exchange rate expectations using uncovered interest parity (UIP), the existence of an uncertain risk premium may affect the size of movements expected, even when the direction of change is predicted correctly. In these cases, the RMSE would not be the correct criterion to judge the forecasts; forecasts could be much worse than a random walk in a RMSE comparison, but predict the correct exchange rate direction every period.

The proportions of correct directional predictions by the Reuters mean forecasts are shown in Table C. Table C also shows *t*-statistics for the forecasts relative to a 50% success level. The correct Reuters forecast proportions are not significantly different from 50% for any cases except the twelve-month sterling/euro forecast. The twelve-month sterling/euro forecast is correct almost two thirds of the time, significantly better than 50%. Excluding this case, the Reuters mean exchange rate forecast is not significantly better at predicting the direction of exchange rates than the toss of a coin. In fact, in half of the cases the mean of the Reuters forecasts correctly predicted the direction of the exchange rate less than 50% of the time.

# Is there little information content in surveys?

The preceding analysis appears to suggest there is little informational value in the mean survey forecast. More

#### Table C

# Percentage of Reuters forecasts that accurately predicted direction of change and *t*-statistics for whether proportions were significantly better/worse than 50%

	Dollar/sterling	Dollar/euro	Sterling/euro
One-month:			
Per cent	61	43	46
t-statistic	1.84	-1.26	-0.75
Three-month:			
Per cent	53	46	39
t-statistic	0.58	-0.64	-0.13
Six-month:			
Per cent	47	51	42
t-statistic	-0.58	0.13	-0.65
Twelve-month:			
Per cent	54	53	64
t-statistic	0.61	0.41	2.13

Bold: proportion is significantly different from 50%.

precisely, it finds that mean survey forecasts were beaten by a random-walk 'no change' forecast in a mean squared error sense. And if one had been interested in predicting the future direction of the exchange rate, then flipping a coin would have been as reliable a strategy as relying on the mean forecast in all cases but the twelve-month sterling/euro forecast.

Despite the results, there are possible reasons why they should not be interpreted as implying that market participants are unskilled at forecasting exchange rates. Respondents may not submit their true expectation, because it is commercially sensitive. Some may not wish to be too far from what they perceive the consensus to be, while others may feel an incentive to produce a forecast different from everyone else's.

Another measure of the 'market' forecast might be one that is money-weighted to reduce the influence of small players, who might have no impact on the price determination process, and who could affect the mean by submitting an extreme forecast.<sup>(1)</sup> In practice, this measure would be hard to construct.

This article has deliberately not discussed the issue of forecaster or survey rationality. The survey mean may not represent any individual forecaster, so testing each individual's forecast performance should complement any attempt to assess the rationality of the 'market' forecasts.

One possible interpretation of the apparent poor forecasting performance in recent years is that respondents had simply built into their forecasts the probability of an adjustment to the level of the exchange

<sup>(1)</sup> Another way to avoid this potential problem would be to use the modal forecast.

rate that was not realised as quickly as expected. This may well have been the case for the euro exchange rates between 2000 and 2002, when the euro was widely seen as considerably undervalued against the dollar and sterling—the correction did eventually occur. It could be argued that survey respondents were right in their long-term predictions for euro exchange rates, even though they were consistently wrong over a particular period.

Currently it appears that market participants are not forecasting a significant appreciation or depreciation of the euro. The forecasts of euro exchange rates may have entered a mode of behaviour similar to forecasts of dollar/sterling in recent years—when both short and longer-term expectations tracked the spot rate closely, possibly suggesting consensus that the exchange rate was not far from some long-term equilibrium level.

# Conclusions

The mean Reuters forecasts for dollar/euro, dollar/sterling and sterling/euro bilateral rates have all been closer to the spot rates in recent months than historically. But this year's survey results so far still suggest that sterling is expected to depreciate against the euro, although by much less than in 1999 and 2000.

Regressions support the idea that changes in short-term exchange rate forecasts are highly associated with recent changes in the exchange rate. The correlation between changes in exchange rate forecasts and recent changes in the spot rate falls at longer forecast horizons.

In a mean squared error sense, the mean Reuters forecast is a weaker predictor of future exchange rates than a simple random walk. And, excepting sterling/euro at the twelve-month horizon, survey forecasts are not significantly better than tossing a coin in determining the direction of exchange rate moves. Overall, the Reuters mean exchange rate forecasts do not appear to have much predictive power. And, especially at short horizons, the mean forecasts appear to be very responsive to recent changes in the actual exchange rate. This could potentially reflect either the fact that survey respondents react to recent changes in the exchange rate, or that exchange rates are forward looking.

# Sterling money market funds

### By Adrian Hilton of the Bank's Sterling Markets Division.

Sterling institutional money market funds have, over the past five years, become an important feature of the sterling money market. This article looks at the characteristics of such funds and the instruments they invest in. It recognises that the growth of sterling institutional money market funds has the potential to change the flow of funds in the sterling money markets and to alter the composition of banks' balance sheets, but has no material implication for the implementation of monetary policy.

Sterling money market funds (MMFs) have grown, in terms of net asset value (NAV), from around £1.5 billion to over £40 billion in the past five years (Chart 1), and as a proportion of the sterling money market from less than 0.5% to around 6% over the same period.<sup>(1)</sup> Through collective investment in short-term, highly rated money market instruments, these funds offer an investment product that has portfolio diversification and liquidity, and that is used by institutional investors to manage short-term cash positions.

#### Chart 1 Sterling money market funds



This article describes the market for sterling money market funds, and considers the reasons behind its growth and the possible implications of that growth.

### What is a money market fund?

MMFs are pooled investment funds that issue shares that are similar, in terms of liquidity, to call deposits. They do not provide guaranteed security of principal, however, and it is possible for the value of a fund's assets to fall to such an extent that the fund is unable to meet the maximum possible redemptions (known as 'breaking the buck'). MMFs invest in money market instruments or in interbank deposits with a residual maturity of up to one year and distribute income, less fees, to shareholders (see below). In sterling, MMFs are typically institutional: they are used chiefly by financial and non-financial corporates, investment institutions, charities and local authorities as a means of short-term cash and liquidity management. Retail sterling MMFs do exist but their market size is small (the Investment Management Association estimates somewhere in the region of £2.5 billion) and they are not considered here.

Though managed from London, sterling MMFs are usually based in offshore centres,<sup>(2)</sup> primarily in Luxembourg and Dublin, both of which offer a 'tax-neutral' environment in which investment income earned by non-resident investors is neither taxed at source nor subject to a withholding tax. Fund providers establishing their funds in these centres have historically enjoyed low levels of corporation tax and a flexible approach from the regulatory authorities under which the industry has been encouraged to develop. For example, the Central Bank of Ireland (which authorised money market funds in Dublin until the formation of the Irish Financial Services Regulatory Authority in 2003)

<sup>(1)</sup> Data on sterling money market funds are taken from iMoneyNet's Offshore Money Fund Vision, which captures the large majority of the sterling institutional money fund market. The sterling money market is defined here as interbank deposits (including deposits between entities in the same group), Treasury bills, certificates of deposit, commercial paper, gilt repo and eligible bills.

<sup>(2)</sup> Around 40 small (mainly retail) MMFs are based in the United Kingdom.

was the first authority to allow securities that are not listed on exchanges to be held within collective investment schemes (including MMFs) authorised under the European investment funds legislation, UCITS.<sup>(1)</sup>

Sterling money market funds are provided by financial institutions (Table A). The largest are run by major UK banking groups but insurance groups are also present in the market. The ten largest funds account for over 90% of the total market and the two largest funds represent around 40%. Such concentration is likely to reflect the degree to which MMFs are marketed to the existing depositor base of their parent banks, perhaps aided by a tendency of depositors to maintain existing bank relationships.

#### **Table A**

# Ten largest sterling money market funds (as at 21 May 2004)

Fund name	Net asset value (£ billions)
Parelava (Clobal Investore) Clobal	
Liquidity First Fund	9.0
Scottish Widows Clobal Liquidity Fund	73
RBS-Global Treasury Funds	2.8
IP Morgan Fleming Liquidity Fund	2.7
Insight Liquidity Funds plc	2.5
Standard Life Liquidity Fund	2.3
Henderson Liquid Assets Fund	1.5
Fidelity Institutional Cash Fund	1.4
Citi Institutional Liquidity Fund plc	1.3
Merrill Lynch (Asset Management)	
Institutional Liquidity Fund	1.3

Source: iMoneyNet.

Table B shows the key differences between an MMF and an overnight call deposit offered by a bank, from the viewpoint of an investor.

### Table B

# Characteristics of money market funds and overnight bank deposits

	Call deposit	MMF
Risk	Single name.	Credit diversification through broad portfolio mix.
		Possibility of 'breaking the buck' through volatility of asset prices. (a)
	Covered by deposit insurance (up to around £30,000).	Not covered by deposit insurance.
Return	Related to market overnight interest rates.	Depends on returns on portfolios; intended to be stable.
Fees	None.	10-20 basis points of return.
Interest	Paid daily.	Stable or accumulating NAV (see above).
Liquidity	Later intraday deposit/withdrawal deadlines (often driven by payment system deadlines).	Early cut-off times for purchase/sale of shares.
Minimum investment	None, but interest rates may vary according to size of investment.	Varies; most around £1 million.

(a) A fund 'breaks the buck' when the value of its assets falls below the book value of the fund, rendering it unable to meet maximum possible redemptions. Money market fund returns arise in one of two ways. The shares in a 'stable NAV' fund accrue interest daily over each month and this income is either converted into additional shares or paid directly to the shareholder. 'Accumulating NAV' funds reflect investment income in an increased share price each day.

# What do money market funds invest in?

Sterling MMFs invest in bank and corporate sterling debt—commercial paper (CP), certificates of deposits (CDs), floating-rate notes (FRNs) and bank deposits—and (to a much lesser extent) in short-term government securities (mainly UK Treasury bills) and gilt repo (Chart 2).







Figures do not sum to 100% due to rounding.

The investment strategy of a sterling money market fund is partly governed by European legislation: the UCITS directive, which is not exclusive to money market funds, limits the range of permissible investments for collective investment vehicles and lays down guidelines for the degree of portfolio diversification. By far the most important external influences on the portfolio composition of sterling money market funds, however, are the stipulations of the ratings agencies, which take a view on a fund's overall investment quality (see the box on page 178). In doing so, they impose explicit restrictions on the asset quality and maturity of the portfolio, with further implications for its overall liquidity.

 Undertakings for Collective Investment in Transferable Securities. Investment in non exchange-listed securities is essential for MMFs, which invest in large amounts of commercial paper and certificates of deposit.

# Money market fund ratings

Most sterling institutional money market funds carry AAA MMF ratings from one of the major agencies. These ratings are intended to indicate that the rated funds are of a similar (though not directly comparable) investment quality to an AAA-rated long-term fixed-income product. Standard and Poor's (S&P) distinguishes MMF ratings from its long-term asset credit ratings by the addition of a lower-case 'm' as a suffix to the rating. Moody's does the same by adding a measure of market risk to its ratings.

A fund rated AAAm by S&P must invest at least 50% of its portfolio in assets with the top short-term rating of A-1+. The remainder must be rated at least A-1. Moody's, on the other hand, requires that, while a fund may only invest in assets rated at least P1 (the equivalent of A-1), the overall risk of an investment in an Aaa-rated MMF must be no greater than the risk of investing in an Aaa-rated fixed-income obligation for 13 months. It uses an expected loss calculation to decide the extent to which a lower credit rating can be offset by a shorter residual maturity. Both agencies require a weighted asset maturity (WAM) of no more than 60 days. In addition to these rules, the agencies say that they scrutinise liquidity, management philosophy and internal controls to reach a view on a fund's overall investment quality.

Since the funds themselves are situated offshore, local authorities (such as the Irish Financial Services Regulatory Authority or the Commission de Surveillance du Secteur Financier in Luxembourg) are responsible for authorisation of funds under the UCITS directive (see below) and the UK Financial Services Authority (FSA) has a responsibility for regulating asset managers and their promotion activities if they operate from within the United Kingdom. But rating agencies remain the most powerful external control on sterling money market fund activities and investment.

The agencies claim that their own criteria for top-rated funds are more stringent than the requirements of SEC Rule 2a-7, which applies to US funds.<sup>(1)</sup> For example, the maximum WAM under 2a-7 is 90 days (compared with 60 days under the agencies' AAA requirements). In the European Union, the UCITS directive lays down guidelines for collective investment vehicles that cover portfolio diversity and permissible investments, but these are not specific to money market funds.

(1) A notable exception is the maximum exposure to any one name: Rule 2a-7 puts that limit at 5% while S&P and Moody's allow 10%.

Within these restrictions, investment strategies and portfolio compositions may differ markedly between funds, reflecting both a fund's investment aims (ie the degree to which yield generation is deemed important relative to preservation of principal) and the fund manager's views on the relative value and liquidity of different money market instruments. Fund managers may also seek to increase the investment return on their funds for the purpose of gaining market share. They can do this by altering the precise composition of their portfolios to include higher-yielding products such as asset-backed commercial paper (see below) and FRNs at the cost of lower secondary market liquidity or higher price volatility.

Chart 2 shows that cash deposits with banks form an important component of any money market fund

portfolio. For the most part, these are overnight or short-term deposits, which funds place in order to cover potential investor outflows. Funds might also hold sterling CP and CDs with the aim of providing a second tier of liquidity.

More generally, CP and CDs are held for the purpose of generating yield and, as such, constitute a large proportion of most portfolios. Sterling money market funds hold, on average, around 50% of their investment portfolios in the form of CP, although the exact proportion does vary between different funds (Chart 3). CP is issued by a wide range of names, both financial and non-financial (for example manufacturers, retailers and utilities), allowing portfolio diversification. There is also a growing pool (around £9 billion) of asset-backed CP issuance in sterling, much of which is purchased by MMFs.<sup>(1)</sup> Asset-backed CP typically offers

(1) See Rule, D (2001), 'Risk transfer between banks, insurance companies and capital markets: an overview', Financial Stability Review, December, pages 137–59, for more on asset-backed CP.

Chart 3 Share of commercial paper in sterling money market funds



higher yields, but can require more onerous credit analysis than conventional CP and be less liquid.

CDs also form an important part of sterling MMF portfolios: market contacts report that there is greater secondary market liquidity in CDs (including repurchases by issuers) than in CP, which makes them more attractive to some funds. Floating-rate notes, which pay coupons linked to market interest rates such as three-month Libor, are frequently held as a minority asset by most funds. But they are usually bought close to final maturity and many funds hold only bank-issued notes to limit their corporate exposure.

Overall, a large part of a fund's assets tends to be concentrated at short maturities, their frequent 'churn' reducing reliance on secondary market liquidity. Under rating agency rules, AAA-rated funds must maintain a weighted asset maturity (WAM) of less than 60 days, but fund managers may reduce their WAM by buying shorter-term assets, depending on their view of the yield curve. At 21 May the average sterling MMF WAM was 43 days, with a standard deviation of 11 days.<sup>(1)</sup>

Across the various instruments, only money market funds' holdings of CP constitute a significant proportion of any particular market (Chart 4). The growth of outstanding sterling CP and of MMF assets has been roughly the same in recent years (Chart 5) and it is possible that their growth shares some key influences. It is also possible that the growth of MMFs has stimulated issuance of CP by providing a new source of demand for short-term paper.

# Chart 4

### Sterling money market instruments and holdings by money market funds, March 2004



# Chart 5 Sterling commercial paper outstanding and



# Why have sterling money market funds grown? Demand

Contacts suggest that the key attraction of money market funds to investors is the ease with which they can diversify risk through such products. For a corporate treasurer to open the number of bank lines required to achieve the same level of diversification would be operationally intensive. In addition, the resources required to perform credit analysis on such a wide range of investments would make it impractical for many treasury operations to monitor the risk of such a broad money market portfolio.

Demand for MMFs has, therefore, sprung at least in part from a move away from in-house cash management towards greater investment diversification, and a

<sup>(1)</sup> iMoneyNet Offshore Money Fund Report.
#### A comparison with US money market funds

MMFs have been an important feature of the US dollar money market for almost 30 years. US money market fund assets now total around \$2 trillion. In nominal dollar terms, sterling funds are still smaller than US funds were in 1980 (Chart A). Euro funds are also small by comparison. Unlike in the United Kingdom, US money market funds are included in monetary aggregates.<sup>(1)</sup>





Evolution of US dollar, euro and sterling money

US MMFs emerged primarily as a vehicle for retail investors during the 1970s when falling equity and bond prices following the oil price shocks increased the attractiveness of cash as an asset class. At the same time, and despite rapidly rising interest rates, banks were prohibited by 'Regulation Q' from paying interest on current accounts and were restricted to paying around 5% on time deposits. MMFs were the natural beneficiary, although the growth of inflows eased slightly when Money Market Deposit Accounts (MMDAs) began to be offered by banks in 1982. Fewer banking regulations and the ability of bank current account rates to track money market rates meant that retail funds in the United Kingdom did not take off at the same time as US funds. Reflecting this, while US money market funds have traditionally been marketed to retail investors—many bear the characteristics of bank accounts (offering chequebooks, for example)—most money market funds in the United Kingdom are wholesale products.

In recent years, US wholesale funds have grown in terms of assets at a faster rate than US retail funds (Chart B). A trend among companies during the 1990s towards 'outsourcing' cash management responsibilities via MMFs (similar to that discussed before in the context of sterling funds) has boosted investment in US institutional funds. Declining relative interest rates in recent years have caused some retail investors to shift short-term assets out of MMFs into bank deposits.

#### Chart B





(1) Retail MMFs are included in M2 and M3; institutional MMFs are included in M3.

re-evaluation of existing banking relationships. The same has been said of US wholesale investors, who have moved in the past few years towards outsourcing of cash management.<sup>(1)</sup>

This process has occurred over a period when the number of banks operating in the United Kingdom has fallen (by 20% over the 1990s).<sup>(2)</sup> Treasurers have been

prompted to look to alternative products to retain diversification of their cash portfolios.

Market contacts have noted that, in addition, MMF yields have generally been less volatile in recent years than sterling market overnight interest rates (and bank call deposit rates, which are typically linked to overnight rates) (Chart 6). But it seems unlikely that

<sup>(1)</sup> Investment Company Institute (2003), Mutual fund fact book.

<sup>(2)</sup> Bank for International Settlements (2001), Group of Ten-Report on consolidation in the financial sector.

Chart 6 Sterling money market fund yields and overnight interest rates



(a) Average annualised gross yield on sterling MMFs for past seven days(b) SONIA is the sterling overnight indexed average.

short-date volatility has been a key driver of MMF growth, since this has occurred over a period in which that volatility has declined (Chart 7). Market rates have stabilised further since the Bank published a consultative paper on money market reform on 7 May 2004.<sup>(1)</sup>

#### Chart 7 Overnight interest rate volatility and sterling money market funds



The growth of sterling MMFs also coincided with a period of increasing corporate liquidity and positive cash positions. Chart 8 shows that corporate liquidity has been built up throughout the past five years, during which time the money market fund industry has expanded. The accumulation of cash and liquidity on corporate balance sheets may have led to greater demand for short-term cash management products such as MMFs.

#### Chart 8 UK PNFCs' liquidity<sup>(a)</sup>



(a) Defined as all currency deposits, money market instruments (MMIs) (excluding shares in MMFs) and bonds held, divided by all short-term borrowing and MMIs issued.

#### Supply

It is possible that another driver of sterling MMF growth was the impetus given to the European fund industry by the arrival in the market of American investment firms with experience of an established money market fund industry in the United States. Many of the first sterling funds were provided by such firms as Fidelity, Northern Trust and Citibank. By 2002, most major UK banks had followed suit, either directly or via their fund management businesses.

There may be some value for major UK banks in setting up funds as an alternative to holding corporate demand deposits on their balance sheet, where they would be subject to the FSA's regulatory regime for major UK banks' liquidity—the stock liquidity regime (SLR). Under the SLR, a bank is obliged to hold a stock of high quality, marketable instruments (chiefly gilts and other EU sovereign bonds held outright or on reverse repo) sufficient to cover net sight deposit and five-day wholesale cash outflows.

## Implications of sterling money market fund growth

Increased use of MMFs changes the flow of funds in the sterling money markets: cash invested in money market funds might previously have been invested in bank deposits or directly in money market instruments. To the extent that it would otherwise have remained in money market instruments, MMFs are intermediating the process by which treasurers run money market books.

(1) See 'Reform of the Bank of England's operations in the sterling money markets', reprinted on pages 217-27 of this *Quarterly Bulletin.* 

But to the extent that it would have been deposited with banks, it may be the case that MMFs serve to divert some institutional cash away from banks' balance sheets and into money market instruments. In doing so, they change existing relationships and sources of funds. Holdings of corporate CP by MMFs suggests that at least some of this cash is used to fund corporate borrowers directly, rather than through financial intermediaries. In this case, corporate loans and deposits might form a smaller part of bank balance sheets in future, should MMF growth continue.

Alternatively, by investing in bank paper of up to 13 months' maturity, MMFs provide banks with liabilities of longer maturities than customer call deposits, undertaking some of the maturity transformation that might otherwise have occurred across banks' balance sheets.

One consequence for central banks is the effect on monetary aggregates. Since MMF investments take place offshore, they are not counted as a component of M4 in the United Kingdom, and it is possible that the data do not measure the full size of sterling 'money', ie both deposits and deposit-like shares in MMFs. The extent of this leakage depends on the amount of MMF investment that would otherwise have been deposited with banks, and the level of MMF investment in non-financial corporates (rather than in banks). Currently, MMFs represent only a small proportion of the total market (around 6%).

In summary, while sterling money market funds have experienced rapid growth over recent years, the relatively small size of the market suggests that there is no immediate challenge to the banking system, by contrast with the United States, where a larger proportion of households' liquid assets are held via funds. That would suggest that there are no obvious implications, therefore, for the implementation or transmission mechanism of monetary policy in the United Kingdom. As an innovation in financial markets, however, there is potential for the growth of MMFs to alter the landscape of the sterling money market and the relationships between banks, wholesale borrowers and investors.

## How can the IMF catalyse private capital flows? A model

#### Working Paper no. 215

#### Adrian Penalver

In the past decade, the IMF has been confronted by crises in member countries with very large external financing needs (Mexico in 1995, Thailand, Indonesia and Korea in 1997, Russia in 1998 and repeated crises in Turkey, Brazil and Argentina). The IMF responded to these capital account crises by providing financial support that was very large by historical standards, but only partially filled the countries' gross external financing needs. In deciding the amount of financial support to provide, the IMF was caught between two competing objectives. On the one hand, the IMF is a credit co-operative and cannot put too much of its members' resources at risk by lending substantial amounts to an individual member. On the other hand, a significant contributing factor in capital account crises is a loss of financial market confidence because external creditors do not believe a country has sufficient foreign reserves to repay its debts. A financial package within normal IMF limits may have done little to restore market confidence during the above crises.

In these cases, the IMF argued that its lending would have a catalytic effect on private capital flows and programmes of this type became known as the 'catalytic approach'. The catalytic approach was endorsed by the International Monetary and Finance Committee of the IMF in September 2000 and became a key component of the IMF's strategy to resolve capital account crises. Despite its importance, however, the catalytic approach was only loosely defined. It was generally taken to mean that a combination of limited IMF financial support and a country's adherence to a credible programme of reform would catalyse private sector capital inflows (or reverse capital outflows) sufficient to fill the remaining financing gap. An IMF loan would signal that a country's policies were sound and this would provide the incentive for creditors to invest.

As well as being loosely defined, there is very little theoretical literature to support the concept of catalytic financing. This paper fills part of this gap. A two-period model is developed to examine how a country faced with a capital account shock chooses between policy adjustment, borrowing from the market and defaulting. Which combination of these the debtor chooses influences the amount of private capital flows. The analysis shows that, if the shock is severe, the cost of policy adjustment exceeds the benefit of avoiding default and private capital flows will be low. If the IMF provides bridging finance below the market interest rate, it can tip the balance of the debtor's incentives in favour of policy adjustment. Assisted by the IMF, the debtor avoids default and private capital flows are catalysed.

Empirical evidence and IMF staff analysis, though, have shown that IMF projections of private capital flows during an IMF programme have been overly optimistic. The analysis in this paper suggests two reasons why this might be the case. First, structural reforms implemented at the behest of the IMF may only have long-term pay-offs and be subject to considerable uncertainty. Therefore, private capital flows may return over a longer period than contained in IMF projections. Second, capital flows can be considerably lower if the borrower's commitment to reform is lower than expected.

Several policy implications can be drawn from this analysis. First, IMF programmes based on catalytic finance are most likely to succeed when shocks are relatively mild. Second, there is a much greater risk of programme failure when the policy reform agenda is lengthy. The IMF should be wary of programmes that require extensive conditionality. Third, if catalytic programmes fail, capital flows are often well below the amounts projected—if programmes fail, they do so in a major way. Finally, when projecting capital flows in a catalytic finance programme, the IMF needs to be convinced that reforms will genuinely increase the marginal productivity of investment. When the catalytic approach is not feasible, the IMF should consider carefully the relative merits of alternative policies such as standstills or debt restructurings.

## IMF lending and creditor moral hazard

#### Working Paper no. 216

#### Andrew G Haldane and Jörg Scheibe

There has been an active on-going debate on the appropriate role of IMF lending in resolving international financial crises. On one side are those who favour the IMF playing the role of pseudo international lender of last resort. On the other are those who would favour the debtor country and its private creditors, rather than the IMF, shouldering more of the burden when crises strike.

The balance between these arguments requires us to weigh the benefits of public policy intervention in mitigating an international capital market externality against the costs of distorting risk-taking incentives through such intervention—so-called moral hazard. But taking a quantitative view of the importance of international moral hazard is troublesome: there have been only a handful of studies and their results have been mixed. For example, a number of studies have looked at the behaviour of borrowing spreads around the time of IMF interventions as evidence of moral hazard. But the behaviour of such spreads has rarely been consistent.

This paper focuses on the incentives for creditor banks to engage in risky lending to emerging markets as a result of large-scale IMF loans. Specifically, it looks at whether the market valuations of creditor banks have been boosted excessively following a number of IMF interventions. These interventions begin with the IMF loan to Mexico in 1995 and end with the IMF loan to Brazil in 2002. If banks' valuations are indeed boosted by IMF loans, incentives to take on further risk will increase.

The following results stand out. First, returns to creditor banks are indeed (statistically significantly) greater than can be explained by general market movements around the time of IMF bailouts. Second, these boosts to the market valuation of banks are large quantitatively—for around ten interventions, they exceed \$4 billion. Third, these excess returns are greater for big-ticket IMF packages and especially when IMF loans have been subsequently augmented. Fourth, these valuation responses are larger than can be accounted for by the potentially welfare-enhancing effect of IMF loans in offsetting international capital market frictions.

Taken together, this evidence is consistent with a generic creditor moral hazard story. The response of market prices is consistent with increased incentives to take on emerging market risks, in response to large-scale IMF interventions. The costs of crisis are clear, immediate and visible while the costs of moral hazard are, by contrast, invisible and long-lasting. This paper makes clear that, though they may be out of sight, these moral hazard costs should certainly not be kept out of mind.

## International financial rescues and debtor-country moral hazard

#### Working Paper no. 217

#### Prasanna Gai and Ashley Taylor

The recent debate on the 'international financial architecture' has highlighted the potential moral hazard implications of large-scale financial rescues of emerging market economies by the official sector. Concern that the increased scale of IMF-led bailouts may distort debtor and creditor incentives, generating excessive borrowing and lending, has led to calls for clearly defined limits to official support and greater private sector involvement in crisis resolution. There has, however, been little formal empirical work to examine whether the 'international financial safety net' established by policy changes has influenced debtors' reliance on official sector resources.

Previous empirical studies have either attempted to quantify the financial redistributions arising from IMF interventions or aimed to detect moral hazard by examining asset price changes around such events. Rather than using such indirect proxies, this paper introduces an innovation to the literature by modelling directly an observable action—a country's use of IMF resources—to examine changes in debtor behaviour induced by changes in IMF lending practices. In particular, the paper focuses on behavioural changes associated with the introduction of the New Arrangements to Borrow (NAB) in January 1997 and of the Supplemental Reserve Facility (SRF) in December 1997.

Incentive effects are easiest to detect when there are exogenous changes in the incentive structure-for example, through a policy change-and where it is possible to compare the responses of a 'test' group that is affected by a policy change with those of a 'control' group that is not. The estimated effect of the policy change on incentives is then inferred from the difference between the outcomes for these two groups, controlling for other factors. The application of this approach is not straightforward. The policy changes considered were not exogenous, but rather a response to the Mexican and Asian crises. It is also hard to distinguish between a test and control group since all IMF members, at least in principle, have access to all IMF facilities. To address these difficulties, a suitable instrumental variable must be constructed that captures a country's capacity to access IMF facilities and how this may have been affected by changes in lending policy.

Since the SRF and the NAB were both designed to contain the systemic impact of capital account crises, a measure of systemic importance might be used to index the potential for enhanced access. Such an index, albeit subjective, can be constructed from indicators of potential crisis spillovers. Given their objectives, we would expect the introduction of

these policies to have had a greater effect on resource use, the more 'systemic' the country was. This hypothesis was examined for 19 middle to lower-income emerging markets over the period 1995 to 2001.

The estimation method involves three main steps. The first is to specify the directly observable action. A binary dependent variable is constructed that takes the value one if a country is in an IMF programme designed to address balance of payment difficulties and makes a drawing on IMF resources, and is zero otherwise.

A change in a country's unconditional probability of going to the IMF could merely reflect a change in vulnerabilities, rather than a change in propensity to draw on IMF resources for given fundamentals. The second stage is thus to specify factors that influence the decision on whether to enter a programme. The paper is therefore also linked to the empirical literature on the economic determinants of IMF programmes. The most significant factors in explaining programme participation are found to be: foreign reserve coverage of short-term external debt; the real exchange rate; and the residual of sovereign ratings when regressed on other fundamentals. Previous studies suggest that these variables largely reflect demand-side considerations.

