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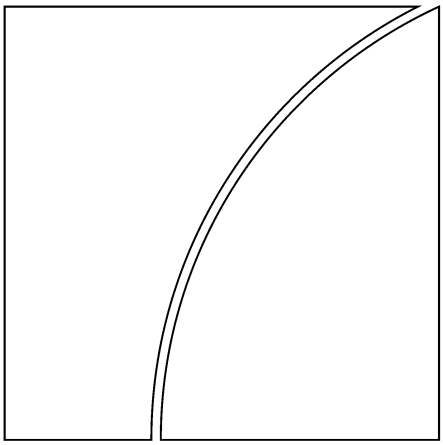

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Asset prices, financial imbalances and monetary policy: are inflation targets enough?

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Monetary and Economic Department

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Foreword

On 28-29 March 2003, the BIS held a conference on “Monetary stability, financial stability and the business cycle”. This event brought together central bankers, academics and market participants to exchange views on this issue (see the conference programme and list of participants in this document). This paper was presented at the conference. Also included in this publication are the comments by the discussants. The views expressed are those of the author(s) and not those of the BIS. The opening speech at the conference by the BIS General Manager and the prepared remarks of the four participants on the policy panel are being published in a single volume in the BIS Papers series.

Conference on
"Monetary stability,financial stability and the business cycle"
28-29 March 2003, Basel

Conference programme

Opening keynote remarks

Andrew Crockett (Bank for International Settlements)

Session I: The lessons from history

Chair: William White (Bank for International Settlements)

Paper 1: The price level, relative prices and economic stability: aspects of the interwar debate

Author: David Laidler (University of Western Ontario)

Discussants: Olivier Blanchard (Massachusetts Institute of Technology)
Nobuhiro Kiyotaki (London School of Economics)

Paper 2: The Great Depression as a credit boom gone wrong

Authors: Barry Eichengreen (University of California, Berkeley)
Kris Mitchener (Santa Clara University)

Discussants: Michael Bordo (Rutgers University)
Charles Goodhart (London School of Economics)

Session II: Monetary and financial frictions in business fluctuations

Chair: John Moore (London School of Economics)

Paper 3: Public and private information in monetary policy models

Authors: Jeffery Amato (Bank for International Settlements)
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Simon Gilchrist (Boston University)
Fabio Natalucci (Board of Governors of the Federal Reserve System)

Discussants: Philippe Bacchetta (Study Center Gerzensee)
Philip Lowe (Reserve Bank of Australia)

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Chair: Charles Freedman (Bank of Canada)

Paper 5: Asset prices, financial imbalances and monetary policy: are inflation targets enough?

Author: Charles Bean (Bank of England)

Discussants: Ignazio Visco (Bank of Italy)
Sushil Wadhwani (Wadhwani Asset Management LLP)

Paper 6: Financial strains and the zero lower bound: the Japanese experience

Author: Mitsuhiro Fukao (Keio University)

Discussants: Ignazio Angeloni (European Central Bank)
Jürgen von Hagen (University of Bonn)

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Chair: Andrew Crockett (Bank for International Settlements)

Panellists: Roger Ferguson (Board of Governors of the Federal Reserve System)
Otmar Issing (European Central Bank)
Michael Mussa (Institute for International Economics)
Yutaka Yamaguchi (formerly Bank of Japan)

Conference on
"Monetary stability,financial stability and the business cycle"
28-29 March 2003, Basel

Participants in the conference

Ignazio Angeloni	European Central Bank
Philippe Bacchetta	Study Center Gerzensee
Armando Baqueiro Cãrdenas	Bank of Mexico
Charles Bean	Bank of England
Olivier J Blanchard	Massachusetts Institute of Technology
Michael Bordo	Rutgers University
Barry Eichengreen	University of California, Berkeley
Charles Freedman	Bank of Canada
Mitsuhiro Fukao	Keio University
Simon Gilchrist	Boston University
Marvin Goodfriend	Federal Reserve Bank of Richmond
Charles Goodhart	London School of Economics
Otmar Issing	European Central Bank
Nigel Jenkinson	Bank of England
Thomas J Jordan	Swiss National Bank
Nobuhiro Kiyotaki	London School of Economics
David E Laidler	University of Western Ontario
Flemming Larsen	International Monetary Fund
Philip Lowe	Reserve Bank of Australia
Kris J Mitchener	Santa Clara University
John Moore	London School of Economics
Michael Mussa	Institute for International Economics
Fabio M Natalucci	Board of Governors of the Federal Reserve System
Peter Praet	National Bank of Belgium

Jan F Qvigstad	Central Bank of Norway
Hermann Remsperger	Deutsche Bundesbank
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Giovanni Toniolo	University of Rome Tor Vergata
José Viñals	Bank of Spain
Ignazio Visco	Bank of Italy
Jürgen von Hagen	University of Bonn
Sushil B Wadhwani	Wadhwani Asset Management LLP
Charles Wyplosz	Graduate Institute of International Studies
Yutaka Yamaguchi	formerly Bank of Japan
Gang Yi	The People's Bank of China
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1. Introduction[1]

On the face of it, the last decade and a half has been a successful period for most developed country central banks. Compared to the previous 15 years inflation has been low and relatively stable. Moreover, price stability has not been achieved at the expense of the real economy, as growth has also been relatively stable and unemployment has been falling in a number of countries.

Notwithstanding the good macroeconomic outturns there has, however, been a growing concern that the achievement of price stability may be associated with heightened risks of financial instability, particularly so in the aftermath of the collapse of the dotcom bubble and the more recent wider correction to share values. Appreciating asset values and debt accumulation have, in some countries, led to stretched household and corporate balance sheets that are vulnerable to the sort of equity price corrections witnessed recently. That has led some commentators to question the quasi-consensus that monetary policy should be directed exclusively at maintaining price stability and its role in combating financial instability should be restricted to minimising any adverse consequences when overvaluations are corrected or as financial imbalances unwind.

The heterodox 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."

In this paper I examine the view that inflation targeting alone, whether explicit or implicit, is not enough and that there is a case for an additional monetary response to asset price movements and/or developing financial imbalances in order to reduce the risks of future financial instability. My view, in a nutshell, is that (flexible) inflation targeting is best thought of as a description of the objective function of the policymaker rather than entailing an explicit monetary policy reaction function. The abrupt unwinding of asset price misalignments and/or financial imbalances that may lead to financial instability will also invariably be associated with significant macroeconomic instability. A forward-looking flexible inflation targeting central bank should bear in mind those longer-run consequences of asset price bubbles and financial imbalances in the setting of current interest rates. There is thus no need for an additional response of monetary policy to be specified, though inflation targeting central banks may need to look out further into the future than is usual in order to take on board these considerations.

The remainder of the paper is organised as follows. In the next section, I review some of the recent literature on the extent to which monetary policy should respond to asset prices, and in particular to asset price bubbles. While it may well be appropriate for interest rates to respond to asset prices, among many other economic indicators, I conclude that such a response is consistent with inflation targeting. In the subsequent section I characterise the optimal monetary policy in a simple New Keynesian macroeconomic model in which financial imbalances play a role and where their subsequent unwinding may lead to a credit crunch or similar financial distress. The possibility of credit crunches turns out to affect the design of the optimal policy in a subtle, and perhaps surprising, way. I also consider a variety of other ways that incipient financial imbalances could impinge on the conduct of an optimal monetary policy. Finally I illustrate some of the difficulties in deciding whether an asset price is misaligned, or an imbalance poses a potential threat to macroeconomic stability, by considering the recent evolution of house prices and consumer debt in the United Kingdom.

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[1] Prepared for the conference on "Monetary stability, financial stability and the business cycle" at the Bank for International Settlements, Basel, 28-29 March 2003. I am grateful to the discussants, Ignazio Visco and Sushil Wadhwani, to participants at the conference, and to Peter Andrews, Francesco Giavazzi and Ed Nelson for useful comments. The views expressed are those of the author and do not reflect those of either the Bank of England, the Monetary Policy Committee or the BIS.

2. Asset prices and monetary policy: some recent views

The conventional view that monetary policy can do little more than deal with the fallout from the unwinding of asset price bubbles has been clearly ennunciated 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."

But not everyone subscribes to this view, and there has recently been a lively literature debating the extent to which monetary policy should respond to asset price movements (see eg Batini and Nelson (2000), Bernanke and Gertler (1999, 2001), Cecchetti et al (2000), Cecchetti et al (2002), Taylor (2001)). Thus on the one hand Bernanke and Gertler (1999) conclude that:

> "The inflation targeting approach dictates that central banks should adjust monetary policy actively and pre-emptively to offset incipient inflationary and deflationary pressures. Importantly for present purposes, it also implies that policy should not respond to changes in asset prices, except insofar as they signal changes in expected inflation."

Against this, Cecchetti et al (2000) argue:

> "A central bank concerned with both hitting an inflation target at a given time horizon, and achieving as smooth a path as possible for inflation, is likely to achieve superior performance by adjusting its policy instruments not only to inflation (or its inflation forecast) and the output gap, but to asset prices as well. Typically modifying the policy framework in this way could also reduce output volatility. We emphasize that this conclusion is based on our view that reacting to asset prices in the normal course of policymaking will reduce the likelihood of asset price bubbles forming, thus reducing the risk of boom-bust investment cycles."

Each of these contributions evaluates the appropriateness of a policy response to asset prices by exploring the efficacy of a variety of interest rate reaction functions in simple calibrated stochastic model economies in which asset prices play some explicit role. Thus both Bernanke and Gertler (1999, 2001) and Cecchetti et al (2000) employ a dynamic New Keynesian model, modified to allow for credit market frictions and exogenous asset price bubbles. The credit market frictions arise from agency problems in the credit market, so that internal finance is cheaper than external finance and the external finance premium depends on the firm's financial position. In particular, a rise in the firm's share price increases the available collateral and leads to a reduction in the marginal cost of external funds, and a consequent increase in borrowing and investment. Furthermore, the equity price may differ from fundamentals by an exogenous and stochastic bubble component, which grows exponentially but may collapse. During the build-up of such a bubble the external finance premium falls, and investment, aggregate demand and future potential output rise, whereas when the bubble collapses the process reverses.

But despite the apparent similarity of the models employed, the two sets of authors come to strikingly different conclusions about whether it is wise for the monetary authorities to condition their short-term interest rate on the equity price. Cecchetti et al (2002) argue that a key difference lies in different assumptions about what shocks are present and exactly what the monetary authorities are allowed to observe.

Similarly, Batini and Nelson explore whether feedback to the interest rate from the exchange rate (which may or may not contain a bubble) is advisable in a New Keynesian model of a small open economy in which the real exchange rate influences both demand and supply and the exchange rate is determined via uncovered interest parity. They find that for an optimised rule, there is apparently no gain to reacting separately to the exchange rate. Yet Cecchetti et al (2002), using essentially the same model, find that under some circumstances feedback from the exchange rate leads to higher welfare than not responding. Again, the key difference appears to lie in the assumptions about what shocks are present and exactly what the monetary authorities know.

Now, at one level it may not seem surprising that different assumptions about the stochastic structure of the economy and what the authorities can observe/infer may lead to different conclusions about the

appropriateness of adjusting interest rates in the light of asset price movements. And few people would disagree that the authorities should take account of asset price movements insofar as they affect the outlook for output and inflation. But the question is whether some additional response is called for, as the above quotes should make clear. In addressing this issue, I think it is fruitful to look at exactly how the above authors go about trying to answer that question.

Essentially, all these contributions evaluate whether the addition of asset prices - or an estimate of the bubble component therein - to a simple feedback rule for the policy rate instrument leads to a lower value of a suitable loss function. Two general classes of simple rule are employed.

