Speech

Inflation Targeting: The UK Experience

Speech given by

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Abstract

In this paper I first review the background to the adoption of an inflation target in 1992 and the subsequent development of the regime, in particular the delegation of operational responsibility for monetary policy to the Bank of England in 1997 and the associated institutional framework. I then go on to explain some aspects of the way we formulate and conduct policy at the Bank, relating it to some of the burgeoning literature on inflation targeting. I next review some aspects of performance since the Bank's independence. I conclude with a discussion of the topical question of how monetary policy should respond to asset price booms and high rates of debt accumulation.

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1   Introduction

Over the past fifteen years a growing number of central banks around the world have followed the lead of the Reserve Bank of New Zealand in adopting an inflation target as the objective of monetary policy. The United Kingdom was one of the early followers of this trend, introducing an inflation target in the aftermath of sterling's exit from the Exchange Rate Mechanism (ERM) in September 1992. Since then, as indicated in Figure 1, inflation has been both low and remarkably stable, especially when viewed in the context of the UK's past inflation performance. Moreover, that has not come at the expense of other macroeconomic indicators, for growth has also been remarkably steady and close to trend (see Figure 2), while unemployment has fallen almost continuously throughout the last decade, reaching levels last seen in the early 1970s (see Figure 3). Given the experience of the previous twenty years, few commentators back in 1992 would have believed that the UK's economic performance could have turned out so well.

At the outset it should be stressed that this performance should not be solely attributed to the adoption of an inflation target. Major structural reforms to labour and product markets were carried out first by the Conservatives under Mrs Thatcher and consolidated in the 1990s by both political parties. There is little doubt that many of those reforms have improved the workings of the real economy. But the adoption of an inflation target has, I believe, made a real contribution to keeping inflation low and stable and helped provide the right sort of environment in which to reap the benefit of those reforms.

In this paper I first review the background to the adoption of an inflation target in 1992 and the subsequent development of the regime, in particular the delegation of operational responsibility for monetary policy to the Bank of England in 1997 and the associated institutional framework. I then go on to explain some aspects of the way the Bank's Monetary Policy Committee (MPC) formulates policy, relating it to some of the burgeoning literature on inflation targeting. I also review some aspects of performance since the Bank's independence. I conclude with a brief discussion of an issue that has recently preoccupied us, along with some other central banks, namely

how policy makers should respond to an asset price boom and/or high rates of private sector debt accumulation.

2   Some history

In order to set the context, it is helpful to begin by briefly recalling the various UK monetary policy strategies that had preceded the adoption of an inflation target. For the first part of the post-war period, monetary policy was assigned only a marginal role in the control of aggregate demand. In line with Keynesian precepts, fiscal policy was seen as the primary tool of macroeconomic stabilisation, while interest rates were to be set low to encourage investment and credit controls employed to restrain consumer borrowing. If excess demand pressures showed signs of spilling over into higher inflation and a deteriorating balance of payments, then incomes – rather than monetary - policy was the chosen tool to keep those pressures in check. When they turned out to be unsuccessful, resort would be made to devaluation in order to restore competitiveness. The demise of Bretton Woods and the move to a floating exchange rate removed the balance of payments as a constraint, but in its place came an increased tendency towards higher inflation in the face of excess aggregate demand. The acceleration of inflation in 1974 and the failure of incomes policy to bottle up inflationary pressures in anything more than the short term led to a growing awareness of the importance of monetary control in the management of aggregate demand. Monetary targets were first adopted by the Labour Chancellor, Denis Healey, in 1977, and in 1979 became the centrepiece of Mrs Thatcher's government's macroeconomic strategy. The latter was complemented during the ensuing decade by a sequence of market-oriented reforms to product and - especially - labour markets.

Monetary targets proved to be an unreliable guide to the conduct of monetary policy during the 1980s, however, on account of unpredictable movements in the velocity of circulation. The first chosen target aggregate was £M3, a broad aggregate including sterling time deposits with the banking sector. In order to reduce inflation, the target ranges were set at 7-11% for 1980 and 6-10% for 1981; the outturns were 18.4% and 16.3% respectively. But other indicators did not point to monetary laxity, with narrow money growth slowing from 12.1% in 1979 to 2.6% in 1981. And monetary policy

tightness was reflected in other developments in the economy: sterling rose by around a quarter, while output dipped more than 3% leading to a subsequent sharp fall in inflation.

That, and subsequent, experience led to considerable disenchantment with monetary targets within official circles, and a shift in focus onto the exchange rate as a suitable nominal anchor. Through the second half of the 1980s, the then Chancellor of the Exchequer, Nigel Lawson, pursued an informal exchange rate peg by shadowing the Deutsch Mark. This evolved into a formal exchange rate target when sterling entered the ERM in 1990 at 2.95DM/£, a rate was felt in some quarters as perhaps a little high. But that suited the government as it permitted lower interest rates – a sensitive matter in the United Kingdom on account of the prevalence of flexible rate mortgages - while still restraining inflationary pressures. The risks inherent in this strategy were brought home when the economy subsequently slowed sharply at exactly the same time as the pressures of German re-unification were pushing European interest rates upwards. Eventually the tension between following a tight policy in order to maintain the exchange rate peg and the desire to limit the domestic downturn by lowering interest rates became so great that the government's policy ceased to be credible, resulting in speculative attacks on sterling and the decision to quit the ERM on 16th September 1992.

There was now an urgent need for an alternative framework for the conduct of monetary policy. Monetary targets, and intermediate targets more generally, were seen to have failed because of the lack of a predictable relationship with the ultimate goal of policy. Furthermore shifts in the relationship between the intermediate target and the policy goal not only complicated the conduct of policy but also its communication. Furthermore, advances in economic understanding might well lead to a changed view on the most appropriate intermediate target. An inflation target offered a way out of this impasse. And by defining the framework in terms of the objectives of monetary policy, an inflation target allowed the strategy for its actual implementation to evolve without requiring continual respecification of the framework. The target measure chosen was the Retail Prices Index excluding mortgage interest payments (RPIX), with a target range of 1%-4% and the intention

that it should be in the lower half of that range by the end of that Parliament (scheduled to be in 1997).

Now it is worth emphasising that the adoption of an inflation target was also accompanied by important institutional changes. For the achievement of a measure of macroeconomic stability in the subsequent decade has probably had less to do with the adoption of an inflation target *per se*, and more to do with the associated institutional changes. Prior to the adoption of an inflation target, interest rate decisions were often taken in response to a crisis or else with half an eye on political considerations. By instituting a regular monthly meeting between the Chancellor and the Governor of the Bank of England and their respective advisory teams, there was a greater chance that policy decisions might be made in a forward-looking rather than purely reactive way. More importantly, the decision to publish minutes of those meetings (dubbed the "Ken and Eddie show" by the press) exposed the thinking behind decisions and thereby allowed the Governor to register disapproval if he thought the Chancellor's decisions inappropriate (the actual decision was purely in the hands of the Chancellor). This provided a highly visible public check on the monetary decisions of the executive, and was reinforced by the publication by the Bank of a quarterly *Inflation Report* containing analysis of the inflationary trends in the economy, including conditional forecasts of inflation over a two-year horizon complete with estimates of margins of error.

3   Bank of England independence

Though the post-1992 institutional changes placed some constraints on the ability of the Chancellor to base interest rate decisions on political rather than economic considerations, that discipline was inevitably only partial given the scope for differences in view about the prospects for inflation. Thus a Chancellor could judge that interest rates should be lower than the Governor either because of genuine differences in view about economic prospects or because of political considerations. As an outside observer could never be sure that it was the former rather than the latter, the new arrangements lacked full credibility. That lack of full credibility is evident in long-term (10 year) inflation expectations implied from a comparison of the yields on

nominal and indexed government debt. As Figure 4 reveals, inflation expectations in 1996 were close to 5%, and moreover had been tending to edge up as the date of the election drew nearer.

A lack of counter-inflationary credibility in monetary policy was potentially even more of an issue for the incoming Labour government that took power on 1st May 1997. The economic record of the previous Labour government over the 1974-9 period had not proved a success and part of Labour's objective while in opposition had been to show they could be trusted with the economy. To help to substantiate that, Chancellor Gordon Brown's first act was to hand over operational responsibility for achieving the inflation target to the Bank of England, or more precisely a Monetary Policy Committee (MPC) that comprised five Bank officials and four external experts. But unlike some other central banks, responsibility for setting the inflation target remained with the Chancellor. This act generated an immediate credibility gain as long-term inflation expectations fell by more than half a percentage point (see Figure 4). That was followed by further gains over subsequent months as inflation expectations converged on the target of 2.5%.

Despite these credibility gains, it is worth noting that giving the Bank operational independence was nevertheless seen as a revolutionary step and did not immediately gain the wholehearted support of all sections of the parliamentary Labour party. This is important, as aspects of the UK model stem from the context in which it was forged. In particular, it would probably have been a step too far to also allow the Bank to set the target. It also explains the considerable stress placed on the accountability of the MPC.