The third stage is to examine whether there is a change in debtors' incentives to participate in a programme, conditional on fundamentals, following the introduction of the SRF or NAB. The paper finds that their introduction has a greater impact on IMF resource usage, conditional on fundamentals, the more systemically important the debtor is, ie the more likely an economy is to benefit from the safety net created by these measures. These are necessary conditions for debtor moral hazard (interpreted as changes in debtors' incentives to access IMF resources following extension of the international financial safety net).

These results need to be interpreted cautiously. The data set is relatively narrow and the choice of instrumental variable for systemic importance is subjective. It is also impossible to disentangle perfectly the impact of supply-side incentives from that of demand-side incentives. Only the latter could be strictly interpreted as debtor moral hazard. Ideally, a structural model of demand and supply could distinguish the two, but this is not empirically tractable. Nonetheless, given that the fundamental variables in the model largely reflect demand-side considerations, the results can be interpreted as offering some support for the presence of debtor-country moral hazard.

### **Bail out or work out? Theoretical considerations**

#### Working Paper no. 219

Andrew G Haldane, Gregor Irwin and Victoria Saporta

Over recent years, the official sector, the private sector, academics and others have put forward a spectrum of policy proposals on how to improve the resolution of capital account crises. At one end of the spectrum, some have suggested the need to create, in effect, an international lender of last resort based around the International Monetary Fund (IMF)—resolving crises through international 'bailouts'. At the other end of the spectrum, some have suggested the need to create, in effect, an international bankruptcy court—resolving crises through 'workouts'. In between these poles there are several middle-ground proposals including the use of creditor committees and the insertion of collective action clauses in debt contracts.

The purpose of this paper is to assess the merits of these proposals within a single, but simple, theoretical model of capital account crisis. The model comprises three sets of agents-private firms, international creditors and a national government. Firms borrow from international creditors to finance projects with uncertain returns. Occasionally, firms face repayment problems—financial crises. As firms are assumed to be identical, firm-level crises translate into economy-wide crises. International creditors aim to maximise expected profits by offering short-term debt contracts which give them the option to roll over their debts or withdraw financing before the outcome of the project is known. The government maximises its welfare, which depends positively on the firms' profits and negatively on policy adjustment effort. Firm productivity, on the other hand, depends positively on government policy adjustment effort.

The model nests both liquidity and solvency crises. Liquidity crises are default events which would not have occurred had creditors rolled over their credit. In contrast, in solvency crises, debtors are fundamentally unable to repay their debts—even if all creditors roll over—but have sufficiently productive opportunities, looking forward, for default to be socially inferior to continued financing. Both liquidity and solvency crises result in the government putting in insufficient policy effort, aggravating the inefficiencies.

The analysis suggests a number of policy conclusions. First, the model underlines the importance of using different crisis resolution tools for different types of crisis. Second, for liquidity crises, the model suggests an exact equivalence between last-resort lending and standstills, both from an *ex-post* and, perhaps more interestingly, from an ex-ante perspective as well. Creditor committees can also help resolve liquidity crises under certain circumstances, but are unlikely, by themselves, to remove entirely the potential for liquidity crises unless they are organised on an economy-wide level. Third, turning to solvency crises, the model suggests that although debt write-downs and subsidised IMF lending are equally efficient crisis resolution tools ex post, write-downs ('workouts') are more effective than 'bailouts' ex ante because they do not entail moral hazard costs. The model also suggests that write-downs can only work effectively if they are organised on an economy-wide basis. In theory at least, this can be achieved through the establishment of an international bankruptcy court. Contractual tools, such as collective action clauses, can help but their efficacy may be undermined by aggregation problems and debtor/creditor bargaining problems.

## Does job insecurity affect household consumption?

#### Working Paper no. 220

#### Andrew Benito

The hypothesis that household consumption is in part shaped by how much uncertainty households face regarding their future incomes has potentially important implications for our understanding of consumer expenditure, the single largest component of aggregate demand. This hypothesis is also associated with precautionary saving models of consumption. This paper considers this by taking job insecurity to be an observable and quantitatively important indicator of income uncertainty for most households and examines its role in influencing the non-durable and durable expenditure decisions of households in the United Kingdom.

In addition to shedding light on how households form their expenditure decisions, the paper is also motivated by a desire to examine the effects of job insecurity on household decision-making in the United Kingdom. Although the issue of job insecurity has attracted considerable attention, relatively little is known about the effects of a perceived or actual increase in job insecurity. To this end, the paper estimates to what extent non-durable consumption by households is depressed when they experience a high level of insecurity about their job prospects. In addition, the paper considers whether households delay the purchase of durable goods when they are subject to greater risk of becoming unemployed. The paper employs data at the level at which such household consumption decisions are actually made-that is at the level of individual households in the United Kingdom-from around 10,000 households covered by the British Household Panel Survey (BHPS).

The first contribution of the paper is to provide evidence of significant precautionary saving effects associated with unemployment risk. More specifically, the estimates imply that a one standard deviation increase in unemployment risk lowers consumption by 2.7%. This is an appreciable impact. Interpreting the spread of the distribution of levels of job security across workers as consisting of four standard deviations, this implies that moving from the top to the bottom of the distribution gives rise to a reduction in consumption of 11%, *ceteris paribus*.

Variation across households in this estimated effect is considered. This is of interest for two reasons. First, this increases the richness of the results. Second, economic theory itself makes specific predictions about which types of households should respond relatively more strongly in terms of their spending decisions to higher levels of job insecurity. For instance, according to the theory of precautionary saving, this effect should be stronger among younger households. Such households are in the process of building a buffer stock of saving in order to weather the effects of income uncertainty. Older households that have already accumulated such assets need not depress consumption to the same extent in response to income uncertainty. Furthermore, households that have financial assets that they draw upon during any period of low income should be less sensitive to uncertainty concerning their labour income. These two predictions are borne out strongly in the analysis. At age 25, a one standard deviation increase in unemployment risk is estimated to reduce consumption by 5.2%, whereas by age 60 the effect is zero. The consumption of those that are more reliant on labour income-those that do not have liquid assets to draw uponis also found to be more sensitive to unemployment risk. For those without investment income, the one standard deviation increase in unemployment risk lowers household consumption by 4.2%. Moreover, variation by occupational group is considered. The consumption of manual workers, for whom the persistence of a shock to income induced by unemployment is likely to be greater given typically longer unemployment durations, is found to be more sensitive to job insecurity than that of non-manual workers.

Finally, the paper explores the relationship between consumer durables purchases and job insecurity. Evidence is found supporting the notion that increases in unemployment risk cause households to delay their purchases of durable goods. Economic theory suggests that an increase in labour income uncertainty, such as that originating from greater job insecurity, leads households to delay the purchase of consumer durables as they instead opt to add to their precautionary assets, which are used as a buffer against the higher level of uncertainty. In the estimates presented here, use of a subjective measure of job insecurity shows that households that express some degree of job insecurity have a significantly lower probability of having recently purchased durable goods.

Income uncertainty probably increased through much of the 1980s and early 1990s in the United Kingdom. Unemployment risk, at least since the early 1990s, has been falling. This suggests other sources of income risk have increased in importance. Future research might therefore consider these forms of income uncertainty, such as wage flexibility, and whether they give rise to a precautionary saving motive.

## The new Bank of England Quarterly Model<sup>(1)</sup>

The Bank of England has developed a new macroeconomic model to help prepare the Monetary Policy Committee's quarterly economic projections. The new model does not represent a change in the Committee's view of how the economy works or of the role of monetary policy. Rather, recent advances in economic understanding and computational power have been used to develop a macroeconomic model with a more clearly specified and coherent economic structure than in previous models used by the Committee. This article provides an overview of the new model and includes some simple simulations to illustrate its properties.

The Bank of England has developed a new macroeconomic model for use in preparing the Monetary Policy Committee's quarterly economic projections. The new Bank of England Quarterly Model, or BEQM, was used to an increasing extent during 2003 and is the main tool in the suite of models employed by the staff and the Monetary Policy Committee (MPC) in the construction of the projections contained in the quarterly *Inflation Report*.

This article describes the role of models at the Bank of England in helping to produce the MPC's quarterly projections, explains the motivation for the new model, and provides an overview of BEQM and the modelling approaches underlying it. It finishes by describing some simple simulations that illustrate some of the properties of the new model.<sup>(2)</sup>

## The role of models and forecasts at the Bank of England

The Bank of England is mandated by the Chancellor of the Exchequer to aim at an inflation target—at the time of writing, a 2% annual inflation rate of the Consumer Prices Index (CPI)—and uses a very short-term nominal interest rate as its instrument to pursue this target. Because of the lags between changes to interest rates and the associated effects on inflation, setting monetary policy is inherently a forward-looking exercise. Hence the quarterly *Inflation Report*, in addition to assessing the current state of the economy, contains projections for output growth and inflation up to two years out, based on assumptions of both constant and market-based interest rates. These projections represent the Committee's best judgment of both the most likely central outcome and the range of possible alternative outcomes around that central case. A key element of the analysis contained in the *Inflation Report* is to consider the big risks and uncertainties surrounding the central projection, rather than to focus simply on the central point predictions for GDP growth and inflation.

The Bank uses numerous economic models to help produce these projections.<sup>(3)</sup> No model can do everything—*all* models are imperfect, precisely because they are simplifications of reality. And each projection is produced by the MPC rather than as a mechanical output from any model. Nonetheless the Bank has found, like many other policy institutions, that, when producing its economic projections, it is helpful to use a macroeconomic model as the primary organisational framework to process the various judgments and assumptions made by the Committee. This is the role now played by BEQM.

The forecast process at the Bank involves a high degree of interaction between the Bank's staff and the members of the Monetary Policy Committee. In particular, a key element of the forecast process is for Committee members to assess the extent to which different economic judgments and assumptions concerning the big issues affecting the economy could influence their view of future prospects. This process is critical to understanding the nature of the risks and uncertainties surrounding the central projection. In order to be able

<sup>(1)</sup> This article is based on the version released on 22 April 2004.

<sup>(2)</sup> A book including a full technical account of the model and its quantitative properties will be published later.

<sup>(3)</sup> The Bank's use of economic models is discussed in more detail in Chapter 1 of Bank of England (1999), Economic

models at the Bank of England, available at www.bankofengland.co.uk/modcobook.htm.

to carry out this sort of analysis, the main forecast model ideally needs a relatively explicit economic structure that identifies the key behavioural parameters and channels within the economy.

The importance of having a model suitable for analysing the implications of different economic judgments and assumptions is not new. This role was also central to the design of the previous macro model used by the Bank, the Medium-Term Macro Model (MTMM).<sup>(1)</sup> Indeed, the basic structure of BEQM is very similar to that of the MTMM. The aim of BEQM is not to incorporate a different view of how the economy works or of the role of monetary policy. Rather, the decision to develop a new model reflected the view that recent advances in both economic understanding and, importantly, in computational power meant that it was possible to improve upon the economic structure within the MTMM. As Professor Adrian Pagan noted in his 'Report on modelling and forecasting at the Bank of England', the MTMM was no longer 'state of the art'.<sup>(2)</sup> In particular, Professor Pagan concluded that 'It seems highly likely that [a new model] could achieve the same empirical coherence [as the MTMM] with a stronger theoretical perspective'. In doing so, this would provide the Committee with a more flexible and coherent framework to aid its economic deliberations. That, in short, is what the new model tries to achieve through a clearer articulation of the underlying structure of the economy and a more explicit identification of the role expectations play.

#### An overview of BEQM

BEQM describes the behaviour of the UK economy at a relatively aggregated level that is closely related to the incomes and expenditures recorded in the UK National Accounts. To do this, the model contains formal descriptions of the behaviour of private domestic agents, policymakers and the rest of the world, and their interactions in markets for capital and financial assets, goods, and labour.

Firms seek to maximise profits by hiring labour and buying capital in order to produce output. Firms and workers bargain over wages and, given the outcome, firms are assumed to choose the labour they wish to employ so that the costs of any extra workers are compensated for by the higher revenues they generate. Similarly, firms' desired level of capital is determined by the cost of capital and the return to extra investment. The output that firms produce is sold in markets for domestic consumption, investment and government purchases, as well as in housing and export markets. Firms are assumed to face varying degrees of competition in these markets, which implies that firms may receive a different profit margin from the sale of their goods in each market. The composition of total sales will therefore affect revenue and profits, so that relative demand conditions will matter as well as overall demand conditions. Firms face competition from importers for consumption and investment goods, and have to price their products in export markets so as to achieve maximum profits. In addition, various short-run factors can influence firms' behaviour. such as the short-run prospects for demand affecting the speed with which they invest.

Households consume imported and domestically produced goods. When deciding on their current level of consumption, and hence their level of saving or borrowing, households are assumed to want to keep their lifetime consumption as smooth as possible. To do this, households can borrow and save using a range of financial assets, including domestic equities, corporate debt, government debt, money, and foreign assets. In addition, in the short run, households' levels of consumption can be influenced by a variety of other factors, such as short-term fluctuations in their income and their level of confidence about the future.

The government buys output from domestic firms and pays for it by raising taxes and selling debt, in addition to a small amount of revenue that accrues from seigniorage. Total revenue also has to be sufficient to pay the cost of servicing the existing level of government debt and any government transfers. For long-run solvency, the fiscal authority may at some stage have to adjust a policy instrument—such as a tax rate—to ensure that the fiscal budget constraint is met. A variety of fiscal policy 'rules' can be considered. In general, these rules assume that any required fiscal adjustment occurs only gradually.

The monetary policy maker has the job of anchoring the nominal side of the economy. The nominal target could,

<sup>(1)</sup> The Medium-Term Macro Model is described in more detail in Bank of England (2000), Economic models at the Bank of

<sup>England: September 2000 update, available at www.bankofengland.co.uk/modcoupdate.htm.
(2) Adrian Pagan (2003), 'Report on modelling and forecasting at the Bank of England', reprinted in Bank of England Quarterly Bulletin, Spring, pages 60–88.</sup> 

in principle, be specified in terms of any nominal aggregate, such as the nominal exchange rate, the growth rate of nominal output, or the growth rate of the money stock. The default assumption is that the central bank targets an annual inflation rate of the CPI of 2%, using the short nominal interest rate as its instrument. An assumption about the policy rule used by the central bank—the monetary policy reaction function—is required for inflation to be anchored in the long run. The structure allows a variety of different reaction functions to be incorporated.

BEQM assumes that UK capital markets are 'small', in the sense that the demand for and supply of financial assets in the United Kingdom do not affect the level of interest rates prevailing in the rest of the world. Since all claims on domestic firms' assets and government debt must ultimately be held either by domestic households or the rest of the world, it follows that the United Kingdom's net foreign asset position is determined jointly by the decisions of firms and the government about how many financial liabilities to issue and by domestic households about how many of these assets to hold. The rest of the world affects these decisions via assumptions about the level of foreign real interest rates and world demand.

These decisions also have implications for the United Kingdom's trade balance. Suppose, for example, UK households were assumed to want to hold only some of the domestic financial assets on offer, such that the United Kingdom maintained a net debt with the rest of the world. This would imply that, in the long run, the United Kingdom would need to have a trade surplus sufficient to meet the costs of servicing this debt. The equilibrium real exchange rate is assumed to move eventually so as to ensure that exports and imports achieve this long-run balance. This story is further complicated by the assumption that UK producers have some market power in the prices they set in world markets, so the long-run trade balance will, in general, depend on assumptions made about conditions in both financial and goods markets.

The main channels through which changes in monetary policy are transmitted to the rest of the economy are similar to those previously described by the Monetary Policy Committee.<sup>(1)</sup> The fact that prices and nominal wages move only slowly means that the central bank, by changing the nominal interest rate, has the ability to influence real interest rates. Lower real rates tend to encourage consumers to spend more now. Lower real rates also encourage investment and spending on housing by lowering financing costs, and they make it less costly to hold inventories. The combined effect is to push up domestic demand. To meet that demand, firms will demand more of the factors used in the production of goods and services, namely capital and labour. This in turn is likely to increase the costs of these factors of production.

The fact that the UK economy is a small open economy adds an important channel through which monetary policy operates. In particular, a lower domestic real interest rate may tend to encourage a depreciation in the real exchange rate. This will lead to both a direct price effect—the prices of imported goods will rise and a number of possible indirect (or 'second-round') effects, reflecting both any pass-through from higher import prices onto domestic prices and costs, and the impact of any change in competitiveness associated with the change in the real exchange rate on the United Kingdom's trade balance.

The impact of changes in aggregate demand on prices and inflation will depend on the way in which agents households, firms, policymakers and the rest of the world—interact with each other. Other things being equal, increased demand for workers leads to higher wage costs, which firms will typically attempt to pass on to some degree in the form of higher prices. Similarly, increases in world prices or an exchange rate depreciation create pressure on import prices. And increased demand for domestically produced goods will also create incentives for firms to raise prices.

Inflationary pressures reflect the degree of imbalance between the level of demand and the capacity of firms to meet that demand. The level of demand and potential supply will depend on both the current stance of monetary policy and the stance expected in the future. Likewise, firms' responses to these pressures on capacity will depend on the extent to which they are likely to persist, and hence on the expected stance of monetary policy in the future. The importance of future expectations in determining current inflationary pressures underlines the central importance of monetary policy anchoring private sector expectations of the long-term inflation rate.

See Monetary Policy Committee (1999), 'The transmission mechanism of monetary policy', reprinted in Bank of England Quarterly Bulletin, May, pages 161–70.

#### Some key technical features of BEQM

The improved economic structure of BEQM is reflected in a number of specific features. First, it has a well defined steady state. This means that, in the long run, all variables in the model settle on paths that are growing consistently with each other in a sustainable equilibrium. This aids analysis of economic issues, since an understanding of the medium term requires an understanding not just of short-run forces, but also of where the economy is heading to in the long run. For example, a stable steady-state solution would not be compatible with a situation in which household debt was increasing without bound.

In characterising this steady state, careful attention has been paid to 'stock-flow' and 'flow-flow' accounting. This is designed to ensure that all economic flows within the economy are accounted for—all income is spent or saved, for example—and that all expenditures have implications for physical and financial stocks. This again aids the understanding of medium-term issues. For example, stock-flow consistency implies that monetary policy cannot stimulate consumption indefinitely, since this would imply an erosion of households' net wealth, which they could not ignore forever.

Another important feature of the new model is that it contains more explicit forward-looking representations of agents' expectations about the future. These include expectations about future labour income, aggregate demand, the exchange rate, and so on. Models with fully forward-looking agents can sometimes exhibit unrealistic dynamic properties; in particular, if households and firms are assumed to have perfect foresight, they might adjust their behaviour immediately in response to future anticipated events. But in reality the economy does not 'jump' about in this fashion. That partly reflects the fact that it is often costly for households and firms to change their behaviour very rapidly. In addition, firms and households do not have perfect foresight. Instead, they have to form expectations on the basis of limited information. BEQM incorporates both of these features. In particular, it is structured in such a way that assumptions about the speed of adjustment and the amount of information available to agents can be altered and changed in order to help the Committee to assess how these assumptions could affect the future path of the economy.

These features are not new: some or all of them are present in many other models currently used by policy institutions, such as the Bank of Canada's Quarterly Projection Model, the FRB/US model at the US Federal Reserve Board of Governors, and the Reserve Bank of New Zealand's FPS model. Indeed, these features were often an explicit aim of pioneering work on macro modelling in the United Kingdom over the past 25 years, such as the Liverpool model, the London Business School model, the COMPACT model, and various models at the Cambridge Economic Policy Group and the National Institute of Economic and Social Research. The implementation in BEQM may differ in technical details. reflecting decisions made on how to satisfy the particular demands of forecasting at the Bank, but the basic ideas and motivations are the same.

#### Some illustrative simulation results

It is possible to gain some understanding of the properties of the new model by conducting some simple simulations. The simulations discussed below focus on the effects of changes in the short-term nominal interest rate on output and inflation.<sup>(1)</sup> A major caveat is appropriate here. Simulation analyses are highly stylised, offering an insight into what happens in a model when one economic variable is altered—in this case the short-term nominal interest rate-and 'all other things are assumed to be equal'. But in reality other things are not equal. The short-term nominal interest rate is not changed without reason, but rather in response to the variety of disturbances affecting the economy. The precise effect of a change in the short-term nominal interest rate will depend on the exact causes of the change, on whether this change was anticipated by households and firms, on the credibility of the monetary policy regime and a host of other factors. So simulations can be used to provide only an illustration of the properties of a model. They cannot be used mechanically to predict how the economy-or even a model-will react to actual changes in economic variables.

Charts 1 and 2 illustrate the effect of a temporary change in the short-term nominal interest rate on output and inflation respectively. The simulation considers the effect of an unanticipated 1 percentage point rise in the short-term nominal interest rate for one year.<sup>(2)</sup> Interest rates beyond the first year in this simulation are

<sup>(1)</sup> A more detailed discussion of the properties of BEQM will be provided in the forthcoming book.

<sup>(2)</sup> This is the same simulation as that considered for the MTMM on pages 17-18 of Bank of England (2000), Economic

models at the Bank of England: September 2000 update, available at www.bankofengland.co.uk/modcoupdate.htm.

#### Chart 1 Response of GDP level to nominal interest rate increase



#### Chart 2 Response of annual inflation rate to nominal interest rate increase



determined by a monetary policy rule that assumes interest rates are set so as to return inflation to base. Charts 1 and 2 show the effects of this simulation in BEQM, together with the most recently published simulations for the MTMM.<sup>(1)</sup> To illustrate the sensitivity of the simulations to different assumptions, Charts 1 and 2 show three different simulations for the new model, based on different assumptions about the form of the monetary policy rule, in which monetary policy is assumed to respond more or less strongly to deviations of inflation from target.

The responses of output and inflation to the temporary change in interest rates are similar in the two models. The maximum effect on the level of real activity occurs after about one year and on inflation after about two years. The demand effects come through a little more quickly in BEQM, reflecting in part the fact that consumption responds more strongly in the short run to interest rate changes in the new model. Further out, the effects of the temporary change in interest rates on inflation are somewhat less persistent in the new model, reflecting the fact that households and firms are forward looking and that they expect monetary policy will be set so as to return inflation to base.

#### Response to nominal interest rate increase

The responses of output and inflation to a change in interest rates will also depend on the credibility of the inflation target. In particular, as inflation expectations become more firmly anchored around the inflation target-the inflation target becomes more credible-a change in the short-term interest rate is likely to have less impact on activity and inflation.<sup>(2)</sup> The simulations illustrated in Charts 1 and 2 are based on the assumption that the temporary change in interest rates does not affect households' and firms' long-run inflation expectations. To illustrate the sensitivity of these simulations to this assumption, Chart 3 compares the response of inflation in the central case with a situation in which households and firms perceive that the unexpected increase in interest rates may have been triggered by a reduction in the targeted rate of

#### Chart 3

## **Response of annual CPI inflation to nominal interest rate increase**



<sup>(1)</sup> The BEQM simulation is based on a similar monetary policy rule and similar fiscal policy assumptions to those used in the original MTMM simulations. The BEQM simulations show the impact of changes in interest rates on annual CPI inflation. In contrast, the MTMM simulation shows the response of annual RPIX inflation. However, this difference does not significantly affect the comparison.

<sup>(2)</sup> For a more detailed discussion of the impact of monetary policy credibility on the sensitivity of the economy to changes in interest rates, see the box on pages 10–11 of the February 2004 Inflation Report.

inflation.<sup>(1)</sup> The response of inflation to the change in interest rates in this case is significantly greater and, as such, underlines the importance of monetary policy credibility in determining the sensitivity of the economy to changes in interest rates.

#### Conclusion

The Bank of England has developed a new macroeconometric model for use in preparing the MPC's quarterly economic projections. This model uses recent advances in economic understanding and computational power to develop and improve upon existing models used at the Bank. The new model does not represent a change in the Committee's view of how the economy works or of the role of monetary policy. Indeed, the sensitivity of output and inflation to temporary changes in interest rates is broadly similar to that in existing models used at the Bank. However, the model does provide the Committee with a more flexible and coherent framework to aid its economic deliberations.

(1) This simulation is sensitive to the precise assumptions made about the change in expected inflation. The simulation shown in Chart 3 is based on the assumption that the unexpected increase in interest rates causes firms and households to revise down their expected level of inflation in the long run by around 0.2 percentage points.

## **Public attitudes to inflation**

#### By Norbert Janssen of the Bank's Inflation Report and Bulletin Division.

Since November 1999 the market research agency NOP has carried out quarterly and annual surveys of public attitudes to inflation, on behalf of the Bank of England. As part of an annual series, this article analyses the results of the surveys from May 2003 to February 2004. Public opinion on most issues has changed little over the past year. Around one in five people thought retail price inflation had been between 2% and 3% over the past year and a similar proportion expected price increases in that range. Both in November and February, a large majority of respondents expected interest rates to rise over the next year, though nearly 40% thought the economy would fare best if rates stayed where they were. Just over half the sample population remained satisfied with the way the Bank is setting interest rates.

#### Introduction

The Bank of England believes that the new monetary policy framework established in May 1997 will be most effective if it is accompanied by wide public understanding and support, both for the objective of price stability and the methods used to achieve it. The Bank has an objective to 'promote understanding of the MPC's remit and its processes.'(1)

MPC members use a variety of methods to explain themselves to the public, including the publication of minutes of their monthly meetings, the quarterly *Inflation Report,* speeches and lectures, research papers, appearances before parliamentary committees, interviews with the media, visits to the regions, and an education programme that includes the 'Target Two Point Zero' competition for schools.

The Bank decided that one way to quantify the impact of its efforts to build public support for price stability was to carry out quarterly sample surveys of public opinion and awareness. After trials between November 1999 and November 2000, the current version of the survey questions has been in use since February 2001. The results between November 1999 and February 2001 were described in the first annual article in the Summer 2001 edition of the *Quarterly Bulletin*, and this article updates the results from May 2003 to February 2004. The survey covers a total of 14 questions, but the trials showed that the results of five of them varied little over the quarters. So the other nine questions are asked every quarter, after the publication of the *Inflation Report* in February, May, August and November, and a full survey covering all 14 questions is held once a year in February. The sample for the quarterly surveys is 2,000, about half the size of the annual February survey. A sample of 2,000 allows only a broad regional breakdown, but the larger sample used in the full annual survey allows more detailed analysis.

The range of questions seeks information on public knowledge, understanding and attitudes to the MPC process, but also covers expectations of interest rates and inflation. The five annual questions (numbers 9–13) cover perception of the relationship between interest rates and inflation, and knowledge of who sets interest rates. The nine quarterly questions, which are also asked in the annual survey, cover views of past and future changes in prices and interest rates, perceptions of the impact of inflation and interest rate changes on both the economy and the individual, and satisfaction/dissatisfaction with the way the Bank of England is doing its job of setting interest rates in order to control inflation.

The surveys are carried out by NOP in its regular Omnibus surveys using a random location sample designed to be representative of all adults in Great Britain, and interviewing is carried out in homes, face to

<sup>(1)</sup> See Bank of England (2004), Annual Report.

face. In the February 2004 survey, NOP interviewed a quota sample of 3,960 people aged 15 and over in 350 randomly selected enumeration districts throughout Great Britain between 12 and 24 February 2004. The February 2004 survey included two additional questions (3B and 3C) which were asked of 1,985 respondents, to test their knowledge of the change in the inflation target made by the Chancellor of the Exchequer in December last year. All raw data were weighted to match the demographic profile of Great Britain as a whole.

The quarterly results of the May survey are published as a separate News Release at the same time as this article in the *Bulletin*. The quarterly survey results for February were published in March, whereas the answers to the five annual questions for February are published here for the first time.

The following sections look at the answers to the questions<sup>(1)</sup> in a demographic and historic context, and compare answers across questions.

#### **Knowledge and predictions**

#### Inflation

(*Question 1*) The median<sup>(2)</sup> view of the current annual rate of inflation was 2.4% in February, the same as a year earlier. Annual RPIX inflation in January this year (the latest month for which data were available at the time of the February survey) was also 2.4%. Annual CPI inflation, the MPC's current target variable, by contrast was 1.4%. Whereas RPIX inflation has been on a downward path since reaching 3.0% between February and April 2003, the median response fell to 2.2% in May and August last year, before rising to 2.5% in November. Consequently, in May and August the median responses diverged markedly from actual RPIX inflation in the respective months before the surveys (see Chart 1).<sup>(3)</sup> The gradual closing of the gap since May 2003 may be a result of increased awareness of RPIX inflation among survey respondents, at least at the median level. It also suggests that the change in the inflation target from 2.5% for annual RPIX inflation to 2.0% for annual CPI inflation in December 2003 has not affected

respondents' interpretation of the first question. This is given more weight by the result that only 12% of respondents correctly answered that the current inflation target is lower than last year's (Question 3C, which was added in February 2004 to determine knowledge of the change in the target measure). Similarly, a minority of 23% rightly thought the inflation target for this year is between 1.5% and 2.5% (the range that includes the current target, see *Question 3B*, which was also asked only this February). The responses to *Questions 3B* and *3C* varied little across demographic groups, though awareness of the numerical value of the target was higher (around a third) among 55-64 year olds, AB respondents (professionals, managers and their adult dependants) and people earning more than £25,000 a year.

#### Chart 1 Median survey response to change in prices over the past twelve months and RPIX inflation(a)



The distribution of responses to *Question 1* across different inflation ranges has changed little in the four surveys since February 2003, with around one in five people thinking retail price inflation had been between 2% and 3% over the past year. Annual RPIX inflation has fluctuated between 1.5% and 3.2% since the Bank was granted operational independence in May 1997. In each of the past four surveys, just under half the number of people reported inflation in this range. So even though the median view of inflation has moved closer to

<sup>(1)</sup> The precise wording of the questions and the full results since the start of the survey are shown in the annex to this article.

