

DISCUSSION PAPER SERIES

No. 1941

**INFLATION TARGETING:
WHAT CAN THE ECB LEARN
FROM THE RECENT EXPERIENCE
OF THE BANK OF ENGLAND**

Michael J Artis, Zenon G Kontolemis
and Paul D Mizen

INTERNATIONAL MACROECONOMICS



Centre for Economic Policy Research

www.cepr.org

Available online at:

www.cepr.org/pubs/dps/DP1941.asp

INFLATION TARGETING: WHAT CAN THE ECB LEARN FROM THE RECENT EXPERIENCE OF THE BANK OF ENGLAND

Michael J Artis, European University Institute, Firenze and CEPR
Zenon G Kontolemis, European Commission
Paul D Mizen, University of Nottingham

Discussion Paper No. 1941
July 1998

Centre for Economic Policy Research
90–98 Goswell Rd, London EC1V 7RR, UK
Tel: (44 20) 7878 2900, Fax: (44 20) 7878 2999
Email: cepr@cepr.org, Website: www.cepr.org

This Discussion Paper is issued under the auspices of the Centre's research programme in **INTERNATIONAL MACROECONOMICS**. Any opinions expressed here are those of the author(s) and not those of the Centre for Economic Policy Research. Research disseminated by CEPR may include views on policy, but the Centre itself takes no institutional policy positions.

The Centre for Economic Policy Research was established in 1983 as a private educational charity, to promote independent analysis and public discussion of open economies and the relations among them. It is pluralist and non-partisan, bringing economic research to bear on the analysis of medium- and long-run policy questions. Institutional (core) finance for the Centre has been provided through major grants from the Economic and Social Research Council, under which an ESRC Resource Centre operates within CEPR; the Esmée Fairbairn Charitable Trust; and the Bank of England. These organizations do not give prior review to the Centre's publications, nor do they necessarily endorse the views expressed therein.

These Discussion Papers often represent preliminary or incomplete work, circulated to encourage discussion and comment. Citation and use of such a paper should take account of its provisional character.

Copyright: Michael J Artis, Zenon G Kontolemis and Paul D Mizen

CEPR Discussion Paper No. 1941

July 1998

ABSTRACT

Inflation Targeting: What can the ECB Learn from the Recent Experience of the Bank of England

The establishment of the European Central Bank (ECB) presents a rare opportunity to define the operations of a central bank with no prior track record. Before the ECB specifies an, as yet undefined, operational target this paper asks what might be learnt from the recent experience of inflation targeting at the Bank of England. We consider whether there should be single or multiple targets and which, if any, of the existing inflation measures should be used. If inflation is targeted then a forecast of its value becomes the intermediate variable. This raises both the issue of transparency and the issue of providing a compensating supply of information material necessary to fill the gap, but too much 'openness' can also be problematic. The ECB must be accountable and the contracting approach may be useful, but being seen to 'say' and 'do' the same thing is ultimately of the most importance.

JEL Classification: E52 and E58

Keywords: accountability, Bank of England, central bank, ECB and inflation targeting

Michael J Artis
Department of Economics
European University Institute
Via dei Roccettini 9
I-50016 San Domenico di Fiesole (FI)
Florence
ITALY
Tel: (39 055) 4685 221/777
Fax: (39 055) 4685 202
Email: michael.artis@iue.it

Zenon G Kontolemis
European Commission
Office BU-1 2/69
200, Rue de la Loi
1049 Brussels
BELGIUM
Tel: (32 2) 296 8046
Fax: (32 2) 299 6151
Email: zenon.kontolemis@cec.eu.int

For further Discussion Papers by this author see:
www.cepr.org/pubs/new-dps/dplist.asp?authorid=100324

For further Discussion Papers by this author see:
www.cepr.org/pubs/new-dps/dplist.asp?authorid=118200

Paul D Mizen
Department of Economics
University of Nottingham
University Park
Nottingham
NG7 2RD
Tel: (44 115) 951 5479
Fax: (44 115) 951 4159
Email: paul.mizen@nott.ac.uk

For further Discussion Papers by this author see:
www.cepr.org/pubs/new-dps/dplist.asp?authorid=122115

Submitted 06 July 1998

NON-TECHNICAL SUMMARY

The paper asks what lessons the experience of inflation-targeting, especially in the United Kingdom, might afford the European Central Bank, whose operating target has yet to be clarified. The European Monetary Institute, which was tasked with considering the issue, suggested that the choice of target lay between monetary targeting and inflation targeting, with some combination of the two being a possibility. Whilst an outright and exclusive adoption of inflation targeting seems unlikely, inflation targeting has been the regime in which many newly independent Central Banks have chosen to operate, among them the Bank of England. Some recent interpretations of the Bundesbank's policies have also suggested that it too is a covert inflation targeter: the point is that not only has the Bundesbank delivered a low inflation outcome but also that in justifying uncorrected 'misses' of its monetary targets, the Bundesbank invariably appeals to a secure inflation environment.

An important technical issue is the choice of price index, inflation in which is to be targeted. The usual choice of index has been some version of the consumer price index, with exclusions of lumpy and erratic terms and the deletion of any component directly reflecting the monetary policy instrument. Thus in the UK the target is formulated for the retail price index excluding mortgage interest payments. In the paper we consider additional exclusions of erratic items and alternative methods of smoothing - choosing the median rather than the mean, focusing on a moving average and extracting a 'core' component. The essential argument is to avoid making monetary policy hostage to an erratic, jumpy inflation series. Rather, policy should focus on controlling the underlying inflation rate. For the ECB, the choice of consumer price index might not be so obvious. Wholesale prices - which correspond more closely to traded goods, where the market should ensure the "Law of One Price" - might be preferred. The reason is that a large proportion of any consumer price index consists of non-traded goods (and services) prices, which may evolve in quite different ways in different parts of a Monetary Union, which embraces countries in very different stages of development.