The new regime required legislative changes and these are embodied in the *Bank of England Act* (1998). That charges the Bank "to maintain price stability, and subject to that to support the economic policy of (the) government, including the objectives for growth and employment". The lexicographic structure of this general objective imitates the wording in Article 105 of the Maastricht Treaty laying out the statutory objectives of the European Central Bank (ECB). But in contrast to the ECB which is free to choose exactly how it interprets its general objective, the MPC is each year provided with a *Remit* by the Chancellor which defines "price stability" more

precisely. So as to maintain continuity with the pre-1997 regime, that was chosen to be an annual rate of inflation of 2.5% for RPIX "at all times". The *Remit* has remained the same since then, though the Chancellor announced in his June 2003 statement on euro entry that the targeted measure would in due course be changed to the Harmonised Index of Consumer Prices (HICP)[1] - the corresponding measure to that used by the ECB. The *Remit* also fleshes out the "economic policy of the government", namely the maintenance of high and stable levels of growth and employment.

From time to time this framework has been criticised for paying insufficient attention to economic objectives other than inflation (though the critics usually believe that the statement of objectives makes no reference whatsoever to growth, employment, etc, which is not the case). It is also sometimes suggested that the statement of objectives should put equal weight on inflation and activity, as is the case in the United States with the Federal Reserve.

Are there grounds for thinking the objective is overly focussed on inflation? My own view is No. The Chancellor's original letter to the Governor at the time of independence makes clear that, although the target is 2.5% "at all times", we are not expected to achieve it continuously. Inevitably from time to time there will be shocks that drive inflation away from target. Given the lags inherent in the transmission mechanism of monetary policy, it may be difficult to offset such shocks if they are temporary and will have faded by the time the effect of any change in interest rates is starting to be felt. And even if some shocks could be offset in principle, there may nevertheless be a good case for allowing temporary slippage relative to target in order to avoid undue volatility in activity; that is particularly the case with some sorts of supply shock. In essence, we have a degree of "constrained discretion" in deciding exactly how to deal with shocks and how quickly to plan to bring inflation back to target when it has moved away (see King, 1997).

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[1] It is likely that the numerical value of the target will change at the same time that the targeted measure is changed as the rate of inflation of HICP has on average run about three-quarters of a percentage point below that of RPIX, reflecting differences in construction and the inclusion of a housing cost component in RPIX. The current (August 2003) difference of 1.5 percentage points is

The lexicographic structure of the objective is, I believe, a practical solution to the problem of how to instruct an agent (the central bank) to minimise (the expected value of) a discounted loss function of the general form

(1)
$$L_t = \sum_{k=0}^{k=\infty} \beta^k L(\pi_{t+k} - \pi^*, \ y_{t+k} - y^*_{t+k}),$$

where L(.) is concave in both its arguments (e.g. quadratic), π_t is inflation, π^* is the ideal inflation rate, y_t is output, y^*_t is the natural rate of output (note that unlike π^* this is time-varying), and β is a discount factor. I do not think it is a practical option to legislate such an objective function into law, but the lexicographic structure in effect first describes the "high-level" inflation objective and the associated bliss point, π^*, before going on to recognise the presence of activity in the loss function under the heading of supporting the general economic policy of the government with respect to growth and employment.

One might be tempted to suggest that the principal ought to specify a "high-level" target for output, y^*_t as well. However, unlike π^* the natural rate of output is not known with any certainty. Given the absence of any long-run trade-off between inflation and activity under the natural rate hypothesis – a common feature of many macroeconomic models – and the consequent inability of monetary policy to influence anything other than inflation in the long-run, nothing is lost by this omission as output must gravitate to the natural rate in the long-run as expectations adjust and nominal rigidities work their way out[2]. Moreover, if the government were to set a "high-level" target for output, it would reintroduce scope for the manipulation of interest rates for political ends. The lexicographic structure also helps to insulate the central bank from pressures to pursue a more accommodative monetary policy in the short run if that conflicts with keeping inflation close to target.

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unusually wide, reflecting recent high house price inflation, but is likely to shrink as house price inflation subsides. For further details, see Bank of England (2003).

[2] Of course there is a large literature, stemming from Kydland and Prescott (1977) and Barro and Gordon (1983), that assumes the policymaker targets a level of output above the natural rate. For the reasons explained in Bean (1998), I do not think this is an accurate description of what central banks are trying to do. See Blinder (1997) for a similar view.

Of course, the *Remit* does not specify the relative weight we are supposed to place on deviations of inflation from target and output from potential. So the "contract" between the government and the Bank is incomplete. Svensson (2003a) has argued that in the interests of transparency the members of the MPC ought to reveal their individual or collective objective function - and in particular the relative weight placed on deviations of inflation from target and output from potential. Though this might be of interest to academics and technicians, I am not sure that it would be very revealing, and quite possibly confusing, to the public at large. Moreover, I think that in practice it would make little difference. Empirical evidence suggests that the "Taylor frontier" that traces out the minimum feasible inflation variance for a given output variance may be quite sharply curved. In that case a wide range of plausible loss functions lead to rather similar policy choices (Bean, 1998). More importantly, as detailed below, any deviation of inflation of more than 1% either side of the target triggers an Open Letter from the Governor to the Chancellor, which amongst other things is supposed to say how quickly the MPC expect to bring inflation back to target. The Chancellor's (open) response to that letter would allow him to indicate whether that was too rapid, or not rapid enough, if he so wished.

A valuable feature of the current regime has, I believe, been the choice of a point target. That has given simplicity and clarity to the target and helped to anchor private sector inflation expectations in a way that would not necessarily be the case with a target band, particularly if that band is quite wide[3] as there may be ambiguity about exactly where in the band the central bank is aiming for.

Another feature of the UK model that is worth highlighting is the emphasis placed on accountability that accompanied the decision to delegate operational responsibility for monetary policy to the MPC. The primary channels are threefold. First, the MPC is accountable to the Court of the Bank[4], whose job it is to oversee the Committee's processes though not its interest rate decisions. Second, members of the MPC appear before the appropriate Committee of Parliament, usually shortly after the publication of the *Inflation Report*, to be questioned about the reasoning behind interest rate

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[3] This is obviously not so much of a problem when the band is narrow. Thus the Reserve Bank of Australia targets a "thick point" of 2-3% inflation.

decisions. Importantly members are held individually accountable for their votes. Third, as already noted, if inflation deviates more than one percentage point from target, the Governor is expected to write an Open Letter to the Chancellor explaining why the deviation has occurred, what action the Committee is taking to bring inflation back to target, and how that is consistent with the government's general economic policies.

It is worth stressing that the Open Letter is part of the arrangements for public accountability, not an elaboration of the target into a *de facto* 1.5%-3.5% tolerance band. Sending an Open Letter is not therefore to be seen as a sign that we have "failed", rather it is a trigger for a public explanation as to why the deviation has occurred.

Effective accountability requires a degree of transparency and openness about our processes and deliberations. But transparency and openness also helps outsiders understand the thinking behind interest rate decisions and thus allows them to build up a picture of our reaction function. As King (1997) remarked, our goal is to make monetary policy boring: if our reaction function is well understood, then markets will react only to the news in the economic data - there should be no news in our subsequent decision. Of course, perfect predictability is unachievable because outsiders can never know exactly what we will make of the latest data, but our intent is clear.

The two main channels for explaining our thinking are the minutes of the policy meeting, published two weeks later along with the individual votes, and the quarterly *Inflation Report*, produced by Bank staff with the approval of the MPC. Although we usually produce a press statement when rates are changed (or if they are not changed when it was expected they would be) we only seek to give a broad brush indication of the reasons behind the decision, preferring to leave it until the minutes are published to give a more complete flavour of the pros and cons of the various arguments. Also we prefer to hold press conferences only quarterly, on the occasion of publication of the *Inflation Report*, rather than after every policy meeting, so as to ensure that

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[4] This comprises the Governor, the two Deputy Governors and 16 non-executive directors, drawn from all sections of commerce and society.

markets and commentators get the full story, rather than a possibly incomplete one. Of course, other central banks choose to achieve transparency in different ways and I think it is important to recognise that there is no single best way – *chacun a son goût*.

4   Process: the Committee

All independent central banks – whether they are inflation targetters or not – have broadly similar processes, involving regular briefing of the policy board (or policy maker if it is a singleton) by the bank's staff, and usually involving the periodic production of a forecast to help guide the decision maker(s) (for more details on the specifics of the Bank and MPC's processes, see Bean and Jenkinson, 2001). But there are a number of aspects about the way the MPC functions that marks us out, or at least puts us at one end of the spectrum of approaches. These follow in large part from the make-up of the Committee.

First, as noted earlier, the Bank of England's MPC comprises five members of the Bank's staff[5] *ex officio* and four external members, appointed by the Chancellor. The role envisaged for the externals was to keep the Bank on its toes and inject fresh thinking; this they have certainly achieved. Importantly, the Chancellor took the decision that these external members should be experts who brought knowledge relevant to the setting of monetary policy to the Committee. While only a minority have been monetary specialists, all the appointees have been economically literate. And that is also generally true of the internal members. In fact of the 20 past and present members of the Committee, no fewer than nine have held academic positions in economics at some time in their career and the remainder have either been professional economists or acquired considerable economic expertise in the course of their former occupations.