<sup>(2)</sup> To calculate the median, responses are assumed to be evenly distributed within each band.

<sup>(3)</sup> The first question in the survey does not ask respondents explicitly about RPIX inflation, but about price changes of goods and services over the past twelve months. Given that the MPC targeted RPIX inflation until December 2003, respondents may be thinking of this measure when answering the question. Although individuals' consumption patterns may differ from that underlying the RPIX, such differences have no significant effect on responses to the questions about past (and expected) price changes (see Lombardelli, C and Saleheen, J (2003), 'Public expectations of UK inflation, *Bank of England Quarterly Bulletin*, Autumn, pages 281–90). This may suggest that respondents do not report their own inflation experience over the past year, but instead correctly interpret Question 1 as being about inflation in the economy. Inflation experience not necessarily related to expected changes in the RPIX measure.

actual outturns over the past year, the proportion of people reporting price changes in the range of recorded inflation has been stable. The proportion of respondents having 'no idea' about inflation reached an all-time high of 18% in November last year, before falling back to 15% in February. Only 3% of respondents in February thought prices had fallen over the past twelve months, the lowest since the survey started in November 1999.

The distribution of responses was similar in most demographic groups of the February 2004 survey, peaking in the 2%–3% range. But among 15–24 year olds, DE respondents (semi and unskilled workers and those living on state benefits), those renting council accommodation and people living in 'other' accommodation, as well as participants in Wales and the West, the proportion who has 'no idea' about past price changes was the highest. In Scotland, the distribution was more skewed towards lower rates of inflation than in the rest of the country, with the largest group (20%) reporting price increases between 1% and 2%.

(Question 2) Chart 2 shows that the median of inflation expectations tends to move closely in line with that of reported inflation in the survey (the correlation coefficient is 0.9). Indeed, during the past year median inflation expectations were identical to reported inflation, except in November when expectations reached an all-time high of 2.6%. In February, median expected inflation fell to 2.4%, thereby remaining close to the previous inflation target. The distributions of responses to Questions 1 and 2 across inflation ranges were also similar in February (see Chart 3). Both peaked in the 2%-3% band, with the proportion expecting such price increases over the next twelve months (22%) higher than that reporting these price changes over the past year. Since the Bank commissioned the first survey, the largest group of respondents has always expected prices to rise between 2% and 3% over the next twelve months. The precise distribution has fluctuated somewhat over the past four surveys, but responses in February 2004 were more concentrated in the bands up to 3% compared with a year earlier, perhaps reflecting the fall in RPIX inflation between those periods. At the individual level in February 2004, responses to Questions 1 and 2 were less closely related than at the median level over time; nevertheless, the correlation in the February survey was strong at 0.6 (see Table A), consistent with people largely forming expectations on the basis of their most recent perceptions of inflation in general.

#### Chart 2 Median of percentage changes in prices over the past and the next twelve months







Table A

February 2004 survey: correlation coefficients between individuals' answers to different questions

Questions 1 and 2	0.60
Questions 5 and 6	0.64
Questions 6 and 7	0.45
Questions 7 and 8	0.41

Although the distribution of inflation expectations was broadly similar across demographic groups, the largest part of DE respondents (19%) and those renting council houses (21%) had no idea what inflation rate to expect, whereas 5% of people with incomes above £25,000 gave this answer. Responses in Scotland (25%) and Wales and the West (19%) peaked in the 1%–2% range, and 14% of people in Scotland expected inflation between 0% and 1%, compared with a national score of 8% expecting inflation in that range. Expectations in the three English regions distinguished in the survey were more skewed towards higher inflation rates; 34%, 31% and 30% of respondents in the South East, the Midlands and the North respectively expected inflation above 3% over the next twelve months. Mortgage payers reported lower inflation expectations (63% expect inflation to be less than 3%) than people with other forms of tenure. And fewer mortgage payers (9%) said they had no idea, again consistent with findings in previous surveys.

#### **Interest rates**

(Question 5) In the February 2004 survey a majority of 54% of respondents correctly answered that interest rates had risen over the past twelve months (the official interest rate was 3.75% in February 2003 and it was raised to 4.0% in February this year), and only 13% thought rates had fallen.<sup>(1)</sup> At the time of the preceding three surveys, actual interest rates had fallen compared with a year earlier (see Chart 4). But in these surveys, only in August last year did a majority (of 52%) give the right answer. The results over the past year suggest that respondents may answer the question with the most recent change in interest rates in mind, rather than compare the current level of rates with that a year earlier (as the question specifies); for example, in November 2003 more people said rates had risen rather than fallen, consistent with the rise in the official interest rate to 3.75% on 6 November, but ignoring the fact that rates were still lower than a year earlier.

#### Chart 4

#### Percentage of respondents giving correct answer to change in interest rates over past year and official rate changes



As in previous surveys, some of the differences between demographic groups in February confirm that people's own financial situation affects their awareness of interest rate changes. Nearly two thirds of mortgage payers and of those with incomes above £17,500 were aware of the rise in rates since February 2003. This is in sharp contrast with the score of 45% of people on incomes of less than £9,500 and 43% of council tenants. The proportion of correct answers rises with qualification level; from less than half in the DE category to just over 60% for AB respondents. Awareness of interest rate changes also appears to be positively related to the age at which respondents left education: from less than half for those who finished education when they were younger than 16, to just over 60% for individuals who left later than age 19. Correct knowledge of past changes in rates is below the national average for the youngest (15-24 years) and the oldest (older than 64) groups. Broken down by geographical area, the degree of awareness was highest in the Midlands and the South East (almost six in ten), but less than half the people surveyed in Wales and the West thought rates had risen over the past year.

At the individual level, respondents' expectations for interest rates over the next twelve months (*Question 6*) in the February survey were strongly positively related to their view of changes in rates over the past year (see Table A). To some extent, this may reflect individuals having experienced that interest rates tend to move in a particular direction for some time, so they expect past patterns in rates to continue in the near future. The Monetary Policy Committee also stressed in its January 2004 *Minutes* that increases in interest rates in the current cycle should be gradual.

In November and February, a large majority of respondents (of 71% and 69% respectively) expected interest rates to rise over the next year, though mainly by a small amount. This marked a big increase from the other 2003 surveys, partly related to the most recent changes in interest rates at the time of the surveys, but also perhaps to a better understanding gained from recent media coverage. Among mortgage payers and the highest earners, the majority expecting rates to rise was larger (above 80%) than for the February 2004 survey as a whole, whereas only half of council tenants expected higher rates. This may suggest that having a mortgage induces people to pay more attention to macroeconomic developments in general and monetary policy in particular. But over the lifetime of the NOP survey, the proportion of people expecting interest rates to rise over the next twelve months has tended to be larger than that reporting increases in rates over the past year. That was despite the fact that actual

(1) Part of the dispersion of respondents' views may also reflect their personal experience over the past year with interest rates on savings accounts, mortgages and bank loans. These rates do not all move in line with official interest rates. official interest rates did not rise (and even fell) for a large part of the period covered. The proportion of people who have no idea about past or future changes in interest rates has been reasonably stable at around a fifth.

#### The Bank of England

Awareness of the monetary policy process, tested by asking without any prompts who sets 'Britain's basic interest rate level' (*Question 11*), has changed little from previous surveys. A stable proportion of 40% showed awareness, of which 4% correctly thought the Monetary Policy Committee is responsible, whereas 36% answered the Bank of England. But still more than half the number of participants (54%) did not know the answer. The degree of awareness improved markedly when respondents were given a show card with five options (*Question 12*); 69% (the same as the series high in August 2000 and February 2003) chose the Bank, although 13% answered 'Government ministers' and only 12% did not know.

Overall, awareness has changed little since the 2003 survey, both within and across demographic groups. Without prompting, awareness was highest among the AB class (7% said the MPC sets interest rates and 52% thought the Bank) of respondents. Other groups where a majority gave one of these answers were 45-54 and 55-64 year olds, people with incomes above £25,000 and those who finished education after age 19. When prompted, the highest earners and the AB group were again most aware of the monetary policy framework (85% and 84% respectively chose the Bank). But in the 15-24 age group only 42% of respondents gave the correct answer. In line with results in past surveys, more than three quarters of homeowners (both with and without mortgages) knew the Bank sets interest rates, whereas awareness among council tenants fell to 49%, from 51% a year earlier.

Knowledge of how the MPC is appointed improved; 38% answered that it is an independent body, partly appointed by the government (*Question 13*), compared with 36% in February 2003, though this year's score remained below the peak of 42% in August 2000. A further 23% of respondents thought the MPC is completely independent and 18% had no idea, slightly lower than the scores last year.

#### **Attitudes**

#### Inflation

Over the past four surveys, the proportion of the public that was aware of the negative relationship between inflation and the strength of the economy (Question 3A) was below the peak of 53% reached in February 2003, though it recovered gradually to 49% this February. A series high of 10% of respondents (up from 7% a year earlier) thought faster rates of inflation would benefit the economy, whereas around a fifth answered that these would make little difference and a similar percentage did not know. The latter two proportions fluctuated somewhat over the year, though the February results were close to those a year earlier. Understanding of the relationship between inflation and economic strength was lowest in the over-64 category. The group of 35-44 year olds, the highest earners, AB respondents and people in the Midlands showed the highest degree of understanding within their respective demographic breakdowns.

Throughout the history of the survey, more than half the sample population thought the actual inflation target at the time of questioning was 'about right' (Question 4). This proportion rose to 57% in February this year, from 54% a year earlier. Fewer than one in ten saw the current target as too low and fewer than one in five thought it was too high. Even though the inflation target was changed from 2.5% for annual RPIX inflation to 2.0% for annual CPI inflation in December last year, the distribution of responses has changed little between November and February. This suggests that economic decisions of businesses and individuals are unlikely to be affected by the change in the target, a point also made by the Governor in a speech in January.<sup>(1)</sup> Previous differences in responses across demographic groups persisted, with nearly 70% of the highest earners saying they were satisfied with the current target, compared with just over half of the lowest earners. More than six in ten homeowners were content with the target inflation rate of 2.0%.

#### **Interest rates**

With regard to the relationship between interest rate movements over the next few months and the strength of the British economy (*Question 7*), traditionally the

<sup>(1)</sup> See 'The Governor's speech at the annual Birmingham Forward/CBI business luncheon' (2004), Bank of England Quarterly Bulletin, Spring, pages 74–76.

largest group of respondents thinks it is best if rates stay the same. 36% of individuals chose this option in February this year, the same as a year earlier, though this proportion had picked up to four in ten in May 2003. Whereas in May the proportion saying that rates should go up was smaller (14%) than that arguing for lower rates (19%), the former has risen since to reach 23% in February, more than the 15% of people who then thought lower rates were best for the economy. Given actual movements in interest rates in the three months following each of the past four surveys, it would appear that 19%, 17%, 22% and 23% of respondents respectively would have been satisfied with the MPC's decisions, at least from a macroeconomic perspective. The correlation of individual responses to Questions 6 and 7 was reasonably close at 0.4 in February (see Table A), suggesting that individuals thought that their expectations for interest rates over the next year were also likely to deliver the best outcome for the economy. Moreover, only fewer than one in ten thought interest rates do not matter for the strength of the economy. People with a mortgage had an above-average preference for unchanged rates and the youngest age group was more in favour of lower rates than the population as a whole. A third of the highest earners, the AB group and those who left education after age 19 thought rates should go up.

Asked about the relationship between interest rates and their personal situation (Question 8), 31% of the February survey participants would like lower interest rates and just over one in five people preferred higher rates. Responses to this question tend to vary little and indeed changes in their distribution have also been minor over the past year. The biggest group (of around a third) tends to prefer a fall in interest rates, whereas the finances of just under one in five people are perceived to be immune to rate changes. Perhaps surprisingly, one in ten respondents do not know how interest rates affect their position. Table A shows that individual answers to Questions 7 and 8 were closely related in February. This may suggest that people's finances are perceived to depend to a large degree on the performance of the economy as a whole or that respondents do not distinguish sufficiently between the two questions.

As in previous surveys, across demographic groups, there was considerable variation in responses in February. Perhaps understandably, those with a mortgage and 25–44 year olds (who are likely to overlap considerably), as well as the highest earners, would benefit most from lower interest rates. Nearly half of outright homeowners and around 40% of above 54-year olds preferred higher rates, probably reflecting the fact that they have significant savings.

#### Inflation versus interest rates

(Questions 9A and 9B) As in the past, only a minority of respondents agreed with the statement that a rise in interest rates would make prices in the high street rise more slowly, either in the short (36%) or the medium term (39%). Responses to both questions were similar, indicating that the public is less than fully aware of the lags between changes in interest rates and their impact on inflation, and have changed only very slightly over the years. The results generally suggest limited understanding of the objective of monetary policy-to maintain low and stable inflation. Nevertheless, the fact that in February 2004 49% of people knew that faster rates of inflation would weaken the economy (Question 3A) indicates more awareness of the relationship in practice between inflation and economic growth.

Asked to choose between higher interest rates to keep inflation under control or lower rates and faster increases in the prices in the shops (*Question 10*), a majority of people tends to prefer the former, though in the most recent survey only 57% did so, compared with 62% last year. 19% of respondents would prefer prices to rise faster, the same as the series high in February and November 2000, and higher than the 16% last year.

#### The Bank of England

Finally, survey participants were asked for their degree of satisfaction with the way the Bank of England is doing its job of setting interest rates to control inflation (*Question 14*). Since the August 2000 survey, more than half of respondents have said they were satisfied with the Bank in this respect. During the past year, the distribution of responses has varied little. In February 2004, 8% of participants were very satisfied, the same as a year earlier, and 46% were fairly satisfied (47% in February 2003). So the overall proportion of satisfied people was 54% in February this year, compared with 55% a year earlier and 52% in August (which was the lowest in three years). Net satisfaction (the proportion

of people satisfied minus that of dissatisfied respondents) fell from 47% in November to 44% in February—just below the figure for February 2003 perhaps reflecting the fact that the MPC raised interest rates again on 5 February 2004. Nevertheless, it remained well above net satisfaction in the first four surveys.

Net satisfaction in February peaked among the highest income earners (63%), and was also well above 50% for the AB group, 55–64 year olds, people who left

education after age 19 and those with incomes in the range £17,500–£24,999. The male population continued to be far more satisfied than female respondents, with net satisfaction scores of 53% and 34% respectively. Net satisfaction was lowest in the youngest age group (20%), though the same proportion answered 'no idea' to *Question 14*. A small net majority of homeowners (51%) was satisfied to some extent with the Bank's policy on interest rates, but less than a third of council tenants and those living in 'other' accommodation were content.

#### Annex Survey results

Per cent

Ter cent	1999	2000				2001				2002				2003				2004
Q 1 Which of these option	Nov.	Feb.	May e how r	Aug.	Nov.	Feb.	May r the la	<u>Aug.</u>	Nov.	Feb.	May	Aug.	Nov.	Feb.	May	Aug.	Nov.	Feb.
Gone down	11	7	5 now p	8	6	igeu ow	7	5 12 m	8	7	5	6	7	6	5	8	4	3
Not changed Up by 1% or less Up by 1% but less than 2% Up by 2% but less than 3% Up by 3% but less than 4% Up by 4% but less than 5% Up by 5% or more No idea	18     7     12     16     7     4     9     17     17	12 5 11 17 11 8 12 17	10 4 12 18 13 7 13 17	12 7 12 20 13 5 10 12	14 5 13 18 13 6 11 13	15 6 12 20 11 6 12 13	15 6 13 19 11 6 10 12	16 6 13 18 11 6 9 15	18 7 14 17 9 5 7 15	16 7 14 19 10 7 9 11	14 6 12 20 12 8 10 13	13 7 15 20 12 7 11 10	14 6 14 17 10 6 11 15	11 6 12 20 13 7 10 14	14 7 13 20 11 7 9 14	13 7 10 19 13 5 11 13	12 6 10 20 13 6 12 18	10 7 14 19 13 7 11 15
Median	1.5	2.4	2.6	2.2	2.3	2.2	2.1	2.1	1.7	2.0	2.3	2.2	2.1	2.4	2.2	2.2	2.5	2.4
Q.2 How much would you	expect p	orices in	1 the sl	10ps gen	erally t	o chang	e over t	he next	12 mon	ths?								
Go down Not change Up by 1% or less Up by 1% but less than 2% Up by 2% but less than 3% Up by 3% but less than 4% Up by 4% but less than 5% Up by 5% or more No idea	$     \begin{array}{r}       10 \\       14 \\       10 \\       16 \\       17 \\       6 \\       3 \\       8 \\       16 \\       16 \\       \end{array} $	7 8 7 15 21 12 7 10 13	$4 \\ 9 \\ 7 \\ 14 \\ 21 \\ 10 \\ 7 \\ 11 \\ 16$	6 9 10 15 19 12 6 9 13	4 9 8 16 21 12 6 11 12	5 11 9 16 20 11 5 10 13	5 11 9 17 20 9 7 9 13	4 9 10 16 21 11 6 9 13	5 13 10 18 20 9 5 7 13	3 9 10 17 22 11 6 9 12	2 9 10 16 22 11 8 9 13	$     \begin{array}{r}       4 \\       9 \\       10 \\       20 \\       22 \\       11 \\       6 \\       9 \\       10 \\     \end{array} $	$     \begin{array}{r}       4 \\       10 \\       8 \\       17 \\       20 \\       10 \\       5 \\       10 \\       16 \\       \end{array} $	3 7 15 20 12 8 13 15	3 10 8 18 21 11 6 8 15	4 11 9 15 20 11 6 9 14	2 5 8 16 20 15 7 11 17	2 7 8 17 22 11 7 11 14
Median	1.5	2.2	2.4	2.2	2.3	2.1	2.1	2.2	1.9	2.2	2.3	2.1	2.1	2.5	2.2	2.2	2.6	2.4
Q.3A If prices started to r	ise faste	r than t	they do	now, do	o you th	ink Brit	ain's ec	onomy	would									
End up stronger Or make little difference Or weaker Don't know	8 28 44 20	8 23 48 21	8 22 47 23	6 23 50 21	8 25 49 18	7 26 47 20	8 27 47 18	9 23 48 20	8 28 48 15	8 27 48 17	9 29 44 18	7 26 50 16	8 25 48 20	7 22 53 18	7 26 47 19	7 24 48 21	8 24 48 20	10 22 49 19
Q.3B The Government sets	s a targe	t each y	year fo	r what it	thinks	inflatio	n shoul	d be. W	/hat do	you thi	nk that	the targ	get is fo	r this ye	ar?			
Up by less than 0.5% Up by 0.5% but less than 1.9 Up by 1.5% but less than 2.9 Up by 2.5% but less than 3.9 Up by 3.5% but less than 4.5 Up by 4.5% or more Don't know	5% 5% 5%																	1 5 23 18 5 5 44
Q.3C Do you think the fig	ure the	Govern	ment h	as given	for the	curren	t target	is highe	er, lowei	or the	same as	s last ye	ar's figu	ıre?				
Higher Lower The same Don't know																		36 12 27 26
Q.4 The Government has s	et an in	flation	target	of 2%. (a	a) Do yo	ou think	this ta	rget										
Is too high Or too low Or about right No idea	19 6 51 24	27 7 50 16	23 7 52 18	22 8 54 16	23 6 58 13	22 6 58 14	20 6 61 13	21 7 55 16	21 7 60 12	18 7 61 13	20 7 61 12	23 8 57 12	20 8 56 16	21 10 54 15	21 8 55 15	22 9 52 17	23 8 51 18	19 8 57 16
Q.5 How would you say int	terest ra	tes on t	things s	such as 1	mortgag	ges, ban	k loans	and sav	ings hav	e chang	ged ove	r the las	at 12 mo	onths?				
Risen a lot Risen a little Stayed about the same Fallen a little Fallen a lot No idea	7 35 18 17 4 19	18 37 12 8 3 21	19 37 13 7 2 22	13 36 20 10 2 19	10 29 26 12 3 21	6 16 20 33 3 21	4 10 12 39 16 19	5 10 12 37 17 20	2 8 7 29 37 17	4 11 13 32 23 16	5 13 20 28 16 19	5 14 25 26 12 18	6 12 24 24 13 21	5 12 14 34 15 19	6 12 20 31 12 19	4 11 13 35 17 20	7 28 23 18 5 18	8 46 16 10 3 17
All saying 'risen' All saying 'fallen' Net risen	42 21 21	55 11 44	56 9 47	49 12 37	39 15 24	22 36 -14	14 55 -41	15 54 -39	10 66 -56	15 55 -40	18 44 -26	19 38 -19	18 37 -19	17 49 -32	18 43 -25	15 52 -37	35 23 12	54 13 41
Q.6 How would you expect	interes	t rates t	to chan	ige over	the nex	t 12 mo	nths?											
Rise a lot Rise a little Stay about the same Fall a little Fall a lot No idea	7 52 19 4 1 18	16 50 12 4 1 17	$     \begin{array}{r}       10 \\       46 \\       19 \\       5 \\       1 \\       20 \\     \end{array} $	8 47 23 6 0 16	6 39 27 10 0 17	$     \begin{array}{r}       4 \\       24 \\       26 \\       25 \\       1 \\       20 \\     \end{array} $	$     \begin{array}{r}       4 \\       24 \\       30 \\       21 \\       1 \\       20 \\     \end{array} $	6 30 28 16 1 19	5 31 30 16 2 17	6 43 27 7 1 16	6 46 26 5 1 17	6 43 27 8 1 16	$     \begin{array}{r}       6 \\       34 \\       28 \\       9 \\       1 \\       22     \end{array} $	8 33 28 11 2 18	$5 \\ 33 \\ 33 \\ 10 \\ 1 \\ 18 $	$     \begin{array}{r}       4 \\       32 \\       33 \\       9 \\       1 \\       20 \\     \end{array} $	15 56 11 2 * 16	12 57 12 3 * 16
All saying 'rise' All saying 'fall' Net rise	59 5 54	66 5 61	56 6 50	55 6 49	45 10 35	28 26 2	28 22 6	36 17 19	36 18 18	49 8 41	52 6 46	49 9 40	40 10 30	41 13 28	38 11 27	36 10 26	71 2 (E 69	69 ) 3 66
Q.7 What do you think wo or would it make no differe	uld be h ence eitl	best for	the Bri ?	itish eco	onomy—	-for into	erest rat	es to go	up ove	r the ne	ext few i	nonths,	or to g	o down,	or to s	tay whe	re they a	are now
Go up Go down Stay where they are Make no difference No idea	$12 \\ 21 \\ 40 \\ 7 \\ 20$	12 27 33 10 18	11 29 28 10 23	11 27 35 9 17	9 24 42 11 15	8 28 34 10 19	$10 \\ 24 \\ 40 \\ 10 \\ 16$	13 24 37 10 17	14 21 40 10 14	16 16 40 10 17	17 16 41 10 17	19 17 40 9 15	17 17 39 9 19	17 17 36 11 19	14 19 40 8 19	17 15 38 10 20	22 15 37 8 19	23 15 36 8 18

#### Survey results (continued)

Per cent																		
	1999 Nov.	2000 Feb.	May	Aug.	Nov.	2001 Feb.	May	Aug.	Nov.	2002 Feb.	May	Aug.	Nov.	2003 Feb.	May	Aug.	Nov.	2004 Feb.
Q.8 And which would be be	st for y	ou pers	sonally,	for inte	erest rat	es to												
Go up Go down Stay where they are Make no difference No idea	17 30 22 17 14	19 35 15 22 10	16 33 16 22 13	17 36 18 19 10	17 36 19 20 8	18 33 17 22 10	22 33 18 20 20	20 33 16 22 8	24 32 18 21 6	22 30 20 20 8	22 29 21 21 7	22 30 23 19 6	22 29 22 18 9	24 29 20 18 10	22 29 22 19 9	23 28 20 18 10	20 30 21 19 10	22 31 20 19 9
Q.9 How strongly do you ag (A) A rise in interest rates w	ree wit ould n	th the fo take pri	ollowin ices in t	g staten the high	ents? street	rise mor	e slowl	y in the	short to	erm—sa	у а то	1th or tw	wo					
Agree strongly Agree Neither agree nor disagree Disagree Disagree strongly Don't know					2 35 16 25 2 21	2 32 19 20 2 25	n.a. n.a. n.a. n.a. n.a. n.a.	n.a. n.a. n.a. n.a. n.a. n.a.	n.a. n.a. n.a. n.a. n.a. n.a.	$     \begin{array}{r}       1 \\       34 \\       19 \\       20 \\       1 \\       25 \\     \end{array} $	n.a. n.a. n.a. n.a. n.a. n.a.	n.a. n.a. n.a. n.a. n.a. n.a.	n.a. n.a. n.a. n.a. n.a. n.a.	2 35 18 19 2 24	n.a. n.a. n.a. n.a. n.a. n.a.	n.a. n.a. n.a. n.a. n.a. n.a.	n.a. n.a. n.a. n.a. n.a. n.a.	1 35 19 20 1 23
All agree All disagree Net agree					37 27 10	34 22 12	n.a. n.a. n.a.	n.a. n.a. n.a.	n.a. n.a. n.a.	35 21 14	n.a. n.a. n.a.	n.a. n.a. n.a.	n.a. n.a. n.a.	37 21 16	n.a. n.a. n.a.	n.a. n.a. n.a.	n.a. n.a. n.a.	36 21 15
(B) A rise in interest rates w	ould n	1ake pri	ices in t	the high	street	rise moi	e slowl	y in the	mediun	n term—	-say a y	ear or t	wo					
Agree strongly Agree Neither agree nor disagree Disagree Disagree strongly Don't know					2 39 16 21 1 22	2 35 19 16 1 27	n.a. n.a. n.a. n.a. n.a. n.a.	n.a. n.a. n.a. n.a. n.a. n.a.	n.a. n.a. n.a. n.a. n.a. n.a.	1 38 18 15 1 26	n.a. n.a. n.a. n.a. n.a. n.a.	n.a. n.a. n.a. n.a. n.a. n.a.	n.a. n.a. n.a. n.a. n.a. n.a.	$1 \\ 38 \\ 18 \\ 16 \\ 1 \\ 25$	n.a. n.a. n.a. n.a. n.a. n.a.	n.a. n.a. n.a. n.a. n.a. n.a.	n.a. n.a. n.a. n.a. n.a. n.a.	2 37 19 16 1 25
All agree All disagree Net agree					41 22 19	37 17 20	n.a. n.a. n.a.	n.a. n.a. n.a.	n.a. n.a. n.a.	39 16 23	n.a. n.a. n.a.	n.a. n.a. n.a.	n.a. n.a. n.a.	39 17 22	n.a. n.a. n.a.	n.a. n.a. n.a.	n.a. n.a. n.a.	39 17 22
Q.10 If a choice had to be r faster, which would you pref	nade, e er:	either to	o raise i	nterest	rates to	try to l	eep inf	lation d	lown; o	r keep i	nterest	rates do	own and	allow p	orices ir	n the sho	ops to ri	ise
Interest rates to rise Prices to rise faster No idea	51 17 31	58 19 24	52 16 31	57 15 28	63 19 18	62 16 22	n.a. n.a. n.a.	n.a. n.a. n.a.	n.a. n.a. n.a.	63 16 21	n.a. n.a. n.a.	n.a. n.a. n.a.	n.a. n.a. n.a.	62 16 23	n.a. n.a. n.a.	n.a. n.a. n.a.	n.a. n.a. n.a.	57 19 24
Q.11 Each month, a group o Do you know what this grou	of peop p is?	ole meet	s to set	Britain	's basic	interest	t rate le	evel.										
Monetary Policy Committee Bank of England The Government The Treasury Parliament Other Don't know	7 39 4 1 1 1 47	4 29 2 1 * 2 62	5 33 3 1 * 1 57	6 38 2 1 * 2 51	5 29 3 1 1 1 60	5 32 3 1 * 2 57	n.a. n.a. n.a. n.a. n.a. n.a. n.a.	n.a. n.a. n.a. n.a. n.a. n.a. n.a.	n.a. n.a. n.a. n.a. n.a. n.a. n.a.	4 35 4 1 * 2 54	n.a. n.a. n.a. n.a. n.a. n.a. n.a.	n.a. n.a. n.a. n.a. n.a. n.a. n.a.	n.a. n.a. n.a. n.a. n.a. n.a. n.a.	4 35 3 1 * 1 56	n.a. n.a. n.a. n.a. n.a. n.a. n.a.	n.a. n.a. n.a. n.a. n.a. n.a. n.a.	n.a. n.a. n.a. n.a. n.a. n.a.	4 36 4 1 * 2 54
Q.12 Which of these groups	do yo	u think	sets the	e intere	st rates?	2												
Government ministers Civil servants Bank of England High street banks European Central Bank No idea	14 n.a. 67 3 2 13	15 n.a. 63 4 3 14	12 n.a. 63 3 3 18	13 n.a. 69 2 3 12	16 n.a. 65 4 3 12	15 1 66 3 3 13	n.a. n.a. n.a. n.a. n.a. n.a.	n.a. n.a. n.a. n.a. n.a. n.a.	n.a. n.a. n.a. n.a. n.a. n.a.	13 1 67 3 4 13	n.a. n.a. n.a. n.a. n.a. n.a.	n.a. n.a. n.a. n.a. n.a. n.a.	n.a. n.a. n.a. n.a. n.a. n.a.	12 * 69 3 2 13	n.a. n.a. n.a. n.a. n.a. n.a.	n.a. n.a. n.a. n.a. n.a. n.a.	n.a. n.a. n.a. n.a. n.a. n.a.	13 1 69 2 3 12
Q.13 In fact, the decisions a Which of these do you think	are tak best d	en by tl lescribe	ne Mon s the M	etary Po lonetary	licy Co Policy	mmittee Commit	of the tee?	Bank of	Englan	d.								
Part of the Government A quango, wholly appointed by the Government An independent body, partly appointed by the Governmen	11 8 nt 38	11 8 39	9 8 37	10 8 42	12 9 37	11 8 38	n.a. n.a. n.a.	n.a. n.a. n.a.	n.a. n.a. n.a.	11 7 39	n.a. n.a. n.a.	n.a. n.a. n.a.	n.a. n.a. n.a.	13 7 36	n.a. n.a. n.a.	n.a. n.a. n.a.	n.a. n.a. n.a.	13 8 38
A completely independent body No idea	23 20	20 21	22 24	20 20	24 17	24 19	n.a. n.a.	n.a. n.a.	n.a. n.a.	23 19	n.a. n.a.	n.a. n.a.	n.a. n.a.	24 19	n.a. n.a.	n.a. n.a.	n.a. n.a.	23 18
Q.14 Overall, how satisfied	or diss	atisfied	are you	u with t	he way t	he Banl	c of Eng	gland is	doing i	ts job to	o set int	terest ra	tes in o	rder to	control	inflatio	on?	
Very satisfied Fairly satisfied	7 41	4 37	5 38	6 45	7 48	8 47	9 49	10 45	11 51	11 50	10 49	11 46	11 42	8 47	9 46	12 40	10 45	8 46
dissatisfied Fairly dissatisfied Very dissatisfied No idea	26 7 4 16	28 12 5 14	27 9 4 17	25 9 4 12	26 8 3 9	25 7 3 11	23 6 2 12	23 6 2 14	19 6 2 11	20 6 2 11	23 6 2 11	22 7 3 11	23 7 3 14	24 7 3 11	22 7 2 14	22 6 2 17	22 6 2 15	24 7 3 12
Total satisfied Total dissatisfied Net satisfied	48 11 37	41 17 24	43 13 30	51 13 38	55 11 44	55 10 45	58 8 50	55 8 47	62 8 54	61 8 53	59 8 51	57 10 47	53 10 43	55 10 45	55 9 46	52 8 44	55 8 47	54 10 44

n.a. = not available.