A problem with inflation targeting is that, because of the lags in policy transmission and because of the objective uncertainties of forecasting, monitoring the policy of the Central Bank is difficult. For these reasons it has become fashionable to argue that the intermediate variable of inflation targeting is in fact the inflation forecast. If the private sector's "unconditional" forecasts of inflation (i.e. forecasts which allow for the Central Bank's future policy responses) lie within the target range, then the implication is that the market believes the Central Bank is "doing a good job". This fact, however, means that the Bank can learn nothing about future inflation from the market, and the private sector cannot provide a professional forecasting standard against which the Central Bank's predictive competence and policy

performance can be assessed. But it would be desirable that the Central Bank's technical forecasting expertise should be maintained at the forefront by peer group pressure. The paper advocates that at a minimum full information about the Bank's forecasting procedures should be made available. Bank of England practice invokes the presentation of forecast inflation "fan charts" illustrating the uncertainties which surround a forecast; the advance that this represents is qualified by some doubts as to whether potential users can handle this type of information efficiently.

The choice of operational strategy exposes some important issues of transparency and commitment. What has been termed "the inherent lack of transparency" of inflation targets - due, as discussed above, to the lags in policy transmission and the objective uncertainty in inflation forecasts - has resulted in practice in a compensating supply of information material in countries where the regime has been taken up: minutes of meetings, details of the forecasting process, of the Bank's reaction function and so on. Bank of England experience suggests that too much "openness" is also possible: the revelations of voting behaviour on the monetary policy committee seem to have provided an unwelcome diversion. Inflation-targeting Central Banks typically have independence to use their policy instruments to pursue goals laid down by government: instrument-, but not goal-independence. Formally they are in the position of carrying out, as agent, a contract for the principal. The ECB has, by statute, both goal- and instrument-independence. The contractual arrangement is perceived to have a number of merits: first, that the government has pre-committed not to meddle in monetary policy; second, that the Central Bank is accountable. In the European context, the statutes assure the ECB a huge degree of formal independence, but the "implicit rules" of democratic governance require the ECB to give an account of itself. Moreover, the ECB needs a constituency of support to make of its formal independence from governments a strong and effective bulwark. The ECB must in fact in some way emulate the contractual approach, offering to make itself accountable to the "people of Europe", perhaps in practice to the European Parliament. As it happens, inflation targeting as a regime requires many of the same accoutrements of transparency and explanation as the ECB possibly needs to arm itself with in any case.

Inflation targeting: What can the ECB Learn from the Recent Experience of the Bank of England?¹

By

Mike Artis

European University Institute and CEPR

Paul Mizen

University of Nottingham and CEPR

and

Zenon Kontolemis

International Monetary Fund

JEL: E52, E58

Keywords: inflation targeting, central bank, accountability, Bank of England, ECB

ABSTRACT

Establishment of the European Central Bank presents a rare opportunity to define the operations of a central bank without a prior track record. This paper asks what might be learnt from the recent experience of inflation targeting at the Bank of England before the ECB specifies an, as yet undefined, operational target. We consider whether there should be single or multiple targets and which inflation measure should be used, if at all. If inflation is targeted then a forecast of its value becomes the intermediate variable. This raises an issue of transparency and the compensating supply of information necessary to fill the gap, but too much “openness” can also be problematic. The ECB must be accountable and the contracting

¹ Address for correspondence: Department of Economics, University of Nottingham, University Park, Nottingham, NG7 2RD. The work was begun whilst Zenon Kontolemis was a research fellow at the European University Institute and does not represent the views of the International Monetary Fund. We are grateful for comments on earlier versions of this paper from Nicoleta Batini, Charles Bean, Andrew Haldane, David Mayes, Ken Wallis, and Robert Woods.

approach may be useful although being seen to “say” and “do” the same thing is ultimately most important.

Introduction

With the formal establishment of the European Central Bank (ECB) a rare opportunity presents itself to define the provisions for the structure and operation of a central bank without a prior historical track record. Some of these are already written into the statutes of the Maastricht Treaty which, for example, defines the ECB’s primary statutory duty to be that of the pursuit of price stability; and it has been the remit of the European Monetary Institute (EMI) to make recommendations on other aspects. Critically, however, the terms of reference for the ECB in relation to an operational target for its monetary policy are yet to be resolved. The EMI (1997) provisionally narrowed the choice to one between monetary targets and inflation targets. Since inflation targeting is the latest game in town it seems important to take stock of the experience of those newly independent central banks which have adopted it. It is rather too soon to reach a definitive conclusion on the performance of inflation targeting central banks, so what we consider are the lessons to be learnt from the mechanisms and structures that have been adopted by various inflation targeting central banks, focusing in particular on the policies of the Bank of England.

The first issue is the nature of the operational target for monetary policy. Should the ECB attempt to set targets for monetary growth like the Bundesbank, or adopt an inflation or nominal income target, or track a weighted index of monetary conditions including the exchange rate? Can more than one of these targets be used in combination? If we assume that the ECB will, like many of the newly independent national central banks, adopt some form of inflation target there are a several groups of issues that must be dealt with in order to define the target. First, which inflation rate should be targeted and how should it to be measured? Should a conventional index be used or a truncated index or a re-weighted index? Should inflation rates be smoothed or a core component extracted from the raw data? Second, when an inflation target is specified, how far ahead should the target realistically be set? How long do current changes to monetary policy take to pass through via the transmission mechanism to prices? If the target is set consistently with the transmission lag the intermediate variable for monetary policy becomes an inflation *forecast* target. Third, does a central bank

need both goal and instrument independence? Is there a conflict of interest in terms of accountability if the central bank - like the ECB - is both goal- and instrument-independent? Lastly, has the (quite widespread) change to an inflation targeting framework in the orientation of monetary policy caused a regime change in inflation behaviour? Are there other factors that suggest that low inflation outturns are the result of some other cause? We address these questions in turn in the rest of the paper.