So the degree of economic literacy on the Committee is high. That is not the case with all central bank policy boards, which sometimes have a preponderance of

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[5] The Governor, the two Deputy Governors, and the Executive Directors for Monetary Analysis and for Market Operations. The three Governors are all Crown appointments.

representatives of business and commerce[6]. The creation of the MPC has thus not only taken politics out of monetary policy, but it has also put economics firmly into it. Now obviously that is not a guarantee that the Committee will always make the right decision, but given that the setting of monetary policy is a technical matter that requires an understanding of how economies behave, I believe economists have a better chance of getting it right than do those untutored in the dismal science.

Second, by appointing strong-minded individuals who are willing to take an independent stand, it has fostered healthy debate. That has been immeasurably helped by the Chair, in the person of the Governor, who refrains from seeking to impose his own views on the rest of the Committee. There is no attempt to seek a consensus. Indeed that is a consequence of our invidual accountability under the legislation. So we each vote according to our interpretation of the data, our view of economic prospects and the various issues that might guide the policy decision. That is reflected in the diversity in the voting patterns which has displayed just about every combination imaginable.

Now it should be said that the willingness to reveal disagreements – often amplified through members' speeches – could have backfired in that it could have led to confusing messages. That would have especially been the case if the Committee sought to take decisions by consensus. But once market participants and commentators had grasped that the Committee comprised nine independent individuals this willingness to disagree has, I believe, turned out to be a strength in that it reinforces the point that the future - not to mention the past - is uncertain and it is reasonable for there to be (usually slight) differences in interpretation.

This naturally raises the question of whether having a Committee also leads to better decisions. My personal view is Yes – I certainly find the discussion with my colleagues on the MPC invaluable in forming my own view. But it is not easy to test the proposition that having a Committee has improved the quality of decision making. However, some of our staff have recently conducted an interesting experiment using

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[6] For instance the the nine-person Board of the Reserve Bank of Australia includes the Governor, Deputy Governor, a (voting) Treasury representative and six externals, of whom typically only one is a professional economist.

170 economics students at the London School of Economics as guinea pigs that suggests having a Committee indeed adds value (Lombardelli, Talbot and Proudman, 2002).

In this experiment, the students were asked to act as monetary policy makers by attempting to control a simple macroeconomic model - comprising an IS curve and a Phillips curve - that was subject to random shocks each period, as well as a structural shock that occurred at some point during the game. In each period, participants chose the interest rate observing only the previous period's realisations of output and inflation. So over the course of the game, participants could learn about the structure of the model. Participants were also paid according to a pay-off function that depended on their ability to stabilise output and inflation.

The students were divided into 34 groups of five, each playing 16 rounds, with each round consisting of 10 periods. In the first and last four rounds, participants made their decisions in isolation, but in the middle eight they came together as a committee, with their joint decision set equal to the median of their individual recommendations (as a proxy for majority voting). Figure 5 shows the evolution of the average across the 34 groups of the mean and median scores within each group. A number of points are worth noting. First, there is a general upward trend in scores that is associated with learning about the structure of the economy. Second, there is a large rise in scores when the switch is made to decision-making by committee. This gain comes from two sources: the distance AB reflects the neutralising impact of committee decisions of the effect of weak players; and the distance BC reflects the additional gain from the sharing of information. Third, there is a large downward movement in scores, when players revert to playing individually. That again indicates the value of a committee decision, as it cannot be attributable to learning. Another interesting finding - not displayed in the Figure – is the mean committee score is somewhat higher than the mean score of the best individual playing alone. That suggests that the committee process involves more than the person with the best understanding sharing their knowledge with others – even the best player benefits. Of course, the environment here is a long way from that inhabited by the MPC, but the results are certainly consistent with my own perception of the value of having a committee make the monetary policy decision.

5   Process: the forecast

A notable feature of our procedures is the central role played by the quarterly forecast. As already noted, in many central banks the staff produce a forecast that is an input into the policy decision, along with a range of other data and indicators. That is the case for instance with the ECB, where the first pillar of the monetary strategy rests on a broad-based assessment of inflation prospects, including econometrically-based forecasts, while the second pillar rests on an assessment of monetary developments. But those forecasts often remain purely a staff view. By contrast, at the Bank of England the forecasts published in the quarterly *Inflation Report* are those of the Committee, rather than the staff, and their production involves a considerable amount of active input on the part of the Committee.

Thus each forecast round starts with the preparation of a "benchmark forecast" by the staff, incorporating new data, etc, onto the previous forecast. That is discussed with the Committee and a series of "key issues" identified. These are issues where judgment is required and which have a material effect on the expected inflation profile. In a series of meetings with the staff, the Committee discuss and debate those issues, intermediated through one or more of the Bank's "suite" of economic models, and arrive at a best collective judgement on each key issue. These are then incorporated in a revised set of projections, followed by a further two or three meetings, at which the forecasts are compared with those of outsiders, with forecasts produced from other models in the Bank's suite, and if necessary further tuned. In all there are usually six or seven substantial meetings between the Committee and the staff during each forecast round before a final forecast is produced that embodies the overall best collective judgement of the Committee.

It should be clear that this approach to the forecast would not be possible without, first, a high degree of economic literacy on the part of members of the Committee; and, second, Committee members who spend a substantial amount of time in the Bank - it would be more difficult to operate in this way in federal systems, such as the Federal Reserve or the European System of Central Banks, for instance.

The quarterly forecast round plays a dual role in our process. First, it is the period when we discuss most intensively how the various pieces of data fit together, and the associated key economic issues, within an explicitly quantitative framework. That means the model(s) of the economy that we employ need to have a theoretical structure that embodies the Committee's economic paradigm reasonably closely if the discussions are to be fruitful. A model that fitted the data well, but did not have a recognisable theoretical basis would not be particularly useful for such a function. Consequently, though we use VARs, factor analytic models, and the like as a cross-check on the projections, they are not so useful in constructing "stories", a function that is essential for an effective forecast process. In order to improve our ability to tell such stories in a way that matches the Committee's thinking, we are currently in the throes of adding a new model to our suite. This model is built around a dynamic stochastic general equilibrium core that includes both real and nominal rigidities, augmented with some additional terms to improve its coherence with the data, and contains explicit expectations terms enabling a variety of "what if?" simulations to be easily conducted.

The second function of the forecast is as an aid to communicating the rationale for our interest rate decisions to the outside world. Lags in the transmission mechanism of monetary policy mean that all central bankers, and especially those with explicit inflation targets need to be forward-looking, focussing not on the current rate of inflation which may be subject to all sort of transient influences which the central bank is powerless to affect. Instead, the policy maker needs to focus on inflationary prospects into the medium-term and beyond. Our forecasts for growth and inflation, over a two-year horizon, presented as explicit probability distributions (the "fan charts") rather than as point forecasts[7], help to set the context in which interest rate decisions are made.

The publication of forecasts, and the linking of interest rate decisions to those forecasts, has certainly helped outside commentators understand that we aim to be

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[7] It is worth noting that they are not true unconditional forecasts, but rather forecasts conditioned on an assumed path for official interest rate rates – either unchanged rates or the path implied by the profile

forward-looking and pre-emptive, rather than simply responding to the current rate of inflation. However, an unfortunate by-product has been that some commentators have come to believe that in setting interest rates we follow a rather mechanistic approach, namely adjusting the current official interest rate until the central projection (mode) for inflation at the forecast horizon is on target. That is true not only of some financial commentators, but also of some academic writers (see e.g. Giannoni and Woodford, 2003), and in a number of academic studies inflation targeting is characterised by an instrument rule relating the nominal interest rate, i_t, to expected inflation at a fixed horizon in the future and (possibly) a Taylor-style output gap term:

(2) $$i_t = i^*_t + \lambda(E_t\pi_{t+k} - \pi^*) + \mu(y^*_t - y_t),$$

where λ and μ are positive constants, with $\lambda \to \infty$ giving "strict" inflation targeting of the sort the MPC are said to follow. This view of what inflation targeting is about has also led some people to argue that it leaves insufficient room for discretion.

Svensson (2003b) has argued persuasively that this approach to implementing inflation targets is seriously flawed and offers an alternative view that characterises "flexible" inflation targeting as the policy that implements the first-order condition obtained from a suitable optimisation problem (see also Svensson and Woodford, 1999; and Giannoni and Woodford, 2002). Specifically, to take a simple example, suppose that the loss function is quadratic:

(3) $$L_t = E_t[\sum_{k=0}^{k=\infty} \beta^k\{(\pi_{t+k} - \pi^*)^2 + \lambda(y_{t+k} - y^*_{t+k})^2\}/2],$$

and the supply side is given by a New Keynesian Phillips curve:

(4) $$\pi_t = \beta E_t\pi_{t+1} + \kappa(y_t - y^*_t) + u_t,$$

where u_t is a supply shock. Then the optimum policy (under commitment from the "timeless perspective") satisfies the first-order conditions (for all $k \geq 0$):

of market interest rates. For that reason we often refer to them as "projections" to emphasise their hypothetical nature.