Note: \* indicates less than 0.5%. Figures may not add to 100 due to rounding.

(a) Figures up to and including November 2003 are based on a target of 2.5%.
(b) The November 2003 release incorrectly stated that the November 2003 figure for all saying 'fall' was 5%.

# Perfect partners or uncomfortable bedfellows? On the nature of the relationship between monetary policy and financial stability

## By Chay Fisher of the Bank's Financial Stability Assessment Division and Melanie Lund of the Bank's Centre for Central Banking Studies.

The first annual Chief Economist Workshop, organised by the Bank of England's Centre for Central Banking Studies (CCBS), brought together economists from over 30 central banks. It marked a changing path for the CCBS as it increases its role in providing a forum where central bankers and academics can exchange views on central bank policies and share specialist technical knowledge. The topic for the inaugural meeting was the interplay between monetary policy and financial stability, an issue that has risen to prominence in international debate in recent years.

#### Introduction

The first annual workshop for central bank economists was held at the Bank of England in February this year. At the workshop, experts from within and outside the Bank of England presented different aspects of the relationship between monetary policy and financial stability and the participating chief economists expressed their views in the ensuing discussions and, on particular issues, in small groups. The programme started with an overview of some of the main economic issues, the policy framework and definitional differences. The group then moved on to debate the case for a proactive monetary policy response to asset price bubbles and financial imbalances. The international dimension of the interplay between monetary and financial stability was later drawn out through the discussions on whether the nature of the relationship is the same for developed and developing countries, with a particular focus on the issue of currency mismatches and the choice of exchange rate regime. This led to a debate on the various institutional and regulatory aspects of the relationship and the optimal level of coordination and co-operation between monetary policy and prudential regulation.<sup>(1)</sup>

This article presents a synthesis of the main themes that emerged from the workshop and highlights some of the conclusions from the discussions.<sup>(2)</sup>

## Monetary stability and financial stability: definition and measurement

Workshop participants first considered the intrinsic nature of monetary stability and financial stability. How are they defined and measured? What instruments can be used to achieve the two goals?

On the one hand, the central tenets of monetary policy were considered to be widely accepted. Since the high-inflation decade of the 1970s, central banks around the world have focused monetary policy on achieving price stability, which is often thought of as an environment where inflation does not materially enter into economic decisions.<sup>(3)</sup> Such an environment promotes efficient allocation of economic resources and has led to more stable macroeconomic conditions in many countries. Price stability refers not to individual prices, but prices of an aggregate 'basket' of consumer goods and services that can be summarised in a single index. In this respect, price stability-whether or not it is formalised in an explicit inflation targetwas considered to be relatively well understood, transparent and measurable. Nonetheless, participants noted the practical difficulties central banks face in pursuing price stability, including the conduct of monetary policy in the presence of uncertainty and when operating close to the zero bound on nominal interest rates.

<sup>(1)</sup> Presentations were given by Charlie Bean, Nigel Jenkinson and Patricia Jackson from the Bank of England. External presenters were: Claudio Borio (BIS), Michael Foot (Financial Services Authority), Morris Goldstein (Institute for International Economics), Marvin Goodfriend (Federal Reserve Bank of Richmond), Charles Goodhart (London School of Economics) and Eduardo Levy-Yeyati (Universidad Torcuato Di Tella, Argentina).

<sup>(2)</sup> All discussions were conducted under the Chatham House Rule whereby comments can be recorded, but not attributed to individuals.

<sup>(3)</sup> See King (2002) for a further discussion.

Transparency and accountability of the monetary policy process are enhanced by the relative clarity about the instruments used and the institutions responsible for price stability. In many countries it is the responsibility of the central bank, which has direct control over short-term interest rates which, in turn, influence other financial prices and, with a lag, economic activity and inflation.

By contrast, the concept of financial stability was considered to be more nebulous, with no commonly agreed definition. Indeed, financial stability is often thought of as the absence of financial instability-such as a banking crisis or extreme financial market volatility-which, as history has shown, can have severe macroeconomic consequences for countries that have experienced such episodes.<sup>(1)</sup> Other definitions focus more directly on the links between the financial system and the real economy, recognising the importance of the financial system in allocating economic resources from savers to borrowers.<sup>(2)</sup> A proposed definition along these lines was 'A financially stable system is one in which shocks emanating from or propagated by the financial system do not materially change agents' optimal savings and investment plans.'

The challenge in reaching agreement on a workable definition is exacerbated by the difficulty of measuring financial stability. Unlike price stability, it cannot be summarised in a single measure; a financially stable system depends not only on the health of individual financial institutions, but also on the complex links between those institutions, and the interplay between the financial system, the real economy and financial markets.

As a consequence, the instruments and institutional arrangements that are used to pursue the financial stability objective are also more varied than for monetary policy. In most countries, financial stability policy consists of a number of elements designed to improve the resilience of the financial sector to unexpected developments and to respond should they spill over into a financial crisis. These policies often include: prudential regulation; promotion of sound payments and settlement architecture; appropriate corporate governance and accounting standards; and a robust legal framework. But the nature of these instruments means that they are often difficult to

adjust in a timely manner in response to a shock, an issue that is further complicated by these instruments often being the responsibility of a number of different authorities.

Overall, there was a broad consensus among participants that the relative ambiguity surrounding the concept of financial stability made it more difficult, compared with monetary policy, to formulate appropriate, transparent policies. An advantage of the relative transparency of the monetary policy framework is that it promotes greater accountability on the part of policymakers; whether or not the central bank has been successful in achieving price stability is readily observable (particularly for those with an explicit inflation target). As there is no agreed definition or method of measuring financial stability, the same cannot be said for that goal. As such, developing a coherent analytical framework for financial stability was considered to be a key area for further research.

#### Asset prices and financial imbalances: is there a case for proactive monetary policy?

Despite the issues highlighted above, participants generally agreed that a better understanding of the links between financial stability and monetary policy was a key element in designing effective policies with which to pursue both objectives. The debate centred on the extent to which financial stability concerns should be taken into account in formulating monetary policy.

As background to the discussion, it was noted that monetary stability and financial stability had typically been thought of as mutually reinforcing, with low and stable inflation considered a necessary, but not sufficient, condition for promoting financial stability. This is because an environment of high and variable inflation can facilitate the build-up of vulnerabilities in the financial system as price signals become distorted. However, some participants noted that, while many countries had returned to an environment of low and stable inflation over the past decade or so, the incidence of financial instability appeared to be increasing.<sup>(3)</sup> This observation has led some commentators to suggest that monetary policy should respond proactively to the build-up of potential vulnerabilities in the financial system. It was emphasised by some participants that,

<sup>(1)</sup> See Hoggarth and Saporta (2001) for estimates of the cost of financial instability.

<sup>(2)</sup> See, for example, Haldane *et al* (2004) for a further discussion
(3) See, for example, Crockett (2003) and Borio and Lowe (2002).

though the debate often focuses on the appropriate response of monetary policy to asset price bubbles, it was the broader set of imbalances that tended to accompany them that were the main concern for policymakers, rather than asset price bubbles themselves.<sup>(1)</sup>

Some of those in favour of a proactive monetary policy response suggested that, somewhat paradoxically, the success of central banks in reducing, or anchoring, inflation expectations may have introduced stickiness into prices, which might mask the build-up of imbalances in the real economy by taking longer to feed through to consumer prices. It was argued that, under these circumstances, monetary policy may be slower to respond than otherwise and unintentionally contribute to the conditions for financial imbalances to develop in the future.<sup>(2)</sup> As such, a direct response to emerging financial imbalances may be required to try and avoid the future macroeconomic costs of financial instability should these imbalances unwind; a policy response that could be likened to taking out insurance.<sup>(3)</sup>

Others argued that such a proactive response to asset price bubbles and financial imbalances was not feasible and monetary policy should instead be directed at alleviating the impact on the real economy should they unwind.<sup>(4)</sup> The main objections to a more proactive approach rested primarily on practical issues such as the difficulties of identifying financial imbalances and determining the appropriate timing and size of a monetary policy action.<sup>(5)</sup> A further consideration was that a form of moral hazard may be introduced if market participants expected the central bank to act in response to financial imbalances. Political economy constraints were also thought to be difficult to overcome if monetary policy were to be adjusted in the absence of obvious near-term inflationary pressures.

There was a view, however, that a flexible forward-looking inflation-targeting framework may be able to take into account the potential impact of financial imbalances by recognising the downside risks they posed to the central forecast for inflation and output growth. But, since financial imbalances may develop over a relatively long period of time, flexibility in the forecast horizon was considered to be important.<sup>(6)</sup>

Although no consensus was reached on this issue, participants agreed that further work was required, both by central banks and the academic community, on key issues. These included: integrating the financial sector into macroeconomic models; the measurement and identification of financial imbalances; and assessment of the magnitude and sources of the costs of financial instability. Research on these and related issues was thought to be important to inform the debate on how proactive monetary policy should be in responding to potential vulnerabilities in the financial system.

#### International dimension of the relationship

The importance of the interrelationship between monetary policy and the health of the financial system was further emphasised by discussions of the international dimension of the monetary stability/financial stability nexus. This broadening of the topic led to an increased focus on the situation in developing countries, where currency and exchange rate regime issues have, in the past, been a source of financial stress and a challenge for monetary policy.

The participants debated whether the nature of the relationship between monetary policy and financial stability was the same for developed and developing countries. Their discussions highlighted that, even if countries were subject to the same broad economic principles, the difference in environments between countries would lead to some variation in the relationship between monetary policy and financial stability. And although there were some generalised distinctions, participants believed that the dichotomy between developed and developing countries was an oversimplification. It was clear that there were significant heterogeneities within the two groups of countries, as well as some similarities across the groups.

The debate drew out a number of factors considered to be important determinants of the nature of the relationship between monetary policy and financial

<sup>(1)</sup> This point is emphasised in the literature by Bordo and Jeanne (2002), Borio and Lowe (2002) and Bean (2004),

among others. (2) See Borio and White (2004) for a fuller discussion of this argument.

<sup>(3)</sup> Recent papers supporting this view include Bordo and Jeanne (2002), Borio and Lowe (2002) and Cecchetti et al

<sup>(2002).</sup> (4) See, for example, Greenspan (2002) and Goodfriend (2003) for a discussion.

<sup>(5)</sup> See, in particular, Gruen et al (2003) for a discussion of the informational problems in responding to an asset price

bubble. Borio and Lowe (2002) argue that identification is difficult, but not impossible, and develop simple indicators of financial distress.

<sup>(6)</sup> See Bean (2003 and 2004) for a further discussion.

stability relating to: the size and openness of an economy; currency mismatches and the exchange rate regime; the stage of development of its financial system; the degree of financial liberalisation and the state of prudential regulation; and ultimately the strength and credibility of a country's institutional and policy framework.

The size and openness of a country might affect its sensitivity to exchange rate volatility. A high degree of exchange rate pass-through, the significance of capital inflows, combined with a country's ability to raise debt in its own currency, could potentially contribute to this sensitivity. A high level of short-term, predominantly foreign currency denominated debt and a lack of credibility surrounding the authorities' commitment to controlling inflation have been associated with the amplification of currency crises into full-blown financial crises, as a currency depreciation affects corporate balance sheets as well as those of financial institutions.<sup>(1)</sup> Although a number of small developed countries were also subject to these problems, participants emphasised the heterogeneities across developing countries. For example, the holding of foreign currency denominated assets and liabilities by residents was considered to be prevalent among many Latin-American countries, but was not always a significant feature of developing Asian and African countries.

The discussion on measuring the importance of foreign currency in the domestic market went beyond the issues typically associated with the 'original sin' hypothesis,<sup>(2)</sup> which focuses primarily on a country's inability to borrow externally in its own currency and so its aggregate foreign-currency position. It also evolved beyond what is called in the literature financial dollarisation, whereby both foreign-currency assets and liabilities are taken into account. It was claimed that a more complete picture would be offered by the degree of currency mismatch, ie the net currency position of the whole economy, including hedging facilities as well as its balance of trade position.

The latter measure of exchange rate sensitivity has served to highlight significant variations across developing countries, pointing to how crisis-prone countries are more likely to experience the build-up of currency mismatches prior to a financial crisis.<sup>(3)</sup> These

(1) See Mishkin (2001).

mismatches might also act as a constraint on authorities to loosen monetary policy during a crisis, for fear of causing or exacerbating a currency crisis, or might discourage them from adopting what might be a more appropriate exchange rate regime, the so-called 'fear of floating'. It became evident from the discussions that underlying the currency-mismatch problem of many countries were poor monetary policies—either with respect to controlling inflation or adopting a suitable exchange rate regime—and institutional weaknesses.

Poor inflation performance and monetary policies that lack credibility serve as a disincentive to investors to provide long-term finance in a domestic currency if the expectation is that governments will attempt to reduce their real debt obligations through high inflation. Therefore countries with a history of high and volatile inflation will generally have more foreign-currency debt obligations. However, the direction of causation is not entirely clear: there is some evidence that highly dollarised economies could experience higher levels of inflation, as a result of the growth in money supply, contradicting the traditional view that dollarisation is a self-disciplining device. On another view, a fixed exchange rate regime could lead to complacency towards exchange rate risk with the expectation that the authorities will maintain a stable real exchange rate.

Although participants accepted that a combination of floating exchange rates and inflation targeting might be necessary conditions to reduce the financial stability consequences of currency mismatches, they were not judged to be sufficient. For some countries, their currency sensitivities were, to some extent, a function of the stage of development of their financial markets. Vulnerabilities arising from currency mismatches might be mitigated by better developed domestic markets for foreign-currency hedging and reduced by the introduction of domestic-currency substitutes. More effective and efficient domestic financial intermediation would in turn reduce a dependency on, often volatile. capital inflows and so lend the authorities greater control over the money supply, thus strengthening the money transmission mechanism of monetary policy. It was argued that the development of domestic financial markets can be achieved not only through the 'stick' approach of tighter prudential controls and greater transparency of currency mismatches (both on banks'

<sup>(2)</sup> Discussed in Eichengreen and Hausmann (1999).
(3) See Goldstein and Turner (2004).

balance sheets and those of their debtors), but also through the 'carrot' of developing local-currency substitutes for both savers and borrowers as well as providing hedging possibilities.<sup>(1)</sup>

Participants noted that deeper financial markets tended to be associated with developed countries, although different legislative and fiscal environments had led to important heterogeneities, such as whether the financial system was bank or market oriented, to what extent financial institutions were integrated, and the level of concentration in the financial system. A high degree of investment from the private sector, typical of many developed countries, was judged to be important to the development of deeper financial markets. Government borrowing, often associated with aggregate demand management policies, risked crowding out private borrowing and had resulted in banks in many developing countries holding a large proportion of public debt on their balance sheets.

Although increasing the strength and credibility of monetary policy for some developing countries lay in improving the money transmission mechanism through the deepening of its financial sector, it was noted that liberalising too quickly in inappropriate conditions (eg weak supervision and too generous safety nets), with increased capital inflows and the growth of domestic intermediation, had previously led to credit booms and asset price bubbles. With this and the reputational impact on government credibility in mind, it was suggested that some developing countries may have a 'fear of liberalisation'. One possible solution discussed was the establishment of a strong framework of prudential regulation in order to reassure the private sector, as well as mitigating some of the less desirable effects of financial liberalisation.

But ultimately, all of these steps required a backdrop of a stable macroeconomic environment and government credibility. This point became a constant theme in the discussion of the relationship between monetary policy and financial stability across different countries. Lack of credibility in monetary policy meant that greater changes were required to counter shocks. But the question remained how to improve confidence in monetary policy in the face of large and volatile capital inflows, which significantly reduced the authorities' ability to control the 'trinity' of the money supply, exchange rate and inflation? This in turn raised the question of what was the appropriate sequence of measures employed prior to liberalising a financial sector and what was the optimal institutional framework to adopt?

#### Do institutional arrangements matter?

Compared with monetary policy, institutional arrangements for pursuing financial stability vary substantially across countries. Participants discussed whether these differences affected the nature of the relationship between financial stability and monetary policy and, in particular, the optimal degree of co-ordination between monetary policy and prudential regulation.

Maintaining financial stability is a long-standing goal of central banks, though many have sharpened their focus on this area in recent years-the increased number of central banks now publishing financial stability reviews is evidence of this.<sup>(2)</sup> In some cases—such as the United Kingdom and Australia-this renewed, and more explicit, focus on the stability of the financial system as a whole partly reflected changes in the regulatory environment brought about by the creation of an integrated prudential regulator, separated from the central bank. In other countries, by contrast, the central bank had retained responsibility for both monetary policy and bank supervision. Participants, in general, considered that there was no universal prescription for an optimal regulatory structure across countries, with theoretical arguments in favour of one structure over another unable to provide an unambiguous answer. Instead, an individual country's structural and institutional circumstances were thought to be important considerations.

There was a view, however, that the challenges to effective communication and co-operation may be greater where the prudential regulator is separated from the central bank. The counter to this argument was that establishing both formal and informal co-ordination arrangements between authorities may help to overcome these challenges.<sup>(3)</sup>

Indeed, the discussion highlighted that communication between prudential regulators and monetary policy

<sup>(1)</sup> See Levy-Yeyati (2003) for a discussion.

<sup>(2)</sup> See Oosterloo and de Haan (2003) for a survey of institutional frameworks for financial stability.

<sup>(3)</sup> It has also been argued that separation of responsibilities provides greater transparency regarding the agents and instruments used to pursue both financial stability and monetary policy.

makers was important to formulating effective policies in both spheres, regardless of the precise institutional structure. This was because of the two-way feedback between the real economy and the financial system; macroeconomic conditions are a key determinant of the health of financial institutions, which in turn can influence the business cycle and the monetary policy transmission mechanism. These links are reinforced by the potential for the financial system to amplify shocks to the real economy. In this context, some participants argued that 'microprudential' regulation, with its focus on individual firms, may not, by itself, adequately account for these links so that a more 'macroprudential' approach to financial stability is required.<sup>(1)</sup> This argument implied that greater co-operation between policymakers may be needed in the future.

A further challenge for financial stability policy noted in the workshop was that there were potential trade-offs between other public policy goals such as the promotion of an efficient financial sector. Overly prescriptive regulation, for example, may help to prevent failures of individual financial institutions, but it was also likely to discourage the development of an innovative financial system. This was a consideration behind the widespread deregulation of financial systems that has occurred since, at least, the mid-1980s.

#### **Concluding remarks**

This article has discussed the proceedings of the inaugural CCBS central banks' Chief Economist Workshop, on the interaction between monetary policy and financial stability. Although consensus was not reached on all of the issues, there was general agreement that a better understanding of the interaction is important for policymakers. This will require further research to consider whether monetary policy and financial stability are indeed close to being 'perfect partners'.

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## A review of the work of the London Foreign Exchange Joint Standing Committee in 2003

*This note reviews the work undertaken by the London Foreign Exchange Joint Standing Committee during* 2003.

#### Introduction and overview

The Foreign Exchange Joint Standing Committee (henceforth referred to as 'the Committee') was established in 1973, under the auspices of the Bank of England, as a forum for banks and brokers to discuss broad market issues. The membership of the Committee includes senior staff from many of the major banks operating in the foreign exchange market in London and representatives from brokers, corporate users of the foreign exchange market and the Financial Services Authority (FSA). A list of the members of the Committee, as at end-2003, may be found at the end of this review.

The Committee met six times during 2003. At the start of the year, the main focus of the Committee's work was on the issue of undisclosed principal trading, whereas for the latter part of the year it mainly concentrated on proposals for a semi-annual survey of the UK foreign exchange market. Contingency planning has also been a focus of the Committee's agenda throughout the year. In November 2003, the Committee marked the 30-year anniversary of its first meeting by holding a seminar attended by visitors representing market committees in eight international financial centres.

#### **Undisclosed principal trading**

Undisclosed (or unnamed) principal trading is where a fund manager acts as an agent for clients who do not want their identity disclosed to a third party (usually a bank) with whom the fund manager is trading on their behalf. It is inherently risky because the third party is unable to quantify accurately the counterparty credit, legal and operational risks in undertaking the trade. In addition, there is the possibility that anti money-laundering regulations might not be properly observed.

In September 2002, the Committee decided to consult with the foreign exchange market on whether the Non-Investment Products (NIPs) Code<sup>(1)</sup> should be amended to discourage the practice.<sup>(2)</sup> Under the revised wording, a fund manager should notify the credit, compliance or legal function of the bank counterparty as to the identity of the principal for which it was acting. The front office would be unaware of the principal's identity (the bank must operate procedures to ensure this) and this would avoid any market-sensitive information being released.

Responses to the consultation were broadly positive, and the Committee agreed to hold a 'round table' meeting at the Bank in March 2003. This allowed for a direct exchange of views between banks and fund managers, and heard the views of the FSA. It was agreed that revised wording should be introduced to discourage undisclosed trading, and a working group was constituted to finalise the details.

The working group met in April. It finalised and agreed the changed wording for the NIPs Code, and also recommended that there should be a grace period of one year to allow banks and fund managers to amend their legal agreements and to make the IT system changes required to introduce the change. After consulting the other bodies that endorse the NIPs Code,<sup>(3)</sup> the Committee formally approved the change at its 15 May 2003 meeting, and the change was publicised

<sup>(1)</sup> This is a code of good market conduct for the sterling, foreign exchange and bullion wholesale deposit markets, as well as the spot and forward foreign exchange and bullion markets. It can be downloaded from:

www.bankofengland.co.uk/markets/nipscode.pdf. The Committee has responsibility for its maintenance.

<sup>(2)</sup> More information on the work of the Committee in 2002 can be found at www.bankofengland/markets/forex/fxjsc/annualreview2002.pdf.

<sup>(3)</sup> The Money Market Liaison Group and the London Bullion Market Association co-ordinate the NIPs Code in their relevant markets, jointly with the Committee. The Association of Corporate Treasurers, the British Bankers' Association, the Building Societies Association, the Chartered Institute of Public Finance and Accountancy, the London Investment Banking Association, and the Wholesale Markets Brokers' Association also endorse the code.

on 28 May.<sup>(1)</sup> A working group has continued to meet, without the involvement of the Committee, to agree a pro-forma wording for legal documentation relating to undisclosed trading that banks and fund managers can exchange with each other. The Committee continues to monitor the progress of this work.

There is an international dimension to the issue because undisclosed trading also occurs in other markets, including in the United States. The New York Foreign Exchange Committee has sent a letter to US market participants, supporting the work of the Joint Standing Committee<sup>(2)</sup> and the vice-chair of the New York Committee attended the March round table meeting. The Singapore Foreign Exchange and Market Practices Committee has also endorsed the Committee's work in this field.<sup>(3)</sup> Finally, ACI—The Financial Markets Association amended its own Model Code,<sup>(4)</sup> on 18 September 2003, to discourage the practice of undisclosed trading in other financial centres.<sup>(5)</sup> The Chairman of the Joint Standing Committee has also been active in raising the issue with central banks and international bodies such as the European Central Bank and the Bank for International Settlements (BIS).

The Committee continued to monitor banks' and fund managers' preparations and expects the agreed procedures to be in place by the time the one year's grace period ends in June 2004.

#### **Contingency planning**

During 2003, the Committee and its Operations subgroup<sup>(6)</sup> continued to focus on the issue of contingency planning, and engaged in a series of tests of contingency telephone call arrangements, including some that were initiated at very short notice. The Committee and the subgroup have set up a secure web site, access to which is restricted to members of the two groups. This web site contains members' emergency contact details and would be used to exchange information during times of market disruption.

In February 2003, the Government began a consultation process on the possibility of new legislative measures to aid it in coping with a major operational disruption to the financial system.<sup>(7)</sup> The Committee asked the Operations subgroup to co-ordinate a response to these proposals for the foreign exchange market. In summary, the Committee and the Operations subgroup felt there would be significant difficulties in seeking to implement legislative proposals, given the international nature of the market. For example, by potentially allowing foreign exchange market participants operating in the UK legal jurisdiction not to settle trades, the Committee believed that legal disputes could arise with other jurisdictions, which would not be covered by the legislation.

In June 2003, after reviewing all the responses to the proposals, the Chancellor decided that a Task Force on major operational disruption in the Financial System should be formed under the leadership of Sir Andrew Large, Deputy Governor of the Bank of England. Its remit was to investigate in more depth the arguments for and against extending the legislative tools for coping with operational disruptions. Its work was aided by three working groups covering contract law, market infrastructure and regulatory powers. Members of the Operations subgroup were invited to serve on all three groups, and acted as a bridge between them, the subgroup and the Committee.

In December 2003 the Task Force concluded that legislative powers were not required at this time.<sup>(8)</sup> In addition to the international issues described above, the Task Force noted 'an overall determination on the part of all [market] participants to act pragmatically with the common purpose of getting the system up and running again as fast as possible. The initial instinct was above all to get moving again'.<sup>(9)</sup> The Committee and the Operations subgroup

<sup>(1)</sup> See www.bankofengland.co.uk/pressreleases/2003/058.htm for a copy of this press release.

<sup>(2)</sup> See www.newyorkfed.org/fxc/2003/fxc030303b.pdf.

<sup>(3)</sup> See www.newyorkfed.org/fxc/2004/fxc040223.pdf for a copy of this endorsement.

<sup>(4)</sup> The ACI model code is a statement of good market practice endorsed by the ACI, which has regulatory standing in eight countries including Canada and Australia.

<sup>(5)</sup> See www.aciforex.com/docs/Update%2018%20DealingwithUnidentifiedPrincipals220403FinalPLPDF.
(6) In 2002 the Committee decided that an Operations subgroup, consisting of technical settlement experts, should be created. Its remit is to cover issues relating to contingency planning: to act as a forum for the discussion of technical operational issues; to raise with the Committee the potential or actual implications of developments in these operational issues for market practice; and where appropriate to suggest actions to improve procedures or update the

NIPs Code. More information on this group's other work is contained in section five of this review. (7) The consultation document is available at www.hm-treasury.gov.uk/media//F0911/fin\_disrup03.pdf, and a summary of the responses to the consultation document is available at

www.hm-treasury.gov.uk/media//83FEB/fsmod\_resp\_sum\_03\_2.pdf.

<sup>(8)</sup> The report can be accessed at www.financialsectorcontinuity.gov.uk/home/pdf/tr\_report\_whole\_report.pdf. The report recommended firms pursue a number of the recommendations set out in the Task Force Report. It is possible that the Government may consider legislation if firms do not make sufficient progress on the recommendations and if associated actions are not forthcoming.

<sup>(9) &#</sup>x27;Report of the Task Force on Major Operational Disruption in the Financial System', page iii.

both agreed with this conclusion. A further review is expected in October 2004 which will detail progress on each of the Task Force recommendations and update on a range of business continuity issues.

The Committee continues to play an active role in the arena of contingency planning, focusing on refining its contingency phone call arrangements.

## Frequent survey of the UK foreign exchange market

The Committee has been aware for some time that there is a lack of timely, robust statistics on turnover in the foreign exchange market, both in the United Kingdom and globally. The BIS co-ordinates a detailed survey of market turnover, but this only takes place every three years. The Committee plays an important role in this survey, through refining the questionnaire sent to bankers and brokers, so as to ensure that it reflects changes in market structure. Though a number of qualitative trade publication surveys are also available, no other regular quantitative analyses exist in this area.

The Committee has investigated the potential for undertaking a more regular data-collection exercise in the United Kingdom. Consultations with member banks suggested that more regular collection of a limited amount of turnover data in a format similar to that required by the BIS would not prove too onerous and would generate a number of benefits. The main

#### A brief history of the Foreign Exchange Joint Standing Committee

The Foreign Exchange Joint Standing Committee was established in November 1973 under the auspices of the Bank of England, to promote communication between banks and the brokers, and to facilitate the smooth functioning of the foreign exchange market. The original catalyst was provided by some difficult negotiations between representatives of the banks' Foreign Exchange Committee (FEC) and the brokers' Foreign Exchange and Currency Deposit Brokers Association (FECDBA). At that time these two bodies negotiated over the rate for brokerage on individual foreign exchange trades on behalf of the market as a whole.