Either an augmented Taylor rule:

$$(1) \qquad i_t = i^*_t + \phi_\pi \pi_t + \phi_y x_t + \phi_q q_t,$$

where i_t is the nominal interest rate, i^*_t is the "natural" level of the nominal interest rate, π_t is inflation (strictly, the deviation from target), x_t is the deviation of output from its flexible-price level, ie the output gap, and q_t is an asset price (relative to some suitably defined normal or equilibrium value).

Or else an augmented inflation forecast targeting rule:

$$(2) \qquad i_t = i^*_t + \mu_\pi E_t \pi_{t+k} + \mu_q q_t,$$

where E_t denotes the mathematical expectation conditional on information available to the policymaker at time t and k is some suitably chosen time horizon.

The authorities are assumed to have a period loss function that is quadratic in the deviation of inflation from target and in the output gap:

$$(3) \qquad L_t = \pi_t^2 + \lambda x_t^2,$$

where for simplicity the inflation target is set to zero. The associated expected objective function, Λ_t, is

$$(4) \qquad \Lambda_t = E_t[(1-\beta)L_t + \beta\Lambda_{t+1}],$$

where β is a discount factor. As β tends to unity, so this loss function tends to a simple weighted average of the conditional variances of inflation about the target and of the output gap. One can then think of searching over the parameters in the Taylor-type rule (1) and the inflation forecast targeting rule (2) to find the values of the feedback coefficients that minimise the loss function (3 and 4), and this is what the papers in this literature in essence do.

However, it is worth recalling that, despite their appeal, Taylor-type rules imply feedback from a relatively restricted state vector and the optimal feedback rule can only be written as a Taylor rule in very simple settings. The same is true of inflation forecast targeting rules, which furthermore are dynamically inconsistent (see Svensson (2001)). A relevant question is why we should be interested in whether an asset price, or indeed any other variable for that matter, appears in some ad hoc class of feedback rule, even though the coefficients of that rule may have been optimised? It seems more instructive to ask first what an optimal rule looks like, and then consider how asset prices ought to figure in it. One might then go on to consider whether particular simple rules represent sufficiently close approximations to the optimal rule to be useful guideposts for policy.

In order to say more we need first to assume something about the structure of the economy. Suppose, for illustrative purposes, the demand side is given by a forward-looking IS schedule, including the asset price:

$$(5) \qquad x_t = E_t x_{t+1} - (i_t - E_t \pi_{t+1} - r^o_t)/\sigma + \chi q_t + v_t,$$

where r^o_t is the flexible-price real interest rate (ie the natural real interest rate) and v_t is an aggregate demand shock. The IS schedule is augmented by a suitable intertemporal arbitrage condition determining the asset price (including, perhaps, a bubble component or a stochastic risk premium). And the supply side is given by a New Keynesian Phillips curve

$$(6) \qquad \pi_t = \beta E_t \pi_{t+1} + \kappa x_t + u_t,$$

where u_t is a supply (cost) shock. Both shocks are observed by the monetary authorities and for simplicity are assumed to be serially uncorrelated.

Then, as shown by Svensson and Woodford (1999), Svensson (2002) and Giannoni and Woodford (2002), the optimal policy under commitment, from the "timeless perspective", satisfies the first-order condition, for all $k \geq 0$:

(7) $$E_t\pi_{t+k} = -(\lambda/\kappa)(E_t x_{t+k} - E_t x_{t+k-1}).$$

This optimal targeting rule describes a plan that the conditional expectations of the two target variables should satisfy.[2] This optimal plan 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. Svensson has characterised an optimality condition of this type as describing "flexible inflation forecast targeting".

Combining the first-order conditions for periods t and $t+1$ with the supply schedule (6), one can also characterise the optimal choice of the output gap in terms of lagged activity and the supply shock as:

(8) $$x_t = \gamma_x x_{t-1} + \gamma_u u_t,$$

where $\gamma_x = \{[(1+\beta+\kappa^2/\lambda) - [(1+\beta+\kappa^2/\lambda)^2 - 4\beta]^{1/2}\}/2\beta$ and $\gamma_u = -\kappa\gamma_x/\lambda$.

A key feature of condition (7) is that it contains neither the policy instrument,[3] nor indeed anything to do with the structure of the demand side of the economy. In particular, there is no role for asset prices.[4] So in that sense the analysis supports the conventional wisdom as summarised in the quote above from Bernanke and Gertler - with the modification that policy responds to changes in asset prices only insofar as they signal changes in expected inflation or *growth*.

Is this a reasonable interpretation of what inflation targeting central banks are about, as opposed to an inflation forecast targeting rule like (2)? Take for instance the statutory objective of the Bank of England since it was given operational independence in 1997. The *Bank of England Act* (1998) 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". An annual *Remit* from the Chancellor of the Exchequer then defines price stability - currently as an annual rate of inflation of 2.5% for RPIX at all times - and also fleshes out the "economic policy of the government", namely the maintenance of a high and stable rate of growth. This can be thought of as defining the bliss point for inflation, but instructing the Monetary Policy Committee to seek to achieve it in a way that avoids undue volatility in economic activity. However, the remit is non-specific about the relative weight that we should put on deviations of output from potential and deviations of inflation from target. Both King (1997) and Bean (1998) discuss the UK inflation targeting regime in these terms; the latter also explores the consequences of the incompleteness of the remit.

Similarly, the objectives of the Reserve Bank of Australia (RBA), another inflation targeting central bank, as laid out in the *Reserve Bank Act* (1959) are "to ensure that ... monetary and banking policy ... is directed ... (so as to) contribute to: the stability of the currency ...; the maintenance of full employment ...; and the economic prosperity and welfare of the people". The counterpart of the UK *Remit* from the Chancellor in Australia is the joint *Statement on the Conduct of Monetary Policy* between the Governor and the Treasurer. The target is for an inflation rate for the underlying CPI of 2-3% "over the cycle". Again the "first-level" target for inflation is specified explicitly, together with a general injunction that the central bank should care about the level of activity. I think this view of what monetary policymakers are seeking to achieve is also a fair description of central banks like the Federal Reserve or the European Central Bank that do not describe themselves explicitly as inflation targeters.

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[2] Suppose instead that supply were given by an accelerationist Phillips curve: $\pi_t - \pi_{t-1} = \kappa x_t + u_t$. The optimality condition would then be: $E_t[\sum_{k=0}^{\infty} \beta^k \pi_{t+k}] = -(\lambda/\kappa)E_t x_{t+k}$. Consequently, the argument that asset prices only matter insofar as they affect expected inflation or growth still holds.

[3] If the objective function contains a term in the interest rate, as in Woodford (1999), then the policy instrument appears in the optimality condition. It is then, however, a rather different animal from the instrument rules (1) and (2).

[4] In an open economy subtle issues arise as to whether the real exchange rate should also appear in the optimality condition (7) as a result of the impact of the terms of trade on consumer prices. Under some assumptions the closed economy model of the text can be translated directly into an open economy setting (see eg Clarida et al (2001)), but under other formulations that is not necessarily the case. However, it is clear that the presence of the real exchange rate in the optimality condition under such circumstances has little to do with arguments about the appropriate response to asset price bubbles.

But that does leave open the extent to which asset prices should affect the setting of the instrument, because they will affect the outlook for growth and inflation. Given the optimality condition (7), or its counterpart for the output gap written in terms of observables (8), the IS schedule (5) can be used to back out the associated value of the instrument, i_t. Clearly this reaction function in general will contain the asset price, q_t. That is consistent with the views of Cecchetti et al (2002), though the finding that the inclusion of asset prices in an augmented Taylor or inflation forecast targeting rule reduces the expected loss does not imply an independent role for asset prices *beyond* their impact on the outlook for inflation and growth. And in fairness to Cecchetti et al (2002), they never really claim that it does.

In my view, the substantive issue that divides those who advocate a more activist response to asset prices from those who do not is really the extent to which asset price movements are informative about the prospects for inflation and growth, and whether pre-emptive action against a bubble is either possible or effective. Here, it is worth recalling the difficulty of establishing significant and stable econometric relationships between asset prices and subsequent movements in output or inflation; see eg Stock and Watson (2001) for a recent survey. But there are good reasons why such links should be unstable as asset prices can move for a variety of reasons, each of which may have different implications for growth and inflation.

For instance, even if valued according to their fundamentals, equity prices could fall because of a reduction in expected future earnings, an increase in the expected risk-free discount rate, or a change in the equity risk premium. And that reduction in earnings might come about because of, for example, a fall in the expected rate of growth of productivity, an increase in corporate taxes, or an increase in product market competition. And finally, equity prices may include a non-fundamental or bubble component. But these various shocks all have rather different implications for growth and inflation, either qualitatively or quantitatively.

That suggests that an automatic response to any single asset price is likely to be in general inappropriate, as stressed by Goodfriend (2002). As an aside we might note that this applies not only to equity prices, but also to exchange rates. Monetary conditions indices (MCIs) that weight together nominal interest rates and the exchange rate are often used to indicate whether monetary conditions have changed, on the argument that a fall in the exchange rate - seen as a monetary variable - boosts demand in the same way as does a reduction in nominal interest rates. But this ignores the fact that the exchange rate can change for a variety of reasons, including shifts in preferences or productive potential at home or abroad, changes in current or expected interest rates, changes in portfolio preferences and risk premia, and bubbles and fads. The nature of the shock, as well as the initial degree of over- or undervaluation of the exchange rate, will affect the pass-through into activity and inflation and thus also the appropriate monetary response.

The danger in following MCIs slavishly in setting policy is well illustrated by the experience of New Zealand during the Asia crisis. An MCI was at that time used as the operating target for implementing monetary policy, so the depreciation of the New Zealand dollar during 1997-98 led more or less automatically to an increase in domestic interest rates. But the depreciation of the Kiwi dollar was part of a more general depreciation of currencies in the region, and was associated with a contraction in the markets for New Zealand exports. A more appropriate monetary response would have been to reduce interest rates rather than raise them, as in fact the Reserve Bank of Australia did. That Australian economic performance was noticeably better than that of New Zealand over this period was no accident, and prompted the abandonment of the MCI as the operating target of monetary policy the following year.

But the fact that asset prices may move for a variety of reasons is not a justification for ignoring them completely. Rather, as stressed by Cecchetti at al (2002), it is an argument for using the full array of asset prices and other information in order to try to extract an estimate of the underlying shocks driving them. Drawing such inferences from the co-movements of a set of variables is something that empirical economists and policymakers frequently do already and even an imperfect estimate of the underlying shocks is better than ignoring the information altogether. The case in principle for exploiting the information contained in asset prices thus seems irrefutable, though the difficulties involved in doing so may be considerable and due recognition needs to be paid to the imprecision of the resulting estimates.

As to the possibility of preventing asset price bubbles and misalignments through pre-emptive action, I am rather more sceptical. As with the more general problem of imbalances discussed below, early diagnosis of such problems is fraught with difficulties. Once one can be fairly confident that a bubble has emerged, it is probably too late to take significant action against it without causing just the

disruption to the real economy that one wants to avoid. If one is confident that an asset price bubble will continue, then one might want to raise interest rates in order to try to moderate it. But the presence of lags between an interest rate change and its effect on the real economy means that if one expects the bubble to burst imminently, then policy relaxation is appropriate now in order to prepare for the fallout. Tightening policy to deal with an asset price bubble may thus end up being counterproductive if the bubble then bursts, so that the economy is subject to the twin deflationary impulses of an asset price collapse and the lagged policy tightening. Gruen and Plumb (2003) explore this issue and show that the informational requirements necessary to make such activist policy effective are extreme. At best there seems likely to be only a very narrow window of opportunity during which action is likely to be effective.