A. *What target?*

Friedman (1959) specified a preference for a target, in terms of an *intermediate variable* of monetary policy such as a growth rate of a monetary aggregate, and the Bundesbank has followed this kind of monetary targeting strategy. More recently there has been a preference amongst central banks to define a target in terms of a monetary policy *outcome* rather than an *instrument* or *intermediate variable*.. The central bank could define a target in terms of inflation (as in the United Kingdom), or nominal income, or a general index of monetary conditions (as in Canada). An inflation target has the advantage that the central bank has a single objective for monetary policy; both a nominal income target and a monetary conditions target, in contrast, allow for deviations in more than one economic variable (Bean, 1983; Goodhart, 1994; Meade, 1994). Allowing for deviations from 'equilibrium' output by using a nominal income target has the advantage that policy makers will not be inclined to make matters worse by engineering a disinflation in the face of adverse supply shocks as they might do with an unqualified inflation target. The disadvantage is that lags in the receipt of data on which the target is based would typically mean that policy makers could only react to new information about the target variable on a quarterly basis rather than the typical monthly basis for price data. In any case, in practice the choice may not be so stark since an inflation targeting regime will normally carry provision for adjustment of the target (how this is done matters for the credibility of the regime, as discussed below).

Covering a target stated in terms of a general index of monetary conditions would ensure that the external consequences of a tight monetary policy through the exchange rate were taken into account. An index of conditions helpfully takes into account the legitimate point that external factors matter and avoids excessive exchange rate appreciation as a result of an

unchecked zeal to eradicate inflation. It also addresses the question of who should take care of the exchange rate in a world of delegated responsibility for monetary policy, which is ignored when the objective is focused on a domestic target (Woods, 1998). Whilst this may be of great importance to a central bank in a small open economy it is less likely to be important to the ECB. Besides, the index of conditions relies heavily on the weights attached to each component in the index and these would need to be robust and correctly identified. There should be reasonable certainty surrounding the weights to be able to rely on them for monetary policy setting but at present there is some doubt that the index can meet these requirements (see Eika et al, 1996, Ericsson et al. 1997).

We recognise that adoption of a simple inflation target by the ECB might not seem so likely because of the absence from the first wave of EMU of the UK and Sweden, the most determined inflation targeters in Europe. The EMI's studied indecision on this point could well allow the ECB to adopt a "combinatorial" policy, however, mixing the Bundesbank's devotion to monetary targeting with an element of inflation targeting. It is important to note, too, that recent studies of Bundesbank policy (Bernanke and Mihov, 1997) give reasons for thinking that the Bundesbank has been inflation targeting all along since overshoots of monetary targets have always been justified with an appeal to a reliable record on inflation. In the light of this it is most likely that the ECB will consider some aspect of inflation targeting even if this is in a mixture with monetary targeting. We sidestep the issue of whether the target should be in the price level or the inflation rate, since it has not been a proposal to consider adopting price level targeting in Europe. Most observers have concluded that a target in the price level is a vastly more difficult objective than a target in inflation. With price level targeting, overshoots must be corrected for in subsequent periods by deflation whilst with inflation targets an overshoot can be overlooked by allowing for 'base drift', since it is the change in the price series year-on-year that matters, not the level of the price index. If this is so and the objective is set in terms of inflation we must ask the next question: 'inflation in what?'

B. Inflation in what?

Previous inflation targeters have chosen some version of the consumer price index so far, implicitly recognizing that a central purpose of inflation control is to improve the decision-making environment for consumers, Hall and Mankiw (1994).

However successful the ECB might be in targeting 'European' inflation, there will remain substantial differences between the countries in recorded national consumer price inflation. This will not mainly be because of differences in national consumer expenditure patterns, but rather will reflect the operation of the "Harrod-Balassa-Samuelson" theorem in a monetary union, the constituent parts of which exemplify radically different levels of development (Artis and Kontolemis, 1998a, b). It might be felt as a constraint on the choice of index to be targeted that the variation across nations in the inflation rate of that index should not exceed some relatively small magnitude (say, 3 percentage points); if so, it might be sensible to adopt targeting of wholesale price indices, on the grounds that these consist largely of tradable goods prices for which the law of one price can be expected to hold. In a related, though not identical context, McKinnon (1988) advocated such a choice of index to be targeted. A clear disadvantage in such a choice, however, is that volatility in wholesale price index inflation is clearly greater than that in consumer price index inflation.

More generally, there are competing criteria that make a target more or less desirable. The price index should (probably) be "of interest to consumers" in that it should not exclude components that are likely to form a large share of the typical consumer's expenditure basket. In that sense, the index should be as inclusive as possible to represent accurately the general rise in prices of a representative basket of goods for an average consumer. Nor should the index respond perversely to changes in the stabilisation instrument, but at this point there may be a conflict with the first criterion; in the UK, for example, where a large proportion of the housing stock is owner occupied, mortgage interest payments form a large part of the typical consumer's expenditure basket. Ideally the index should not be too "lumpy" or volatile since this is likely to induce volatility in the instrument of monetary policy and create greater uncertainty in financial markets.

One procedure is to surround the central target rate by bands; in Bank of England practice these are set at $\pm 1\%$ per cent around the target rate, which itself is defined for the RPIX, i.e.

excluding mortgage interest payments. The bands permit some volatility in the recorded rate of inflation and insulate the monetary instrument from excessive variation. But the bands cannot be too wide, or the discipline of the target is lost. There are other suggestions for dealing with these problems. One approach is to delete components of the index that are particularly volatile. The target should therefore exclude items such as food, which have strong seasonal effects, and energy prices, which have jumps corresponding to supply shocks, or interest costs, which cause perverse movements in inflation when there are changes to the monetary policy instrument. Cecchetti (1997) has argued that there are good reasons to exclude these items from the basket, since what really matters is a measure of the permanent component of the inflation process. These items simply add noise. It is possible to go too far in 'smoothing by eliminating', however, since there is a danger of excluding the items in which the consumer is most interested, and consumer support is needed to underwrite the policy.