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(5) $\qquad E_t\pi_{t+k} = -\ (\lambda/\kappa)E_t[(y_{t+k}-y^*_{t+k}) - (y_{t+k-1}-y^*_{t+k-1})].$

The optimal plan thus equates the marginal rate of transformation between output and inflation that is embodied in the supply schedule with the marginal rate of substitution that is embodied in the loss function. It ensures that inflation will be brought back to target, but at a rate that recognises the consequences for activity.

So which is the better characeterisation of how the MPC behaves? On the face of it, the sequence of published fan charts since independence, in which the central projection has almost always been quite close to target at the two-year horizon, might appear to support the first characterisation of our behaviour. However, as stated earlier, I see inflation targeting as really being a statement about the *objectives* of the monetary policy maker, rather than a detailed description of how it is achieved. The *Remit* itself says nothing about a two-year horizon – it enjoins us to target 2.5% inflation at all times, but to take on board the implications for growth and employment in deciding how we pursue our primary objective. As most of the impact of a change in interest rates will have worked its way through the economy after two years, the two-year point makes a convenient reference point for the purposes of communication. But as the Committee has explained on a number of occasions there is no mechanical link between the central projection at the forecast horizon and the policy decision. The latter may also be affected by "the balance of risks", i.e. the skewness of the probability distribution, what is happening to inflation both before and beyond the two-year horizon and what is happening to activity (see e.g. Bank of England, 2000).

The fact that the central projection for inflation two years out has usually been quite close to 2.5% is, I think, a straightforward consequence of the fact that inflation has rarely strayed very far from target – an Open Letter has so far not been triggered despite expectations in 1997 that they might be triggered nearly half the time – and output has been quite close to potential with growth close to trend. But if inflation had strayed far from target, then the Committee would surely have needed to consider

how quickly to bring it back, and might well have chosen to do so over a longer time horizon than two years.

6   Performance

As noted at the outset, macroeconomic performance since the inception of inflation targeting in October 1992 has probably exceeded the expectations of most commentators. RPIX inflation has averaged 2.6%, and GDP growth[8] has averaged 2.8%; since Bank independence the corresponding figures are 2.4% and 2.5%. Given previous experience, both growth and inflation have also been remarkably stable, as a glance at Figures 1 and 2 reveals.

Should any significance be attached to the slight tendency for inflation to undershoot the target since independence? First, it should be said that this was not the result of a conscious decision by the Committee because, as already noted, the published forecasts usually showed the central projection close to target by the end of the forecast horizon. Rather it was the consequence of forecast error. Table 1 provides information on the average forecast error (relative to the mean of the fan chart probability distribution), the average absolute forecast error and the dispersion of forecast outturns relative to the fan chart probability distributions. These indeed show a slight bias in the forecasts of inflation two years ahead, though the average error is not large[9]. It turns out that there are two main factors behind the tendency to over-forecast inflation during the 1998-2002 period. The first is the sharp appreciation of sterling that occurred in 1996, which both the Committee and outside commentators thought likely to be temporary, but ultimately proved to be more permanent (see Figure 6). Consequently externally driven inflationary pressures were over-estimated. Second, the UK's supply-side performance turned out to be rather better than expected - in particular falling unemployment did not lead to any marked pick up in wage inflation.

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[8] Calculated on a 1995 price basis.
[9] The fact that these forecast errors were serially correlated also attracted attention (Wadhwani, 2001), though Pagan (2003) points out that, since inflation is highly serially correlated and that the observations are overlapping, this is not an unlikely occurence.

The high degree of stability in inflation is more interesting, and is reflected in the fact that outturns have tended to be closer to the centre of the forecast probability distributions than the Committee would have expected – for instance, three-quarters of the outturns have been within the central 50% of their respective two-year ahead distributions. This stability is not the unique to the United Kingdom and most other industrialised countries – some, but not all, of whom are inflation targetters - have experienced a similar phenomenon during the 1990s. And it is also true that growth rates have tended to exhibit greater stability than in previous decades.

There are at least three possible explanations for this greater stability. First, smaller shocks, or a particularly benign sequence of shocks. Second, structural changes in the economy, possibly associated with the IT revolution and the advent of just-in-time production processes that have attenuated the amplification and propagation induced by the inventory cycle. And, third, improved macroeconomic policies leading to reduced cyclical variability and better anchoring of inflation expectations. All three are likely to have played a part, though the relative importance of individual factors is still a matter for debate. For instance, Cecchetti, Flores-Lagunes and Krause (2001) argue that better monetary policy should take the lion's share of the credit, whereas Stock and Watson (2003) argue that the role of policy is negligible. This is an area where further research would be useful.

6   Asset prices, debt and inflation targets

To conclude, I want to turn to an issue that is a matter of current debate amongst central bankers and monetary economists, namely the appropriate response of monetary policy to asset price bubbles and any associated rapid expansion of credit. In the aftermath of the collapse of the dot-com bubble and the more recent wider correction to international share values, a number of commentators have argued that the achievement of price stability by central banks may be associated with heightened risks of financial instability. They argue that central banks should not focus solely on inflation prospects, but also take account of developments in asset prices, debt and

other indicators that may be symptomatic of incipient financial imbalances. That view is neatly summarised by Crockett (2003; italics in original):

> "(I)n a monetary regime in which the central bank's operational objective is expressed *exclusively* in terms of short-term inflation, there may be insufficient protection against the build up of financial imbalances that lies at the root of much of the financial instability we observe. This could be so if the focus on short-term inflation control meant that the authorities did not tighten monetary policy sufficiently pre-emptively to lean against excessive credit expansion and asset price increases. In jargon, if the monetary policy reaction function does not incorporate financial imbalances, the monetary anchor may fail to deliver financial stability."

According to this view, policy should be tightened if the policy maker believes that an asset price bubble is developing, or if balance sheets show signs of becoming stretched through excessive debt accumulation, even though inflation may be well under control. Failing to do this may raise the likelihood of financial instability further down the road.

This argument is developed at greater length by Borio and Lowe (2002) who emphasise that it is not asset price bubbles *per se* that central bankers should be concerned about, but rather the broader set of symptoms that usually accompany asset price booms, namely a build-up of debt and a high rate of capital accumulation. During the asset price boom - which may initially be prompted by an improvement in economic fundamentals, such as an increase in total factor productivity growth occasioned by a new technology - balance sheets may look healthy as the appreciation in asset values offsets the build-up of debt. But when optimism turns to pessimism, the correction in asset values results in a sharp deterioration in net worth, stretched balance sheets, retrenchment and possible financial instability. This process may be further aggravated if banks respond to the deterioration in balance sheets by restricting lending, i.e. a credit crunch.

But others are more sceptical about the usefulness of using monetary policy in this way. Raising interest rates to "prick" an apparent bubble may simply produce the sort

of economic collapse one wants to avoid. The best that one can do is deal with the consequences as the bubble bursts or financial imbalances unwind. This more orthodox view is well summarised by Chairman Greenspan (2002):

> "Such data suggest that nothing short of a sharp increase in short-term rates that engenders a significant economic retrenchment is sufficient to check a nascent bubble. The notion that a well-timed incremental tightening could have been calibrated to prevent the late 1990s bubble is almost surely an illusion. Instead, we …need to focus on policies to mitigate the fallout when it occurs and, hopefully, ease the transition to the next expansion."

This debate revolves around the desirability and feasibility of pre-emptive monetary policy tightening in order to prevent subsequent financial instability, and there is a growing literature examining this question. Much of this literature focuses on stochastic asset price bubbles (see e.g. Bernanke and Gertler 1999, 2001; Cecchetti, Genberg, Lipsky and Wadhwani, 2000; Cecchetti, Genberg and Wadhwani, 2003; and Gruen, Plumb and Stone, 2003), and analyses the implications in a suitably calibrated macroeconomic model of following either a simple Taylor rule or an inflation-forecast-targeting rule augmented with the asset price. The bottom line of this literature seems to be that the results hinge on the particular stochastic assumptions regarding the asset price (as well as other shocks that might provide a fundamental explanation for the asset price movements) and above all on the information available to the policy maker. Gruen, Plumb and Stone, in particular, argue that the policy maker needs to know rather a lot about the nature of the bubble, and needs to know it early, if a pre-emptive activist policy is to be effective.

Suppose, for the sake of the argument, that policy makers do have the information that Gruen, Plumb and Stone find is required. What does that say about the pursuit of inflation targets? This debate is often couched in language that appears to suggest that inflation targets are not enough, e.g. the quote above from Crockett. And that would indeed be the case if one assumed that the inflation target was implemented through the adoption of an instrument rule in which the interest rate is adjusted in line with the expected deviation of inflation from target (say) two years ahead, as in equation (2). But, as noted above, that is not what inflation targeting is all about, in the United

Kingdom at least. Our *Remit* dictates that we should target annual RPIX inflation of 2.5% *at all times*, and that we should be mindful of the implications for growth and employment in achieving that. There is nothing in our *Remit* that tells us to focus on inflation exclusively at the two-year horizon. In fact doing so would actually run counter to the *Remit*!