3. Financial imbalances and monetary policy

Borio and Lowe (2002) argue persuasively that the issue is not really whether monetary policy should respond to asset price bubbles per se. Rather, booms and busts in asset prices - which may reflect the presence of bubbles, but may also reflect shifts in assessments of the underlying fundamentals - should be seen as part of a broader set of symptoms that typically also include a build-up of debt and frequently a high rate of capital accumulation. Thus during a period of exuberance - irrational or otherwise - optimism about future returns drives up asset values, prompting private agents to borrow in order to finance capital accumulation. Moreover, appreciating asset values raise the value of collateral, hence facilitating the accumulation of debt. During the upswing, balance sheets may look healthy as the appreciation in asset values offsets the build-up of debt. But if that optimism turns to pessimism, leading to a correction in asset valuations and a sharp deterioration in net worth, then financial distress may be the result as the financial imbalances are exposed. That is particularly likely to be the case if financial intermediaries respond to the deterioration in their own and their creditors' balance sheets by tightening credit conditions. This process may apply to the corporate sector and productive capital, but may equally well apply to the household sector and housing capital.

Borio and Lowe also argue that while low and stable inflation may promote financial stability overall, such financial imbalances can nevertheless build up in a low inflation environment. Indeed, beneficial supply shocks - resulting either from faster productivity growth or from structural or institutional reform - are likely both to lower inflationary pressure and to foster the build-up of such imbalances. And that may be aggravated when monetary policy has a high degree of counterinflationary credibility as excessive expansion in aggregate demand beyond the natural rate of output may have only limited impact on inflationary pressures.

In order to explore some of the implications of debt-financed asset accumulation for the conduct of monetary policy, I shall employ a simple New Keynesian macroeconomic model of the sort considered above, though modified to allow for debt-financed capital accumulation and the possibility of credit crunches.

There are two types of agents in the economy: households and firms. Households, who are infinitely lived, supply labour, consume and can borrow and lend freely. All debt lasts a single period and is denominated in real terms. Households also own a non-tradable diversified portfolio of shares in firms, so that all profits are returned to households in lump sum form. Firms are monopolistic competitors, and nominal prices are fixed with a fraction of prices being reset each period as in the standard New Keynesian Phillips curve. Capital lasts a single period, has to be installed a period in advance, and is financed entirely by borrowing from households.

Credit crunches occur with a fixed probability,[5] ρ. When they do occur their effect is to lower the level of supply in the economy. One rationalisation for this could be that a credit crunch leads to bankruptcies and the necessary administration or reorganisation of the firm's assets absorbs resources. Another could be that firms need access to working capital within the period in order to pay their workers, buy inputs, etc. If firms cannot get access to the required working capital then their supply will necessarily be curtailed. So in effect a credit crunch is treated as a negative shock to total

[5] Though the impact of the crunch if it occurs is endogenous. It might seem natural to also make the probability of a crunch depend on policy, but this complicates the analysis significantly.

factor productivity, though it reflects events in financial markets rather than a change in the technical capabilities of the economy. Moreover, if a credit crunch does occur, it is assumed to be more severe the higher the level of overall debt outstanding. An individual firm's borrowing decision has a negligible impact on *overall* debt. Consequently, firms ignore the impact of their borrowing on the severity of any future credit crunch, ie there is a negative externality present.[6]

The production function is Cobb-Douglas in capital and labour:

$$y_t = a_t + \alpha k_t + (1-\alpha) n_t, \tag{9}$$

where y_t is (the logarithm of) output in period t, a_t is (the logarithm of) total factor productivity in period t, k_t is (the logarithm of) the capital stock at the start of period t, inherited from the previous period and n_t is (the logarithm of) employment in period t. Total factor productivity is given by the process:

$$a_t = e_t - \varepsilon_t[\varpi + \omega(d_t - E_{t-1} y_t)], \tag{10}$$

where e_t is a shock to the technology, d_t is the (logarithm of) debt outstanding and ε_t is an indicator variable that takes the value unity if a credit crunch occurs and zero otherwise. The severity of the credit crunch is assumed to depend on the debt-output ratio. We write (10) in terms of expected output at the start of the period rather than realised output because the latter depends on whether a credit crunch occurs or not. Making the extent of the credit crunch depend on ex post output complicates the analysis considerably.

Equation (9) may be inverted to give labour demand conditional on the level of output

$$n_t = (y_t - a_t - \alpha k_t)/(1-\alpha), \tag{11}$$

The demand for capital is then obtained by minimising expected costs, conditional on the expected future level of output and recognising that employment will subsequently be determined through the labour requirement equation (11):

$$\begin{aligned} k_{t+1} &= E_t y_{t+1} - E_t a_{t+1} + (1-\alpha)(E_t w_{t+1} - E_t p_{t+1} - r_t + v_t) \\ &= E_t n_{t+1} + E_t w_{t+1} - E_t p_{t+1} - r_t + v_t, \end{aligned} \tag{12}$$

where w_t is (the logarithm of) the nominal wage in period t, p_t is (the logarithm of) the price level in period t, r_t is the real rate of return on debt and v_t can be thought of as representing a shock to "animal spirits", ie irrationally over- or underoptimistic expectations. For simplicity, v_t is assumed to be serially uncorrelated, and here and elsewhere inessential constants are normalised to zero through appropriate choice of units.

Following Calvo (1983), prices are set on a staggered basis, with those firms that are able to change their price choosing an optimal one based on expected marginal cost.

$$\pi_t = \beta E_t \pi_{t+1} + \delta m_t + u_t, \tag{13}$$

where m_t ($= w_t - p_t + n_t - y_t$) is (the logarithm of) marginal cost and u_t is a shock to the markup, assumed uncorrelated for simplicity.

Turning to the household sector, we assume that savings are a constant fraction of income, and labour supply is an increasing function of the real wage alone:

$$w_t - p_t = \phi n_t. \tag{14}$$

It is, of course, possible to develop the model along standard lines with an intertemporal optimality equation for consumption of the usual form and a corresponding intratemporal optimality condition for labour supply. However, that leads to a rather more complex dynamic structure without changing the nature of the basic insights. For that reason I prefer a simpler, albeit more ad hoc, approach.

Given the constant savings rate assumption, an IS schedule can then be obtained from (12) and using the fact that marginal cost is equal to the labour share:

$$y_t = E_t y_{t+1} + E_t m_{t+1} - r_t + v_t. \tag{15}$$

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[6] Of course, the first-best policy may well be to look for other instruments that tackle the market failures more directly, such as prudential capital requirements, etc. But it is nevertheless fruitful for central bankers to ask what monetary policy should look like in a second-best world where those market failures are still present.

This is similar to the standard expression, except for the appearance of expected marginal cost.

Using equations (11) and (14), marginal cost is

(16) $m_t = (\alpha+\phi)y_t/(1-\alpha) - (1+\phi)(a_t + \alpha k_t)/(1-\alpha)$.

The flexible price level of output, y^o_t, is then obtained by setting $m_t = 0$:

(17) $y^o_t = \nu(a_t + \alpha k_t)$,

where $\nu = (1+\phi)/(\alpha+\phi)$. The model may then be condensed into the two equations:

(18) $\pi_t = \beta E_t\pi_{t+1} + \kappa x_t + u_t$,

where x_t ($= y_t - y^o_t$) is the output gap and $\kappa = \delta(\alpha+\phi)/(1-\alpha)$, and:

(19) $x_t = \eta E_t x_{t+1} + r^o_t - r_t + v_t$,

where $r^o_t = E_t y^o_{t+1} - y^o_t$ is the natural real rate of interest and $\eta = (1+\phi)/(1-\alpha)$ ($= \kappa\nu/\delta$). Aside from the coefficient on the expected output gap in (19), this is isomorphic to the standard New Keynesian model considered in Section 2, though the impact of interest rates on demand is via their effect on investment rather than consumption.

We now consider the policymaker's control problem. Crucially, we assume that the policymaker would like to stabilise output around its *technically* feasible level:

(20) $y^*_t = \nu(e_t + \alpha k_t)$.

When there is no credit crunch, this is just the same as the flexible price equilibrium, y^o_t. But when a credit crunch occurs, there will be a gap between the two, which is larger the greater is the current debt-output ratio. The relevant gap, x^*_t is:

(21) $$\begin{aligned} x^*_t &= (y_t - y^o_t) + (y^o_t - y^*_t) \\ &= x_t - \nu\varepsilon_t[\varpi + \omega(k_t + r_{t-1} - E_{t-1}y_t)] \\ &= x_t - \nu\varepsilon_t[\varpi + \omega\kappa E_{t-1}x_t/\delta + v_{t-1})]. \end{aligned}$$

where we have used the fact that $d_t = k_t + r_{t-1}$. Note that the impact of the credit crunch is not affected directly by the rate of interest in the preceding period. A higher rate of interest reduces capital formation and debt accumulation during period $t-1$, but that is nullified by the higher interest payments on the debt. Consequently, the total amount that has to be repaid is left unchanged. Clearly, whether an increase in the rate of interest in period $t-1$ raises or lowers the debt stock in period t depends on the semi-elasticity of borrowing with respect to the interest rate. In the present case that is unity, so the two effects exactly offset.

Equation (21) implies that:

(22) $E_{t-1}x^*_t = (1-\rho\omega\eta)E_{t-1}x_t - \nu\rho\varpi + \omega v_{t-1})$.

Using this, the Lagrangian for the optimisation problem at date τ may be written:

(23) $\Omega_\tau = E_\tau[\sum_{t=\tau}^{t=\infty} \beta^{t-\tau}\{(\pi_t^2 + \lambda x^{*2}_t)/2 + \varphi_t(\pi_t - \beta\pi_{t+1} - \kappa x^*_t - z_t)\}]$

where $z_t = \kappa\varepsilon_t[\nu\varpi+\omega v_{t-1}) + \omega\eta E_{t-1}x^*_t]/(1-\rho\omega\eta) + u_t$. The first-order conditions are:

(24) $0 = E_\tau\pi_t + \varphi_t - \varphi_{t-1}$ for all $t \geq \tau$, with $\varphi_{\tau-1} = 0$

(25) $0 = \lambda x^*_\tau - \kappa\varphi_\tau$

(26) $0 = \lambda E_\tau x^*_t - \kappa\varphi_t/(1-\rho\omega\eta)$ for all $t > \tau$

Integrated first-order conditions analagous to equation (7) may then be obtained by eliminating the multipliers:

(27) $E_\tau\pi_t = -[\lambda(1-\rho\omega\eta)/\kappa](E_\tau x^*_t - E_\tau x^*_{t-1})$

The structural similarity to the standard model of Section 2 - obtained by setting ρ to zero - makes it easy to see the impact of the possibility of a credit crunch on the design of the optimal policy. Assuming that $\omega\rho\eta < 1$, introducing the possibility of a credit crunch is similar in effect to reducing the weight on output in the policymaker's objective function.

That there is apparently less incentive to stabilise current output when the economy is overheating and building up larger imbalances today[7] may appear counterintuitive. However, recall that this simple model is forward-looking in nature, and that an increase in interest rates today will not affect the severity of any credit crunch tomorrow because of the assumption that the interest semi-elasticity of borrowing is unity. But policy *does* affect debt levels through another channel, namely expectations of the future output gap. If the output gap is expected to be large and positive in the future, then that will boost capital accumulation today, so raising the future debt stock and the costs associated with a credit crunch.

In the standard model, without the possibility of a credit crunch, the optimal policy in the face of a temporary positive supply shock, such as a reduction in wage push or a fall in the markup, exploits the fact that a credible commitment to hold output above potential in the future raises inflation today via the expectations term in the New Keynesian Phillips curve. Given the desirability of avoiding large deviations in output from potential, the optimal response therefore involves a small, but persistent, deviation of output from potential in response to the temporary supply disturbance, rather than returning inflation to target through a larger, but more short-lived, output gap. When there is a possibility of a credit crunch, however, the gradualist response to the beneficial supply shock generates additional expected future costs. Consequently, the optimal policy involves more variation in the output gap today and less persistence than the standard setup.