The first meeting of the Committee took place on 30 November 1973 at Lloyds Bank. In addition to the Chairman and Secretary provided by the Bank of England, there were eight other members representing four banks—National Westminster Bank, Samuel Montagu, Bankers Trust and Standard Chartered—and four brokers from Charles Fulton & Co., Tullett & Riley, M W Marshall and Harlow Meyer. The Committee's first task was to agree a reduction in brokerage rates from 0.025% to 0.020% per trade for five years.

The Committee was instrumental in standardising market practice for a number of key issues, such as confidentiality and who could trade with whom. The Committee also established consistent policies on practical issues such as poaching of staff, unacceptable gifts and standardising trading language and its meaning.

One of the main themes for the Committee from its inception through to the current day has been to help to maintain a code of conduct for trading foreign exchange. As a largely wholesale, over-thecounter market, regulation of the foreign exchange market has mostly taken the form of a code of best practice. In 1973 the code of conduct took the form of an open letter to market participants from the Chair of the FEC; the existing document being the 'Stirling Letter'. The Committee worked on redrafting this and the 'O'Brien Letter' (named after the then Chair of the FEC) was issued as a replacement in 1975, and amended in 1978.

In January 1980, many of the restrictive arrangements between the banks and brokers were dismantled allowing direct dealing between banks for example. In May 1985 the O'Brien regime was amended again and the 'Guide to Market Practice in Foreign Exchange and Currency Deposits' was issued as a result. The Financial Services Act of 1986 paved the way for further changes and in 1988 a new regime was introduced for 'The Regulation of the Wholesale Markets in Sterling, Foreign Exchange and Bullion' which incorporated a new 'London Code of Conduct'. In the following decade the FEC became part of the British Bankers' Association (BBA) and in 1992 the FECDBA disbanded. In 1994 a new body—the advantage would be the provision of robust, timely statistics on market turnover. This would give the participating banks the ability to monitor their market share, and to view trends in foreign exchange market turnover. As many banks have to undertake data-collection exercises every three years for the BIS, a more regular survey would allow economies of scale to be achieved by repeatedly using the same collection processes as for the BIS survey.

The first data were collected in April 2004, in conjunction with the BIS triennial survey, with the next survey occurring in October 2004. While the timing and content of any post-survey publication has yet to be agreed, it is likely that participating banks will have access to the data one month after the end of the survey

Wholesale Markets Brokers' Association (WMBA)—was formed. Both the BBA and WMBA are currently represented on the Committee.

The next major regulatory change came with the creation of the Financial Services Authority (FSA) in 1998. The FSA was given the majority of the Bank of England's supervisory functions, but it was agreed that the Bank would continue to chair the Joint Standing Committee, while the FSA would be represented on it. Over the next few years the NIPs Code (see above) was developed to replace the London Code of Conduct and formally launched in 2001.

Apart from maintaining the codes of conduct, the Committee spent much of its time before 1998 arbitrating on trade disputes between the banks and brokers. The Committee continues to advise on the interpretation of the NIPs Code, but the need for this arbitration function has largely ceased to exist.

The other main theme of Committee discussions over 30 years has been the impact of new technology. The 1970s saw the first introduction of the recording of dealers' conversations and 'squawk boxes' (which relayed conversations out loud) and, early in 1977, the first mention of the Reuters dealing system to replace phone lines and facilitate direct dealing. The 1980s were dominated by a range of technological issues—

(1) This can be found at www.bankofengland.co.uk/markets/fxjsc.

month, followed by a public release of the aggregate data. The April collection will be treated as a pilot exercise, with the first public release after the October 2004 survey.

#### 30-year anniversary celebrations

In November 2003 the Joint Standing Committee marked the 30-year anniversary of its first meeting. To celebrate this, the Committee decided to hold a conference and dinner/reception for former members and representatives from other international foreign exchange committees. The conference, opened by the Bank's Executive Director for Markets, Paul Tucker, had more than 70 participants. Michael Foot, a former member of the Committee and a Managing Director of

including concerns over the telecommunications infrastructure in London—and automated confirmation systems that were introduced from 1984. In April 1989, the first global turnover survey was conducted—resulting from an initiative in London as early as 1985.

In the 1990s there were further structural developments: the Committee discussed the relocation of back offices overseas as early as 1994, and contingency planning following the Bishopsgate bomb in 1993. The Allsopp report on settlement risk in 1996 led eventually to the introduction of Continuous Linked Settlement in 2002, and this has been a regular discussion topic. In the second half of the 1990s the Committee also discussed the introduction of the first internet-based trading systems, the single European currency and the potential impact of the 'Millennium Bug'.

Since 2000, the Committee has expanded its membership to a total of 25. There are generally six meetings a year, with the facility to call extraordinary meetings and conference calls as required. Since 1998, the Committee has been working on expanding its contact with foreign committees through the exchange of minutes and information on market practices and through working together on issues of common interest such as contingency planning and codes of conduct. The Committee's web site was launched in July 2001 to highlight its work.<sup>(1)</sup> the FSA, made a presentation on the history of the foreign exchange market and some of the current issues. In addition, there were presentations from the Chairs of the New York and Tokyo foreign exchange committees, and from a member of the ECB Foreign Exchange Contact Group. Discussions were wide-ranging, covering regulatory and ethical standards in the foreign exchange market, Asian exchange rate regimes, and the impact of e-commerce.

The dinner was held at the Vintners Hall in London, with a reception hosted by Rachel Lomax, Deputy Governor of the Bank. The Committee was pleased to welcome three of the participants from its first meeting—Allan Orsich, Derek Tullett and Terry Smeeton—with the latter two speaking about the early days of the Committee. Some 120 people attended including representatives from over 20 central banks.

#### The work of the Operations subgroup

The subgroup has worked extensively on contingency planning issues (see above). It has also addressed developments in and the impact of Continuous Linked Settlement<sup>(1)</sup> (CLS) on the foreign exchange market. CLS is a payment-versus-payment settlement system for foreign exchange transactions that has eliminated the principal risk for those trades that it settles. CLS volumes and values have grown strongly since the system was launched in September 2002 and the daily value of transactions settled now frequently exceeds \$1 trillion a significant proportion of the interbank market. The subgroup has also monitored how market practice has evolved following its introduction, and notably how institutions have responded to rare incidents of disruption to CLS.

The subgroup has also set up working groups to review existing NIPs Code guidance relating to Standard Settlement Instructions, as well as documentation issues relating to Prime Brokerage; to encourage the use of Confirmations in post-trade processes; and most recently to encourage service level agreements with customers. These working groups are chaired by members of the subgroup, and are seen as a useful mechanism for allowing experts at member banks to participate in, and augment, the work of the subgroup. The subgroup has also reviewed the special recommendations of the Financial Action Task Force on Money Laundering (FATF),<sup>(2)</sup> monitored discussions regarding the possible introduction of a central clearing counterparty for the London foreign exchange market, and reviewed developments in the outsourcing of settlement functions abroad.

#### **Other subgroups**

The E-commerce subgroup was re-formed in 2003, and presented findings at the May 2003 meeting. Its report was included in the Summer 2003 edition of the *Quarterly Bulletin*<sup>(3)</sup> and also published in *E-Forex Magazine*.<sup>(4)</sup> The Committee has paid particular attention to developments in this area, it has received presentations on prime brokerage and CLS, and has increased its membership to encompass a representative from an e-commerce portal. In 2004, the Committee plans to form new subgroups to cover the work of banks' chief foreign exchange dealers, and to discuss legal and related issues in the foreign exchange market.

#### International co-operation

One of the motivations behind holding the 30-year anniversary conference was to further the Committee's objective of fostering and improving links with the other international foreign exchange committees. To this end, the Chair and Secretary of the Committee have attended meetings of the ECB and the New York foreign exchange committees, and the Secretary of the ECB committee and the Chair of the New York committee attended Committee meetings in 2003. The Chair of the Operations subgroup was a member of the counterpart ECB committee, and one member of the subgroup is a member of the New York Operations Managers Working Group.

In September, the New York Foreign Exchange Committee held a global operations conference in New York. Members from seven international operations committees, including the Operations subgroup, attended. A common theme that has arisen from meetings with international contacts is the need for greater co-ordination between the various codes of market practice used. To that end, the Operations subgroup has begun to review the NIPs Code and to

CLS is a payment-versus-payment settlement system for foreign exchange transactions. For more details see the Bank of England Quarterly Bulletin, Autumn 2002, pages 257–58. For more information on CLS see www.cls-group.com.

<sup>(2)</sup> Particularly Special Recommendation VII, which covers customer information to be included in cross-border payment

messages. See www.fatf-gafi.org/40Recs\_en.htm#Reporting for further details of the FATF Special Recommendations.

<sup>(3)</sup> See www.bankofengland.co.uk/qb/qb030208.pdf.
(4) See www.bankofengland.co.uk/markets/forex/fxjsc/fxjscecomm2003.pdf.

compare it with both the ACI Model Code and the code of good practice endorsed by the New York Committee (the '60 best practices').<sup>(1)</sup> And the Operations subgroup is discussing areas of common interest with its New York counterpart, for both committees to collaborate on.

The Committee will continue to foster international links in 2004. The main Committee will continue to undertake reciprocal visits to other committees, and the Operations subgroup is likely to host a global operations conference in London in 2004 or 2005.

 Its full title is 'The management of Operational Risk in foreign exchange'. See www.newyorkfed.org/fxc/2003/fxc033103.pdf for a copy of this document.
#### Members of the London Foreign Exchange Joint Standing Committee as at December 2003

#### Name Mike Beales Marcus Browning Adam Burke Alan Collins Darren Coote Jeff Feig David Gibbins Brian Gracey Geoff Grant David Hacon John Herbert Simon Hills Jack Jeffery Michael Kahn Shigeyasu Kobayashi Rob Loewy Peter Murray Peter Nielsen Ivan Ritossa Jon Simmonds Matt Spicer Gordon Wallace Phil Weisberg Brian Welch Paul Fisher (Chairman) Sumita Ghosh (Secretary)\*

**Firm/Organisation** Wholesale Markets Brokers' Association Merrill Lynch JPMorgan Chase Bank of America UBS Citibank Royal Bank of Canada HSBC and Chair, FXJSC Operations subgroup Goldman Sachs Financial Services Authority Garban Intercapital British Bankers' Association EBS State Street Bank of Tokyo-Mitsubishi HSBC Morgan Stanley Royal Bank of Scotland Barclays Capital Crédit Agricole Indosuez CSFB Deutsche Bank FXAll The Association of Corporate Treasurers Bank of England Bank of England

\*Andrew Grice was Secretary of the Committee and its Operations subgroup until the September 2003 meetings.

# Members of the FX JSC Operations subgroup as at December 2003

Name	Firm/Organisation
Andrew Brown	CSFB
Jos Dijsselhof	ABN Amro
Michael Douglas	Bank of America
John Godfrey	Goldman Sachs
John Hagon	CLS
Barry Holland	Barclays Capital
Elaine Kelly	Deutsche Bank
Brian Leddy	Mellon Bank
Chris Mann	Bank of England
Leigh Meyer	Citibank
John Moorhouse	Reuters
Mike Neale	JPMorgan Chase
Oonagh O'Neil	Morgan Stanley
Derrick Pearson	Lloyds TSB
Colin Perry	ICAP
Steve Portway	UBS
Stephen Smith	State Street
Allan Spallding	SWIFT
John Whelan	Association of Foreign Banks
Richard White	Royal Bank of Scotland
Brian Gracey (Chairman)	HSBC
Simon Hills (Vice-chairman)	British Bankers' Association
Sumita Ghosh* (Secretary)	Bank of England

\*Andrew Grice was Secretary of the Committee and its Operations subgroup until the September 2003 meetings.

## Reform of the Bank of England's operations in the sterling money markets A consultative paper by the Bank of England

The following reproduces a paper issued for public consultation by the Bank on 7 May 2004. It reviews the objectives and broad framework of the Bank of England's operations in the sterling money markets. Comments were invited by 11 June 2004.

#### I Introduction

1 The Governor announced a review of the Bank's operations in the sterling money markets in a speech in Leicester on 14 October 2003.<sup>(1)</sup> The aim is to make improvements to ensure that the Bank's operational framework is at the cutting edge internationally.

2 The Bank last reformed its official sterling operations in the mid-1990s. The changes introduced then—in particular, the moves to operate in gilt repo and to broaden the range of counterparties—have worked well. But it is timely to examine whether there is scope for further improvements. The Bank has therefore reviewed the overall framework for the provision of central bank money, including its objectives and the implications for the markets and the wholesale payment systems that support them.

3 Since the announcement in October, the Bank has held discussions with more than 60 market participants, including all settlement banks and counterparties to the Bank's open market operations, infrastructure providers and, importantly, users of the markets, such as smaller banks, corporate treasurers and money market fund managers, in the United Kingdom and abroad. The Bank has also studied the operational frameworks of many overseas central banks. The Bank is grateful to those who have made their time available.

4 The great majority of market participants want greater stability in sterling overnight interest rates. Most users of the market, in particular, want a relatively narrow trading range for overnight rates, closer to that in major overseas domestic currency money markets. While intermediaries expressed a wider range of views, many believed that greater transparency and certainty of financing costs would narrow bid/ask spreads in short-dated money markets and allow term money, bond and derivative markets, such as the overnight indexed swap market, to thrive.

5 This paper, which is issued for public consultation, sets out the Bank's objectives and asks for comment from interested parties on a number of specific issues related to the architecture of the framework. Those issues are covered principally in Sections V, VI and VII, and for completeness are summarised in Section VIII. In due course, the Bank will issue a further paper setting out its conclusions and consulting, as necessary, on questions of detail and implementation.

#### II Objectives

6 The purpose of the Bank's operations in the sterling money markets is to implement the Monetary Policy Committee's (MPC's) interest rate decisions while meeting the liquidity needs, and so contributing to the stability, of the banking system as a whole. This will not change.

7 But, in future, in seeking to implement the MPC's interest rate decisions through its operations, the Bank will aim to control overnight market interest rates much more closely. The Bank will have four objectives.

8 The first and primary objective is for sterling overnight interest rates to be in line with the MPC's repo rate, leading to an essentially flat money market curve out to the next MPC decision date, with very limited day-to-day or intraday volatility in market interest rates at maturities out to that horizon. Beyond the next MPC decision date, market interest rates will be free to reflect market expectations of future MPC interest rate decisions.

(1) Available on the Bank's web site at www.bankofengland.co.uk/pressreleases/2003/110.htm.

9 The second objective is an efficient, safe and flexible framework for banking system liquidity management, both in competitive money markets and, where appropriate, using central bank money. This framework should extend from efficient and safe provision of liquidity for making payments during the day, through to day-to-day and longer-term liquidity management, and it should retain incentives for banks to manage their own liquidity actively and prudently. In particular, the Bank is considering:

- Giving banks more choice in their liquidity management by offering the possibility of holding remunerated balances ('reserves') at the Bank.
  Banks would then, for example, be able to choose whether to finance wholesale payments made via the Bank's real-time gross settlement (RTGS) payment system by borrowing from the Bank during the day against collateral (as now) or by drawing on reserve balances held with the Bank and borrowed through the Bank's open market operations or in the markets.
- ii Making the operational framework better able to cope with changes in demand for central bank liquidity, including in stressed market conditions or otherwise extraordinary circumstances.
- iii Giving more banks direct access to the Bank, through holding reserves and/or having access to standing facilities and/or settling payments directly across RTGS accounts with the Bank.

10 The Bank's third objective is an operational framework that is, as far as possible, simple, straightforward and transparent.

11 Finally, the Bank's fourth objective is competitive and fair sterling money markets, both for end-users and intermediaries.

- 12 Summary of objectives:
- **Objective 1:** Overnight market interest rates to be in line with the MPC's repo rate, so that there is a flat money market yield curve, consistent with the official policy rate, out to the next MPC decision date, with very limited day-to-day or intraday volatility in market interest rates at maturities out to that horizon.

- **Objective 2:** An efficient, safe and flexible framework for banking system liquidity management—both in competitive money markets and, where appropriate, using central bank money—in routine and stressed or otherwise extraordinary conditions.
- **Objective 3:** A simple, straightforward and transparent operational framework.
- **Objective 4:** Competitive and fair sterling money markets.

#### III Reasons for change

13 The primary reason for change is that the current operational framework leaves sterling overnight rates considerably more volatile than is desirable, as illustrated by comparison with other currencies (Charts A and B).

#### **Chart A**

Overnight interest rates and policy rates— United Kingdom, United States and the euro area



Chart B Overnight interest rates and policy rates—

Canada, Australia and New Zealand



14 This is despite there having already been substantial reductions over the past decade in volatility in sterling overnight interest rates following earlier changes to the Bank's operations (Chart C). Volatility decreased after the Bank's previous major review of its operations in the sterling money markets in 1996–98. when the Bank began conducting open market operations with banks and securities dealers rather than discount houses and enlarged the pool of eligible collateral to include gilts taken via reverse repo operations. Volatility fell further in 1999 when the Bank broadened the eligible collateral pool to include a much wider range of EEA government and supranational securities, so that there is currently some £3 trillion of collateral eligible for use in the Bank's open market operations, compared with Bank holdings of typically £20 billion. And volatility fell further again in 2001 following the Bank's introduction of an overnight deposit facility to put a floor under overnight market interest rates.





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

the policy rate.(b) Routine gilt repo OMOs introduced.

(c) Introduction of deposit facility.

(d) Introduction of deposit facility.

15 In the Bank's current framework,<sup>(1)</sup> settlement banks<sup>(2)</sup> are obliged to maintain a minimum balance of zero on their accounts at the Bank at the end of each day (the maintenance requirement); balances on these accounts are not remunerated. The Bank conducts daily open market operations at a maturity of around two weeks to supply the market with the Bank's forecast of the net funds needed by the banking system in aggregate (the 'shortage') to meet this maintenance requirement every day. But these open market operations are not in themselves sufficient to make the Bank the rate-setter in the overnight market since they do not necessarily establish the Bank as the marginal provider (or taker) of funds. The corridor for overnight market rates formed by the rates on the Bank's overnight deposit and lending facilities is wide (200 basis points or more), and direct access to these facilities is also limited to a narrow range of firms. This leaves considerable scope for overnight rate variability.

16 Separately, volatility can result from the Bank continuing to lend every day for a maturity of around two weeks at the prevailing MPC repo rate even when the term of the repo spans an MPC meeting. In consequence, when the MPC changes its repo rate at the subsequent meeting, outstanding lending is carried forward until maturity at the previous MPC rate. Through a process of normal market arbitrage, overnight market rates ahead of the meeting adjust to equalise the cost of borrowing from the Bank at two weeks and the expected cost of rolling borrowing in the overnight market over the same period. Thus, overnight rates ahead of the MPC meeting will tend to fall if overnight market rates following the meeting are expected to rise due to an increase in official rates. The opposite occurs (overnight rates rise) if the MPC is expected to reduce its repo rate. This 'pivoting' brings further unnecessary volatility in overnight market rates and distorts the money market yield curve.

17 The Bank's current operational framework could also probably be improved in relation to the Bank's three other objectives:

For example, in meeting the liquidity needs of the banking system, the Bank makes no provision in its current operations for banks to change the level of reserves they hold with the Bank. Banks that are members of RTGS also have an incentive to minimise their holdings of (unremunerated) reserve balances at the Bank, so that in practice they do not have an option to draw on reserves in order to meet intraday liquidity needs. Access to the standing facilities does not extend to banks generally, so many banks cannot use them as a liquidity management tool. And, in contrast to overseas systems, the framework does not include

(1) The Bank's current operational framework is set out in 'The Bank of England's Operations in the Sterling Money

Markets', available at www.bankofengland.co.uk/markets/money/stermm3.pdf.

<sup>(2)</sup> Those banks (including the Bank itself) that are members of the sterling real-time gross settlement (RTGS) wholesale payment system and have settlement accounts at the Bank of England.

arrangements for liquidity provision, against routinely eligible collateral, beyond the Bank's forecast of the system's net liquidity shortage, even in extraordinary circumstances.

- Some elements of the current framework are complex, in particular the arrangements for balancing the banking system's books at the end of the day.
- Many users of the sterling money markets believe that volatility in short-dated market interest rates puts them at a disadvantage because the information available to different market participants about flows in the money market and wholesale payments system is inevitably uneven. Such perceptions may deter participation and impair market liquidity.

#### IV Setting the official interest rate

18 The Bank's ability to set sterling overnight market interest rates stems from its position as monopoly supplier of sterling central bank money. Demand for central bank money principally arises because:

- People want to hold bank notes and their banks must purchase the notes from the Bank. Notes in circulation are currently some £34 billion. The Bank issues bank notes on demand.
- The Bank is banker to the large UK banks: they settle payments amongst themselves across the Bank's books in the 'final settlement asset', central bank money, via the sterling payment system (RTGS).

19 Changes in demand for central bank money can be met only if some other part of the Bank's balance sheet changes at the same time—the Bank's assets must always equal its liabilities. The Bank can, in principle, meet the change in demand by lending (or borrowing) bilaterally or via open market operations.<sup>(1)</sup> The Bank can set the terms on which it lends or absorbs liquidity and the terms on which banks hold accounts with it. This provides the fulcrum of any system used by the Bank to set sterling market interest rates.

20 Payments and payment practices in the economy determine the demand for bank notes. But

banks' reserve balances at the Bank depend on the amount that the Bank lends to the market through its open market operations: on the terms on which the Bank provides these accounts, including how frequently it requires banks to balance their books (the maintenance *requirement*); and on the rates of interest applied to positive and negative balances on these accounts. These terms create incentives for banks to manage their account balances consistent with the Bank's policy objectives. A maintenance requirement can be daily, with banks required to hold a specific (positive) balance at the end of each day and charged a penalty rate if they fail to do so (a same-day requirement); or it can be a period-average requirement, with banks charged a penalty rate if they fail to hold a specific (positive) balance on average over a longer period. Examples of systems with a same-day requirement include Australia, Canada and New Zealand: and also the Bank's current system, in which settlement banks are required to balance their RTGS accounts at the end of each day and are charged a penalty interest rate if their accounts are overdrawn. Examples of period-average systems include those used by the European Central Bank and the US Federal Reserve.

21 Under a period-average requirement, banks would be able to draw down or build up reserves over the course of the maintenance period, provided their average end-of-day balance over the period as a whole equalled the requirement and they had a positive balance at the end of each day. (Banks would be charged a penalty rate on any overdrafts or if they failed to hold the required average balance.) Banks electing to join such a scheme, and so to become subject to the requirement, would be able to vary their reserve balance whenever overnight market interest rates diverged from their central expectation of the rate that would prevail on the final day of the maintenance period (for example, running down reserve balances when market rates were higher than the central expectation of the rate that would prevail on the final day of the maintenance period). This arbitrage process should ensure that overnight market interest rates earlier in the maintenance period remained close to the expected overnight market interest rate on its final day. The banking system's need to hold sufficient reserves to meet the period-average requirement would provide the binding constraint that the Bank would use to set market interest rates on the final day and consequently.

<sup>(1)</sup> Even if a counterparty is not itself a settlement bank, it will bank with a settlement bank or with a bank that banks with a settlement bank. In each case, the settlement of the Bank's injection (or withdrawal) of reserves is ultimately reflected in settlement banks' RTGS accounts at the Bank.

via that arbitrage, throughout the preceding days of the maintenance period.

22 By offering overnight standing lending and borrowing facilities to a wide range of banks at the end of the maintenance period (whether that period is one day or longer), the Bank should be able to ensure that overnight market interest rates remain within the range determined by the interest rates on these facilities. If a sufficiently large number of banks can borrow from or deposit funds with the Bank at these rates, market rates should not trade outside this range.

23 The Bank intends that such standing facilities should be the core of the rate-setting part of its operational framework and, consistent with its rate-setting objective, they will carry interest rates that have the effect of setting a narrow 'corridor' for the overnight market interest rate around the MPC's repo rate. A broad range of banks will have access to the standing facilities.<sup>(1)</sup> The Bank anticipates that they would be available throughout the day.

24 The Bank would expect the market overnight rate, and other rates out to the next MPC meeting, to remain close to the centre of this corridor, consistent with the MPC repo rate, provided four conditions are met:

- The Bank provides sufficient funds to the market to i enable banks to meet the maintenance requirement<sup>(2)</sup> without recourse to the standing facilities. $^{(3)(4)}$  (If that condition were not met, market overnight interest rates could move towards the edges of the overnight interest rate corridor.)
- ii The market's central expectation is that the Bank will provide sufficient funds to enable the banking system to meet the maintenance requirement without recourse to the standing facilities in the period up to the next MPC decision, with symmetric risks of the Bank's liquidity forecast leading to underprovision and overprovision.

- iii 'Pivoting' ahead of MPC decisions (as described in paragraph 16) is eliminated. If the Bank continues to lend beyond the time at which the next MPC decision takes effect, it will do so either at a market rate or at a rate that is indexed to the MPC repo rate(s) prevailing over the life of the transaction (see also Section VI).
- The market is competitive. A narrow corridor iv should aid this. It would make it less expensive than now for banks to use the Bank's standing facilities in order to avoid dealing in the market at unattractive rates.<sup>(5)</sup>

25 As part of its system for setting interest rates, the Bank is considering a deposit facility rate of, say, 25 basis points below the MPC's repo rate and a lending facility rate, say, 25 basis points above it. Depending on what it learnt from operating the system, the Bank would narrow this overnight interest rate corridor if necessary to achieve its rate-setting objective.

#### **Banking system liquidity management** V

26 There are various ways of designing the Bank's operational framework so that it meets the liquidity needs of the banking system efficiently, safely and flexibly whilst still achieving the Bank's rate-setting objective. The dimensions include what maintenance requirement the Bank specifies as banker to the banks and how it meets variations in demand for central bank money, both day to day and during the day in the RTGS payment system.

27 The Bank does not intend that use of the standing facilities should form part of a bank's routine liquidity management. The standing facilities will, however, be available to a broad range of banks on demand. It is proposed that use of the standing lending facility should not (as now) be limited to the Bank's forecast of the banking system's net liquidity shortage. This will enhance the flexibility of the framework in response to extraordinary circumstances by allowing banks to borrow from the Bank (against routinely

<sup>(1)</sup> Borrowing from the Bank in the standing facility would be subject to the provision of eligible collateral.

<sup>(2)</sup> More precisely, in a same-day system, to meet the maintenance requirement every day; and in a period-average system, to meet the maintenance requirement on the final day and to avoid aggregate overdrafts on other days

<sup>(3)</sup> That is, open market operations would supply the banking system's net liquidity need. (4) In the case of a period-average requirement, this might include a routine 'fine-tuning' open market operation on the final day of the maintenance period to ensure that the banking system's net liquidity need was met as precisely as possible at (or very close to) the MPC's repo rate.

<sup>(5)</sup> In normal circumstances, the Bank currently envisages recycling any use of one standing facility on the final day of the maintenance period by obliging banks to use the opposite standing facility. So, for example, if £100 million was deposited with the Bank rather than placing funds in the market at unattractive rates, this would leave the banking system short of its maintenance requirement by £100 million, which banks would need to cover by using the standing lending facility. Since banks using the deposit and the lending facility both suffer a penalty, this should encourage market rates to trade towards the centre of the corridor.

eligible collateral), or to deposit funds with the Bank, throughout the day.

28 Currently, reserve balances held at the Bank are not remunerated and amounts held are small. In consequence, the much larger balances needed to accommodate routine *intraday* variations in demand for central bank money, as settlement banks make payments to each other across the Bank's books, are provided through intraday loans by the Bank (via reverse repo of high-quality securities) that must be repaid by the end of each day. Routine *day-to-day* variations in demand for central bank money, principally reflecting changes in notes in circulation, are offset through changes in the size of the Bank's lending in its daily open market operations. One possibility would be to continue with this approach.

As an alternative, the Bank is considering offering banks the opportunity to hold remunerated reserves overnight, which could be drawn down in order to make payments during the day. In managing their payments-related liquidity needs in RTGS, existing and any new RTGS banks would, therefore, have the choice of utilising overnight reserve balances (cash), obtained either in the Bank's open market operations or from the money market, or of holding high-quality securities that could be used as collateral for borrowing from the Bank during the day (as now).

30 If it were to offer remunerated reserves, the Bank's intention would be to broaden the tools available for liquidity management in the banking system. They would not be used as a mechanism for monetary control, nor imposed in order to tax the banking system. For this reason, any reserves held at the Bank would be remunerated close to or at the MPC repo rate.

In advance of a maintenance period, scheme banks would need to have committed to holding a specified positive level of reserves. If they failed to do so—by holding too much or too little—they would face interest rate penalties. Remuneration might be set by the Bank at a slightly lower rate than the MPC repo rate, with scheme banks choosing the quantity held. Or the Bank could remunerate reserves at the MPC repo rate, but set a ceiling on the amount of reserves that scheme banks could choose to hold. Another variant might be for the Bank to auction a fixed value of reserves, with a maximum rate of remuneration equal to the MPC repo rate. 32 If the Bank continued with the present same-day maintenance requirement, banks would be required to hold their agreed level of reserves each day. This level could be reset periodically, for example monthly or quarterly.

33 As stated above, the Bank is also considering specifying the maintenance requirement for banks as a period-average rather than a same-day requirement. In such a system, banks would be able to vary their level of reserves day to day within the maintenance period as well as during the day. Such 'averaging' would allow day-to-day variations in demand for central bank money to be accommodated through changes in reserves rather than daily open market operations. Any maintenance period would run from one MPC decision date until the next, so that speculation about changes in the MPC repo rate should not influence banks' decisions about their demand to hold reserves on particular days within a maintenance period.