Now Borio and Lowe, Crockett, and Cecchetti et al. are concerned about asset price booms and the associated credit expansion because of the instability that may result when the boom later turns to bust, balance sheets become stretched and agents then seek to rebuild them by cutting back on expenditure. Financial instability in the shape of failures of financial intermediaries may or may not be the result, but there is certain to be a fall in aggregate demand, resulting in a reduction in inflationary pressures unless there is an appropriate policy response. In other words asset price booms and debt accumulation based on over-optimism about the future are likely to lead to future macroeconomic instability when expectations adjust and an increased likelihood of deviating from the inflation target in the future. Accordingly a tighter policy to moderate an asset boom that led to a near-term undershoot of the inflation target would nevertheless be in accordance with our *Remit*, if it also sufficiently increased the likelihood of staying close to target further down the road.

I therefore do not see any difficulty *in principle* in taking on board the implications of concerns about asset price bubbles, incipient financial imbalances, etc., within an inflation targeting framework. And indeed Cecchetti et al., who do advocate an activist response to asset price movements, stress that their recommendations are entirely consistent with a framework of inflation targets. But taking on board the sort of concerns that are raised by Borio and Lowe, Crockett and Cecchetti et al. would require a change in rhetoric to emphasise that current interest rate decisions were motivated by considerations that impacted beyond the normal two-year horizon for which forecasts are published. For further discussion of this general issue, see Bean (2003).

The far harder problem is to diagnose what should be done in a particular circumstance. That can usefully be illustrated by recent developments in the UK household sector. Over the period since 1997, consumption growth in real terms has

consistently outstripped that of output, though the difference is rather less marked in current price terms because of the marked improvement in the terms of trade; see Figure 7. And that discrepancy has become somewhat more pronounced during the post-2000 global slowdown as the MPC has deliberately sought to bolster domestic demand through lower interest rates in order to offset the impact on overall spending on UK goods and services. That policy has been reasonably successful in so far as it has avoided recession, kept inflation close to the target and prevented any substantial rise in unemployment (see Figures 1-3). However, the consistent strength of consumer spending has been accompanied by high rates of house price inflation (Figure 8) and rapid debt accumulation (Figure 9). Some commentators have consequently warned that this strategy could end in tears with a house price crash and/or retrenchment by consumers in the face of excessive debt levels (see, e.g. International Monetary Fund, 2003).

There are two questions that need to be addressed here. First, what is the likelihood of a future sharp correction to house prices and to consumer spending? Second, if a future correction is likely, how should policy be modified now to take account of that?

The likelihood of a future correction is in part bound up with whether the movements in house prices and debt are warranted by fundamentals or instead reflect unwarranted optimism. A sharp drop in aggregate demand would be more likely in the latter case. So why might the price of houses have risen?

The demand for housing services (at given permanent income) is likely to have risen for at least three reasons. First, the transition to a low inflation environment implies that nominal interest rates should also be lower on average. As standard mortgages entail an even flow of nominal payments over the life of the mortgage, the initial real payments on a given nominal debt are smaller than they would be if inflation and interest rates were high, with the real burden of payments towards the end of the loan period being correspondingly greater. Shifting the pattern of real payments into the future makes credit-constrained households more willing to borrow to finance house purchase, thus driving up the demand for housing. Second, increased competition amongst lenders and the application of better credit scoring techniques appears to

have increased the supply of loans. And third, population growth and demographic developments – more people wanting to live alone and an increased desire for second homes – has also boosted demand. Finally, the rate of construction of new dwellings has lagged behind the expansion in the number of households, in part because of a shortage of land and the impact of planning constraints, so that the supply of housing has also been restricted.

In sum, there are good structural reasons why the ratio of house prices to income should have risen. Inevitably there is considerable uncertainty about what the underlying equilibrium value of this ratio is, but a comparison of rental yields with the long-term real interest rate suggests that the former is not unusually low, as would be the case if speculative buying in the anticipation of further capital gains had driven house prices up; see Figure 10.

The evolution of household debt is in large part a reflection of what has been going on in the housing market. Some four-fifths of household debt is secured against housing (see Figure 9) and an increase in the debt-income ratio is a natural by-product of an increase in house prices as households take out bigger mortgages to buy more expensive properties. As a consequence the build-up of debt has not been associated with a deterioration in household net worth: total net wealth has almost doubled since 1995. And we also know from the British Household Panel Survey (BHPS) that at the microeconomic level those households with high debt levels also tend to have a lot of assets - which is hardly surprising as people usually take out large mortgages in order to buy expensive houses. Finally, the share of owner-occupiers has been rising steadily over the last decade, imparting an underlying upward trend to the aggregate debt-income ratio even in the absence of any change in the average debt per indebted household (see Hamilton, 2003).

But it is, of course, possible not only that house price inflation may have been greater than warranted by fundamentals, but also that some household borrowing may have been based on over-optimistic assessments of future prospects or else failed to factor in the possibility of job loss or increases in interest rates. Now according to the BHPS roughly a third of indebted households have no liquid assets to speak of. If those households have already borrowed up to the limit, then a future adverse shock to

disposable income would lead those households to cut back spending sharply. And a period of rapid debt accumulation driven by over-optimism is also likely to be associated with an increase in the fraction of households that could find themselves in such a position. As a consequence, stretched household balance sheets may act to amplify the impact of adverse shocks. But the extent to which this is likely to be a problem is hard to judge in the absence of detailed information on the circumstances of individual households. Nevertheless, prudence dictates that such a possibility should be factored into the policy decision.

But how *much* tighter should policy today be given these concerns? That is not a straightforward question to answer. First, policy can always be relaxed if and when an adverse shock occurs, though some pre-emptive action to reduce the consequences of such a shock would seem to be warranted. Second, it is not clear that an increase in interest rates would have much effect on future debt levels - it all depends on whether the semi-elasticity of the debt stock with respect to the interest rate is greater or less than unity; households expectations about their future circumstances are probably more important, and they may be impervious to changes in official interest rates. Finally, even if one is confident that an interest rate increase today would reduce debt accumulation and the amplitude of an asset price bubble, one has to balance the relatively certain short-term costs in terms of foregone output and an undershoot of the inflation target against the more uncertain medium to long-term gains. In sum, calibrating an appropriate pre-emptive policy response is extraordinarily difficult.

7   Concluding Remarks

Britain's monetary policy regime seems to have been in a state of perpetual revolution for much of the post-war period. However, learning from the experience of other countries, we now seem to have found a set of institutional arrangements and a monetary policy framework that have served to bring a degree of macroeconomic stability to the United Kingdom that could never have been envisaged in 1992. Of the two ingredients – the operational independence of the Bank and an inflation target - the former is perhaps more fundamental. But the latter has also been important in helping cement low and stable inflation and in anchoring inflation expectations. No

doubt the world will continue to throw up new challenges to monetary policy makers, in the United Kingdom and elsewhere. Our application of inflation targets will need to evolve to meet those challenges, but the current structure does, I believe, offer a robust and flexible apparatus in which to address them.

References

Bank of England (2000), *Inflation Report*, November.

Bank of England (2003), *Inflation Report*, May.

Barro, R J and D Gordon (1983), 'A positive theory of monetary policy in a natural rate model', *Journal of Political Economy*, 91, pp.589-610.

Bean, C R (1998), 'The new UK monetary arrangements: A view from the literature', *Economic Journal*, 108, pp.1795-1809.

Bean, C R (2003), 'Asset prices, financial imbalances and monetary policy: are inflation targets enough?', paper presented to the Reserve Bank of Australia annual conference, Sydney.

Bean, C R and N H Jenkinson (2001), 'The formulation of monetary policy at the Bank of England', *Bank of England Quarterly Bulletin*, Winter, pp.434-441.

Blinder, A (1997), 'What central bankers can learn from academia – and vice versa', *Journal of Economic Perspectives*, 11, pp.3-19.

Bernanke, B S and M Gertler (1999), 'Monetary policy and asset volatility' *Federal Reserve Bank of Kansas City Economic Review*, 84(4), pp. 17-52.

Bernanke, B S and M Gertler (2001), 'Should central banks respond to movements in asset prices?' *American Economic Review*, 91(2), pp. 253-257.

Borio, C and P Lowe (2002), "Asset prices, financial and monetary stability: exploring the nexus", mimeo, BIS, Basle.

Cecchetti, S G, A Flores-Lagunes and S Krause (2001), 'Has monetary policy become more efficient? A cross-country analysis', mimeo, Brandeis University.

Cecchetti, S G, H Genberg, J Lipsky and S Wadhwani (2000), 'Asset prices and central bank policy', *Geneva Reports on the World Economy*, 2, International Centre for Monetary and Banking Studies and Centre for Economic Policy Research.

Cecchetti, S G, H Genberg and S Wadhwani (2002), 'Asset prices in a flexible inflation targeting framework', in *Asset Price Bubbles: The Implications for Monetary, Regulatory and International Policies*, (eds. W C Hunter, G G Kaufman and M Pomerleano), MIT Press, pp.427-444.

Crockett, A (2003), 'International standard setting in financial supervision', Institute of Economic Affairs Lecture, Cass Business School, London, 5 February.

Giannoni, M P and M Woodford (2002), 'Optimal interest rate rules: II applications' mimeo, Princeton University.