This somewhat paradoxical result is unlikely to be robust, and the model no doubt omits many of the more important channels whereby imbalances can accumulate and unwind. Nevertheless, it illustrates the fact that allowing for the accumulation and unwinding of imbalances may affect the design of policy in subtle ways, as well as the more obvious ones.

3.1 Other considerations

Though the model illustrates one way financial imbalances might affect the design of an optimal monetary policy, it misses a number of other considerations. Importantly, it does not incorporate an explicit role for asset prices and misses the inherent non-linearities that may be present. Falling asset prices reduce collateral and may induce a sharp change in the behaviour of potential borrowers as collateral constraints start to bind. That can act as an important amplification and propagation mechanism, as in the work of Kiyotaki and Moore (1997). Bordo and Jeanne (2002) construct a model in which firms can only borrow against collateral, and a credit crunch occurs if asset prices fall sufficiently. As in the model above, the credit crunch then leads to a loss of output. The resulting model is highly non-linear, and Bordo and Jeanne show that an appropriately forward-looking policy that responds to the initial asset price inflation and build-up of debt by pre-emptively raising interest rates[8] dominates a purely reactive policy that responds to current inflation and activity.

Bordo and Jeanne go on to conclude that this demonstrates that a monetary policy that reacts only to output and inflation is insufficient, and that a (non-linear) response to asset prices, etc is also desirable. They suggest this is inconsistent with inflation targeting. However, Bordo and Jeanne assume a standard loss function that is quadratic in the output gap and inflation. If one accepts the argument that an inflation target is really a statement about the objective function rather than the reaction function, a flexible inflation targeter would also choose their recommended policy. But their analysis does suggest that a richer interest rate reaction function may be required in the pursuance of that inflation target.

Financial instability and credit crunches are probably of the greatest significance when they adversely affect the supply potential of the economy, as in the model of this section and Bordo and Jeanne. But even without such adverse supply effects, the unwinding of financial imbalances may cause problems for the design and conduct of monetary policy. In most settings the appropriate response to the fall in aggregate demand occasioned by the unwinding of cumulative imbalances, triggered say by a fall in asset prices or a downward revision in expectations about future income or earnings, is simply to offset the shock to demand by lowering interest rates. But this may not be possible if the zero lower

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[7] Recall that the constant savings rate assumption implies that higher output must be associated with higher capital formation and therefore more debt accumulation.

[8] This channel is absent in the model described in this paper because of the assumption that the semi-elasticity of debt with respect to the interest rate is unity.

bound on nominal interest rates starts to bind. Although other monetary policy options may be available, including purchases of a broader range of assets than the central bank usually undertakes, as well as more exotic approaches such as taxing money balances à la Gesell, their effectiveness is less certain than conventional interest rate policy. Consequently, it will make sense to conduct a policy during the period of accumulating imbalances that reduces the likelihood of encountering the zero lower bound as the imbalances unwind.

Stochastic simulations with macroeconometric models suggest that, at an average inflation rate of 2%, the fraction of time spent at the zero lower bound is likely to be around 2%. And even for an average inflation rate of 1%, the corresponding figure is only up to around 5% (see the studies surveyed in Yates (2003)). That might appear to suggest this is not likely to be a very serious issue. But those stochastic simulations assume shocks similar to those experienced in the past. The unwinding of imbalances is likely to be sharp, particularly in the context of a credit crunch or similar financial instability, and so corresponds to shock realisations in the bottom tail of the distribution. That suggests the presence of the zero lower bound on interest rates provides a more compelling argument for pre-emptive action to prevent the build-up of imbalances in the first place.[9]

A second consideration in relation to the impact on demand arises from the fact that a sharp unwinding of imbalances is likely to make aggregate demand somewhat less predictable than normal. Knowledge of the current state of the economy is highly imperfect - unlike in the models above - and increased uncertainty about demand will inevitably be transmitted into greater variability in activity. Moreover, the impact of interest rate changes on aggregate demand is also likely to become more uncertain in such an environment, especially if credit channel effects assume greater importance or if there is a credit crunch. Greater uncertainty about policy multipliers will then impact on the optimal policy setting, eg as in the seminal analysis of Brainard (1967).

In this case one would expect there to be something of a trade-off facing the policymaker. Action taken today to reduce the build-up of imbalances might pay off in the longer term by reducing the future uncertainty that the policymaker will face as the imbalances unwind. But, as before, this seems entirely consistent with the approach of flexible inflation targets, taken as a description of the objectives of policy rather than the route whereby they are achieved.

4. Identifying imbalances: a case study

These considerations suggest that even inflation targeters - indeed especially inflation targeters - should take cognisance of the risks to future macroeconomic stability posed by cumulating financial imbalances and/or asset price misalignments. No additional consideration of asset prices or financial imbalances need be introduced into the description of the objectives of policy beyond inflation and activity. But as it may be some while before imbalances unwind or misalignments correct, the policymaker does need to look sufficiently far ahead in assessing the risks to the outlook posed by the build-up of imbalances and misalignments.

A key issue is, of course, the identification of threatening imbalances before they grow too large. But without the wisdom of hindsight, it is often hard to identify those that pose a real threat, as rapid debt accumulation or large asset price movements may be a rational and justified response to changes in the economic environment. The empirical results of Borio and Lowe (2002), building on Kaminsky and Reinhart (1999), seek to develop indicators of imminent financial crises based on the joint behaviour of asset prices, credit and investment and using only information available to the policymaker at the time. Such indicators will no doubt be a useful addition to the armoury of central banks, but early diagnosis of incipient imbalances is always likely to be difficult. By the time it is obvious that there is a problem, it may be too late to do much about it - at least with conventional macroeconomic tools - without causing the macroeconomic instability that the policymaker wishes to avoid.

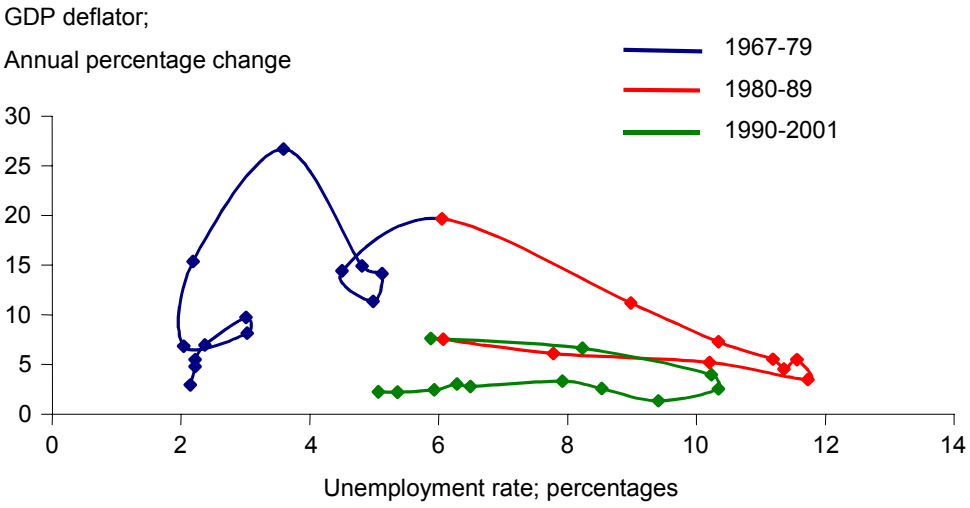
Moreover, as noted by a number of authors, the greater counterinflationary credibility of monetary policy in the last decade or so itself complicates the identification of imbalances (see eg Borio and Lowe or Goodfriend (2002)). Debt accumulation is likely to prove excessive if it is associated with

[9] Note that this argument suggests that greater uncertainty may lead to greater policy activism, in contrast to the classic Brainard (1967) result.

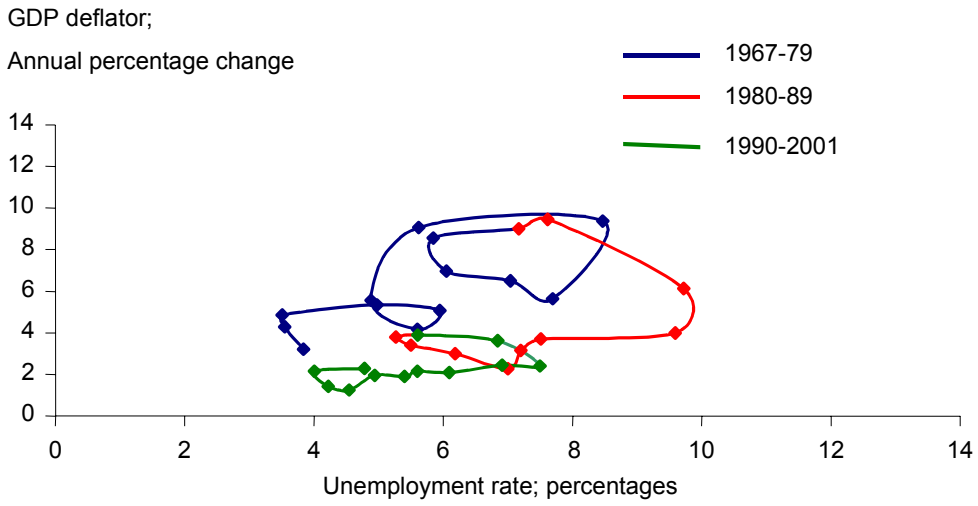
unsustainably high levels of activity. When credibility was low, levels of activity above the natural rate tended to show up relatively quickly in accelerating inflation. But a feature of the last decade has been the apparent flattening of the short-run output-inflation trade-off (see Graph 1). There are at least three possible reasons for this. First, New Keynesian models of nominal price inertia relying on the presence of menu costs suggest that the slope of the output-inflation trade-off should be flatter at low average inflation rates (Ball et al (1988)). Second, models of the Phillips curve in which expectations of inflation play a role - whether of the Friedman-Phelps-Lucas or New Keynesian varieties - suggest that an increase in activity above the natural rate will raise inflation less if those expectations are well anchored. Consequently, the enhanced belief that monetary policy will be used to stabilise inflation will itself help to keep inflation low. Moreover, that credibility will also help to stabilise long-term interest rates. Third, increased competitive pressures in product markets, associated in particular with increased international trade, may also act to restrain inflationary pressures.