An alternative is to retain all the components but to define a measure of central tendency as the target. Supposing that the particular measure of inflation could be agreed upon, it would be necessary to decide which statistical measure of central tendency for inflation a central bank should choose – the mean, median or mode? Whilst the mean is the easiest to compute and understand, and being the average value it is consistent with the market expectation of inflation, nevertheless it is distorted by outliers. The weighted median puts half of the distribution on each side of its value and is not adversely affected by extreme values of the distribution as the mean will still be affected by asymmetry of probability mass. The mode gives the most likely outcome, but is insensitive to the peakedness of the distribution, which means that if the distribution is relatively flat a figure may be given which is only marginally more likely than many other figures. A compromise between exclusion and summary measures is to calculate the measure of central tendency after excluding some components either by cutting off the tails of the distribution (trimmed means) or by re-weighting the components in the distribution to ensure some items are zero weighted (weighted medians).

Since the measure of central tendency chosen will be a summary measure it will not tell the central bank about the distribution of inflation by itself. If there is evidence of asymmetry in the distribution through skewness, then each central tendency measure will give a different

target. Only if the distribution of inflation is symmetric will these summary measures be identical. Evidence on cross sectional data based on mean, standard deviation, cross-sectional skewness and kurtosis reveal that the distributions are not typically symmetric. The weighted median is a more efficient estimator of central tendency when the cross-sectional price distribution is highly leptokurtic. In fact the average sample kurtosis of monthly price changes across our sample of 64 categories is just above 12. This is higher than the figure of "above nine" that Cecchetti (1997) quotes in his paper for the 36 US components. This suggests that the sample mean is a very poor estimator of the central tendency of the cross-sectional distribution in the UK case.

This raises the question whether a central bank should consider a single measure at all. The view put forward by Britton, Fisher and Whitley (1998) is that no summary measure is adequate. Haldane (1998) argues that the best results will be obtained from a mixture of measures from many models that include 'off-model' information allowing for inflationary risks and potential regime shifts.

A third suggestion is to concentrate on a temporally smoothed index such as a moving average of inflation over a 24 or 36 month horizon. Again Cecchetti (1997) argues that the smoothed series have advantages over current inflation rates since the high frequency of the inflation data results in a very high noise-to-signal ratio. Since month-on-month information is almost useless because of the level of noise and differences in prices over longer horizons reduce the noise-to-signal ratio smoothed series, smoothing may be an improvement. The smoothing process, by construction, ensures that new information has a small impact on the index and therefore the impact of noise is low. However by the same reasoning any information or shock to the series takes a considerable time (36 quarters) to be eliminated and this can create a distorted picture by delaying any observable impact of current monetary policy. The smoothed inflation rate does remove the influence of the erratic components but at the price of a considerable degree of hysteresis in the series. This makes the smoothed series rather uninformative about the direction in which the monetary policy instrument should be adjusted since 'new' information has a very small impact on the series

A core measure of inflation may be a better basis for an inflation target than the actual or smoothed rates. The core eliminates the noise without introducing hysteresis in the target. We use the model of Bryan and Cecchetti (1993) that extracts the core inflation by using a weighting scheme that removes the noise from the true inflation signal in the observed time series of individual price series. The key assumption is that core inflation is uncorrelated at all leads and lags with the noise component, that is comprised of relative price disturbances; given this property it is possible to extract the core component by using a Kalman Filter algorithm (see Artis and Kontolemis, 1998b).

In Figures 1 and 2 we illustrate the different approaches for the UK against the level of retail price inflation (RPI). In figure 1 the calculations of inflation for the RPI, a weighted median, and the 25% trimmed mean show that, in general, the headline RPI is higher than the other measures. The pattern of these adjusted measures is very similar to the inflation rate for which the target is specified. In Figure 2 the Stock-Watson dynamic filter provides a core extraction of inflation that reflects the path of RPI. Unlike the measures of central tendency in Figure 1 the extracted core is not always below the RPI figure but exceeds the headline rate for a large part of the 1970s and early 1980s. Although it uses a different method to remove the erratic components from the inflation series the core tracks RPI in which the target is specified quite well. Over the period of inflation targeting in the UK there is very little to separate the weighted median, trimmed mean and the DF core measure of inflation.

C. Inflation Forecasts As The Intermediate Target Variable

The classical theory of economic policy provides a framework for understanding one of the key features alleged of inflation targeting - that it is “inherently non-transparent” - and also makes clear Svensson’s argument (Svensson, 1997) that the intermediate variable in inflation targeting is the inflation *forecast*. In the classical theory, firm distinctions are drawn between policy instruments, intermediate variables and the ultimate variables of policy interest. A causal structure is presumed so that changes in instruments lead reliably to changes in the intermediate variable which plays a role in the transmission mechanism that ultimately conveys an effect on the goal variables of interest. Monetary targeting can be thought of this way: the Central Bank’s instruments produce changes in the intermediate variable, the money supply, which lead - with a lag - to changes in the price level. Given that the links in the

sequence are reliable, a price-stability-oriented Central Bank can be monitored for the quality of its policy simply by keeping track of the current movement of the money supply. Svensson points out that, with inflation targeting the role of intermediate variable, at least from the monitoring point of view, is taken by the inflation forecast. If the forecast does not fall within the announced target bands, the Central Bank is not doing its job. The analogy falters at this point, to the extent that the forecast of inflation does not play the same role in the transmission mechanism of monetary policy as the money supply did in the traditional schema.

The monitoring issue of course arises because the monetary policy transmission mechanism takes time: estimates of the time taken vary. Recent evidence suggests that the optimal forecast horizon for inflation targeting, based on work at the Bank of England by Batini and Haldane (1998) is 6-8 quarters and from estimates produced by RBNZ economists, Conway et al. (1998) is not less than 5-7 quarters. The IMF country survey for the UK suggests that 18 months to 2 years is the lag from implementation to full effect of monetary policy. For shorter horizons the issue of 'long and variable lags' in monetary policy transmission arise: they imply that not all of the policy measures will have worked themselves through. Longer horizons, on the other hand, involve greater uncertainty and even less precision over the effects of risks on inflation.