Greenspan, A (2002), 'Economic volatility', speech at a symposium sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming.

Gruen, D, M Plumb and A Stone (2003), 'How should monetary policy respond to asset-price bubbles?', paper presented to the Reserve Bank of Australia annual conference, Sydney.

Hamilton, R (2003), 'Trends in household aggregate secured debt and borrowing' *Bank of England Quarterly Bulletin*, Autumn, pp.271-280.

International Monetary Fund (2003), *World Economic Outlook*, October.

King, M A (1997), 'The inflation target five years on', *Bank of England Quarterly Bulletin*.

Kydland, F E and E C Prescott (1977), 'Rules rather than discretion', *Journal of Political Economy*, 85, pp.473-492.

Lombardelli, C, J I Talbot and A J Proudman (2002), 'Committees versus individuals: an experimental analysis of monetary policy-making', *Bank of England Quarterly Bulletin*, Autumn, pp. 262-273.

Pagan, A (2003), 'Report on modelling and forecasting at the Bank of England', *Bank of England Quarterly Bulletin*, Spring, pp. 60-88.

Stock, J and M Watson (2003), 'Has the business cycle changed? Evidence and explanations', paper presented to the Federal Reserve Bank of Kansas City Jackson Hole Symposium.

Svensson, L (2002), 'What is wrong with Taylor rules?', *Journal of Economic Literature*, forthcoming.

Svensson, L (2003a), 'The inflation forecast and the loss function' in *Central Banking, Monetary Theory and Practice: Essays in Honour of Charles Goodhart*, (ed P Mizen) Volume I, Edward Elgar, pp. 135-152.

Svensson, L (2003b), 'Inflation targeting: should it be modeled as an instrument rule or a targeting rule?' *European Economic Review*, 46, pp.771-780.

Svensson, L and M Woodford (1999), 'Implementing optimal policy through inflation-forecast targeting', in *Inflation Targeting*, (eds B S Bernanke and M Woodford), University of Chicago Press, Chicago.
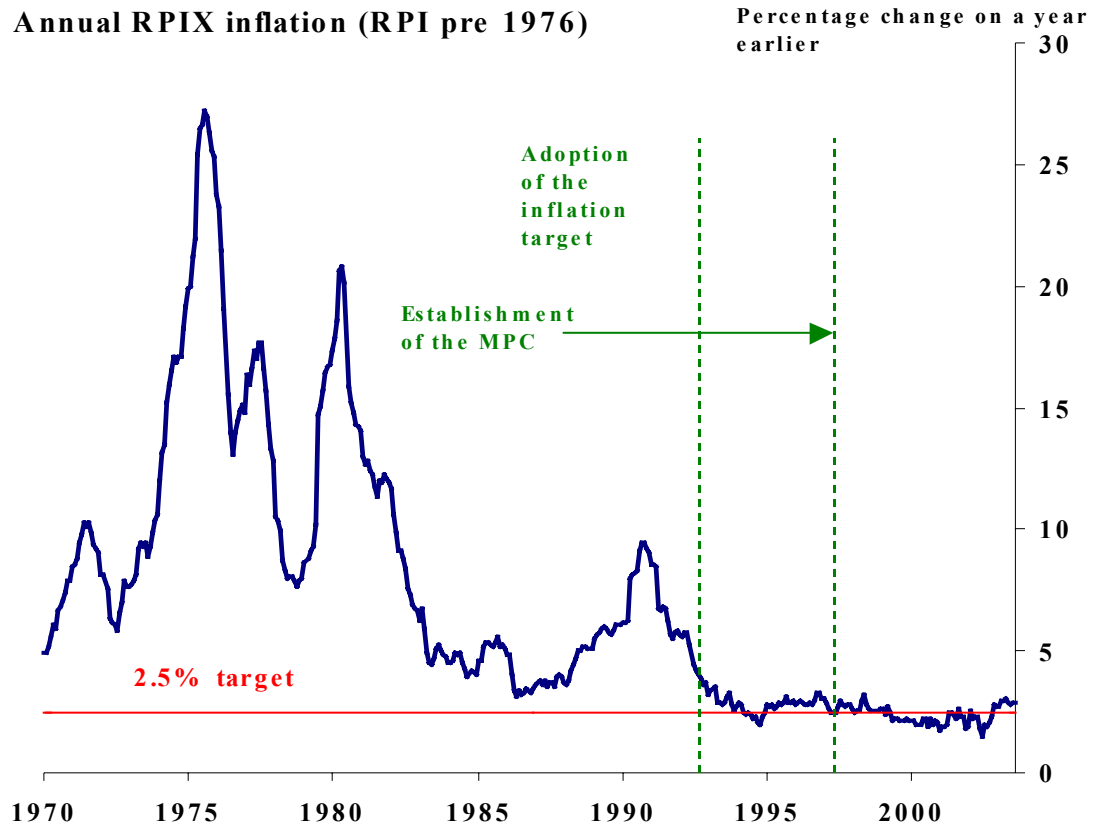
Wadhwani, S B (2002), 'The MPC: some further challenges', speech at the National Institute of Economic and Social Research, london.

Table 1: MPC's Forecasting Record

	Mean error	Mean absolute error	Fraction* in central 30%	Fraction* in central 50%
RPIX inflation				
One year ahead	0.0	0.3	8/18	11/18
Two years ahead	-0.3	0.4	6/14	11/14
GDP growth				
One year ahead	0.3	0.7	4/18	11/18
Two years ahead	-0.3	0.5	4/14	10/14

* Denominator is sample size. Based on Inflation Reports from February 1998 to May 2002.

Figure 1

Annual RPIX inflation (RPI pre 1976)

Percentage change on a year earlier

Sources: ONS and Bank of England.

Figure 2

GDP at market prices

Percentage change on year earlier
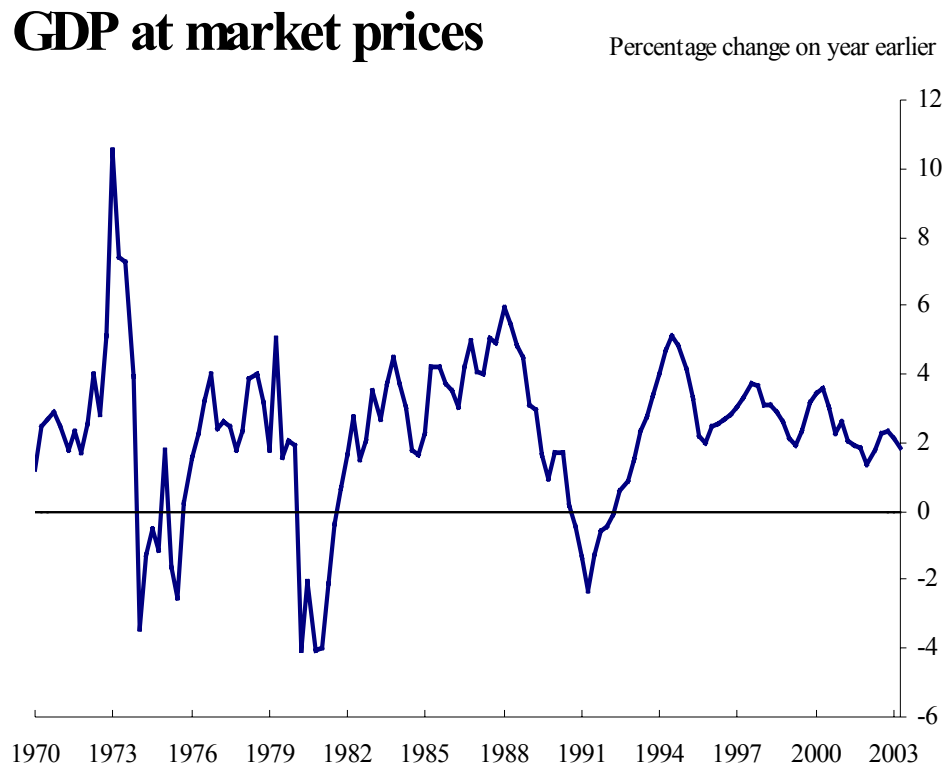
Source: ONS.

Figure 3

Unemployment Rate

Per cent

LFS

Claimant Count

1970   1975   1980   1985   1990   1995   2000

Source: ONS.