Graph 1

UK Phillips curve 1967-2001



US Phillips curve 1967-2001



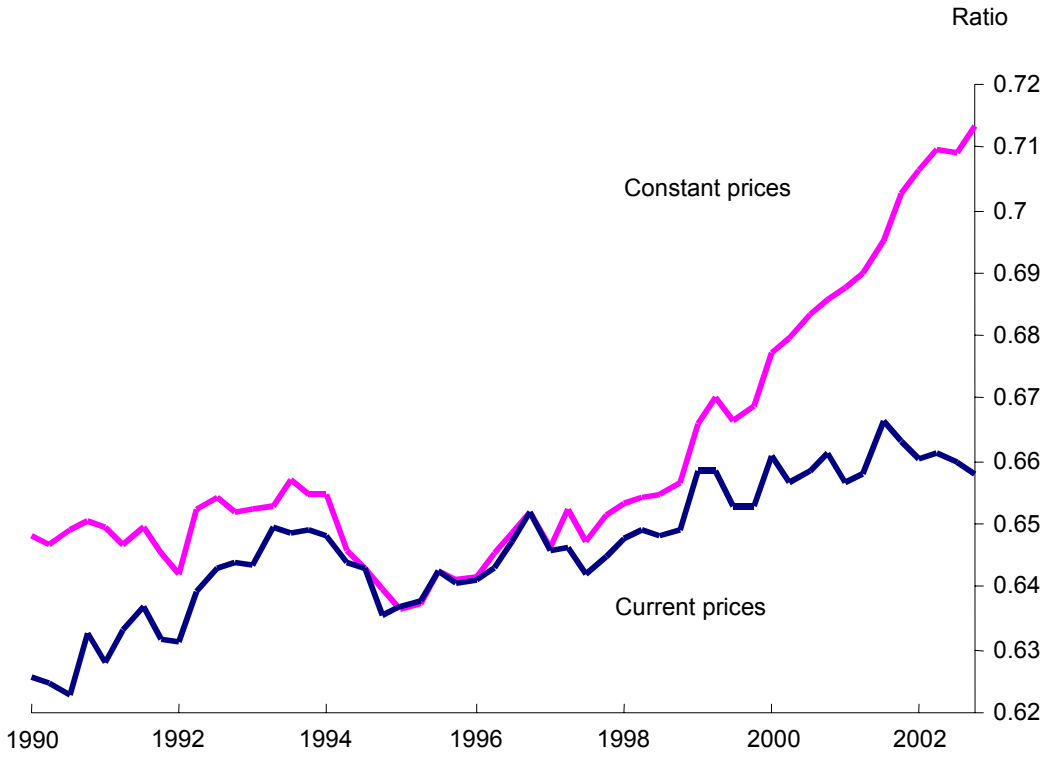
Sources: IMF; OECD.

In such a world, excess debt accumulation and levels of demand above the natural rate will not immediately show up in higher inflation rates. Moreover, that in itself may encourage market participants and policymakers to believe that the natural rate of output is higher than it really is. That in turn is likely to boost asset prices, further raising demand. Instead of showing up in inflation, the excess demand will show up in other indicators, such as profit rates, measures of labour shortage and the like. That suggests focusing attention on other indicators, as well as inflation, in identifying when demand is excessive and imbalances are unsustainable.

Rather than add to the body of work that seeks to develop early-warning indicators of potentially dangerous imbalances, I conclude with a review of current developments in the United Kingdom that illustrates the difficulties in assessing whether or not asset price movements and credit growth constitute a potential problem. A key feature of the UK economy in the past six years has been the buoyancy of household spending, which has consistently grown faster than output, in both real and nominal terms (see Graph 2). And associated with that has been a build-up of household debt and rapid house price inflation (see Graphs 3 and 4). Moreover, the Bank's Monetary Policy Committee has over the past two years sought to offset the impact of the global slowdown by relaxing policy in order to further boost domestic spending, and in particular private consumption. That has added to the accumulation of household debt and raised house prices further. Is there any evidence that the financial imbalances in the UK household sector have reached the point where they might pose a threat to the economic outlook?

Graph 2

Consumption to GDP ratio



Source: ONS.

In addressing this question, it is helpful first to ask why consumer demand might have been so buoyant. Standard theory suggests that it should be "permanent" income rather than current income that drives consumer spending, though the extent to which households will intertemporally shift expenditures will also depend on the cost of borrowing and the return to saving. The recent strong growth in consumption has coincided with robust growth in real disposable household incomes and falling unemployment, and for a while also with rising equity prices. So one explanation for the strength of consumer spending is that households have been revising up their assessment of their

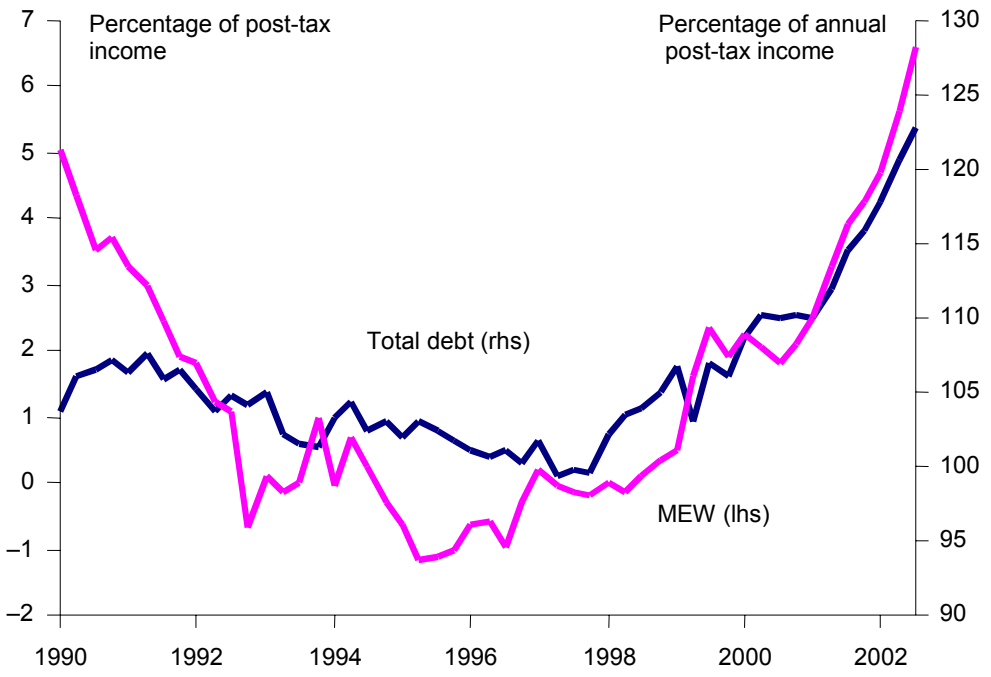
permanent income. To the extent that there has indeed been an increase in households' permanent income, then we would expect consumption growth in due course to fall back in line - or strictly speaking a little below - the rate of growth of their income, with the extra accumulated debt being gradually repaid. But if expectations prove to be overoptimistic then a sharper future correction to consumer spending is likely.

Furthermore, a significant fraction of the increase in real household incomes has been associated with the substantial improvement in the terms of trade - up 13% since 1996 (see Graph 5). An important issue is whether the improvement from this source is permanent, reflecting the exploitation of comparative advantage, or whether it is associated instead with a temporarily high level of the exchange rate, in which case real incomes and consumption will eventually both drop back. The answer to this question is not obvious.

A second explanation for the rapid growth in consumer spending and debt is easier access to, or cheaper, borrowing. This is where house prices enter the picture. The most important channel through which house prices affect consumer spending is probably not via a conventional wealth effect. Rather it is through increasing the value of the collateral against which owners - who would otherwise be credit-constrained - can borrow, or else by allowing them to borrow at lower rates. The higher house prices of recent years have allowed owner-occupiers to increase their borrowing, using the proceeds in part to boost spending. That is reflected in high rates of mortgage equity withdrawal, currently estimated to be equivalent to about 7% of personal disposable income (see Graph 3).

Graph 3

Household debt and mortgage equity withdrawal

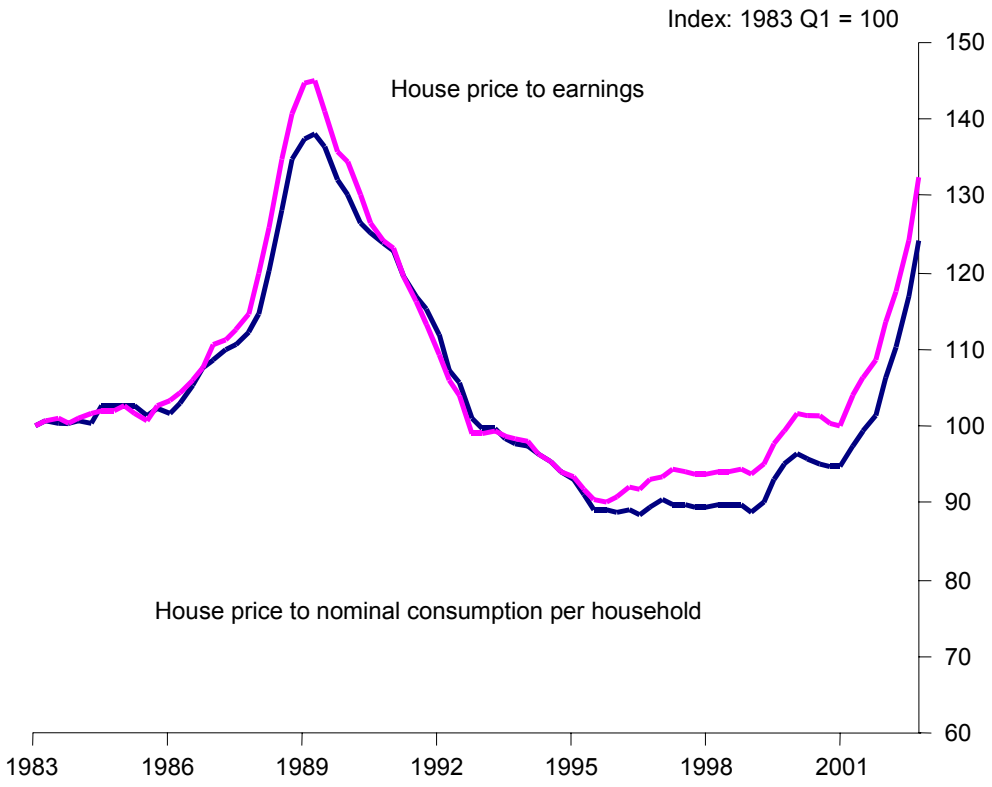


Sources: ONS; Bank of England.

But why has the price of houses risen? The demand for housing services should be driven by the same factors that drive the demand for consumer goods and services, ie permanent income. Graph 4 also shows the evolution of house prices relative to the nominal value of consumer spending per household (a proxy for consumers' estimates of their permanent income). That ratio has risen sharply in recent years, although the picture is not quite as dramatic as when house prices are compared to earnings.

Graph 4

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



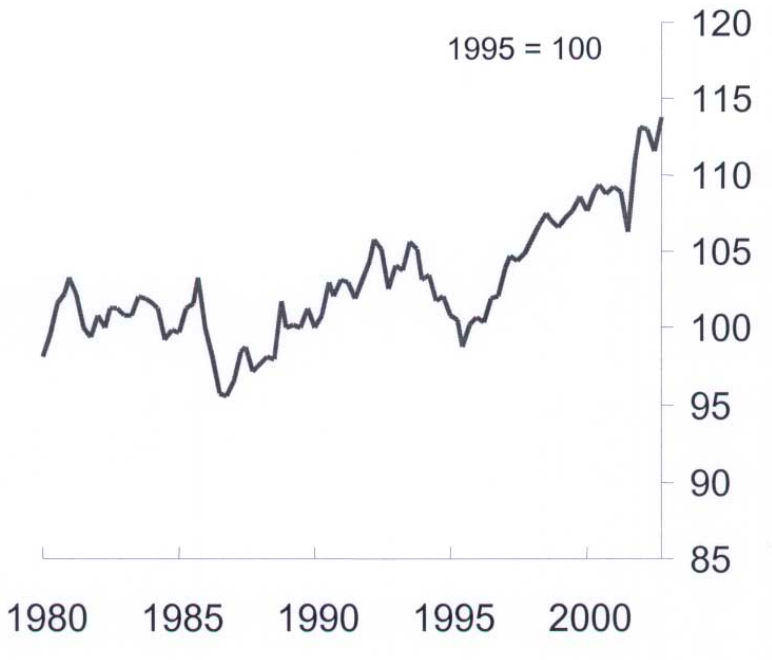
Sources: Halifax; Office of the Deputy Prime Minister; ONS; Bank of England.