34 As described in Section IV, under a period-average requirement, the Bank would control market interest rates within a narrow interest rate corridor on the final day of the maintenance period in order to achieve its rate-setting objective. As well as being designed to ensure that market expectations of the final-day rate were equal to the MPC's repo rate, the corridor would also limit actual volatility in overnight market rates on the final day of the maintenance period. On other days, however, the interest rates on the standing facilities would not be performing a rate-setting function in the same way. So they could be set at a wider spread around the MPC's repo rate, such as plus and minus 100 basis points. By applying a clearly penal rate to use of the Bank's standing facilities, this would encourage banks to manage their liquidity prudently.

35 Under either a same-day or period-average scheme, the Bank envisages making access to central bank money more widely available throughout the banking system. If a period-average system were introduced, the Bank would especially want to ensure that the ability to average reserves was used by a broad range of banks. In principle, all UK banks could be invited to hold reserves with the Bank and given access to the standing facilities, although the Bank would reserve the right to exclude banks on prudential or risk grounds. The Bank would hope that, having elected to bank with the Bank, many banks—especially those that have significant sterling business or are otherwise significant participants in capital markets—would also become direct participants in the sterling RTGS payment system. This would aid efficient settlement and also reduce residual intraday credit exposures in the UK payments system, helping to underpin the stability of the UK financial system as a whole.

# **36** The Bank would like to understand the factors that would influence banks' demand for remunerated reserves:

- i How sensitive would demand for reserves be to the rate of remuneration?
- ii What factors other than the rate of remuneration would influence demand for remunerated reserves?
- iii How might these factors change over time (for seasonal or other reasons)? (Is this different within and between maintenance periods?)
- iv What preferences do banks have between borrowing intraday against high-quality collateral or drawing down remunerated reserves in order to meet intraday liquidity needs in the Bank's real-time gross settlement (RTGS) payment system? Would having this choice be valued?
- v Would demand for remunerated reserves vary depending on whether the maintenance requirement was a period-average or same-day?
- vi How frequently might banks wish to change their desired level of remunerated reserves under (a) a period-average maintenance requirement and (b) a same-day maintenance requirement? Why?

#### VI Open market operations

The Bank will use open market operations (OMOs), potentially alongside reserve averaging, to offset variations in demand for central bank money and other flows across its balance sheet. The Bank is considering a number of ways of organising its open market operations.

38 Although open market operations do not directly control market interest rates, they will be

undertaken on terms that are consistent with the Bank's objective for market interest rates. The aim will be to ensure that the banking system as a whole does not need to use the standing facilities for routine liquidity management, which could otherwise lead to movements in market interest rates towards the edges of the overnight interest rate corridor.

39 The size of the Bank's balance sheet (and thus the banking system's net liquidity need) can vary day to day, month to month, seasonally (for example, due to increases in notes in circulation during holiday periods) and permanently (resulting, for example, from underlying growth in notes in circulation). For managing short-lived variations, daily open market operations at short maturities are an alternative to setting a period-average maintenance requirement. In other words, variations in the Bank's balance sheet can be offset either through changes in the stock of lending via open market operations or through changes in the banking system's reserve balances. For this reason, with a same-day maintenance requirement, the Bank would need to undertake open market operations each day; but in a period-average system, they could be less frequent, perhaps weekly or twice weekly. On either scheme, the Bank would plan to use open market operations as a way of offsetting longer-term variations in its balance sheet.

40 Currently, the Bank has a regular pattern to its OMOs—it is always a lender for around two weeks, typically lending more than £1 billion each day. A regular pattern could include provision for medium-term ('rough tune') repos to offset semi-permanent or seasonal shifts on the Bank's balance sheet—for example, to accommodate the rise in demand for bank notes over Christmas/New Year. **Would that be useful?** 

41 Would market participants prefer one-week, two-week or overnight maturities for the Bank's open market operations?

# 42 What would be the advantages and disadvantages of the Bank using variable or fixed-rate tenders?

43 If the Bank continues to undertake fixed-rate tenders, as stated above it will want to avoid lending at a fixed rate across MPC meetings. The Bank could achieve this by undertaking indexed repos such that whenever the MPC decided to change its repo rate, the interest rate on any outstanding transactions would reset to the new rate for the remaining term of the transaction. Although the Bank undertook such indexed repos as part of its management of banking system liquidity ahead of the Y2K date change and such instruments exist in private markets, indexed repos have not been used routinely in official operations. **The Bank seeks views on whether or not counterparties would be able to work with a system where the rate on the Bank's repos was indexed to the MPC's repo rate.** 

44 Separately, another possibility is that the Bank could offset longer-term variations in its balance sheet by lending via longer-maturity repos—say at six, nine or twelve months—at market rates in variable-rate tenders. Would the ability to obtain liquidity from the Bank at such longer maturities be valuable? Would regular public tenders of this type help to encourage liquidity at longer maturities in the gilt repo market or in other parts of the sterling money markets?

45 Given its desire to simplify its operational framework, even if the Bank retains a same-day maintenance requirement, it would prefer to undertake only one round of routine open market operations each day. The Bank has a more accurate forecast of the daily net liquidity shortage in the afternoons than in the mornings, perhaps suggesting a single afternoon round at, for example, 2.30 pm. **Do banks have a preference about the time of the Bank's operations during the day? If so, why? Do these preferences vary depending on the size or maturity of the Bank's operations?** 

46 At a later stage, the Bank will consider what, if any, criteria should be retained for being a counterparty in its open market operations.

#### VII End-of-day arrangements

47 The current end-of-day arrangements are too complicated. The Bank wants to simplify them, whether the maintenance requirement is same-day or a period-average.

48 In a same-day system, the Bank would require scheme banks to balance their accounts (ie to have a non-zero balance or to meet any pre-set positive reserve balance) by the end of the day. Likewise, in a period-average system, on the final day of the maintenance period, scheme banks would be required to hold whatever balance was needed to achieve the agreed period-average and, every day, banks would need to ensure that their account at the Bank was not overdrawn.

49 The Bank expects banks to manage their liquidity, and square off expected end-of-day positions, actively during the trading day. As described above, it is proposing to give banks the option—probably throughout the day—to cover any expected deficit via the standing (collateralised) lending facility and to place any expected surplus in the standing deposit facility. Any excess reserves at the end of the maintenance period will be non interest-bearing. Overdrafts or shortfalls in reserve balances will be charged a significantly higher interest rate than available in the standing lending facility in order to create incentives for banks to manage their liquidity in a controlled way when markets are open.

50 As discussed in Sections IV and VI, the Bank will seek to provide sufficient funds to the market via its open market operations to meet the banking system's net liquidity need over the maintenance period. But errors in the Bank's liquidity forecast are still likely to occur from time to time. The Bank has identified a number of options for resolving such errors at the end of the maintenance period.<sup>(1)</sup> These include:

- Where necessary (for example in the event of an unusually large forecast error), undertaking an end-of-day 'fine-tuning' open market operation directly to offset the forecast error.
- ii Allowing scheme banks to use standing facilities at the MPC repo rate in order to offset the Bank's forecast error. If use of the standing facilities exceeded the forecast error, a mixed rate could apply on a pro-rated basis. (For example, if the forecast error was -£50 but banks, in aggregate, had borrowed -£100 in the standing lending facility, 50% of each bank's borrowings would be charged at the MPC repo rate and 50% at the standing lending facility rate.)
- iii The Bank remunerating reserve balances that fall within some range. In other words, the

<sup>(1)</sup> That is, every day in a same-day system; and on the final day of the maintenance period in a period-average system.

maintenance requirement would be expressed as a band rather than as a point target that banks needed to achieve precisely.<sup>(1)</sup> Some errors in the Bank's forecast of the system's liquidity needs, and thus in its supply of liquidity, would then leave scheme banks' reserve balances within the target band. Scheme banks would, in consequence, be less likely to need to have recourse to the standing facilities as a result of Bank forecast errors.

## 51 Which (if any) of the above (or other) approaches would banks prefer and why?

52 With a much narrower trading range for overnight rates and more widely available standing facilities at less penal rates than now, the Bank believes that there would probably be less need for any special end-of-day arrangements for banks that are direct members of the payments system to square off amongst themselves. It would therefore like to hear views on whether or not the current End-of-Day Transfer Scheme for settlement banks<sup>(2)</sup> should be discontinued.

#### VIII Summary of questions and next steps

53 The Bank is seeking views from interested parties on the following issues:

(Para 36) The factors that would influence banks' demand for remunerated reserves:

- i How sensitive would demand for reserves be to the rate of remuneration?
- ii What factors other than the rate of remuneration would influence demand for remunerated reserves?
- iii How might these factors change over time (for seasonal or other reasons)? (Is this different within and between maintenance periods?)
- iv What preferences do banks have between borrowing intraday against high-quality collateral or drawing down remunerated reserves in order to meet liquidity needs in the Bank's real-time gross settlement (RTGS) payment system? Would having this choice be valued?

(1) This is similar to having some carry-over provision between maintenance periods.

- Would demand for remunerated reserves vary depending on whether the maintenance requirement was a period-average or same-day?
- vi How frequently might banks wish to change their desired level of remunerated reserves under (a) a period-average maintenance requirement and (b) a same-day maintenance requirement? Why?

(Para 40) Whether or not medium-term repos to offset semi-permanent or seasonal shifts on the Bank's balance sheet (for example, to accommodate the rise in demand for bank notes over Christmas/New Year) would be useful.

(Para 41) Whether market participants would prefer one-week, two-week or overnight maturities for the Bank's open market operations.

(*Para 42*) The advantages and disadvantages of the Bank using variable or fixed-rate tenders in its open market operations.

(Para 43) Whether or not counterparties would be able to work with a system where the rate on the Bank's repos was indexed to the MPC's repo rate (such that whenever the MPC changed its repo rate, the interest rate on outstanding transactions would reset to the new rate for the remaining term of the transaction).

(Para 44) Would the ability to obtain liquidity from the Bank at longer maturities (six, nine or twelve months) at market rates in variable-rate tenders be valuable? Would regular public tenders of this type help to encourage liquidity at longer maturities in the gilt repo market or in other parts of the sterling money markets?

(*Para* 45) Do banks have a preference about the time of the Bank's operations during the day? If so, why? Do these preferences differ depending on the size or maturity of the Bank's operations?

(Para 51) Which (if any) of the following (or other) approaches to managing the resolution of the Bank's forecast errors would banks prefer and why—(i) an end-of-day fine-tuning OMO, (ii) use of the standing

<sup>(2)</sup> As described at www.apacs.org.uk/downloads/EoDT.pdf.

facilities at the MPC repo rate in order to offset the forecast error (pro-rated if necessary) or (iii) the Bank remunerating reserve balances that fall within some range?

(*Para 52*) Whether or not the current End-of-Day Transfer Scheme for settlement banks should be discontinued.

54 This paper is issued for public consultation. Comments are invited and should be sent to the Head of Sterling Markets Division, Bank of England, Threadneedle Street, London EC2R 8AH, or by e-mail to moneymarketreform@bankofengland.co.uk.

55 The Bank would be glad to discuss these issues with interested parties.

56 In the light of comments received and following further consultation if necessary, the Bank will finalise its proposals for the broad architecture of its operational framework. It will in due course issue a paper setting out the changes it intends to make and consulting, as necessary, on questions of detail and implementation.

### Appendix

The Bank believes that a number of possible schemes are consistent with the principles outlined in this document. Two such possible schemes, illustrating the range available, are outlined below.

Maintenance requirement	Same-day; minimum reserve balance of zero or higher by agreement with (individual) banks.	Period-average reserve requirement (plus minimum balance of zero daily); maintenance period from one MPC decision date until next MPC decision date.
Applicable to	Voluntary: any UK bank.	Voluntary: any UK bank.
Level of remunerated reserves	Voluntary. Chosen periodically (say quarterly).	Voluntary. Chosen ahead of each maintenance period.
	Remunerated at a slight discount to or at MPC repo rate.	Remunerated at a slight discount to or at MPC repo rate.
Standing facilities	Available all day. ±25 basis points.	Available all day. Final day of maintenance period: ±25 basis points. Other days: ±100 basis points.
Penalty rates	Excess reserves—earn zero.	Excess reserves—earn zero.
	Overdrafts/missed reserve targets— greater than standing lending facility rate.	Overdrafts/missed reserve targets— greater than standing lending facility rate.
Type of regular OMO	Indexed repo (the rate changes when the MPC repo rate changes).	Repo.
Frequency of OMOs	Daily (one per day).	Weekly/twice a week.
		Plus routine fine-tuning OMO on final day of maintenance period.
Maturity of regular OMOs	One-week.	One-week, plus weekend repo if twice-a-week OMOs are necessary, plus overnight end-of-maintenance period fine-tuning OMO.

# Puzzles in today's economy—the build-up of household debt

In his March 2004 speech<sup>(1)</sup> at the Association of Corporate Treasurers' annual conference, Sir Andrew Large, Deputy Governor responsible for financial stability, considers the potential impact on monetary and financial stability of high levels of household debt. The speech assesses recent trends in household debt and the demand and supply factors that have contributed to them. Sir Andrew notes that while in extreme circumstances potential vulnerabilities stemming from higher debt levels could crystallise at some point and trigger a sharp demand slowdown, this is not the central case. In concluding, he explains that household debt is just one of many factors that are considered each month by the Monetary Policy Committee and that it is considered and weighed together with the whole gamut of demand and supply data.

#### Leverage and debt: benefit and vulnerability

A key economic debate of the day is whether we, as a society, should be concerned about the level of debt borne by families, businesses and, indeed, governments. We are all aware of the positive role of debt in the development of market economies and social well-being. But equally we are aware that increasing leverage can give rise to vulnerabilities—think of LTCM in 1998 and increase the possibility that external shocks or changes in perceptions will lead to unexpected results that affect the stability of the financial system and the setting of monetary policy.

On the whole, the increasing availability of debt is beneficial. Debt helpfully allows households, companies and even countries to smooth their spending patterns. But as with many things in life, there are potential downsides. It is often said that central bankers and regulators tend to look on the pessimistic side and to see 'the glass as half empty'. As a former regulator, and now a central banker, I am perhaps likely to be doubly cautious and to focus on the potential vulnerabilities!

Improved access to debt may indeed be beneficial overall, although high levels of debt can cause difficulties for companies and for countries. Evidence also suggests that the burden of debt does pose a genuine problem for a minority of households. And, as I will discuss in more detail below, a rise in indebtedness may increase the sensitivity of households—and the economy in general—to future shocks, although by how much is very uncertain.

For public policy makers, the evaluation of these vulnerabilities and the appropriate policy response is a matter of continued debate. What levels of debt are sustainable? And what could be the impact of a breakdown or crisis of one sort or another?

At the Bank of England we take an interest in this subject at several levels. We look at it from the points of view of governments or sovereign countries; corporate entities; and individuals or households.

At each level there are two aspects that we consider. First, what are the implications for financial stability oversight? We look for vulnerabilities that could lead to pressures on counterparties, with the possible failure of institutions and ultimately financial instability. Such crises can lead to immense social and economic cost, as financial intermediation is disrupted and confidence in the monetary system is weakened.

Second, we look at debt from the point of view of monetary policy. In this case we look at the possible impact on our ability to meet the inflation target set by the Chancellor via, for example, its effect on overall levels of demand and supply.

At the level of sovereign entities we have two different types of concern about the working out of sovereign debt positions. First, the potential implications of sharp

Given at the Association of Corporate Treasurers' Annual Conference on 23 March 2004. I would like to thank Alex Bowen, Victoria Cleland and Garry Young for valuable input. This speech can be found on the Bank's web site at www.bankofengland.co.uk/speeches/speech217.pdf.

exchange rate movements for countries that borrow in their own currencies (for example the United States). Second, for countries that borrow large amounts in foreign currency concerns about debt sustainability, which lead to our working on crisis prevention and resolution issues in the sovereign area, including the role of the IMF and issues raised by the present Argentinean default.

At the corporate level, the question you all face is what amount of debt is not only sustainable, but will lead to maximisation of shareholder value over time? Here our interest is in trying to spot vulnerabilities, or debt concentrations across the market place, which could give rise to problems down the track. In the face of shocks, such factors could have an impact on demand in the economy and on the stability of the financial system.

#### Household debt: introduction

It is the third level of our interest—household debt that I would like to focus on today. It is clearly significant for all of us. For you in the corporate world through your customers. And for us in the world of public policy.

I would like to examine, first, why has debt built up in the way it has? Second, what are the facts and how great are the vulnerabilities? And, third, what are the implications for those of us involved in financial stability oversight and monetary policy, quite apart from society as a whole?

#### The household debt build-up: why has it happened?

It is worth reflecting on why the build-up in household debt has occurred. On one side there have been a series of demand factors. Lower real and nominal interest rates have held out the prospect that interest costs and debt-servicing burdens will remain within acceptable bounds-in terms of the burdens on both real incomes and households' cash flows. And lower inflationary expectations have held out the prospect that nominal interest rates will remain low. The lower inflation environment has also increased predictability and made it easier for households to plan ahead. Risks seem more acceptable to households because of confidence in a stable economy, and secure job prospects, perhaps in part due to the current accommodating monetary policy.

In the meantime, wealth has risen and stocks of financial assets have built up. In the light of this, it is not

surprising that households, taken together, are happy to have higher debts relative to their incomes. And the rise in house prices, combined with a high level of owner-occupation, has encouraged equity-enabled homeowners to borrow accordingly. These factors have given households the confidence that present levels of debt are quite rational from the point of view of their balance sheets. In addition, the rise in house prices has itself necessitated an increase in borrowing as the average mortgage size increases.

There have been supply-side factors too. Competition amongst lenders has been intense. There have been new entrants to the market. Not only the traditional lenders but specialist providers of credit cards and the like. Liberalisation of markets has meant new approaches to lending and new credit instruments, enabling credit to be available to a wider variety of participants and reducing credit constraints.

I will come to the vulnerabilities in a moment, but overall this combination of demand and supply-side factors has led debt to rise to today's historically high levels.

#### The debt build-up: what are the facts? How great is the vulnerability?

It is not just in the United Kingdom that domestic indebtedness has risen: its build-up, alongside globally lower levels of inflation, has been a global phenomenon. The ratio of household debt to annual household income has increased in most industrial countries (see Chart 1)—reflecting, over the longer term, increased

#### Chart 1 Household debt to income ratios



Ratio differs from that in Chart 2 because disposable income used here is (a) not adjusted for changes in net equity in pensions.(b) Data for 2003 are as of 2003 Q3.

financial liberalisation, the greater efficiency of financial intermediaries and, in some countries, housing market developments. While the ratio in the United Kingdom is high, at over 130% (see Chart 2), there are other countries where it is higher, and where it has grown more quickly.

#### Chart 2

## Household secured debt and total household debt as a proportion of post-tax income<sup>(a)(b)</sup>



<sup>(</sup>a) Annualised household post-tax income

(b) Debt data are not seasonally adjusted

(c) Total household debt.

In the United Kingdom household debt amounts to just under 18 months' worth of household disposable income. Mortgage debt is the biggest component of this, and total secured debt accounts for about 75% of total debt. Unsecured debt—personal loans, credit card debt and the like—is still a much lower proportion, but has nearly doubled over the past decade.

The actual statistics of stocks and flows are of course one thing. But the real question is in relation to sustainability: sustainability of debt-servicing burdens and sustainability of consumption growth.

Household debt in the United Kingdom has been increasing more rapidly than post-tax income since the end of 1997, and the difference in annual growth rates over the past year has been around 8 percentage points (see Chart 3). This has been one of the factors that have permitted consumer spending growth to outstrip income growth on average over the past few years. Mortgage equity withdrawal, in particular, has risen sharply relative to consumption. Some of this will have helped to finance consumer spending even though much is used to pay off other debts or build up other assets.

We also consider questions of gearing. First, capital gearing (the ratio of debt to gross assets), changes in

#### Chart 3 Twelve-month growth rate of total household debt and post-tax income



which one can regard as a rough-and-ready indicator of pressures on solvency in the household sector.

It is perhaps noteworthy that despite the large increase in debt, the increase in asset prices, not least house prices, has meant that there has been only a slight increase in capital gearing (see Chart 4). But the data do suggest that household capital gearing could rise to historically high levels if there was, for instance, a sharp downturn in the housing market or a significant fall in equity markets. I am not saying that these are likely to happen—simply that there is an upside risk to households' capital gearing.

#### Chart 4 Household sector capital gearing<sup>(a)(b)</sup>



(a) Dashed lines indicate averages of series from 1987 Q1 to 2003 Q3.

(b) Data are not seasonally adjusted.(c) Financial wealth plus housing wealth.

(d) Total debt minus lending secured on dwellings.

Second, we need to look at income gearing. Changes in aggregate income gearing provide a crude proxy for pressures on households' ability to service their debts, although such measures do not take account of who benefits from the interest receipts on households' financial assets.

Having peaked in 1990, aggregate household income gearing fell sharply, mostly reflecting the fall in nominal interest rates, and it has been steady since 1993 at a relatively low level. If, as we expect, debt continues to grow faster than income, as a result of turnover in the housing market, income gearing in the United Kingdom will rise in the future—even on the conditioning assumption of constant interest rates which the Monetary Policy Committee makes in its inflation projection. If, for the sake of argument, one takes the future path of interest rates implied by market yield curves (the path expected in the markets), income gearing is likely to pick up towards the peak last seen in 1990, particularly if, in addition, one takes account of regular repayments not only of mortgage principal, but also of unsecured debt. The possible build-up in income gearing could, under this scenario, require vigilance.

So overall, we may not have an absolute answer as to whether today's levels appear sustainable. I feel, however, that since there are at present relatively high levels of debt and these are rising faster than income, it is likely that potential vulnerabilities from increased gearing are rising. And we know from experience that unexpected shocks from one source or another can upset individuals' predictions and behaviour.

#### Does it matter? The general approach

The question is: does this all matter? Should we really worry about it? Perhaps I can get into this by examining the two schools of thought.

On the optimistic side, as I referred to earlier, you can argue that the rise in debt is a logical response to a more stable economic environment and the relaxation of credit constraints. Households consider the wisdom of given levels of debt after taking into account their assets and prospective income. House prices and the value of financial assets have risen. Accordingly some rise in debt is quite understandable and for many house buyers necessary.

In addition, it is a logical response to a number of factors. First, the lower initial cash-flow costs of servicing in the low nominal interest rate environment of the past decade. And second, the lower real interest burden recently as monetary policy has reacted to weaker aggregate demand growth. And it is understandable for households to wish to spread consumption over their lifetimes. Furthermore, from an overall macroeconomic point of view, the increase in household spending financed by borrowing has been consistent with overall monetary stability and our inflation target because other elements of demand have been weak. In other words, it has been a logical accompaniment to monetary stability at a time of imbalances in the composition of the growth of demand and has reflected an 'acceptable' imbalance needed to keep the economy growing.

The pessimistic school points first to the fact that leverage adds to vulnerabilities. There will always be unexpected shocks, and levels of debt are at historical highs and rising. Second, it warns that reliance on wealth to justify levels of debt and provide the collateral can be a circular argument. Demand for housing itself has, to an extent, been increased by the availability, at the time that it is contracted at least, of affordable credit. Increases in house prices and secured debt have tended to reinforce each other. If either has 'overshot'—for instance, because of unrealistic expectations of income growth—the other is likely to have overshot too.

And, third, there is a timing issue. Perhaps the borrowers' realisation of the implications of higher debt takes time to sink in. When interest rates are falling the case in the United Kingdom in terms of our repo rate from February 2001 to July last year—borrowers may feel better placed to service larger loans and might increase borrowing accordingly. However, if rates rise as they have at the official level—the cost of servicing the outstanding debt will tend to rise and can cause repayment difficulties.

While there are elements of truth in both schools of thought, the balance of probability lies with the optimists. The optimistic school reflects the central case, whereas the pessimists are more inclined to focus on the risks—the tail of the distribution if you like. But even if the probabilities of things going wrong in the near future may not be high, there are nonetheless credible threats, and over time the risks might mount.

Remembering our public policy role, I would like to drill down a bit and ask the question 'does this matter?' from three aspects: financial stability; monetary policy; and the socio-economy.

#### **Financial stability issues**

First, financial stability, the oversight of which is one of the Bank's key responsibilities. Here we need to focus on mitigating the potential impact on the financial system from vulnerabilities that might arise from high levels of debt. Will they give rise to concerns over repayment strains, to financial failures or liquidity withdrawal? Could strains lead to defaults of multiple borrowers, leading in turn to problems for the intermediaries and providers?

From the point of view of lenders I detect that there is on the whole a feeling of confidence, with few overall concerns about the asset portfolios of secured and unsecured household debt. There has been a significant improvement in risk management systems: at the retail level, for example, information technology has enabled the development of sophisticated modelling techniques. Data suggest that: UK-owned banks' capital ratios are strong by international and historical standards; that the proportion of new mortgages granted at high loan to value ratios has dropped; and that the loan to value ratios on existing mortgages have fallen. Mortgage arrears are around their all-time low. Such factors help to boost the resilience of the United Kingdom's financial system.

There are, however, potential hazards—in particular relating to poor lending decisions or to changes in the behaviour of borrowers. There have been examples in other countries, for example the United States, of potentially changing attitudes to personal bankruptcy and defaults. Under some scenarios, such changes could put pressure on the balance sheets of lenders. Furthermore, it is possible for the behaviour of lenders to trigger a response in borrower behaviour. If lenders get nervous about the credit status of borrowers, and turn off the supply of credit, this could cause failure or default of borrowers. The lenders seek to anticipate such issues, partly by pricing expected losses into the lending products they offer and also through the development of risk management tools and stress testing. The strength of the financial system is increasingly reliant on the effectiveness of risk management.

As I mentioned earlier, there is a potential concern that the wealth itself, on the basis of which increased indebtedness has been made possible, may not be wholly dependable. It could be affected greatly by, for example, a downturn in the housing market, or by difficulties in the corporate sector triggering a reduction in people's wealth via their direct or indirect holdings of shares. Not everyone will be affected by the same scenarios, but a reduction in wealth could reduce an ability or willingness to repay debts and at the same time reduce lenders' access to collateral.

So, with all these caveats, just what are the implications of this for the oversight of financial stability? First, of course, we need to be vigilant and watch for emerging signs of weakness. But, second, there are a number of mitigants. We can give warnings to enhance awareness of the implications of the indebtedness increasing. The financial system itself can be strengthened through adherence to a high-quality prudential framework. That is why the current review of the Basel Capital Accord is so important. Remember that this is designed to improve risk assessment by lenders, not just at the wholesale level but at the retail level as well. And risk management techniques and supervisory processes more generally are undergoing significant enhancement.

In earlier days one might have considered other potential mitigants. These might have included credit controls or deliberate prudential measures increasing the cost of lending. The fact, however, is that, with today's liberalised capital markets and with the existence of derivatised products, these would in all likelihood be rendered impractical.

#### **Monetary policy issues**

Turning to monetary policy, the key focus is the extent to which vulnerabilities from the debt build-up could trigger changes to demand or supply in the economy with direct implications for monetary stability and meeting the inflation target.

Higher levels of leverage could make demand more susceptible to external shocks which might lead to precautionary saving: this in turn could reduce demand. Equally, socio-economic factors could also cause changes in behaviour, even though these might be more gradual and are unlikely to affect all members of society at once.

In assessing the potential impact of debt build-up on demand and supply, there seem to me to be several important factors. First is the fact that demand in general is boosted by increases in asset prices themselves. But what would happen if external events broke the cycle of asset price increases, particularly in relation to house prices? A sudden realisation that the wealth cushion supporting levels of secured debt was deflating could trigger behaviour that would reduce demand.

Second, for some people consumption has been growing more rapidly than disposable income, and some of the rise is likely to have been financed by increased borrowing. If such people decided to readjust their balance sheet this could affect demand.

Third, precautionary saving could increase—for example, if households decided they need to make greater provision for their future retirement income. This could alter the desire to take out or to repay debt. Although this would only be likely to affect a particular part of the population, the extent of its impact would be hard to assess in advance.

This, of course, is of direct relevance to monetary policy. Changes in the level of debt can result in changes to demand, and also to the level of vulnerabilities. These in turn have an important bearing on the state of the economy. And the higher the leverage, the greater the vulnerability to any given shock becomes. Furthermore, the price of, and hence the demand for, new debt will be affected by the policy decision itself. Demand might also be affected by the impact of the decision on people's expectations about future rate movements.

It may be true that we do not fully understand the transmission mechanism that could lead to changes in demand. Even though the price of debt is directly influenced by overall interest rate levels, we cannot evaluate with precision how much effect a given change in interest rates will have on levels of debt. But we do watch this from month to month, and are quite well positioned, thanks to the data we regularly look at, to judge the emerging impact of policy decisions.

It is important to remember that we need to consider the fulfilment of our monetary policy remit over time. Not just over the next two years for which our forecast is given, but over the longer term as well. Sudden unexpected shocks of course could threaten monetary stability and might make keeping to the target trickier. We need to ensure that threats of instability from such a shock do not call this into question.

With this in mind, each month when we in the MPC make our policy decision I am conscious of the debt situation. In particular, the possibility that the potential

vulnerabilities stemming from higher debt levels do in fact crystallise at some point and trigger a sharp demand slowdown that could have an adverse impact on monetary stability and make it more difficult to meet the inflation target over time.

So in considering the whole gamut of demand and supply data that we receive and evaluate, I do allow these factors to weigh in the difficult balance all of us face each month in relation to the monetary policy decision. I mentioned my tendency to think about the risks, however conscious I am of the central case. And this explains why on several occasions over recent months I have found myself voting for a rise; with a view to discharging our mandate to stabilise inflation at the target level, with stability in the monetary arena.

#### Conclusion

I have focused this morning on the issues that are of direct relevance to the Bank's own remit: monetary and financial stability. But a discussion on household indebtedness would not be complete without a brief mention of the significant longer-term socio-economic issues, which I certainly give thought to, raised by demographics and a longer-living population.