Given the lags in the monetary transmission process, inflation targeting is inflation forecast targeting in practice. The monetary authorities may alter the monetary instrument, r , to ensure that a specific target in inflation is hit m -quarters' hence. Alternatively they may form an optimal sequence for the policy instrument, r , derived from a forward-looking policy rule based on a forecast horizon n for expected inflation, $\pi_{t-1} \dots \pi_{t-n}$:

$$r = \alpha (\pi_{t-1} \dots \pi_{t-n} - \pi^*)$$

where the target is specified as π^* , and the feedback parameter is α . The choice of the pair (α, n) can be determined by optimising methods using a loss function representing the cost of disinflation, as in Batini and Haldane (1998). Whichever means is used to choose the optimal value for the monetary policy instrument, given the transmission lags, a central bank with

instrument independence will need to form a forecast of its value n -quarters ahead to adjust policy today. It is recognised, however, that m and n may not coincide, since the optimal forecast horizon for the intermediate variable may not be the same as the horizon chosen for the target, Batini (1998). Unless the target horizon, m , is chosen carefully, the use of an optimal forecast horizon, n , which is model specific, may result in a missed target at time $t+m$. If different authorities choose the different horizons, n and m , the central bank may be held responsible (unfairly) for missed targets at $t+m$ even though it is optimising using an acceptable loss function to derive n .

In UK practice, the Bank of England has a numerical goal set for it annually by the Chancellor, but there is no specific policy horizon, m . Since the Bank recognises the need to target the forecast of inflation n -quarters ahead it is able to specify the policy horizon to coincide with it. This gives the Bank a degree of goal independence since it can choose the horizon (now set at eight quarters) over which it will be judged on its performance. The advantage that this confers could be analogous to the advantage that a British Prime Minister has in choosing a future election date on which to be judged by the electorate as compared to the American President who must deliver before a fixed term is up. Ideally goal independence should be used responsibly to supplement instrument independence, but the choice of the horizon is not subject to the same degree of scrutiny as other aspects of independence. Whether the central bank should be trusted to act responsibly in this regard is an issue that we will return to in the last section.

The central issue here is the criterion for determining the best horizon, no matter who makes the choice. If the central bank minimised societal costs of disinflation in choosing the 'optimal' horizon, we would need to return to the questions raised in the first section to consider the breadth and range of its objective function. Even if the optimal horizon was chosen from transmission lags on the basis of minimising the variance of some variable(s) of interest, its choice of the cost function could alter the optimal horizon significantly, following Batini and Haldane (1998). If the authorities are left with the task of setting the policy horizon they would have an equally hard time choosing an optimal horizon, to avoid sub-optimal disinflation performance, as a partly goal-independent ECB. The choice of the optimal horizon is not an easy problem or in any sense resolved.

It is also hard to forecast inflation. A recent study of HM Treasury's forecasting record (Melliss and Whittaker, 1998) quotes average errors in forecasting RPI inflation at four and eight quarters ahead of 0.71 and 3.31 percentage points, respectively. These figures are for a sample period beginning in 1971 and ending in 1996. For a more recent period where inflation is much lower (1993-1996), the errors are smaller, at -0.45 and -1.04 at the corresponding horizons. The negative values reflect "clear evidence of upward bias in the most recent forecasts" (ibid., p. 71). The same authors use evidence from the past history of forecast error to generate confidence intervals for inflation forecasts; an example constructed for 1997 Q3 shows an error band (at the 70% confidence level) of just under 3 percentage points for a year ahead and just under 5 points for two years ahead. Forecasts are inherently *smooth* and it is not surprising that the analysis finds that the forecasts "understate inflation volatility" (ibid., p. 70). Freeman (1998) reports that two measures of a core inflation rate, CPI less food and energy and a weighted median, do not (on US data) provide in themselves forecasts of actual inflation or improve on the forecast that can be obtained by processing actual inflation data. Still, the main point of using a core measure is to escape the (impossible) task of forecasting volatility.

The view put forward by Britton, Fisher and Whitley (1998) is that setting a target for forecasts in terms of a single measure is questionable. The reasoning from the Bank of England's perspective is that numerical estimates suggest a degree of precision that the forecasters themselves are not ready to assign to their own forecast. The Bank is keen to demonstrate that there is a role for judgement in the forecast and key to this is the weight attached to certain risks which influence the distribution; and there is a high likelihood that a single projection will be wrong. This reinforces the view outlined in the first *Inflation Report* in February 1993 that it would be 'unwise to base policy on the wholly spurious precision of a point forecast'. Attaching particular significance to a single indicator would imply either that the response function from monetary indicators to outcomes is fixed and invariant or would involve discarding information that is relevant to a changing feedback rule.

The preference of the Bank of England is to give information on the forecast value of inflation in the form of fan charts and probability distributions from the Bank's own model, private

sector forecasts and cross sectional information. However, there is a very prominent place for judgement in these forecasts. MPC members and the Bank's modelling team must determine the underlying interest rate assumptions over the next two years (the Bank now allows for constant rates and market expectations in two separate forecasts); the nature of the distribution of inflation, particularly in terms of the central measure and the degree of variation around the central measure; and assignment of weights to the upside and downside risks to the forecast based on advice from the Bank's staff (Governor's 1996 lecture to Loughborough University, George, 1997). The role of the MPC members' subjective assessment is crucial and Britton *et al.* (1998) assert that the information in the form of a fan chart reinforces this point.

Whilst the fan chart may have redeeming features in that it reflects the subjectivity without implying that the Bank has a precise forecast the future inflation rate, it suffers from the drawback that it gives an intermediate target that is not straightforward. There is an issue of transparency here. The use of the monetary policy instrument by the MPC members is based on the forecast of inflation two years hence, which is itself conditioned on subjective information which is not in the public domain. The use of a fan chart acknowledges the point made in the United Kingdom country report, International Monetary Fund (1998), that the forward-lookingness 'makes [the target] inherently non-transparent'.. Britton *et al.* (1998) explicitly states that "the fan chart is made consistent with the MPC's judgements – both 'bottom up' and top down" p. 34. This gives considerable scope for 'story telling' which can either be interpreted as a means of including 'off-model' information or as a mechanism for introducing glosses and obfuscation.