So something else has also been driving house prices, and with them the value of the collateral against which owner-occupiers can borrow. At first glance Graph 4 might seem to indicate an incipient house price bubble, but there are at least three reasons why the demand for housing might have risen more than might be suggested simply by looking at permanent income. 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 in this way makes households that are constrained by their cash flow more willing or able to borrow, thus driving up the demand for housing. But a legitimate concern is that borrowers may not have fully factored in the corresponding increase in future real payments. Second, increased competition amongst lenders and the application of better credit scoring techniques may 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 - will also have boosted demand.

In addition, on the supply side of the market, the rate of construction of new dwellings in the United Kingdom has lagged behind the expansion in the number of households, in part because of a shortage of land and the impact of planning restrictions. Graph 6 shows that the ratio of dwellings to households - a measure of spare capacity in the housing market - has been steadily falling over the last two decades. One might reasonably expect that this might also be reflected in higher house prices relative to nominal consumption per household.

Graph 5

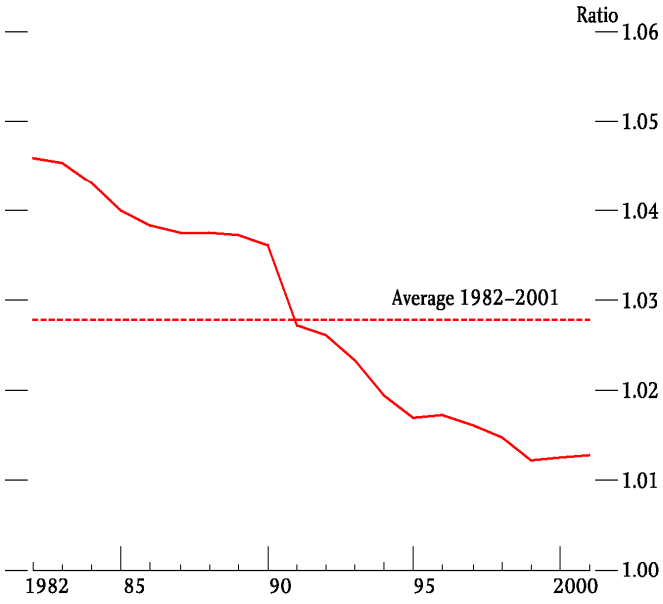
Terms of trade



Source: ONS.

Graph 6

Ratio of dwellings to household[1]



[1] Figures for the stock of dwellings are for 31 December each year prior to 1991 and 31 March from 1991 onwards. This may account for most of the fall in the ratio in 1991.

Source: Office of the Deputy Prime Minister.

In sum, there are good reasons why a higher house-prices-to-consumption ratio (or house-prices-to-earnings ratio) might be warranted by underlying economic developments. But there is inevitably very considerable uncertainty about the underlying equilibrium value of house prices. An optimal monetary policy almost certainly would dictate a differential response to a movement in house prices associated with a misalignment to one that is associated with movements in the fundamentals. Yet diagnosing whether there is a misalignment is far from straightforward.

Whether the movement in house prices is justified by fundamentals or not is clearly also central to assessing whether there is any danger posed by the build-up of household debt that is the counterpart to the increase in the value of housing wealth. But even if a sharp correction were to occur to house prices, it would not necessarily imply a correspondingly sharp fall in household spending. Net household wealth would fall, but rational consumers would spread the required adjustment over the rest of their lives. Even consumers who were credit-constrained and had previously exploited the higher collateral to increase their borrowing would not need to cut back their spending sharply unless the lender were to foreclose on them for some reason.[10]

The high outstanding debt levels could, however, increase the impact on consumer spending of other adverse shocks to activity, especially those leading to higher unemployment. Households with adequate liquid assets or who can still access the credit market would not need to cut back their consumption much if they experience a spell of unemployment, assuming it does not harm their future earning potential. Instead they would simply run down their savings or borrow more. On the other hand, households with no assets, and who cannot borrow, would be forced to cut back spending in line with their reduced income. So the impact of this adverse shock on aggregate consumption will be greater, the higher the fraction of constrained households. Furthermore, that fraction will tend to be higher, the greater the amount of debt already extended.

So a key question is whether those who hold the debt are particularly likely to be exposed to adverse shocks, such as job loss, and whether they have other assets that they could run down. The good news is that it is those households who hold the most debt who also tend to have higher income and more assets (see Graph 7). But this is not very surprising as most of the debt is in the form of mortgages and bigger mortgages are typically associated with more expensive houses!

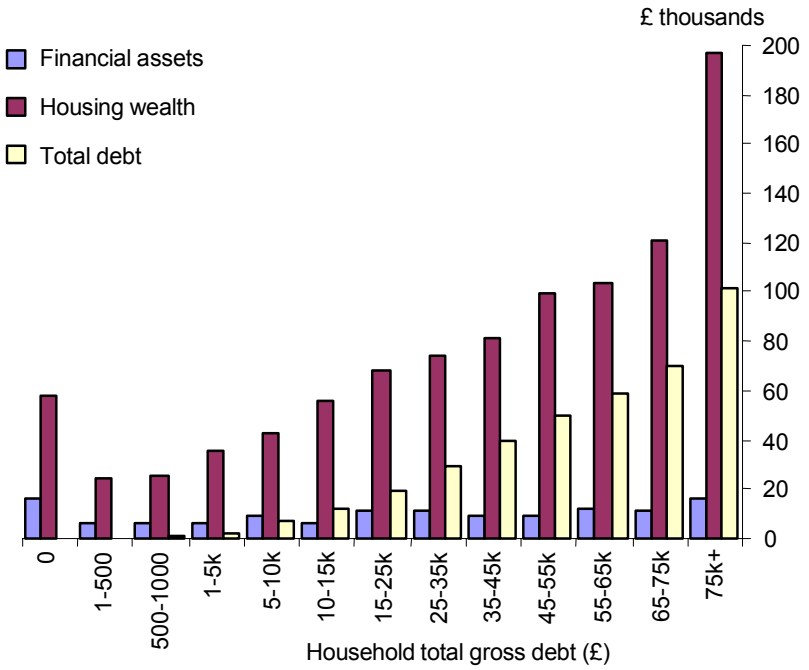
Perhaps more relevant in assessing the potential vulnerability of the household sector to shocks is the matching of debts to liquid assets. Here the news is not quite so good. Graph 8 illustrates the distribution of total liabilities and liquid assets across individual households, drawn from a 10% random sample of the 5,000 households in the 2000 British Household Panel Survey. It is notable that a large fraction of households are positioned on one or other axis. In particular, roughly a third had no liquid assets to speak of. This suggests that the financial position of the household sector might be rather less resilient than is suggested merely by looking at aggregate balance sheet data.

This contemporary example illustrates the problem that policymakers have in assessing whether potentially dangerous financial imbalances are developing or whether credit growth and asset price appreciation is simply the consequence of sustainable movements in the economic fundamentals. Moreover, even if imbalances are developing, information at the microeconomic level may well be required to evaluate the potential problems that may be caused by their unwinding - looking at aggregate data may not be sufficient to reveal whether there is a problem or not.

[10] Note that the mere fact that the value of the collateral is less than the value of the loan does not necessarily imply the borrower will choose to walk away from the debt and forfeit the asset. Some borrowers may, for reputational reasons, prefer to repay their debts even though are worth more than the value of the collateralised asset. Hence lenders, having extended the loan on the basis of what turns out to be a temporarily inflated collateral value, may prefer not to foreclose.

Graph 7

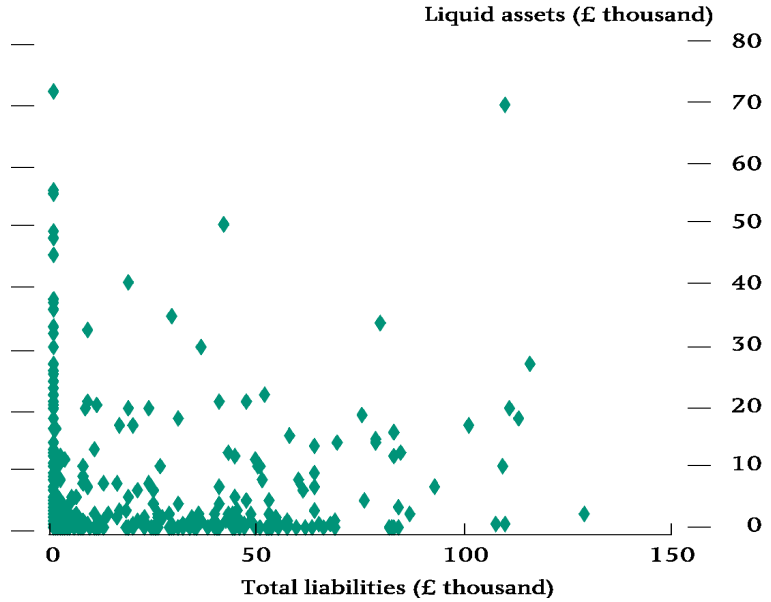
Average financial assets, housing wealth and debt at different levels of household indebtedness (2000)



Sources: BHPS; Bank calculations.

Graph 8

Distribution of total liabilities and liquid assets across individual households



Note: The full BHPS survey for 2000 contains information on the total liabilities and the liquid assets of more than 5,000 households. Households in the upper percentile of either the liquid assets or the total liabilities distribution were removed. This graph is based on a random 10% sample of the remaining households, with each dot representing one of those households.

Source: British Household Panel Survey, 2000.

5. Concluding remarks

Financial imbalances, asset price misalignments and the instability that may result as they unwind and correct may pose significant problems for monetary policymakers. Achieving price stability is no guarantee that financial instability can be avoided. But taking account of financial imbalances in the design of monetary policy does not require a change in the formal structure of inflation targets. Significant financial instability invariably will also have a significant impact on activity and inflation. The attraction of inflation targets is that they focus on the goals of policy - not the means by which they are achieved, as is the case under regimes such as money supply targets and fixed exchange rates. An inflation targeting regime that specifies a "first-level" target for the inflation rate, but requires the policymaker to take on board the implications for activity in seeking to achieve it, is a practical solution to the problem of describing the principal's objective function. A flexible inflation targeter - in the specific sense of Svensson - therefore does not require the explicit addition of financial imbalances or asset prices to be added to their remit. Rather the implications of possible imbalances and misalignments for the macroeconomic goal variables must necessarily be factored into the assessment of expectations of future growth and inflation in order to execute the optimal plan. So the answer to the question posed in the title of this paper is: Yes, (flexible) inflation targets are enough. But taking on board the possible risks posed by cumulating financial imbalances may require a shift in the rhetoric of inflation targeters towards the longer term.

But more investigation is needed into understanding the way in which financial imbalances and asset price misalignments in practice affect economic prospects. There are at least two distinct sets of issues where further work would be useful. First, it would be helpful to advance our ability to detect when rapid credit expansion and asset price increases are symptomatic of the development of underlying imbalances that are susceptible to future correction, rather than simply reflecting sustainable movements in the underlying economic fundamentals. Second, improving our understanding of how imbalances unwind and their associated costs would facilitate the design of appropriate policies, on both the monetary and regulatory front. It is safe to assume that these two issues will remain on the agenda for both monetary economists and central bankers for many years to come.

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Discussion of "Asset prices, financial imbalances and monetary policy: are inflation targets enough?", by Charles Bean

Ignazio Visco[1]

1. Introduction

Whether and how monetary policy should react to asset price misalignments and financial imbalances is a time-honoured question for both the central banking and the academic professions. This question has gained even more relevance as we have been through the New Economy bubble and, following the recent Japanese experience, risks of deflation are no longer confined to the footnotes of macroeconomic textbooks. Charlie Bean's paper is therefore very much welcome, not least as he is a distinguished member of both professions. The paper is a rich blend of theory, empirical analysis and policy considerations. The question whether monetary policy should explicitly react to asset prices is rephrased as "Is inflation targeting enough?", and the answer is unequivocal: "Yes, it is enough", provided it is "flexible".