On the one hand, we can see, as discussed, many households increase their borrowing levels, encouraged as this is by willing lenders, low inflation and interest rates, and social acceptability. On the other hand, people are increasingly going to be confronted, at some stage in their lives, by the realities of the need for extra saving to cater for pension provision, long-term care provision, and increased longevity.

The question is: how can these two factors be reconciled without a significant impact on the real economy? Or will today's generation in effect transfer leverage to the next generation—calling into question the issue of intergenerational fairness? The reconciliation could be exacerbated, given the demographic trend of smaller numbers entering the job market. We can certainly hope that the issue can be resolved by gradual adjustment over time without a significant impact on monetary and financial stability.

But this aspect of the socio-economic scene provides a real dilemma. It is not a short-term issue, and not one for the MPC. But the issues will surely be addressed and the contribution that we can make is to provide a stable economic and financial backdrop against which this can be done.

## Speech at the National Association of Pension Funds Annual Investment Conference

In this speech,<sup>(1)</sup> Paul Tucker<sup>(2)</sup> discusses the Bank's commitment to dialogue with financial market participants as an input into its core monetary policy and financial stability mission, and comments on some current issues for policymakers. Monetary policy, with interest rates at 4%, is still stimulating the economy. Looking ahead, he discusses what the terms 'gradual' and 'caution', recently used about interest rates, mean for him. For financial stability, he believes that the environment looks somewhat more comfortable than a year or so ago, though it is not without hazards. These might stem from the 'search for yield' that has been a feature of international markets over the recent past. Global current account imbalances also create risks for financial markets, and there are risks of volatility in fixed-income markets given the inevitable uncertainty about the path of US interest rates.

It is very good to be here—or, I should say, good to be back. About seven or eight years ago I spoke to this conference about the raft of reforms then under way in the gilt market: repo, strips, regular auction schedules etc.

## Market intelligence and the Bank of England's mission

Since the 1997–98 reforms that gave the Bank monetary independence, codified our financial stability role and created the FSA, gilt issuance has, of course, been the responsibility of the Debt Management Office. There is, though, an important continuity in the Bank's role and outlook: seeking dialogue with market practitioners. Just as many of those mid-1990s' reforms came from listening to the asset managers who bought and held gilts, so now we seek a dialogue to support our core mission: monetary and financial system stability. Let me stress: the Bank's interest in financial markets and participants in markets-and our use of market intelligence to help us to figure out what is going on in markets-is undiminished. If anything, our range of interests and contacts has been expanding as financial markets become more sophisticated and integrated.

On the monetary side, the main focus is on markets and financial intermediaries as part of the transmission mechanism through which our interest rate settings affect the economy: credit conditions, financial wealth, the exchange rate etc. And, of course, we implement policy in the money markets, with the yield curve reflecting expectations of the path of policy. This means that, on the monetary side of our business, we tend to focus on core markets-money markets and government bonds, equities, exchange rates. Markets that are, on the whole, pretty efficient. So our starting point-our default hypothesis, if you like-is to assume that asset prices in these markets reflect fundamentals, and that we can use them as a diagnostic of expectations of economic prospects and of the path of policy. We do not, though, kid ourselves that we can stop there. We are on the look out for where there are transitory or persistent frictions that distort the message from asset prices-for example, on account of regulation, features of the infrastructure, particular market conventions, or information asymmetries. Identifying and making sense of such frictions requires intelligence about actual markets in the real world. Plenty of examples come to mind that will be familiar to this audience, not least the hump that featured in the gilt forward curve for so many years on account of the demand for long-dated bonds from life companies and pension funds.

On the financial stability side of our business, we think of markets as a medium for taking and hedging risk. Most of the time, they promote stability by dispersing risk. But they are also part of the mechanism through which a crisis could spread from one part of the system to others, including across product, sector and geographical boundaries. Contributing to avoiding, or

<sup>(1)</sup> Given in Edinburgh on 19 March 2004. This speech can be found on the Bank's web site at

www.bankofengland.co.uk/speeches/speech216.pdf. (2) Executive Director for Markets and a member of the Bank's Monetary Policy Committee.

containing, debilitating systemic disorder in markets is part of our mission. So for financial stability, the canvas is wide. We are on the look out for symptoms of actual or incipient stress: for example, high leverage coupled with 'crowded' trades-ie with 'everyone' positioned similarly—in markets that could prove illiquid just when trades are suddenly unwound. In the event of a crisis, we are not going to be able to cope-indeed, the financial authorities collectively, here and internationally, are not going to be able to meet the challenge—unless we can comprehend the instruments and structures involved. Given the growing technical sophistication and complexity of today's capital markets, that is unavoidably more difficult than a decade or more ago—a world in which exotic options, securitisation, hedge funds etc hardly featured. One precondition for doing our job properly is that we should understand how global financial markets and the key players in them fit together. Another is to understand modern risk management structures and practices.

For many of the core markets, we have a natural entry in the sterling money markets because that is where we implement monetary policy; in the high-grade sovereign bond, swap and foreign exchange markets through our management of the government's foreign exchange reserves and liabilities and of our own balance sheet. But for both monetary policy and financial stability, the Bank's market surveillance role has to extend beyond those markets, including to a wide range of derivative markets and structured finance.

This is not the kind of task we can begin to fulfil solely by sitting in our building doing desk-based analysis and research. That vital work has to be integrated with intelligence gained from a wealth of relationships across the market, both in the United Kingdom and overseas. Thanks to many of you here—and I really do mean a big thank you—we already have a good network. But we have more to do. The Governor, Mervyn King, has asked me to develop a medium-term strategy to deliver our goals on this front, so I was really delighted to be invited here today to leave the Bank's calling card.

With that bit of advertising out of the way, let me say something about how I see the current environment as it affects monetary policy and financial stability.

#### The monetary policy environment

Compared with when you met at this event a year ago, conditions both for you as asset managers—or rather, I

should stress, asset/liability managers—and for us as monetary policy makers are brighter in some important respects but uncomfortably familiar in others.

Most obviously in the context of today's event, equity prices are some 15% off their March 2003 low, even after the falls since the second half of last week. And default risk in the corporate bond markets seems to have receded—partly reflecting balance sheet restructuring amongst large corporates on both sides of the Atlantic, itself aided by low yields encouraging firms to extend debt maturities.

These improvements in asset markets have, of course, both reflected and contributed to stronger global macroeconomic conditions. I was recently asked at a conference whether the external environment mattered to UK monetary policy—with a goal specified in terms of preserving domestic purchasing power, did we look beyond the domestic economy?

In fact, of course, as a highly open economy, the United Kingdom is very much affected by international conditions: more so than either the United States or the euro area. Indeed, for some years now, UK monetary policy has been directed at offsetting weaknesses in the external environment. In other words, we have been stimulating domestic spending in order to keep aggregate demand more or less in line with the expansion in the economy's productive potential, consistent with keeping inflation expectations in line with our target. In terms of our mandate, it has worked: inflation has stayed pretty close to target, averaging 2.3% on the RPIX measure since the beginning of 2000. But as is now familiar, this has been accompanied by accumulating 'imbalances' in the economy, manifested in a variety of ways—weak manufacturing but strong services; consumption growing well above its long-run average rate for the past three years, or more rapidly than disposable income; rapid accumulation of debt by the household sector alongside burgeoning house prices.

That strategy has in principle always had limits, but whether they would be tested—and whether we would identify them—has depended, in part, on external prospects. Other things being equal, the healthier the international environment, the more we could withdraw the stimulus to domestic spending. For policy, that is the significance of the recovery over the past year in the United States. Until last summer, the risks looked to me to be pretty clearly weighted to the downside relative to a central projection of a fairly rapid return to trend levels of output. But, after declining for five quarters, business investment spending in the United States has bounced back since 2003 Q2, with output recovering rapidly back towards trend and capacity utilisation rising. Risks do nevertheless remain. For a while last autumn, it looked like the recovery in demand was being accompanied by similarly robust job growth, but since December net job creation has fallen back to well below the average rate of growth of the workforce. Commentators-and policymakers, it should be said-take two views on this. The first view sees employment picking up in an environment of sustained output growth and reduced scope, over time, for extracting greater efficiency from current labour and capital inputs at the rates recently achieved. That is persuasive, particularly with US monetary policy remaining so accommodative. The other view worries that protracted weakness in the jobs market could dent household confidence and so spending, slowing output growth. US surveys suggest that sentiment is sensitive to job prospects, but so far spending has remained robust, as has house price inflation (over  $3^{1/2}$ % quarter on quarter in Q4). My take is that the most likely outlook is positive but that downside risks have, again, become tangible.

I think it is fair to say that analysis of the euro area is tougher—on both the monetary policy and financial stability sides of our business. Essentially, that reflects less timely and less rich data, together with varying regional conditions-and so economic stories-across the area. For some time now, we have been forecasting recovery. That is based on stimulative monetary policy-short real rates are around zero in the euro area as a whole—and some recovery in consumer and, particularly, business confidence. Signs of recovery have, though, recently been more apparent in the surveys than in the data. In particular, domestic demand has remained weak, although it picked up in France in Q4. In Germany, not only has household spending been subdued, but investment (at current prices) is lower relative to economy-wide output than at any time since unification. On the one hand, that suggests that there is plenty of scope for recovery back to trend levels. But, on the other hand, there has to be some risk—perhaps not high—that trend output growth is down a bit. If so, and if that were to have adverse knock-on effects on other

parts of the euro area, it would create downside risks for us as the euro area is by far our largest trading partner. For the moment, I continue to place greater weight on the encouraging surveys.

The euro area may be our biggest trading partner, but conditions in the rest of the world make quite a difference to us, both directly and indirectly. In fact, growth has been so strong in parts of Asia that, in 2002–03, the 'rest of the world' contributed more than a percentage point on average to UK-weighted world output growth. The outlook in various parts of Asia and the Far East may mean we have a second engine of global growth alongside the United States.

The domestic picture has also gradually changed since the autumn. Last October, there were the upward revisions to the Q2 GDP data, a pickup in business surveys, and greater-than-expected strength in the housing market. Taken alongside diminished risks in the external environment, that was enough for me to vote for a 25 basis points rise. I regarded that as unwinding the Committee's July cut, which I had viewed as 'precautionary' or 'insurance' against the downside risks then apparent.

In the event, the MPC's rate was raised a month later, in November, and since then the debate about the course of policy has altered somewhat. There have been references to 'caution' in raising rates, and to moving 'gradually' as medium-term inflationary pressures mount. I hope I can provide some clarity about what those terms mean for me.

Our January minutes recorded that if the economy evolved as envisaged in the November *Inflation Report*, with inflationary pressures gradually building, then a gradual rise in interest rates would be necessary. We are in a similar position now. The February increase in the MPC's rate, bringing it to 4%, leaves policy stimulating the economy. Indeed, I prefer to think of our recent policy adjustments as withdrawing some—but not all of the previous stimulus.

If, as projected, output continues to grow above trend then, depending of course on any other developments affecting the outlook, I for one would expect us to continue gradually to reduce the degree of stimulus to demand broadly in line with the take-up of slack in the economy and any consequent pickup in inflationary pressures looking ahead. That seems to be more or less the view of the market, as reflected in our February *Inflation Report* projections using market interest rates; and in the implied forward curve, derived from index-linked gilts, for short-maturity real rates relative to longer-maturity real rates, which in principle should not be affected by cyclical variations (Chart 1).

#### Chart 1

UK short versus long-maturity forward real interest rates<sup>(a)</sup>



While policy must be forward-looking rather than overly focused on the current rate of inflation, which at 1.3% in February is obviously below our 2% CPI target, there is already some evidence of inflationary pressure. Looking at the categories of goods and services in the CPI basket, the median rate of inflation has risen over the past year or so, as have the 70th and 30th percentiles (ie cutting out the categories for which prices have risen most and least in order to exclude erratic changes) (Chart 2). But we take a month at a time. As each month passes, data may reveal that the outlook is either weaker or stronger than expected.

#### Chart 2 Percentiles of the distribution of inflation rates in CPI and RPIX



This takes me to what has been said about 'caution' in raising rates, which at times has perhaps been misconstrued as implying 'hesitant'. The idea here is that we care about the extent to which inflation varies around the target and so, amongst other things, about the degree of uncertainty about the effect on inflation of changes in our interest rate. The marked increases in household debt do somewhat increase that uncertainty. With higher debts relative to incomes, interest rate changes will tend to have a bigger effect on the income that households have free to spend after servicing their debts. But we do not know what the sensitivities are. The implication is that, other things being equal, policy would tend to move towards neutral more slowly than would otherwise be optimal, or 'cautiously' for want of a better word.

But care is needed here, as developments in the economy associated with the debt accumulation have other possible implications. I want to mention two.

First, household borrowing has grown alongside a robust housing market. The ratio of house prices to earnings is up by over 40 percentage points since 2001. The increased value of collateral consequently available to households to secure borrowing has, unsurprisingly, been evident in mortgage equity withdrawal, which as a percentage of personal disposable income is estimated to have reached around 7% in the third quarter of last year. Some of that borrowing has probably substituted for more expensive unsecured debt; some of it has been used to finance consumption. Either way, the increased collateral values will plausibly have reduced the credit constraints faced by some households. If so, other things being equal, the short-run effect may have been to increase slightly the level of interest rates at which output and inflation are stabilised. So the same underlying phenomenon could have more than one effect on the optimal path of interest rates.

The second point is that, although there has been some deceleration since the end of 2002, house prices have continued to rise more rapidly than expected over recent months. This is not especially a London or South East of England thing. Over the past nine months or so, prices have risen more strongly in the north of England, Scotland and Wales. Indeed, the regional dispersion of house price inflation remains very high by historical standards (Charts 3 and 4).





#### Chart 4

Dispersion of annual regional house price changes



Source: Halifax

For the United Kingdom as a whole, relative to the path we incorporated into our February projections, there appear to be upside risks in the near term. As well as straightforward momentum, that would seem to be the message from the rise over the past few months of the ratio of the number of houses sold by estate agents to the stocks of unsold houses on their books-one measure of 'tightness' in the market. This has been a reasonable contemporaneous, or even slightly leading, indicator in the past (Chart 5). The significance for policy is that, taken together with fairly buoyant business surveys, it suggests that the near-term outlook for domestic demand may be slightly stronger than it looked a couple of months ago. We will need to consider that in reaching our policy judgment, alongside other developments, including risks in the international environment.

But, in addition, it separately suggests an argument to be placed alongside that in favour of 'caution'. Namely, that

#### Chart 5 Housing market tightness



Ratio of number of houses sold per surveyor over the past three months to (a) stocks of houses on books per surveyor.(b) Average of the Halifax and Nationwide indices.

it could be argued that policy may need to be tighter than would otherwise be the case in order to arrest somewhat the continuing strength in the household sector. The argument would be that we should try to reduce the risk of an abrupt correction, which would complicate monetary policy and so make achievement of the inflation target more uncertain further ahead. This is an argument that has to be weighed alongside the analysis pointing towards 'caution'. I would not, however, subscribe to making a surprise policy tightening as a form of shock therapy. One of the emphases of the MPC's approach has been to do our utmost to help households, businesses and financial markets to understand our strategy and, in particular, how we react to developments in the economy.

From my perspective, that was the backdrop to the Committee's debate and to my vote at our most recent meeting at the beginning of March. A tightening then would have come as a surprise. My own view was that there was not sufficient evidence to construct a compelling explanation for a rise in terms of the outlook for inflation. And that being so, I was concerned that an earlier-than-expected policy change might well have been misunderstood as implying that my, or more broadly the Committee's, policy reaction function had changed for some reason. With inflation expectations well anchored, that was not a risk worth taking. So I voted for no change. Looking ahead, I just take one month at a time, assessing the domestic and international data, and revising my view of the outlook where necessary.

#### Financial stability environment

A few words on financial stability. The past year or so has also brought calmer conditions in most financial markets. Signs of some potential fragility were perhaps most evident around October 2002. Credit default swap prices for a number of the world's largest banks registered sharp rises as losses in corporate loan portfolios and volatile trading revenues coincided with an uncertain macro outlook, the unwinding of the equity bubble, continuing worries about some emerging market economies, and the fallout from Enron and Worldcom.

On the whole, the environment now looks somewhat more comfortable. In the equity markets, realised and forward-looking volatility is down, and the IPO market seems to have sprung back to life. Most measures of credit risk—spreads, credit default swap premia, default rates, ratings downgrades relative to upgrades—have improved (Chart 6). At the banks and dealers, profits have been used to bolster or replenish capital; and credit default spreads are lower for virtually all banks (Chart 7).





(a) Spread over swaps.(b) Changes between 22 May 2003 and 16 March 2004.

But the environment is not without hazards. One may be sourced in the 'search for yield' that has been a feature of international markets over the past 18 months or so—as evidenced, for example, by record inflows into hedge funds and into emerging market and high-yield bond mutual funds in the United States (Chart 8). Just as 18 months ago some commentators asked whether credit spreads may have overshot on the upside, over the past few months some have wondered whether they

#### Chart 7 Highest CDS premia of major banks in selected countries



#### Chart 8 Cumulative flows into hedge funds



might have overshot on the downside—although there has perhaps been a degree of correction since January.

Separately, the global pattern of current account deficits and surpluses creates risks for financial markets, most obviously the foreign exchange markets—although, as I have taken to noting on these occasions, one would not guess that from what seem to be quite low implied volatilities on most currency pairs.

Perhaps more significantly, there are risks of volatility in fixed-income markets given the inevitable uncertainty about the path that the FOMC will take back towards a more neutral rate. There are signs of that uncertainty in options markets (Chart 9). Those implied volatilities might be exaggerated by the bid for options to manage the negative convexity of US mortgage-backed security (MBS) portfolios. But, in terms of the risk of volatile markets, that convexity hedging can itself create strains, as events during July-August last year underlined rather graphically.





I mention the US MBS market because I guess it has some interest to you given your demand for long-duration fixed-income assets to match long-dated fixed-income-like liabilities etc. So it was good to see that, in his review of the UK mortgage market, David Miles flags the importance of thinking through how any prepayment risk in UK fixed-income mortgages could be managed. Since prepayment in the United States seems to have a 'behavioural' element, it is not so easy to get an exact hedge via a 'matching' financial option. It was also good to see that David has not advocated a Fannie/Freddie type structure for the United Kingdom, with the attendant concentration and moral hazard risks—a conceivable source of systemic issues in global markets.

# Intelligence on fixed-income markets and UK long-term savings industry

This takes me back, briefly, to the Bank's market intelligence work, as I want to conclude by mentioning just a few of the issues that we would like to explore with you looking forward. In particular, we have an interest in understanding the implications for asset prices and market dynamics of the increasing emphasis on joined-up asset and liability management, including giving fund managers benchmarks based on actual liabilities rather than standard market indices. Some of these implications arise from the demand for long-duration assets to match long-term liabilities; moving towards hedging more directly the optionality present in some liabilities, such as guaranteed nominal return annuities; and the search for returns from a wider class of assets. To be concrete, the big issue has been—and probably remains—the balance of equity and bonds in asset portfolios. But there are also questions such as whether the industry is a material participant in the newish inflation swaps market in order to hedge long-dated real defined-benefit pension liabilities; whether swaptions and equity derivatives are being used more to manage risks, and if so whether these are options that are near to being 'in the money' or that are well 'out of the money';<sup>(1)</sup> why demand for long-dated gilt strips has not been greater, especially as many in the industry called for strips; the extent of UK pension fund investment in hedge funds, and whether that is pursued principally via funds of funds; the degree of involvement in other 'alternative asset classes', such as private equity or emerging markets; more speculatively, whether there are 'missing markets' that would be useful to the long-term savings industry-for example, longevity-risk securitisations; and, more prosaically, whether there is a greater interest in more mundane ways of enhancing returns on asset portfolios, such as securities lending.

Finally, in that connection, I hope that the recent multi-agency report on securities lending will prove helpful to pension fund trustees and others. As some of you will know, my colleague David Rule, chair of the Stock Lending and Repo Committee, helped to facilitate the exercise. But it was written by the industry for the industry, and it has been welcomed by the NAPF. It has been an exercise where the Bank has learned from interaction with you. I hope there will be other such occasions to do so.

My thanks again for inviting me to join you today.

(1) A call (put) option is said to be 'in the money' if the underlying asset is more (less) valuable than the strike price.

## Boring bankers-should we listen?

In this speech,<sup>(1)</sup> Richard Lambert, member of the Bank's Monetary Policy Committee, discusses the importance of good communications to modern central banks. Effective communication is very relevant at times like the present, when inflation is subdued and nominal interest rates are low. He argues that the way in which a central bank seeks to influence public expectations is determined by its history and its structure. Considering various suggestions that have been put forward for changes to the Bank of England's communications policy, he discusses the recent messages the Bank has been sending to the public. He concludes that there might be room for the Bank to build yet more public support for price stability by seeking to communicate to a broader range of audiences.

15 September last year marked a very unusual moment for the US Federal Reserve Board. That evening, the Federal Open Market Committee held a special meeting—its first such unscheduled gathering since 1979: the purpose was to discuss how the Fed should be communicating with the public.

For an institution that around ten years earlier had been so discreet that it did not even announce when it had changed interest rates, this was a significant occasion. How and what they should disclose to the public has in recent years become a matter of pressing importance for members of the FOMC.

The following month, the Bank of Japan was also in a reflective mood. On 10 October, its Board voted unanimously to approve a number of measures to 'enhance the transparency of monetary policy'. These included a commitment to more timely press conferences, more lucid and concise explanations of the Bank's view in its *Monthly Report*, and a shift of emphasis to focus more on expectations of future inflation rather than the immediate outlook.

In November, Jean-Claude Trichet took over as President of the European Central Bank. Much of the comment about his appointment focused on his obvious skills as a communicator—controlled and precise in his language, brilliant at handling the press. My plan this morning is to discuss the importance of good communications to modern central banks, and why so much emphasis has been placed on this issue over the past year. Looking at the United States and Europe in particular, I will then explain how each bank's approach to the subject is shaped by its own history and structure.

Finally, I will talk about the Bank of England: why it communicates in the ways that it does; what I think about various suggestions for improving the process; and my views about how the Bank has been explaining its strategy in the months since I joined the Monetary Policy Committee last summer.

Thirty years ago, it would have been difficult to fit the words 'transparency' and 'central bank' into the same sentence. The main mission of the Bank of England's press officer, I recall, 'was to keep the Press out of the Bank and the Bank out of the Press'. And this was the norm among its peers.

The most highly regarded central banks in the world, the Fed and the Bundesbank, rightly placed a high value on their independence but managed monetary policy on a black-box basis: achieving credibility at that time did not require transparency. In most other countries, politics tended to be at least as important as economics when it came to setting interest rates.

(1) Given at the Institute for Public Policy Research on 22 April. I am grateful to Rain Newton-Smith and Michael Sawicki for help in preparing this paper and to Lavan Mahadeva, Tony Yates and Rob Windle whose work I have drawn on. I have also benefited from comments and discussions with many colleagues at the Bank. 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/speech219.pdf.

For a number of related reasons, all this began to change in the 1970s and 1980s. High and volatile rates of inflation around the world underlined the failure of established approaches to the management of economies. Monetary policy came to play a bigger role and to have visible impacts: Paul Volcker's appointment as Fed Chairman in 1979 marked a turning point in this respect. Central bankers had to start explaining the decisions which were now having such a marked impact on the lives of ordinary citizens and central bankers no longer seemed so boring.

At the same time, the rapid expansion of capital markets also made central bankers pay more attention to the way they shaped expectations about the future path of inflation and interest rates. Policymakers came to learn that these expectations influenced people's economic decisions. And they also discovered that there were benefits to be had from publicly explaining their moves—one famous example being the reaction of the newly appointed Alan Greenspan to the stock market crash of 1987. The FOMC explicitly reassured the markets that the Fed would serve as a source of liquidity to support the economy.

In 1994, the Fed began to issue a statement each time it changed rates, and four years later it started publishing more detailed statements when 'it wanted to communicate to the public a major shift in its views about the balance of risks or the likely direction of future policy'.<sup>(1)</sup> Not long afterwards it began releasing statements after each FOMC meeting, even when it had not changed rates.

For the United Kingdom, the moment of truth came in 1992 when the country was ejected from the European Exchange Rate Mechanism. Faced with a policy failure of this scale, the response was a shift to inflation targeting as a way of imposing discipline on monetary policy and to greater transparency in an effort to build badly needed credibility. The launch of the *Inflation Report* in the following year marked a big step in this direction.

The logical next step in this process was to give the Bank independent responsibility for the conduct of monetary policy, which, as we all know, was the first step made by the new Labour government in 1997. Today, as always, a central bank's effectiveness is largely determined by its credibility. But what that now requires is not just an ability to make the right decision at the right time. In order to manage expectations of interest rates and inflation, those decisions need to be put into context and explained in a way that is rational and consistent.

For obvious reasons, the financial markets invest large efforts in trying to pick up signals from the central bank about future policy. But if these messages are communicated in a confusing or inefficient manner, credibility can be damaged—and with it, the effectiveness of monetary policy.

As Governor Bernanke of the US Federal Reserve Board argued in a recent speech: 'Control of the federal funds rate is therefore useful only to the extent that it can be used as a lever to influence more important asset prices and yields—stock prices, government and corporate bond yields, mortgage rates—which in turn allow the Fed to affect the overall course of the economy.'

In certain circumstances, central bank talk can be as important as central bank action. This is particularly true in circumstances—such as those of the past year and more—when inflation has been subdued and nominal interest rates have been very low.

You cannot cut an interest rate that is already close to or actually at zero. This was the problem faced a year ago in the United States—where the federal funds rate fell to 1% last June—and even more in Japan, where short-term interest rates have effectively been close to zero for the past five years. Faced with fears about deflation in the United States and the reality of falling prices in Japan, the authorities in both countries had to think about new ways of influencing expectations of future rates of inflation and of economic activity. Communications became a critical part of their strategy.

As US core inflation fell close to historically low rates in the early part of last year, Fed officials gave much thought—some of it in public—to the kind of unconventional tools that might be deployed to boost the economy should the federal funds rate hit the zero bound. One suggested move would have been for the central bank to start buying government bonds.

<sup>(1)</sup> See Minutes of the FOMC meeting on 22 December 1998, available at www.federalreserve.gov/fomc/minutes/19981222.htm.

In early June, Mr Greenspan spoke of the possible need to build a 'firebreak' to ensure that deflation did not happen. By the time of the FOMC meeting later that month, the markets were pricing in the possibility of a sharp cut in the rate and of a Fed intervention in the bond market. But they had been picking up the wrong signals—and when all they got was a quarter-point rate cut, bond prices fell sharply.

By the time of its next meeting, the Fed was determined to leave no room for doubt about its strategy. Like most other central banks, it normally shies away from giving any indication of how it might move rates more than a month or two ahead. But under these special circumstances, Mr Greenspan felt it appropriate to send out a loud and clear message to the markets. After what was reportedly a lively meeting of the FOMC, the August statement made it clear that in the Committee's view, an accommodative approach to monetary policy could be maintained 'for a considerable period'.

That form of language was repeated in subsequent statements until the beginning of this year, when it was modified to reflect the belief that the Committee could 'be patient in removing its policy accommodation'.

This communications policy has been successful so far. Despite a robust rate of economic recovery, real interest rates in the United States were until recently close to long-time lows.<sup>(1)</sup> Fears of deflation have faded almost out of sight. And although everyone understands that the present federal funds rate—still at 1%—is unsustainably low, the timing of any likely increase is very much a matter for speculation.

This outcome shows how the language that central banks use can influence market expectations at a time when the scope for actual policy changes is limited. Of course, the big question for the next few months is about how the Fed will manage its so-called exit strategy: how it will shift away from the promise of an accommodative policy without upsetting the markets.

The Bank of Japan will face a similar challenge, although perhaps over a different timescale. Both will need to deploy communications skills of a high order.

The Fed's approach has been shaped almost entirely under the long chairmanship of Mr Greenspan. The main instruments are now the monthly statements, testimonies by the Chairman to the Congress and frequent speeches by members of the FOMC. His personal record and credibility, together with the somewhat disparate nature of the FOMC, give Chairman Greenspan a central role in the process of communications.

Votes by individual members at the rate-setting meetings are published, but by convention there are rarely more than one or two dissenters. And the minutes of the meetings are not published until the Thursday after the subsequent FOMC meeting, which means that they can be curling round the edges a little before they reach public consumption.

By contrast, the European Central Bank does not publish the votes of individual board members or minutes of its proceedings—the reason being that board members could come under pressure from their home countries if their actions were to be disclosed in this way. In my view, however, members might find that their independence would actually be strengthened if their votes and arguments were in the public domain.

The current consensual approach to decision-making means that the ECB's single most important instrument for communicating with the public is the press conference which its President holds after the first Council meeting each month. This takes the form of an introductory statement summarising the Governing Council's views, followed by a question-and-answer session.

Hence the importance of the President's ability to handle detailed and sometimes aggressive questioning from the media. In his latest meeting (in April) for example, President Trichet was peppered with questions about a subtle change in wording in the opening text: monetary policy was now said to be 'in line with the maintenance of price stability over the medium term'; in the past, it had been described as 'appropriate'. Mr Trichet responded with enigmatic aplomb.

Where does the Bank of England fit into this picture? Compared with other central banks, it has at least two distinguishing features, which again are the results of history and of structure. Given the history of monetary policy in the United Kingdom since the war, it should be no surprise that the Committee's efforts are focused squarely on a single target which is set each year by the

(1) As measured by the yields to maturity on US Treasury Inflation-Protected Securities.

Chancellor of the Exchequer: a rate of CPI inflation of 2%. That target is symmetric, which means that aiming too low is not the easy option, and other objectives including growth and employment—are subject to the overriding goal of achieving price stability.