Figure 4

UK 10-year inflation expectations

Per cent
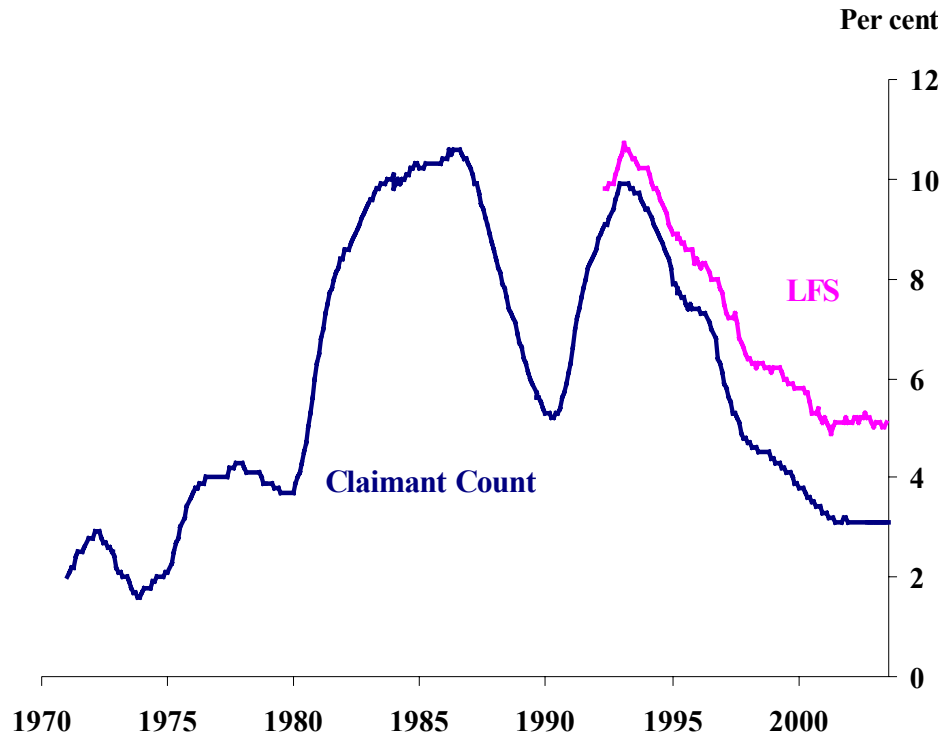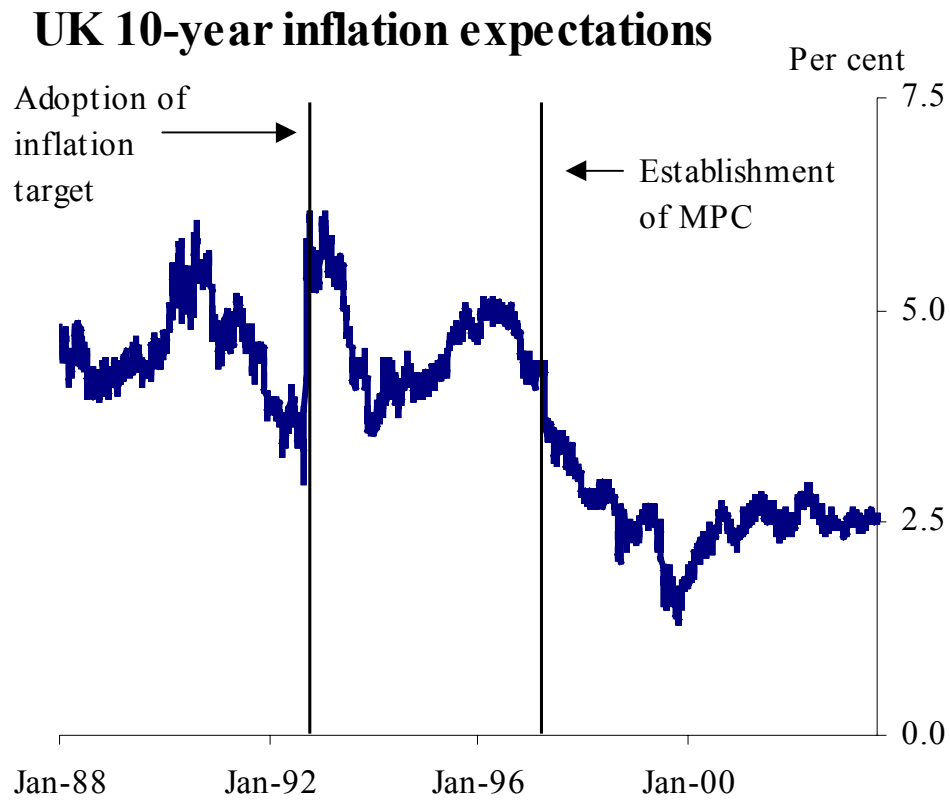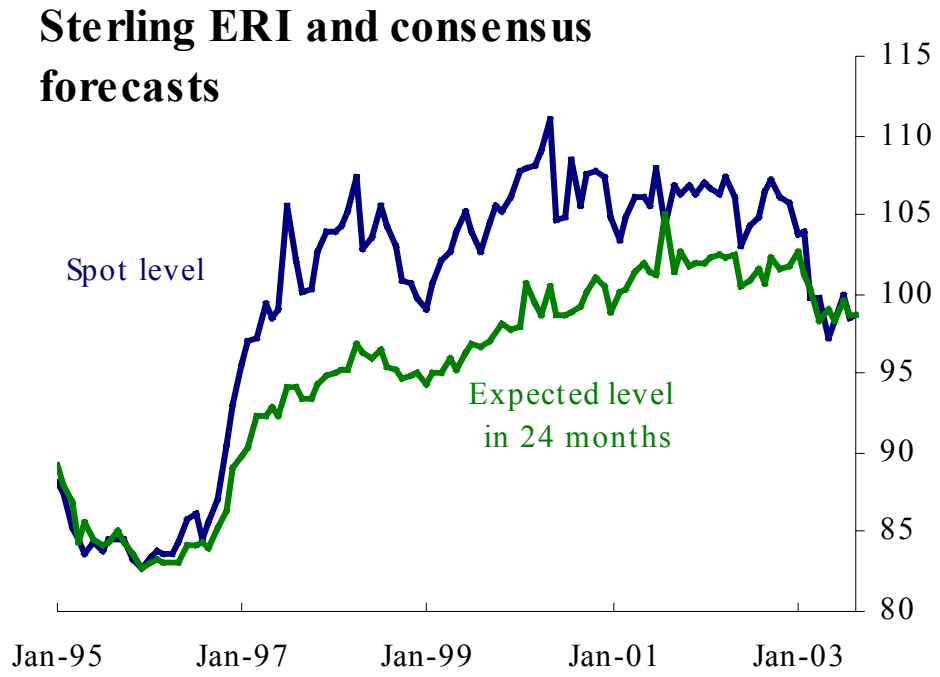

Source: Bank of England.

Note: This chart shows the 10-year ahead 1-year inflation forward rate, defined as the difference between the 10-year ahead 1-year nominal rate and the 10-year ahead 1-year forward rate, as calculated from nominal and index-linked government bonds.

Figure 5

Effect of committees
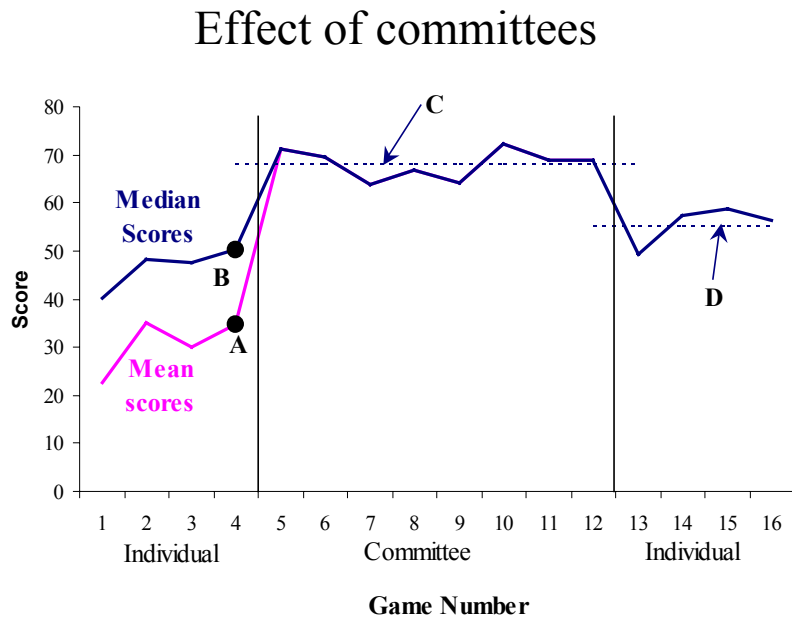
Source: Lomabardelli, Talbot and Proudman (2002)

Figure 6

Sterling ERI and consensus forecasts

Sources: Bank of England, Consensus Economics.