In what follows I shall address three issues: (i) Is this answer too general?; (ii) Is "flexible inflation targeting", as advocated by Bean, operational?; (iii) Given real world non-linearities, could there be a case, even within an inflation targeting framework, for monetary policy explicitly reacting to asset price misalignments?

2. Too general a framework?

Following Svensson,[2] Bean makes clear that flexible inflation targeting (FIT) is not a policy reaction function but a monetary policy framework that depends on an explicit intertemporal *loss* function, a *model* of the economy and the nature of *shocks* affecting the economy. Typically, the loss function is quadratic in the deviation of actual inflation from an inflation target, π, and a measure of the output gap, x. In this framework, forecasts of policy objectives and implied policy instruments that satisfy "optimal" trade-offs are generated. These trade-offs are obtained by equating the marginal rate of transformation (MRT) between π and x (from the model's supply function) to the marginal rate of substitution (MRS) between these two objectives (from the policymaker's loss function). In a linear model of the economy, with a forward-looking rational expectations supply function such as the one considered by Bean, the trade-off is completely characterised by the ratio $-\lambda/\kappa$.

In this case there is no explicit role for other variables or demand shocks. They enter the implicit policy rules through their effects on the forecasts of π and x.[3] As exemplified in the model examined in Section 3 of the paper, (linear) supply shocks also affect the trade-off. In particular, Bean assumes that total factor productivity depends linearly on firms' outstanding debt that is, in turn, dependent on the capital stock, as firms borrow against collateral. The higher the debt-output ratio, the sharper the credit crunch. This takes place, however, with a given and constant probability. Reflecting the model changes (that is the new MRT) the trade-off in this case is $-\lambda\psi/\kappa$ (with ψ likely to be less than one). Thus, the fact that, as Bean puts it, "there is apparently less incentive to stabilise current output" is a consequence of the particular forward-looking supply function adopted in the model, not of the

[1] Bank of Italy. The views expressed are those of the author and do not reflect those of the Bank of Italy or those of the BIS.

[2] See, for example, Svensson (2002).

[3] Implicit policy rules may be derived by combining the trade-off and the model equations and solving for the policy instruments.

preferences of the policymaker. A different result would be obtained with a backward-looking supply function and/or adaptive expectations.[4]

Within a FIT framework, then, if it is possible to identify asset price misalignments that would eventually affect the economy (ie the paths of inflation and output), they should be countered proactively, as suggested by Cecchetti et al (2000).[5] In particular, forecasts of future inflation and output gaps should extend over longer horizons than is typically the case (ie longer than one or two years). In fact, as suggested by Bernanke and Gertler (2001), the relevant asset price effects are those on expected inflation and growth and they possibly take place with considerable lags. In agreement with Bernanke and Gertler, and differently than Cecchetti et al,[6] Bean concludes that specific instrument rules (such as Taylor or inflation forecast targeting rules), possibly augmented to include asset prices or financial imbalances as separate arguments, are *inefficient* compared to the optimal "time-consistent" targeting of the FIT type. In other words, in the latter framework, reaction to asset prices should not be "over and above" their effects on π and x.

At this level of generality, a FIT framework accommodates various sources of information besides the variables and the parameters contained in a particular model of the economy. It allows for the use of judgement in the evaluation of the effects of asset prices and financial imbalances on the economy, as well as the feedback to changes in the policy instruments. And the specification of a loss function in terms of both inflation deviations and output gaps allows for the inflation targeting to be conducted as "flexibly" as desired. It would be difficult then to disagree with Bean's conclusions, but one may ask whether this might be too general a framework to provide an actual guide for monetary policymaking. It is indeed striking that, as Charlie Bean writes, "this view of what monetary policymakers are seeking to achieve is also a fair description of central banks like the Federal Reserve or the European Central Bank".

Also the main conclusion of the paper, that monetary policy should counter asset price misalignments and/or financial imbalances so long as they affect the arguments of the authorities' loss function, may not match what prominent central bankers say and do. Consider, for instance, the following statement: "… central banks do not respond to gradually declining asset prices. We do not respond to gradually rising asset prices. We do respond to sharply reduced asset prices … But you almost never have the type of 180-degree version of the seizing up on the up side. If indeed such an event occurred, I think we would respond to it".[7]

3. How operational is FIT?

It is evident that the more flexible a framework is, the more likely its ability to encompass a large number of cases. In practice, however, it would be interesting to understand whether FIT is something more than just specifying a loss function with current and future inflation as a specific monetary policy target, together with the output gap (with a substitution coefficient of λ). The computation of the trade-off is model-dependent, as it is crucially affected by the shape of the supply function. As mentioned, it is especially important to establish whether past inflation has a significant effect on output decisions and whether the assumption of rational expectations can be maintained. That the framework asks for a serious discussion on the shape of the supply function taking place among monetary policymakers should not be considered a weakness. Even if central banking is as much art as science, the exercise of judgment is also dependent on an interpretation of the real world, and forcing monetary policymakers to come out not only with their preferences on the final objectives, but also with their views on the supply function, should be seen as a constructive challenge.

Besides the specification of the loss function and a view of how the economy operates, two elements seem however to be essential ingredients of FIT. The first is some sort of commitment not to change

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[4] On the puzzling dynamic effects of monetary policy in forward-looking models of inflation-unemployment dynamics, see Mankiw (2001).

[5] See also Cecchetti et al (2003).

[6] See also Blanchard (2000).

[7] Greenspan (1999), p 143.

policy without "new" information having become available. This is technically achieved in Bean's paper by following Svensson and Woodford[8] in deriving the trade-off equations under commitment from "the timeless perspective". As this is an important condition, it would have been interesting if Bean had discussed how it could be achieved in practice. Even more importantly, transparency is a key element of the framework. However, not only it is doubtful whether this is part of the framework within which all the central banks characterised by Bean as (explicitly or implicitly) engaged in flexible inflation targeting operate, but also it is by no means clear how they should communicate the perception of risks associated with an asset price misalignment or a bubble.

To account for the effects of asset prices, Bean suggests that "… central banks may need to look out further into the future than is usual …". A number of issues come immediately to mind with regard to this recommendation. They refer respectively to the identification of asset price misalignments, the evaluation of their effects on the real economy and the proper communication strategy that should be followed.

First of all, it is essential to understand how asset price misalignments develop and how they may produce financial imbalances. Identification of misalignments and imbalances is not an easy task, but it should not be considered impossible. One might start by considering whether asset prices appear to be sharply deviating from some sort of historical averages.[9] Then, it would be natural to ask whether these deviations are justified by observed changes in fundamentals, referring for instance, in the case of stock prices, to complex entities, such as price-earnings ratios, that are often used by practitioners and policymakers. Consider, for example, the New Economy bubble. It is certainly possible that productivity increases linked to the New Economy have not been negligible. However, on the basis of calculations founded on the discounted dividend model or Gordon formulae, already in early 1998 a consensus was being established that stock prices (especially but not only in the Nasdaq) were rising without correspondence to fundamental variables such as changes in discount factors, opportunity costs and risk premiums.[10]

For another example, consider the case study conducted by Bean in Section 4 of his paper. From a preliminary, though thorough, analysis of the risk that recent property prices in the United Kingdom might be substantially misaligned, Bean concludes that while this risk cannot be easily dismissed, it might be too early to conclude that relevant imbalances have already built up. While this is a relatively optimistic assessment, I am more inclined to conclude from Bean's evidence that the odds that a sharp correction in house prices might take place are not negligible. Given the related build-up of household debt, this could lead to severe consequences for the economy. In any case, this example shows how subjective the assessment may be and how important it is to evaluate the possible impact of asset price changes on the final variables of interest.[11]

In fact, a crucial question to be answered is what do we know about the effects of asset price misalignments, and related imbalances in equity, real estate and currency markets, as well as in bank credit and government debt. My reading of the empirical literature is that these effects are in general considered to be small and financial asset price movements are generally found to play a relatively minor role in the transmission of monetary policy. But this conclusion may be seriously biased, as these are often likely to be *rare* and *extreme* events. Even if, when they materialise, the effects of asset price changes are usually strong, in macroeconometric estimates they are likely to be dominated over the sample by "normal time" observations and, being relatively rare, they frequently end up being dummied out. In other words, their effects on the real economy are *rarely* and partly captured by our

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8 See Svensson and Woodford (2003) and Svensson (2002).

9 As is done, for example, in Bordo and Jeanne (2002b).

10 For the use of the discounted dividend models and derivations, see Gordon (1962). The use of Gordon formulae is similar to the more sophisticated econometric tests conducted by Shiller, Campbell and others, for which I refer to the discussion in Herrera and Perry (2003). See, for a mid-1998 examination of stock market prices associated with the New Economy developments, OECD (1998), where warnings of risk of substantial deviation of US stock prices from some historical norms (as well as the implicit anticipation of a return to those norms) were advanced.

11 Even if there is a misalignment in the UK market for real estate, it is not obvious that it would be for monetary policy to respond to it. On one side, there might be effects on aggregate demand that could lead to inflationary pressures and monetary policy should obviously take them into account. On the other side, in this case the use of prudential instruments, which would lead to pricing differently the value of the collateral against which borrowing takes place, might be a better solution.

empirical models, and are often treated as exogenous shocks. Also, if captured, the econometric estimates might be *extremely* imprecise.

Much more empirical work is therefore needed (on wealth effects, asset prices, expectations and credit channels), and microeconomic information should be extensively used. But substantial uncertainty will undoubtedly remain, not least because the effects of (monetary policy) changes on asset prices and quantities depend on rather hazy channels such as consumer and business confidence, expectations and "animal spirits". This would add to the uncertainty due to the fact that, as observed by Bean, these effects are likely to materialise over long time horizons. Even if, as suggested by Bean and Svensson, FIT might be a general framework for the conduct of monetary policy in "normal" times, since the precision of forecasts can only decline over time it is debatable whether trade-offs that depend on forecasts that extend far in the future and are by their very nature rather uncertain turn out to be stable enough to provide reliable guidance for current policy decisions.

Finally, if asset price changes and financial imbalances must be taken into account in the formulation of monetary policy, as Bean readily acknowledges (even if not "in addition" to forecasts), as I have mentioned above a substantial problem must necessarily arise concerning the transparency of policy decisions, and especially the way they are communicated to markets and the public at large. In fact, if central banks do respond to asset price misalignments, monetary authorities should explain, within a general FIT framework of the kind advocated in Bean's paper, how they affect the forecasts, and therefore interest rate decisions. But this may be difficult to assess and in the end much judgment needs to be exercised. While in principle this could be accommodated within a FIT framework, that judgment, and the inevitable uncertainty attached to it, would in turn affect the market response in a direction and a magnitude difficult to predict. This would make the assessment of the odds of a sharp asset price correction even more difficult.

4. A complex, non-linear real world

So far, I have considered the case, examined explicitly by Bean, where asset price misalignments affect the economy through linear demand or supply shocks. In Section 3.1, Bean also briefly discusses the possibility that supply shocks are non-linear or that demand shocks are "unconventional". Also in these cases, Bean concludes that FIT is the proper framework to follow in designing a policy response to financial imbalances and asset price shocks.

Also in the model recently studied by Bordo and Jeanne (2002a, 2002b), financial imbalances affect total supply. Differently than in the model considered in Section 3 of Bean's paper, the probability of a credit crunch (ρ in Bean's notation) is not constant but rises with the debt burden (ie the stock of debt and the rate of interest). The conclusion is straightforward: monetary policy should respond to asset prices, and this response would be rather complex. In particular, not only are the trade-offs between output and inflation affected by the shock, but also the policy response should *explicitly*, no longer implicitly through forecasts of inflation and output, and *non-linearly* react to asset price misalignments and related financial imbalances.