Considerable speculation over the likely 'hawks' and 'doves' on inflation persist, despite the obvious annoyance caused to the Governor and Deputy Governor by this analysis, as revealed by the Mansion House speech in May 1998. It is an evident fact that the MPC members all have the same target to pursue with equal dedication but the subjective component in the interpretation and construction of model forecasts based on the individual weights assigned by each MPC member has probably fuelled this speculation. Moreover, the publication of voting patterns has opened up debate about the likely toughness and tenacity of each member and the possibility of switches from one side to the other. The openness created by the publication of the minutes has been a double-edged sword that appears to have frightened off the ECB

from publishing its minutes with anything like the regularity or immediacy of the Bank of England. As recent events in the UK have shown, publishing the minutes too soon means that the control of monetary instruments needs to be justified well before the outcome for inflation two years hence is known. The decisions of the central bank and its individual members are subject to review in the light of each month's figures for inflation. Since the transmission process is something of the order of 6-8 quarters it would appear unnecessary to reveal the deliberations of the central bank until at least that far ahead. Perhaps this information should have been reserved for open letters to the Chancellor (in the UK case) to explain events when present inflation deviates by more than one percentage point from the target.

D. Accountability and Transparency

How can a central bank be held accountable for its actions? If there is operational independence over the setting of the monetary policy instrument then the target setter can call the central bank to account for any "misses". The strength of inflation targeting is its transparency and the inability of the central bank to deny the outcome in the inflation figures, as opposed to the "mumbo-jumbo" of monetary targeting. Thus the inflation targeting central banks live or die by their success in hitting the target – none more so than in New Zealand where the governor can lose his job. This contrasts with the Bundesbank which is said to debrief itself to the public frequently, in this way, excusing monetary overruns by reference to secure inflation rates and effectively inflation targeting even whilst explicitly setting monetary targets. Yet in practice, if there are lags of two years such that an inflation forecast is the intermediate variable for monetary policy, the construction of the forecast is crucial. What is more, the assessment of whether the target has been hit or missed can only be made after the two year lag has elapsed, since the full effects of present policy cannot be determined until all its effects have been transmitted to prices. Experience shows that an inherent lack of transparency produces laudable efforts to make up for it using inflation reports, press statements, minutes of policy review meetings and cross examination by parliamentary committees.

Current monetary policy decisions will be based on the forecast of inflation several years ahead and any justification of policy will depend on the reliability of the forecast information.

Thus the construction of forecasts is crucial and publication of the basis for the forecasts is important for accountability, yet the subjective role of these models makes interpretation difficult. In the UK the Bank of England's fan presentation allows for story-telling and correctly imparts the point that forecasting is an inexact art but there is little experience in evaluating this type of forecast (an exception is Diebold, Tay and Wallis, 1998). There is the danger then that the attempt at sophistication produces widespread misunderstanding and misinterpretation – muddying the water and spoiling the Svensson logic of simplicity and clarity of the objective in the form of an inflation target.

There is also the question of whose forecast it should be. The disadvantages of relying on the central bank's own forecast are that it may "cover its tracks" and should perhaps be subject to outside checking but there is the problem here that private sector forecasts are usually unconditional forecasts and incorporate the Central Bank's own reaction function, as perceived by the forecasters. In these circumstances, as Woodford (1994) has shown, problems of multiple equilibria, or even non-existence may arise.² In the case of the Bank of England, until February 1998, its own forecasts were based on a constant interest rate assumption and other model specific characteristics that made them incomparable to private sector forecasts. Now the Bank of England provides forecasts with market expectations of forecasts that are comparable to the private sector and should allow some judgement of the success versus the private sector when the data emerges in two years time. There has also been an agreement to publish the models from which the forecasts are derived.

In the US experience the Fed has always outperformed the private sector forecasters when comparisons have been made (Romer and Romer, 1996). The question is what private sector forecasts are likely to tell us. If the private sector believes that the central bank is a highly competent body, it will reproduce the target as the forecast. Under these circumstances no one will learn anything. If they don't reproduce the target we may conclude that the private sector does not believe that achievement of the target for inflation is credible. But if divergence between the forecast and the target are measures of credibility of achieving the target, what incentive does the central bank have to produce anything other than the target in its own forecast? If divergence from the target is interpreted as evidence that current policy settings

² See Barucci et al. (1997) for a further articulation of the problems arising when the beliefs and actions of the private sector are affected by the authorities' policies.

will result in a “miss” they provide signals of the need for a policy change. Private sector forecasts provide a judgement about the future path of inflation, the central bank’s own forecast ability and the private sector perception of the need for a change in present policy. Haldane (1998) reproduces charts from the February 1996 *Inflation Report* which show the Bank of England’s RPIX forecasts consistently below the median market forecast and more often than not outside the inter-quartile range. This suggests that the Bank is less pessimistic than the private sector about inflation, and more likely to suggest policy is correctly set to keep inflation ‘on track’.. It would be more informative to know the forecast errors of the Bank versus the private sector to judge who was more often right about policy stance. If the Bank regards proximity of inflation forecasts to target as a measure of its own credibility then it may be seeking to create (self-fulfilling) expectations of falling inflation over the two year horizon.

An independent body charged with producing strictly conditional forecasts based on present policies given by constant short rates or market expectations would be useful. If the central bank’s forecast models were deposited with the independent body then this would minimise the opportunity for covering tracks. It is likely that the direct comparison and evaluation of the model and its forecasts would give a central bank an incentive to produce high quality forecasts since it would enable an independent body to assess which mistakes were avoidable and which were likely to (be bound to) be made by any good forecaster. The separation of the limits to forecast accuracy from the conduct of a competent policy seemed one of the strengths of the Svensson interpretation.