The second distinguishing feature of the Bank's Monetary Policy Committee is that its nine members are individually accountable to Parliament by way of the Treasury Select Committee, and to the public by way of frequent regional visits and presentations as well as through speeches and interviews. Our votes are published each month, and we can be asked to justify them. Unlike the Fed or the ECB, the monthly meeting does not try to arrive at a consensus.

Not only do members have to explain their own positions: more importantly, the Committee as a whole has to present a coherent view. This explains why the single most important method by which the MPC communicates with the public is its detailed monthly minutes. These were initially published six weeks after the MPC meeting, as dictated by the Bank of England Act, but since late 1998 the publication date has been brought forward so that they are now released two weeks after the meeting.

The importance of the minutes is that they discuss how the Committee views the economic outlook and the developments since its previous meeting. They can also reflect the different arguments put forward by its members.

The fullness of the discussion could not be brought together in a brief press statement published on the day of the meeting, in the way that the Fed does the job. It is true that these days the Bank sometimes does publish a short statement, usually on the days when it changes the repo rate. Yet it can be quite difficult to hit the right language even for these few sentences in the tight timescale available.

This is also why I believe that it would be a mistake for the Governor to run a press conference on the day of the meeting. It would be difficult for him to capture the mood of the meeting in the face of sometimes aggressive press questioning. And it would take attention away from the minutes themselves, which are the key to understanding the Committee's thinking. Should the individual votes be published on the day of the rate decision? The case in favour is that this can be price-sensitive information, which is best disclosed as soon as possible.<sup>(1)</sup> One good example came last October, when an unexpectedly close vote to hold rates was interpreted as a trailer for a rate increase in November.

The case against is that publishing the votes without the minutes could mislead the markets. A good example of this came in March of this year, when the vote for no change was nine-nil, but the minutes subsequently showed that several members had come close to favouring a rate increase.

On balance, I would favour sticking with the present arrangements.

Some have argued that publication of the minutes should be speeded up yet further. The challenge here is that these are not like the minutes of the local tennis club. First, the staff has to distil six hours of often quite discursive argument into an orderly text. Then individual members of the Committee have to be sure that their views are properly represented. Finally, the Committee as a whole has to consider the text—both for the big picture it is presenting, and the more subtle images it may contain. This is a world where adjectives can matter a great deal.

It is worth noting that, when in January the FOMC considered the idea of bringing forward the publication of its minutes from around six weeks after each meeting, some members objected on the grounds that this might not give them enough time to review and comment on the text, and to reconcile differences of opinion.

So it is not easy to see how the Bank's processes could be speeded up significantly.

What might be worth considering, however, is whether the views of individual members could be attributed explicitly to them in the text—perhaps in the concluding section on the policy decision. This would mean that members were publicly accountable for the justifications of their votes, and it might allow the public to make more informed judgments about how each member reacts to news events.

(1) Gerlach-Kristen (2004) finds some evidence that votes do contain price-sensitive information; in particular that split votes can help to predict future changes in the policy rate.

There are good arguments against, though. Such disclosures could, for example, affect the dynamics of the Committee's meeting—free-flowing discussions of issues could be replaced by more formal statements. And they might tend to focus attention on sometimes quite minor disagreements among members, rather than their broad agreement on the big picture.

Another very important instrument for influencing expectations about future rates of inflation and economic growth is the quarterly *Inflation Report*. This serves a double purpose. First, since the MPC is itself responsible for the projections that are updated in every issue, its members have to get to grips with the details of the outlook in much greater depth than is possible in the monthly round. The discussions also allow the MPC to step back a little and think about long-term trends. One of the things that surprised and impressed me as a newcomer was the amount of thinking time and attention paid by the entire Committee to this process.

Second, the *Report* is a way of communicating the Bank's views about developments in the economic outlook to the general public. Some have argued that the *Report* simply goes over the top in the amount of detail it provides. Writing last year in a report commissioned by the Riksbank, Eric Leeper said that the Bank of England wins the 'fill the bathtub' award, reporting as many facts as possible seemingly regardless of their relevance or importance.

But one of the aims of the *Report* is to give a broad picture of economic trends, allowing the readers to make their own judgment about the direction in which the economy is moving. Chapter 6, the 'Prospects for inflation', is where the Committee gives its own summary of the issues that matter when it comes to setting interest rates. And there is room within that structure for dissenting opinions to be expressed.

Moreover, the Bank gets a further opportunity to explain its priorities through the press conference chaired by the Governor, when the *Inflation Report* is published. This has the benefit of not being associated with an immediate policy decision, which means that the message can be broader and more forward looking than would otherwise be the case.

One criticism made by Leeper, Donald Kohn and others which has more weight, it seems to me, is about the prominence given in the *Report* to the projections of inflation and GDP growth that are based on the assumption of a constant interest rate.

This formula has the benefit of not expressing a view about the likely course of future rates, with each policy decision being taken afresh as events unfold. But in most cases, it may not be credible that interest rates will remain constant for two years, and asset prices may reflect different expectations for interest rates. And the *Inflation Report* contains a forecast conditional on the path of interest rates implied by the market yield curve, to which observers should also pay attention.

What messages has the Bank been sending to the public in recent months? I should emphasise here that these remarks represent my views, rather than those of the Committee as a whole.

If you had read the minutes since the October meeting, together with public statements by the Governor and other Committee members, I think you would have come away with the clear message that interest rates were considered to be at a level that would stimulate the economy; that inflationary pressures were likely to be building gradually over the forecast period; and that rate increases would be forthcoming if growth were to continue above trend.

There were several reasons for being willing to talk about the likely future path of interest rates in this rather frank way.

The first was that last autumn marked a turning point in the UK interest rate cycle. After declining for almost four years, the repo rate was pushed up by a quarter of a percentage point in November. Such turning points are moments of uncertainty in the financial markets, and there is some evidence that policy changes can have larger effects on market rates at such times.

So they need careful handling—and the case for caution was increased by the high level of household debt. It was hard to know how borrowers might react to the first rate increase and so it seemed sensible to signpost what was happening with particular care.

Another consideration was the Chancellor's announcement in June of last year that the policy target was going to be switched from the RPIX measure to the consumer prices index. Although the actual target number was not set until the *Pre-Budget Report* in December, it was always clear that clarity in communications would be especially important at the changeover period.<sup>(1)</sup>

We were moving from a measure that at the time was above the central inflation target and falling, to one that was below the new CPI target, and projected to rise. We were convinced that the changeover had few implications for inflation prospects in the medium term and thus the actual conduct of policy, but in these potentially confusing circumstances it seemed important to set the change in a broader context.

Finally, the broad policy message was rather obvious. With interest rates standing as they did in October at 3.5%, policy clearly was accommodative. The Bank's publicly stated view was that inflationary pressures would continue to build over the two-year period if economic growth continued above trend. So there was little risk attached to suggesting that, other things being equal, rates would probably edge upwards.

I would argue that these have been rather unusual circumstances and that we are probably now moving towards a different set of communications challenges. Rates have edged higher without a dramatic impact on consumption growth so far, and inflation expectations appear to be consistent with the new target.

For the MPC, perhaps the biggest domestic uncertainty now is about the outlook for the housing market over the next year or two. Our job is to target inflation, not asset prices, but the Committee will need to explain with great care the impact that house prices can have on consumption and inflationary pressures, and how in turn that influences its policy decisions.

The Committee's traditional position has been that every month represents a fresh decision, and this approach seems to me to make sense. As Rachel Lomax put it earlier this year:

'Every month I may have a fairly well-developed view not just about this month's interest rates, but about where interest rates are likely to need to go in the future, to achieve the inflation target. But that view may—indeed should—change in the light of new information, better research, another set of forecasts, perhaps a different view of the risks.'

As a relative newcomer to the MPC, I think I am allowed to say that the Bank has done a good job over recent years in communicating its strategy to the public. Inflation expectations are well anchored to the target level: one way of measuring this is to look at the inflation rates implied by the gap between the yields on index-linked and nominal bonds. These, as well as surveys of professionals' inflation expectations, have for some time been consistent with the Bank's inflation target.<sup>(2)</sup>

While some opinion polls suggest that a proportion of the public may still overestimate the current and likely path of inflation, this has not been reflected in the subdued rate of earnings growth in recent years. Given the choice, a good majority of people would prefer to opt for a higher rate of interest rather than a faster rise in prices.<sup>(3)</sup> This implies a healthy awareness of the real dangers of inflation.

The goal set—only half in jest—by the Governor, Mervyn King, is that the decisions of the MPC should come to be deemed seriously boring by right-thinking people. That would imply that the Bank had achieved its goals of low and stable inflation, and that it could always be trusted to do the right thing—the ultimate aim of monetary policy.

Does this mean that the Bank's monthly decisions would become utterly predictable? The Committee-based approach of the Bank means this is unlikely to be the case. Members learn from each other in frank and open discussions during policy meetings. And the resources that the Bank dedicates to analysing the economy also add value. So while people may have a better understanding of the Bank's likely reaction to developments in the economy, it may still spring surprises from time to time.

By most measures, the Bank of England is already one of the most transparent central banks in the world, but the market can still be surprised by its decisions.

<sup>(1)</sup> This issue is discussed in more depth in two speeches by King (2004) and Nickell (2003).

<sup>(2)</sup> For an illustration, see Bank of England (2004), 'The sensitivity of the economy to changes in interest rates', *Inflation Report*, February, pages 10–11.
(3) This question is asked in a survey conducted by NOP on behalf of the Bank. The responses for the February 2003

survey can be found in Bank of England (2003), 'Public attitudes to inflation', Bank of England Quarterly Bulletin, Summer, pages 228–34.

So should it seek ways of lifting yet more veils, in the hope of achieving that virtuous state of boringness?

This could be risky. A bank's ability to influence expectations in the way that it wants depends on its credibility, and in today's markets—as I have suggested—credibility requires a greater degree of transparency than seemed necessary in the 1970s and 1980s. But it would be possible to confuse the markets, and damage credibility, by publishing too much information.

To take an extreme example, if MPC members published their thoughts about the economic outlook on a day-to-day basis, you would soon be lost in a tangle of revisions and discrepancies. Better to concentrate on the big picture and to co-ordinate the communications process in an orderly fashion.

But there might be room for building yet more public support for price stability by seeking to communicate with audiences outside the financial markets. Most of the Bank's publications are technical in nature—which is necessary for financial analysts but is less effective for informing the broader community.

In my own experience, few business leaders have much idea about how the MPC operates and the general public is probably even less well informed. There are already excellent initiatives such as the annual schools competition *Target Two Point Zero*, which are aimed at sending the message out to a wider audience. Maybe there could be more.

As new generations grow up with no memories of what inflation did to society in the 1970s and 1980s, the Bank will continue to have to work hard to build the constituency for low inflation. Its long-term approach to communications will remain a critical part of this exercise.

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## **Speech at CBI Yorkshire and the Humber annual dinner**

In this speech,<sup>(1)</sup> Kate Barker, member of the Bank's Monetary Policy Committee, reflects on recent developments in the UK economy, and on current challenges for monetary policy. She notes that over the past few years the Committee's actions have successfully offset a series of negative external shocks so that, despite contrasting fortunes in different sectors, the economy in aggregate did not decline far below its trend level of output. Indeed, the latest evidence suggests that for many firms the future looks bright, with the external economic climate improving. Present concerns arise more from the domestic economy, chiefly the level of household debt and the housing market. She discusses the related risks, highlighting that these risks should be tackled consistently with the MPC's remit. This means responding to the implications for the inflation outlook, and not to house prices per se. She concludes that it is better for monetary policy to respond to changes in asset prices, than to attempt to impose a view of their correct level.

#### Introduction

I am very pleased to have been invited to speak here tonight—three years on from my previous appearance at this dinner. That was the day before my appointment to the Monetary Policy Committee was announced, and now I have just been re-appointed for a further three years. So it is a good opportunity to reflect on one or two of the developments in the economy over the recent past, and on the challenges the MPC seems likely to face over the next three years.

The economic environment has perhaps been less varied than your choice of venue—from the National Railway Museum in York to this football stadium in Bradford. It is perhaps not the most tactful time to dwell on the fortunes of Bradford City, although I will reluctantly point out that there may be a chance of a win this Saturday when my favourite team Stoke City comes to visit, as Stoke has not won away from home against Bradford since October 1990.

When I joined in 2001, the MPC had been setting interest rates for four years, and had established a high degree of credibility in the financial markets and widespread support for its approach in the business community. However, there are few, if any, periods when there is nothing to worry about in the economic situation, and back in 2001 these worries were generally expressed in terms of concerns about imbalances in the United Kingdom. In particular it was argued that these imbalances included the contrasting fortunes of the consumer and the corporate sectors. It was, and is, not clear that imbalances in the economy should necessarily be thought of as problems, but worry about the potentially severe pressure on manufacturing industry, due in part to the sustained period of sterling strength, was largely justified. For example, in February 2001 an article in The Guardian suggested 'This has been the age-old problem for the UK economy. Too much consumer spending and insufficient investment has led to over-heating...' The CBI in May 2001 argued that 'the current imbalances in the economy are likely to persist next year. This will maintain pressure on exporters and hold back the growth of manufacturing output.'

Given these concerns, to what extent is it the case that the past few years have proved an unusually tough time for the UK corporate sector? Not surprisingly, the picture has been mixed across sectors. Total output of the economy rose by over 5% from the end of 2000 to the fourth quarter of 2003. Over the same period, manufacturing output fell by more than 5%, and service sector output rose by over 7%. Even within manufacturing there are sharply contrasting fortunes—

<sup>(1)</sup> Delivered at Bradford City Football Club on 28 April 2004. I am extremely grateful to Rebecca Driver and Miles Parker for assistance and useful discussions in the course of the preparation of this speech, and to Peter Andrews, Charlie Bean, Marian Bell and Jennifer Greenslade 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.

textiles output fell by 16% in the early 2000s (and indeed in the fourth quarter of 2003 it was just 68% of its level in 1995), while the chemicals sector has grown by about 7%.

Output data, while probably the key indicator, are only part of the story, with profitability and investment also important symptoms of a sector's health. Looking at net rates of return according to ONS statistics, these weakened in the late 1990s for both manufacturing and service companies. For manufacturing, at 6.7%, the rate of return in 2001 was the lowest since 1992. For the service sector, net rates of return peaked at 18.3% in the third quarter of 1998 before declining sharply to 14.0% in the fourth quarter of 2001. But both sectors have since experienced an encouraging pickup—indeed the latest estimate for the rate of return in manufacturing was up to 8.6% at the end of 2003, the best for four years.

Similarly, business investment, which in mid-2003 had declined by around 7% from its peak in late 2000, has subsequently shown signs of recovery. In particular, manufacturing investment, which fell sharply by almost 12% in 2002, declined less steeply in 2003, and on the latest estimates rose by over 5% in Q4 from Q3.

Business survey data in early 2004, including and perhaps especially CBI data, point to a continued improvement in business conditions. This has raised some puzzles, especially with regard to manufacturing output, where early estimates for January and February paint a much weaker picture of the sector. Consequently, it seems right to temper optimism about the pace of industrial recovery, especially in the light of sterling's renewed strength since the end of 2003. Nevertheless, even though export orders have fallen back in April, they remain above the levels of the past six years. And more broadly, intentions surveys suggest the strengthening of investment discussed above is set to continue.

This recent cycle has been rather muted by comparison with the major economic swings in the early 1980s and early 1990s. The principal downward pressures stemmed from a series of negative external shocks—the appreciation and sustained strength of sterling, the uncertainties following the Russian default in 1998, the unwinding of the impact of the high-tech cycle on the US equity market and the global uncertainties associated with the events around the Iraq war. The MPC's actions have been generally successful in offsetting the impact of these shocks on the UK economy such that for the whole economy the level of output has not declined very far below its probable trend level.

So whereas the past few years may not have been easy ones for some of you, the United Kingdom has clearly weathered the storms relatively well, and today many indicators suggest companies believe that the future looks bright. The Bank's February central projection anticipated above-trend growth over the next year.

The external outlook is very favourable, with the world economy forecast to experience its strongest year of growth since 2000, although some uncertainties remain. And, while a year or so ago there were some big downside risks causing major concern (such as the persistent weakness of global equity markets, and to a lesser extent worries about deflation), these more acute risks have faded over the horizon. In terms of the impact on the United Kingdom, however, the relatively sluggish outlook for growth in the euro area and the recent appreciation of sterling mean that the support for growth from export prospects may be somewhat muted.

It is probably not much of a surprise that I am suggesting the key uncertainties facing us today stem from the domestic economy, in contrast to the recent past. These chiefly revolve around the outlook for the UK consumer in the light of a household debt to income ratio at its highest since a comparable series started in 1987, and a house price to earnings ratio a little above the peak reached in the previous cycle. However, the fact that these ratios are at unusual levels does not necessarily mean that this is a source of risk, nor that any risk is automatically large enough to require an unusual policy response.

The two main concerns raised by the present situation are risks from the recent rise in unsecured debt and risks due to the condition of the UK housing market. The discussion tends to revolve around the inevitability of a downside risk in the future from reversal of these trends, which is becoming more acute as debt continues to rise. I would like to take this opportunity to discuss briefly, and in some cases to reiterate, my personal take on both of these, looking at what the scale of the risks might be, and to what extent it might be difficult to formulate an appropriate policy response.

Unsecured consumer debt has been rising at an average annual rate of 10.8% over the past five years, and the
stock of this lending has picked up from 17% to 22% of household incomes. A number of factors provide possible explanations for this increase, including greater security of employment prospects in the low unemployment environment, and to a lesser extent a rise in student indebtedness. Unsecured lending rates have also tended to decline, relative to the base rate, over the past few years—for both credit card debt and other unsecured loans, partly as competition among providers has increased. Over the past six months, despite the two quarter-point increases in base rates, unsecured rates have generally tended to edge down. All these factors mean that a higher level of unsecured debt, together with the associated benefits for consumers, is probably sustainable today.

Latest data suggests that the pace of growth of unsecured debt has slackened a little over the past year or so. What would be the consequence if this were to go further, taking the growth rate down from the present 12.5% or thereabouts, to be in line with the growth rate of personal incomes? The key here would obviously be the question of what event triggered the decline. But it seems likely that only in the event of a shock significant enough to bring about a sharp fall in the level of unsecured debt does this aspect of the present situation constitute a severe risk. Such a shock is unlikely to come from monetary policy since, as the interest rates on this debt are relatively high, a large rise in base rates would be required to push up the interest burden from these debts significantly.

There are of course distributional effects. As the Bank's survey at the end of last year indicated, a small group of heavily indebted and often low income individuals face substantial problems in servicing their debt. But at present this seems unlikely to pose a big source of macroeconomic risk.

With regard to house prices, it is frequently observed that the rate of increase of house prices over the past two to three years cannot be sustained. This is of course clearly true over a long enough period, but in common with many other commentators I have been very surprised by how sustained the period of strong house price increases has proved to be.

Would a slowdown in this rate of increase pose a problem? The answer seems to be probably not. While the fan charts around our central case have implied a range of paths for house prices, the MPC's central forecasts recently have expected a slowdown in house price inflation, and the estimated effect on consumption has not implied any major risk to the economy. Such a trend would also be associated with a slower rate of growth of secured debt, although, as a recent article in the Bank's *Quarterly Bulletin* pointed out, the higher level of house prices itself will continue to push the level of secured debt higher as new generations enter the housing market.

More significant is the question of the sustainability of the level of house prices. Having spent the past year looking in some detail at the factors related to the United Kingdom's housing supply, it might be thought that I am now in a better position to understand what has driven house prices up so far, and how far today's level of prices might now be above a long-run equilibrium level. Regrettably, this is not the case. As with other asset prices (even though housing is not just an asset, but provides a flow of services) it remains highly uncertain what the 'right' level is.

So while there is some risk that at some point house prices could fall sharply, and this risk has presumably increased the further house prices have risen, it is still by no means certain either that they will necessarily fall significantly, or that any decline will be abrupt. Indeed, it is not easy to see what is likely to provoke such a change, although recognition of increasingly stretched affordability for first-time buyers could lead to a shift in expectations. A large, abrupt fall would require a monetary policy response, in order to keep inflation from falling below target over the relevant forecast horizon. But given the greater stability of the wider economy it is questionable that this would be an unmanageable situation for policy, in most plausible scenarios.

And a flattening out of house prices, or a moderate decline, would more clearly be manageable in policy terms. I do not, therefore, think that the risk of a big house price fall is so critical that it should dominate all the other policy considerations. It is also perhaps worth noting that the MPC has been urged to act to 'prick the housing market bubble' for some time. I am not convinced that the economy would have benefited if we had followed this course a couple of years ago.

Further, an increase in interest rates, not justified by the inflation outlook but by the desire to hold back house prices in order to lessen this risk, would have carried its own difficulties. Interest rates might well have needed to be raised very sharply, depressing growth. This could have confused the goal of policy, potentially moving inflation expectations away from the Government's target. In the long run this would have created further problems for operating monetary policy.

In conclusion, the past few years have seen UK industry and the economy survive a series of external shocks, including sterling strength, without output falling very far below trend. Although manufacturing performance has been very weak, industry now seems to be emerging from this difficult period with improving profitability, rising investment and greater confidence. The focus on risks to the outlook has changed from the external to the domestic economy. In this regard, it is important to be realistic about the extent to which policymakers can hope to understand the risks in asset prices accurately enough to act to offset them. And then the question is clearly how to tackle any risks in a way which is consistent with our remit, such that it can be made clear that it is longer-term risks to the inflation outlook, not house prices *per se*, which would drive our response. Weighing up these arguments is a critical part of the present policy debate. My own view remains that it is generally better to respond to changes in asset prices as they occur, rather than to seek to impose our views of what price level is 'right'.

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# **Bank of England speeches**

Speeches made by Bank personnel since publication of the previous Bulletin are listed below.

#### CBI Yorkshire and the Humber annual dinner.

Speech by Kate Barker, member of the Monetary Policy Committee at Bradford City Football Club on 28 April 2004. www.bankofengland.co.uk/speeches/speech220.pdf. Reproduced on pages 250–53 of this *Bulletin*.

#### Boring bankers—should we listen?

Speech by Richard Lambert, member of the Monetary Policy Committee at the Institute for Public Policy Research, London on 22 April 2004. www.bankofengland.co.uk/speeches/speech219.pdf. Reproduced on pages 241–49 of this *Bulletin*.

#### A picture of European unemployment: success and failure.

Speech by Stephen Nickell, member of the Monetary Policy Committee and Professor at the London School of Economics, at the OECD, Paris on 26 March 2004. (Speech is an updated version of that previously given in Munich in December 2002.) www.bankofengland.co.uk/speeches/speech218.pdf.

#### Puzzles in today's economy-the build-up of household debt.

Speech by Sir Andrew Large, Deputy Governor and member of the Monetary Policy Committee, in Newport, Gwent, 23 March 2004. www.bankofengland.co.uk/speeches/speech217.pdf. Reproduced on pages 228–33 of this *Bulletin*.

#### National Association of Pension Funds Annual Investment Conference.

Speech by Paul Tucker, Executive Director and member of the Monetary Policy Committee, at the Edinburgh International Conference Centre in Scotland on 19 March 2004. www.bankofengland.co.uk/speeches/speech216.pdf. Reproduced on pages 234–40 of this *Bulletin*.

## **Contents of recent Quarterly Bulletins**

The articles and speeches that 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.

## Articles and speeches (indicated 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 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

Autumn 2002 (continued) 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? 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) Spring 2003 (continued) 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) Winter 2003 (continued) UK monetary policy in a changing world (S) Two current monetary policy issues (S)

#### Spring 2004

Durable spending, relative prices and consumption Asset pricing and the housing market The relationship between the overnight interbank unsecured loan market and the CHAPS Sterling system How much does capital matter? Measuring total factor productivity for the United Kingdom The Governor's speech at the annual Birmingham Forward/CBI business luncheon (S) Inflation targeting—achievement and challenges (S) Risk, uncertainty and monetary policy regimes (S) E-commerce and the foreign exchange market—have the promises been met? (S)

## Summer 2004

Assessing the stability of narrow money demand in the United Kingdom Deriving a market-based measure of interest rate

expectations The economics of retail banking—an empirical analysis of the UK market for personal current accounts The financing of smaller quoted companies: a survey Recent developments in surveys of exchange rate forecasts Sterling money market funds The new Bank of England Quarterly Model

Public attitudes to inflation

Perfect partners or uncomfortable bedfellows? On the nature of the relationship between monetary policy and financial stability

A review of the work of the London Foreign Exchange Joint Standing Committee in 2003

Reform of the Bank of England's operations in the sterling money markets

Puzzles in today's economy—the build-up of household debt (S)

Speech at the National Association of Pension Funds Annual Investment Conference (S)

Boring bankers—should we listen? (S)

Speech at CBI Yorkshire and the Humber annual dinner (S)

# **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.

### **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, where abstracts of all papers may be found. Papers published since January 1997 are available in full, in PDF.

No.	Title	Author
204	The dynamics of consumers' expenditure: the UK consumption ECM redux (October 2003)	Emilio Fernandez-Corugedo Simon Price Andrew Blake
205	Empirical determinants of emerging market economies' sovereign bond spreads (October 2003)	Gianluigi Ferrucci
206	The rise in US debt: assessing its causes and sustainability (October 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 ( <i>November 2003</i> )	John Whitley Richard Windram
208	A matching model of non-employment and wage pressure (December 2003)	Andrew Brigden Jonathan Thomas
209	Settlement bank behaviour and throughput rules in an RTGS payment system with collateralised intraday credit (December 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
211	An empirical analysis of the dynamic relationship between investment-grade bonds and credit default swaps ( <i>February 2004</i> )	Roberto Blanco Simon Brennan Ian W Marsh
212	Crisis spillovers in emerging market economies: interlinkages, vulnerabilities and investor behaviour ( <i>February 2004</i> )	Michael Chui Simon Hall Ashley Taylor
213	Investment-specific technological change and growth accounting (February 2004)	Nicholas Oulton
214	An empirical model of household arrears (March 2004)	John Whitley Richard Windram Prudence Cox
215	How can the IMF catalyse private capital flows? A model (April 2004)	Adrian Penalver
216	IMF lending and creditor moral hazard (April 2004)	Andrew G Haldane Jörg Scheibe
217	International financial rescues and debtor-country moral hazard (April 2004)	Prasanna Gai Ashley Taylor
218	Health, disability insurance and labour force participation (Forthcoming)	Brian Bell James Smith
219	Bail out or work out? Theoretical considerations (April 2004)	Andrew G Haldane Gregor Irwin Victoria Saporta
220	Does job insecurity affect household consumption? (May 2004)	Andrew Benito

### **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 (where n refers to the paper number). The following papers have been published recently.

No.	Title	Author
9	The pricing behaviour of UK firms (April 2002)	Nicoletta Batini Brian Jackson Stephen Nickell
10	Macroeconomic policy rules in theory and in practice (October 2002)	Christopher Allsopp
11	The exchange rate and inflation in the UK (October 2002)	Amit Kara Edward Nelson
12	Measuring the UK short-run NAIRU (April 2003)	Nicoletta Batini Jennifer Greenslade
13	UK consumers' habits (May 2003)	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* continues to be published monthly on the Internet but paper copies are available on a twice-yearly basis. Paper copies will be published for the January and July editions in 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. *Bankstats* is available on a monthly basis free of charge from the Bank's web site at: 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.

The following articles have been published in recent issues of *Monetary and Financial Statistics*. They may also be found on the Bank of England's web site at www.bankofengland.co.uk/mfsd/030901/aug03articles.htm.

Title	Author	Month of issue	Page numbers
Historical comparison of seasonally adjusted series using GLAS and X-12-ARIMA	Martin Daines	January	9–13
Change of seasonal adjustment method to X-12-ARIMA	John Thorp	January	4-8
Public sector net debt: end-March 2003	Paul Burton	January	1-3

### **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 policymakers 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.

### 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 on the Bank's web site at: www.bankofengland.co.uk/euro/piq.htm.

## 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.

## **Quarterly Bulletin**

The *Quarterly Bulletin* provides regular commentary on market developments and UK monetary policy operations. It also contains research and analysis and reports on a wide range of topical economic and financial issues, both domestic and international.

Back issues of the *Quarterly Bulletin* from 1981 are available for sale. Summary pages of the *Bulletin* from February 1994, giving a brief description of each of the articles, are available on the Bank's web site at: www.bankofengland.co.uk/bulletin/index.html.

The *Bulletin* is also available from ProQuest Information and Learning: enquiries from customers in Japan and North and South America should be addressed to ProQuest Information and Learning, 300 North Zeeb Road, Ann Arbor, Michigan 48106, United States of America; customers from all other countries should apply to The Quorum, Barnwell Road, Cambridge, CB5 8SW, telephone 01223 215512.

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.

Bound volumes of the *Quarterly Bulletin* (in reprint form for the period 1960–85) can be obtained from Schmidt Periodicals GmbH, Ortsteil Dettendorf, D-83075 Bad Feilnbach, Germany, at a price of  $\in$ 105 per volume or  $\in$ 2,510 per set.

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The *Report* starts with an overview of economic developments; this is followed by six sections:

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- analysis of demand;
- analysis of output and supply;
- analysis of costs and prices;
- summary of monetary policy during the quarter; and
- assessment of the medium-term inflation prospects and risks.

The minutes of the meetings of the Bank's Monetary Policy Committee (previously published as part of the *Inflation Report*) now appear as a separate publication on the same day as the *Report*.

### **Publication dates**

Copies of the *Quarterly Bulletin* and *Inflation Report* can be bought separately, or as a combined package for a discounted rate. Current prices are shown overleaf. Publication dates for 2004 are as follows:

Quarterly Bull	etin	Inflation Report	
Spring	19 March	February	11 February
Summer	18 June	May	12 May
Autumn	24 September	August	11 August
Winter	17 December	November	10 November

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