I find both the analysis and the conclusions of Bordo and Jeanne's papers suggestive and thorough. And so, it seems to me, does Bean. Bordo and Jeanne, however, also conclude that inflation targeting is insufficient as a policy framework, while Bean disagrees with such a conclusion. To an extent this appears to be just a semantic issue, as is clear from Bean's observation that a "flexible inflation targeter" would follow Bordo and Jeanne's suggested policy. In fact, they also "assume a standard loss function that is quadratic in the output gap and inflation", and "an inflation target is really a statement about the objective function rather than the reaction function".

Again, the level of generality of FIT, as exposed by Bean, is very high. I do not see how one can today disagree with the view that a good central bank should conduct monetary policy by looking at the forecasts of the variables of interest (affected by demand and supply shocks, including those on asset prices) and taking into account the relevant trade-offs in order to reach the targets that are more appropriate. Indeed, FIT seems also to accommodate the case of unconventional shocks that may cause a severe fall in aggregate demand through the unwinding of cumulative imbalances. The standard response would be "simply to offset the shock … by lowering interest rates". As these may encounter a zero lower bound, Bean also appears to support the recommendation of leaving some room to manoeuvre in good times. Indeed, Bean recognises that the unwinding of imbalances would

result in higher uncertainty in demand and greater output variability. And he readily acknowledges, following the suggestion from Brainard's (1967) seminal paper, that being more prudent today (to reduce the build-up of imbalances) pays off by reducing future uncertainty. As in the other cases, this is also found to be entirely consistent with the definition of FIT as "a description of the objectives of policy rather than the route whereby they are achieved".

Given the objectives of policy, however, policy decisions have to follow. Bean suggests that monetary policy should not neglect asset price misalignments and possibly bubbles, and the financial imbalances that are related to them. In this he agrees with Borio and Lowe (2002) and others, that while the issue is not "whether monetary policy should respond to asset price bubbles per se", excessive build-up of debt should not be left unanswered. He seems also to agree with what he defines as the "heterodox" view summarised by Crockett (2003), that "authorities [should] tighten monetary policy sufficiently pre-emptively to lean against excessive credit expansion and asset price increases". Where Bean seems to disagree is with Crockett's following statement that "if the monetary policy reaction function does not incorporate financial imbalances, the monetary anchor fails to deliver financial stability", with possibly serious consequences for the real economy. In his FIT framework, in fact, Bean shows that there is no need to explicitly design a monetary policy reaction function directly incorporating asset prices, as it is sufficient to derive the trade-offs between inflation and output gaps consistent with the policy objectives and the supply function of the economy.

Bean's analysis is clear and well presented. As he illustrates, FIT is a framework that can be defined generally enough to accommodate judgment and information extraneous from the necessarily simple representations of the economy provided by even the more sophisticated econometric models typically available to central banks. However, it should be recognised that Bean's formal analysis only covers the case of relatively simple imbalances and shocks that affect *linearly* the demand and supply decisions of households and firms. As also discussed in Bean's paper, the real world is generally complex and non-linear. Even within a well-specified FIT framework, the *implicit* monetary policy reaction function would then also be non-linear (and possibly very complex, as it would not be possible to rely on certainty equivalence). As in the example considered by Bordo and Jeanne (2002a), it is rather likely that this reaction function, even if not in the simple form of an augmented Taylor rule, would depend on asset prices and financial imbalances.[12]

As Bean recognises, such a world is characterised by a high degree of uncertainty. This follows from the fact that asset prices may affect the real economy with long lags, and over time the precision of forecasts necessarily falls. It also follows from the fact that statements on the timing and the effects of credit crunches or the sharp unwinding of imbalances can only be expressed in terms of subjective probabilities. Even the communication strategy that accompanies transparent policy decisions such as those taken by a central bank committed to a FIT framework might add to the overall uncertainty. In general, with uncertainty of this sort it pays to be more prudent. Indeed, if shocks turn out to positively and permanently affect the real economy, some additional monetary restriction would probably not make a big difference; if they were going to result in a bubble, some extra restriction would probably prove valuable. The question, as always in the difficult art of central banking, is how much restriction would be needed, and this calls for more study and experimentation. But it hardly calls in general, as Bordo and Jeanne (2002b) aptly put it, for "benign neglect".

[12] As a Taylor rule is often used as a *description* of how monetary policy is *normally* conducted, it might turn out that for some purposes a linear rule that expresses interest rates as functions not only of deviations of inflation from the target and output from potential but also of asset price misalignments could be a simple and linear approximation of how central banks would behave in a non-linear and complex environment. Rather than a "Taylor rule" as we have come to know it, after John Taylor the economist, we may think of it as a "Taylor approximation", after Brook Taylor the mathematician ...

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Discussion of "Asset prices, financial imbalances and monetary policy: are inflation targets enough?", by Charles Bean

Sushil Wadhwani[1]

I would like to thank the organisers for inviting me. I have known Charlie for a long time, and it is a great privilege to be given the opportunity to comment on this paper.

Before moving on to substantive issues, it is important that I clarify a possible misunderstanding first. Essentially Charlie sets up a "straw man", which he then sets about knocking down. Since Stephen Cecchetti, Hans Genberg and myself are associated with the "straw man" view - you might call us the "straw men" - it is obviously important that I set the record straight.

Charlie repeatedly emphasises that, in a flexible inflation targeting framework, if you look at the entire future path of expected inflation and growth, there is no independent role for asset prices. He asserts that we argue otherwise.

To quote our paper:

> "It is also important to emphasise that our proposal is wholly consistent with the remit of inflation-targeting central banks, as we are recommending that while they might ***react*** to asset price misalignments, they must ***not*** target them". (Cecchetti et al (2002), abstract)
>
> "This paper is ***not*** about what the central bank objective should be. Instead, we are concerned with how an inflation-targeting central bank can most effectively fulfil its objectives." (Cecchetti et al (2002), p 2)

So what then is the controversy about?

The key issue in the debate, in my opinion, is that in practice much of interest rate setting is not driven by looking at inflation and growth forecasts at all horizons, but is based on rules of thumb. In particular, inflation targeting is usually based on inflation forecasts one to three years out, often with a focus on a fixed horizon such as two years. This can have the effect that asset price misalignments get an insufficient weight in policymaking.

At the Geneva conference when we first presented our work three years ago, Ueda-san argued that a Japanese central banker who was looking 10 years out would have been raising rates in 1987-88. But, given that the central bank was focused on inflation only one or two years out, it was more difficult to justify raising rates (see Cecchetti et al (2000), pp 111-12).

We are simply proposing that, where the reaction function includes fixed-horizon inflation forecasts, it should also incorporate asset price misalignments.

As we said in 2000:

> "A purist might argue that the central bank should really look at inflation forecasts at several (all) future time periods … such a policy might not be easy to implement … The proposal for incorporating asset price misalignments can be interpreted as an alternative way of allowing for considerations relating to longer time-horizons" (Cecchetti et al (2000) p 51).

Hence, our view was simply that including asset price misalignments would help us to do better than existing rules of thumb.

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[1] Wadhwani Asset Management LLP. The views expressed are those of the author and not those of the BIS.

But why focus on rules of thumb?

There are those like Charlie, who argue that improving on existing rules of thumb is not interesting or relevant. Instead, one should just use the theoretically "optimal" policy rule. Recall that, in this case, that might involve reacting to a 10-year-ahead inflation profile. My heart sinks at the thought of having to attempt to implement such a rule.

(1) Practical considerations. It is very time-consuming to agree on a two-year profile for inflation, let alone going out many years into the future. Also many of the econometric models that underlie such forecasts perform particularly badly at longer horizons.

(2) It is what most central banks do in practice. Therefore, unsurprisingly, for most of the period I was on the Bank of England Monetary Policy Committee (MPC), the emphasis was on the two-year-ahead horizon. This was reflected in the substantial time spent on deciding whether the inflation forecast was 2.4, 2.5 or 2.6% at the two-year-ahead horizon. Of course, towards the end of my term on the MPC, the relationship may have become a little less tight. But, even then, for the majority of members of the committee, the two-year-ahead point forecasts remained central.

In many other inflation targeting countries, the central bank also relies on a fixed-horizon element in the target set for the central bank (for example, Sweden and New Zealand).

(3) Ease of communication. Both internally and in terms of how policy is communicated to the public, simple rules are much easier to work with. In particular, if the inflation target is more easily understood, inflation expectations will be better anchored, providing crucial support to the success of monetary policy.

(4) Accountability. If the framework is vague, it is difficult to make the central bank accountable.

Avoiding bubbles

Charlie asserts that:

> "… the design of monetary policy does not require a change in the formal structure of inflation targets" (p 18).

I disagree.

A clear and explicitly enunciated role for asset prices in the inflation targeting framework has the advantage that bubbles will be discouraged. Having a transparent reaction function consisting of the two-year-ahead inflation forecast plus an asset price misalignment adjustment could potentially make bubbles less likely to occur.

One key point is that the simulation work in the literature significantly understates the benefits of including asset price misalignments in the reaction function. It doesn't allow for the Kent-Lowe (1997)/Allen-Gale (2000) effect - ie the impact that the central bank can have on the probability of the bubble growing, by signalling that it will respond.

For example, in the United Kingdom in the last two years, the Bank of England has provided no clear steer on the housing market, with different members expressing different views. A transparent rule of thumb would have made it easier to affect expectations, and might have reduced the degree of the house price misalignment.

Charlie seems sympathetic to the "conventional view" that monetary policy can do little more than deal with the fallout from the unwinding of asset price bubbles and explicitly quotes Chairman Greenspan on this issue. But, this is potentially dangerous as it is asymmetric, and, more importantly, no attempt is made to affect expectations during the period that the bubble is inflating.

Other work

Of course, many people have done interesting work on why the reaction function should be modified - not just to include asset price misalignments but to make it richer more generally. Andrew's address at the beginning of this conference summarised much of this work (eg Borio and Lowe (2002) and Bordo and Jeanne (2002)).

I believe that it is important that central banks use richer reaction functions than the existing ones that seem to feed off fixed-horizon inflation forecasts, and Charlie's paper does not do enough justice to the need for such modifications.

Lack of clarity of current UK framework

While the current UK framework has many advantages, there is a lack of clarity on asset prices and imbalances. The "flexibility" of the framework in this area has meant that MPC members have, in the last two to three years, had a whole host of views on how they should react to the imbalances. This has therefore been confusing to the public.

In particular, some members have reacted differently to the exchange rate "misalignment" and the house price/consumption "misalignment". According to our suggested rule of thumb:

(1) Since unsustainable house price growth could lead to a crash and very low inflation three to four years out, interest rates should initially have been higher than warranted by the two-year-ahead forecast to prevent a build-up of debt and house prices.

(2) But, acting in the opposite direction, since the exchange rate was higher than warranted, interest rates should have initially been set lower than otherwise. This would have helped keep the exchange rate lower, thereby reducing the size of its eventual crash.

However, some members did not apply this same logic to both misalignments. The same members argued for higher interest rates because of the housing market, in line with our proposed rule of thumb. But, at the same time, these members argued that the strength of sterling also argued for higher interest rates. The reasoning was that this meant there was a risk of future exchange rate falls, stimulating inflation at some uncertain point.

So the so-called flexible inflation targeting allows people to be inconsistent in their treatment of misalignments in different asset markets. It would be much better to have a transparent and consistent rule of thumb in that case.

Conclusion

I enjoyed reading Charlie's paper, and am grateful for the opportunity of being here today. However, I do hope that the Bank of England and other central banks decide to adopt superior rules of thumb (which include asset price misalignments) when setting policy.

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