The ECB could follow the British practice (*mutatis mutandis*), of supplementing an undated objective of 2.5% inflation with a band of +/- 1%, crossing which triggers a letter of explanation. The argument for these letters is that it represents an opportunity for the Central Bank to be ‘punished’ and perhaps for the Chancellor (European Parliament) to override it if the breach of the target is not quickly corrected. The argument against states that until two years are up, if the transmission lag is taken into account, there is no way of knowing how current policy will affect the target. Current violations will refer to policy implemented two years previously and current amendments could not be expected to affect the target for another two years. In practice, letters are likely to be commonplace events triggered by the effects of a hot June on the cabbage crop (say) if the band is taken seriously or irrelevant

otherwise. In this context the provision for open letters is unhelpful: we do not know whether the outcome is a violation of the target until two years (or even 'many economic cycles' p. 47 *Inflation Report* February 1996) have elapsed and even evidence of a bad forecast miss is not a sufficient criterion, since point forecasts are bound to err. In the UK the provision in the Chancellor's letter requires the Bank of England to state what action it intends to take to keep inflation in check after a few months when the assessment of necessary action may not be possible, let alone desirable for quite some time after that. Current consensus suggests that the time period required for the full effects of policy to feed through is 5-8 quarters (Batini and Haldane (1998), Conway et al (1998)) but even this information is model-specific. It would appear that a track record of voting patterns and the scrutiny of actions of individual decisions makers against outcomes two years hence is a more realistic means of ensuring accountability.

The ECB has both goal and instrument independence. This produces an immediate contrast with the national central banks such as the Bank of England, RBA, RBNZ, Bank of Canada and others that have instrument independence but do not have goal independence. Does it matter? The literature on central bank independence usually prizes both but only instrument independence seems needed for the Walsh contract to work, with all its superior qualities.³ We must ask whether the ECB can do "Walsh contracting"? To do so it has to "sell" its goal independence in some sense - making a "pact", for example with the European Parliament to control inflation within such-and-such rates and put its reputation "on the line" so that it suffers if it fails to deliver. Calmfors (1998) has recently made such a suggestion. Despite the formal independence granted to it by its Statute, the ECB faces special problems due to its lack of history, and to the fact that it cannot rely upon an already-established reputation or an already-established constituency of support. Susan Lohmann (1996) has argued forcefully that these handicaps make the ECB vulnerable to subversion.

Changing the goal for good reasons has to be part of a good contract; here the problem is how to allow for this element of flexibility without giving the impression that the central bank can always escape blame for a poor performance by changing the goal posts. Some solutions we

³ The pure form of the Walsh contract (Walsh, 1998) can be shown to eliminate the inflation bias present in the Barro-Gordon set-up, whilst allowing for flexibility to deal with stochastic disturbances: it is only necessary to set the target at the right level (see, e.g., Obstfeld and Rogoff, 1996). Some critics (e.g. McCallum 1996) have, however, argued that the contracting arrangement may only cosmetically solve the problem, which in practice will reveal itself again in re-setting of the inflation target.

find are formal escape clauses or a general "power of override" maintained by the government (as in the UK case). The ECB might find it harder to maintain credibility if it is policing its own contract. One argument (Artis and Kontolemis, 1998a) is that a nominal income target could be used to justify changes in the inflation target. This would allow the inflation target to be flexible without risking a political intervention that could undermine the credibility of the target itself, since goal adjustment would be signalled by the deviations from the nominal objective.

E. Inflation Targeting And Regime Change.

It is too early to say for sure that inflation targeting has produced a regime change or even that its introduction has coincided with one. Nevertheless there seems to be a new condition of low inflation in the developed world (even of threatened deflation in Japan). Reforms to central banks in many cases have occurred simultaneously with reforms to fiscal policy and labour markets (c.f. Australia, New Zealand and Canada) whilst in other countries the reforms have been too recent to be able to tests for a regime break. In all OECD countries, whether inflation targeting or not, there has been a reduction in inflation over a period of recession which has been coincident with the central bank reforms. Classical tests of whether there has been a regime change have generally failed: forecasts of inflation don't seem to have become notably more biased recently (though there is evidence of bias in official forecasts of inflation in the UK recently, as mentioned above); studies of inflation in inflation targeting economies don't find any evidence of coefficient change of the type we might expect. But the issue deserves more attention. Results reported in Leybourne and Mizen (1997), using an econometric method to endogenously chose a smooth transition path for inflation, suggest that the severe downturn in output in OECD countries, irrespective of inflation targeting or non-inflation targeting objectives, has been more influential than other factors in explaining the reduction in inflation. Wages and prices do seem oddly subdued - even in countries which have been growing quite rapidly, like the UK and the US.

Is a regime change necessary? Many countries would settle for the Bundesbank's track record over the last twenty years in place of their own performance; this was after all the philosophy behind the ERM. It may be argued that the ECB should adopt the mixture of money targets

and inflation performance that has sustained the low inflation performance in Germany even through reunification.

Even if we were to seek a regime change in inflation there is no guarantee that inflation targeting will achieve it. Blinder (1998) has argued recently that the adoption of a rule is unnecessary and that choosing a target is irrelevant to central bank performance. Few situations in everyday life - corresponding to time inconsistency problems in economics - he argues, are solved by rigid pre-commitments or contracts between principals and agents: parents punish misbehaving children and academics conduct examinations for their courses. Blinder argues that the important issue is the notion of reputation but this does not need to be enforced by a rule or a pre-commitment. The existence of a daily reckoning by the markets means that central bankers will have an incentive to deliver. In his view the central bank should aim to 'do what it says' and in this way it will gain credibility - even under discretion. This would certainly explain why inflation reports, press statements, minutes of policy review meetings and other forms of demonstrating consistency between what the central bank is 'saying' and 'doing' have proliferated among newly independent central banks.

Is the tide turning against rules and pre-commitment? Could we argue that independence and openness are enough? The argument hinges on the premise that governments, not central bankers, are the ones inclined to cheat on inflation – then it would be reasonable to allow the central bank to exercise its own discretion. Whilst this may be true, without independence the central bank is obliged to implement the government's policy unless it can appeal to a constitutional or institutional restriction to prevent it from doing so, irrespective of its own inclination to cheat. Granting independence may be a solution to this problem but independence carries with it a moral obligation to account for the actions taken, as Blinder (1998) has argued. In this respect pre-commitment has some value; independence may be sufficient but the desire for democratic accountability usually makes a target necessary. The central bank can be trusted to behave with 'reputational discretion' (nothing as simple as a mechanical rule) but the government, by granting instrument independence and specifying a target, has made a precommitment not to interfere in monetary policy.