Figure 7

Consumption to GDP ratio

Constant (1995) prices

Current prices

	0.72
	0.71
	0.7
	0.69
	0.68
	0.67
	0.66
	0.65
	0.64
	0.63
	0.62

Mar-90   Mar-92   Mar-94   Mar-96   Mar-98   Mar-00   Mar-02
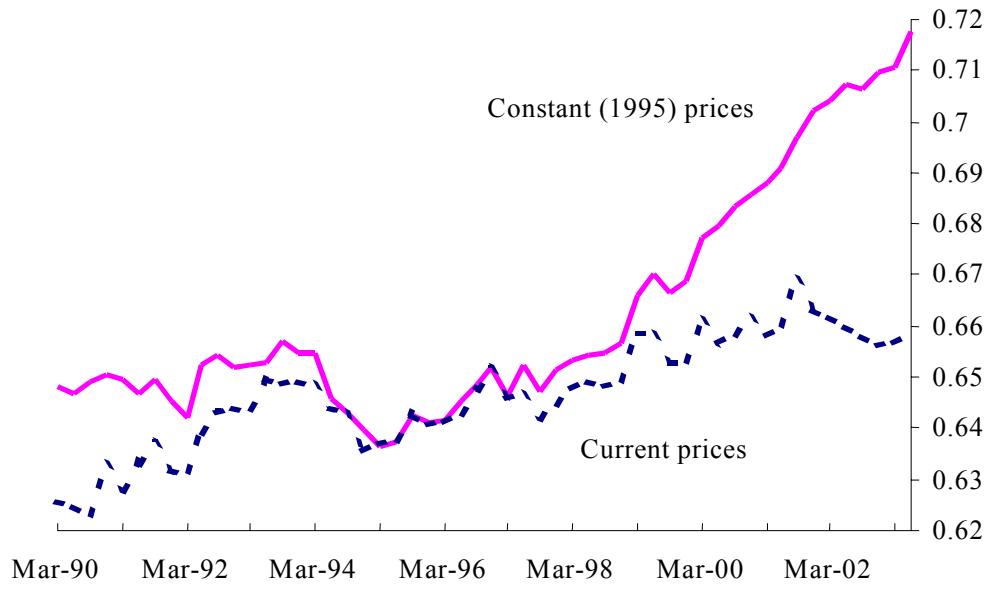
Source: ONS.

Figure 8

House price to nominal consumption per household ratio and house price to earnings ratio

Index: 1983Q1= 100

House price to earnings

House price to nominal consumption per household
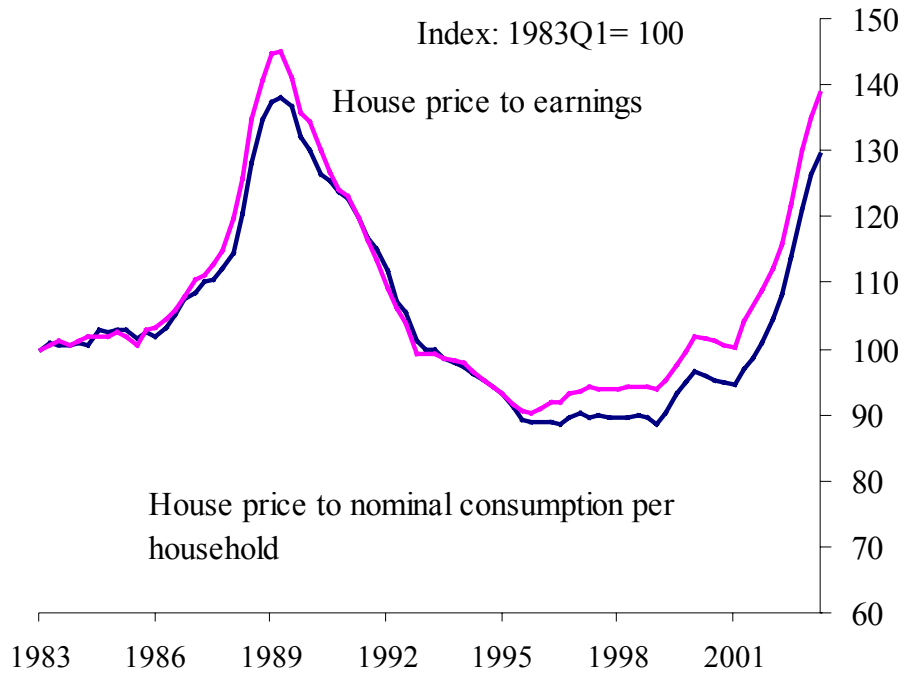
Sources: Halifax, Office of the Deputy Prime Minister, ONS and the Bank of England.

Figure 9

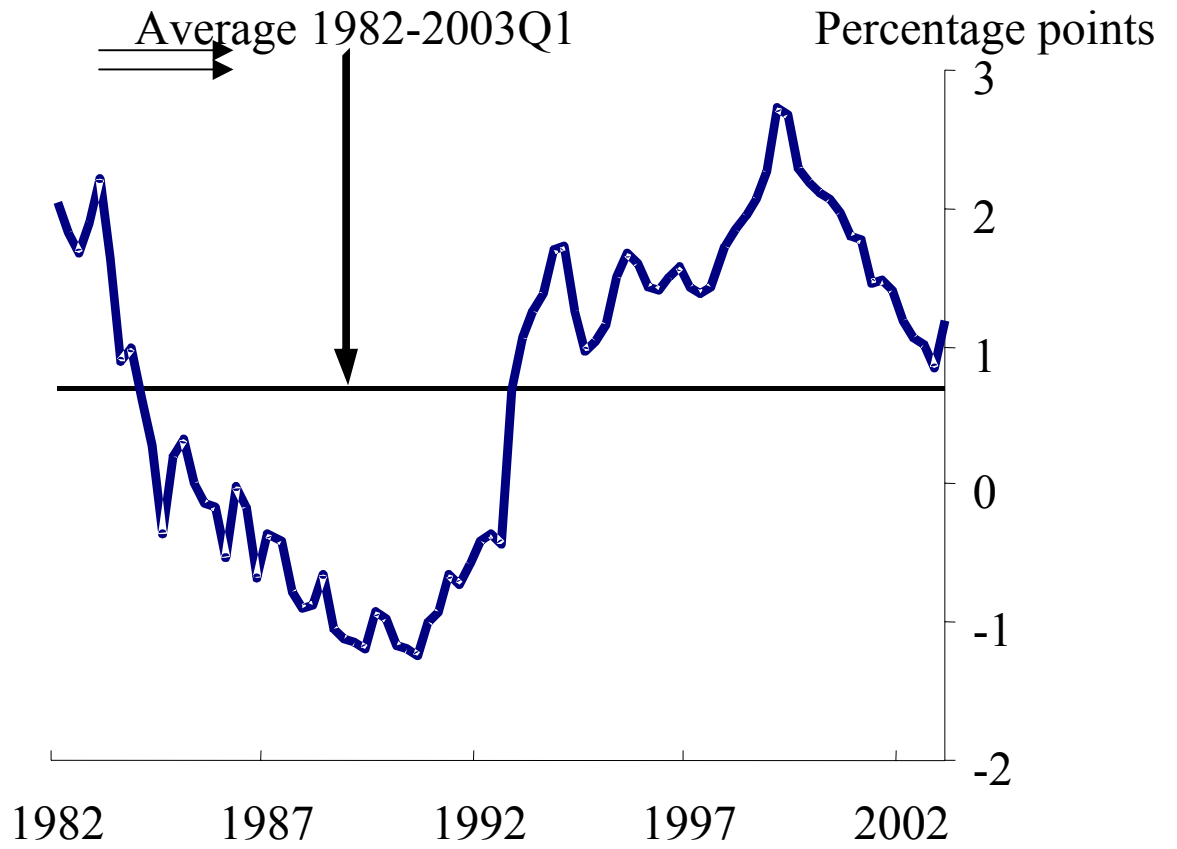# Outstanding household debt as a percentage of post-tax income[a]

Per cent

Loans secured on dwellings

Consumer credit

100
90
80
70
60
50
40
30
20
10
0

1990   1993   1996   1999   2002
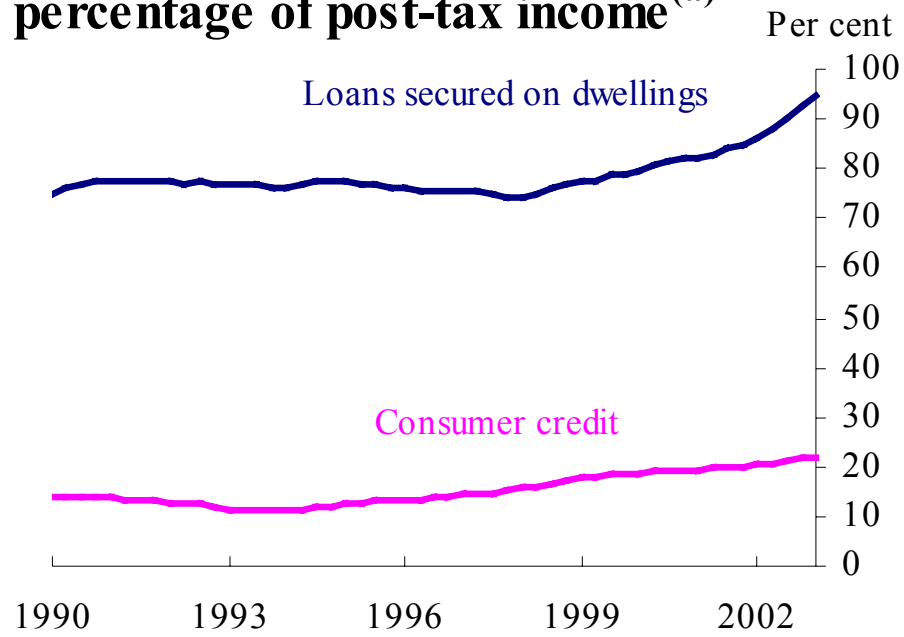
(a) Four-quarter moving sum.

Sources: ONS and Bank of England.

Figure 10

Rental yield less ten-year real interest rate

Average 1982-2003Q1   Percentage points

Sources: ONS and Bank of England