This suggests that whatever the objective for monetary policy and whatever the chosen target the lesson to be learned from the recent experience of central bank independence and inflation targeting is 'do what you say and say what you do'.

References

- Artis, M.J. and Z. Kontolemis (1998a), 'The European Central Bank and Inflation Targeting', *International Journal of Finance and Economics*, 27-38.
- Artis, M.J. and Z. Kontolemis (1998b) 'Inflation Targeting and the European Central Bank', *EUI Working Papers*, Eco. N° 98/4.
- Barucci, E., Bischi G.I. and R. Marimon (1997), 'The Stability of Inflation Target Policies', *European University Institute*, mimeo.
- Batini, N. (1998) 'Optimal Forecast Horizons: A Discussion', *Bank of England* unpublished mimeo.
- Batini, N. and Haldane, A.G. (1998) 'Forward-Looking Rules For Monetary Policy' NBER conference on *Monetary Policy Rules*, Islamorada, Florida, January 1998.
- Bean, C. (1984) 'Nominal Income Targeting: An Appraisal', *Economic Journal*, 93, 806-19.
- Bernanke, B.S. and I. Mihov (1997), 'What Does the Bundesbank Target?', *European Economic Review*, 41, 1025-1053.
- Blinder, A (1998) *Central Banking In Theory and Practice*, MIT Press.
- Britton, E., Fisher, P., and J. Whitley (1998) 'The Inflation Report Projections: Understanding the Fan Chart', *Bank of England Quarterly Bulletin*, February 1998.
- Bryan and Cecchetti, S.G. (1993) 'The Consumer Price Index as a Measure of Inflation', *Economic Review of the Federal Reserve Bank of Cleveland*, 29, 4, 15-24.
- Calmfors, L. (1998), 'An Accountable Bank', *Financial Times*, 23 February 1998
- Cecchetti, S.G. (1997) 'Measuring Short-Run Inflation for Central Bankers', *Federal Reserve Bank of St Louis Economic Review*, May/June 1997, 143-67.
- Conway, P. Drew, A. Hunt, B, and A. Scott. (1998) 'Exchange Rate Effects and Inflation Targeting in a Small Open Economy', *Reserve Bank of New Zealand*, mimeo.
- Eika, K.H., Ericsson, N.R. and Nymoer, R (1996) 'Hazards in Implementing a Monetary Conditions Index;', *Oxford Bulletin of Economics and Statistics*, 58(4), 765-90.

- Ericsson, N.R., Jansen, E.S., Kerbeshian, N.A. and Nymoer, R. (1997) Understanding a Monetary Conditions Index', *Federal Reserve Board*, working paper.
- European Monetary Institute (1997), *The Single Monetary Policy in Stage Three: Specification of the operational framework*. Frankfurt am Main.
- Freeman, D.G. (1998), 'Do Core Inflation Measures Help Forecast Inflation?', *Economics Letters*, 58, 143-147.
- Friedman, M. (1959) *A Program For Monetary Stability*, Fordham University Press, New York.
- George, E.A.J. (1997) Governor's Speech to Loughborough University 1996, *Bank of England Quarterly Bulletin*, 1997.
- Goodhart, C.A.E. (1994) What Should Central Banks Do? What Should Be Their Macroeconomic Objectives and Operations?', *Economic Journal*, 104, 1424-1436.
- Haldane, A.G. (1998) 'On Inflation Targeting in the UK', *Scottish Journal of Political Economy*, 45, 1, 1-32.
- Hall, R.E. and Mankiw, N.G. (1994) 'Nominal Income Targeting', in *Monetary Policy* N.G. Mankiw (Ed.), University of Chicago Press, Chicago.
- International Monetary Fund (1998) *Country Report No 98/4 United Kingdom: Selected Issues*.
- Leybourne, S.J. and P.D. Mizen (1997) 'Understanding the Disinflations in Australia, Canada and New Zealand Using Evidence From Smooth Transition Analysis', *University of Nottingham discussion paper 97/6*, April 97.
- Lohmann, S. (1996), 'Quis custodiet ipsos custodes?', in (ed.) H. Siebert: *Monetary Policy in an Integrated World Economy*, Mohr, Tubingen.
- McCallum, B. (1996), 'Inflation Targeting in Canada, New Zealand, Sweden, the United Kingdom and in general', *NBER Working Papers*, N° 5579.
- McKinnon, R.I. (1988), 'Monetary and Exchange-rate Policies for International Financial Stability: a proposal', *Journal of Economic Perspectives*, 2, 1 (winter), 83-103.
- Meade, J.E. (1994) *Full Employment Without Inflation*, London: Social Market Foundation.
- Melliss, C. and R. Whittaker (1998), 'The Treasury Forecasting Record: Some New Results', *National Institute Economic Review*, 164, April, 65-79.
- Obstfeld, M. and K. Rogoff (1996), *Foundations of International Macroeconomics*, MIT Press, Cambridge, Mass.

- Romer, C.D., and Romer, D.H. (1996) 'Federal Reserve Private Information and the Behavior of Interest Rates' *NBER Working Paper No. 5692*, July 1996
- Svensson, L.E.O. (1997), 'Inflation Forecast Targeting: Implementing and monitoring inflation targets', *European Economic Review*, 41, 1111-1146.
- Walsh, C.E. (1995), 'Optimal Contracts for Central Bankers', *American Economic Review*, 85, 150-167.
- Woodford, M. (1994), 'Nonstandard Indicators of Monetary Policy: Can Their Usefulness Be Judged From Forecasting Regressions?', in *Monetary Policy* Mankiw, N.G. (Ed.), University of Chicago Press, Chicago.
- Woods, R. (1998) 'Transparency and Accountability in the New Monetary Policy Framework', paper presented to H.M. Treasury Academic Panel.