

ECONOMIC POLICY IN THE UK
MACROECONOMIC POLICY
THE DESIGN OF AN INFLATION TARGET

Summary

We discuss issues relating to the optimal design and practical implementation of an inflation target.

Reading

Bofinger, Peter (2001), *Monetary Policy*, ch.8 (see text for more precise references).
<http://www.oup.co.uk/pdf/0-19-924057-4.pdf>

Hargreaves, David (2002), "The implications of modified inflation targets for the behaviour of inflation", *The Policy Targets Agreement: Reserve Bank briefing note and related papers*, September.
http://www.rbnz.govt.nz/monpol/pta/2002ptab_hargreaves.pdf

Dennis, Richard (1997), "Bandwidth, bandlength, and inflation targeting: some observations", RBNZ Bulletin, vol.60, no.1. http://www.rbnz.govt.nz/research/bulletin/1997_2001/1997mar60_1dennis.pdf

Scrimgeour, Dean (2002), "A cross-country comparison of inflation target frameworks", *The Policy Targets Agreement: Reserve Bank briefing note and related papers*, September.
http://www.rbnz.govt.nz/monpol/pta/2002ptab_scrimgeour.pdf

Svensson, Lars (2003b), "In the right direction but not enough: the modification of the monetary-policy strategy of the ECB"
<http://www.princeton.edu/~svensson/papers/ep305.pdf>
(see text for further references to Svensson comments on the ECB)

THE DESIGN OF AN INFLATION TARGET

The Svensson (1997) model has already told us something about how we should design an inflation target regime. We now show how we can think further on this issue.

Inflation targeting and shocks

(see Bofinger (2001), sec.8.4.5 and 8.3.3)

An IS-LM / AS-AD framework can be used to describe how policy responds to supply and demand shocks under inflation targeting. We can compare this to other regimes (see subsequent lectures). We can also use this analysis to see the importance of the inflation target horizon, the band width and the price index chosen. In our initial analysis we will focus on the *target horizon*. Later we will see how the same analysis can be used to discuss *band width* and *price index*.

Demand shock

Take the case of a demand shock that affects inflation 2 years from now. E.g. a fall in investment, shifting the IS curve.

Imagine an inflation targeting regime where policymakers are required to keep inflation at the target every period – a target that applies continuously, “at all times”, as specified in the Bank of England mandate. In the face of a shock that is likely to affect inflation at the control horizon (i.e. approx 2 years hence), policy would have to respond now in order to get inflation back to target. E.g. interest rates would be reduced if there were a negative demand shock that caused inflation 2 years hence to be lower than target. The aim would be to completely offset the shock. The AD curve would have to be shifted back to its original position by an increase in the money stock.

Note that in counteracting a demand shock, inflation targeting does not feature any decline in output and prices, but interest rates change.

Some other inflation targeting countries have, like the UK, instituted an inflation target that applies each period (see Table 1 – the countries include Iceland, Israel, Mexico, Poland, Peru, South Africa, Switzerland and Thailand. Brazil, Columbia, Hungary, Indonesia and Turkey also have relatively short target horizons (“in 2006”)).

Other countries aim to achieve their inflation target over the medium run. This is often defined as 1-2 years (Canada [1.5-2 years], Chile, Philippines, South Korea and Sweden). The medium term is not well defined in the Czech Republic [until it joins EMU], New Zealand, Norway [“usually 1-3 years”] or the ECB.¹

Australia’s is the longest target horizon: it aims for 2-3% on average over the business cycle (see e.g.

http://www.rba.gov.au/MonetaryPolicy/third_statement_on_the_conduct_of_monetary_policy_2006.html).

¹ Note that the ECB can only controversially be classified as an inflation targeter.

Table 1: Formal Inflation Objectives of Inflation Targeters

| Country | Target (per cent) | Further details |
|----------------|-------------------|---|
| Australia | 2–3 | Average over the business cycle |
| Brazil | 4.5 | In 2006; tolerance band of +/- 2 percentage points |
| Canada | 1–3 | Through to the end of 2006; 6–8 quarter horizon |
| Chile | 2–4 | Over the medium term, i.e. 12 to 24 months |
| Colombia | 4–5 | In 2006 |
| Czech Republic | 3 | Until accession to the euro area; tolerance band of +/- 1 percentage point |
| Euro Area | < 2 | Below but close to 2 per cent; over the medium term; for the euro area as a whole |
| Hungary | 3.5 | By December 2006; tolerance band of +/- 1 percentage point |
| Iceland | 2.5 | Tolerance band of +/- 1.5 percentage points |
| Indonesia | 6.5–8 | In 2006 |
| Israel | 1–3 | |
| Mexico | 3 | Tolerance band of +/- 1 percentage point |
| New Zealand | 1–3 | On average over the medium term |
| Norway | 2.5 | Over the medium term, usually 1 to 3 years |
| Peru | 2.5 | Tolerance band of +/- 1 percentage point |
| Philippines | 4–5 | In 2006 and 2007 |
| Poland | 2.5 | Tolerance band of +/- 1 percentage point |
| South Africa | 3–6 | Headline inflation excluding mortgage interest cost |
| South Korea | 2.5–3.5 | Core inflation; annualised average during 2004–2006 |
| Sweden | 2 | 1–2 year horizon; tolerance band of +/- 1 percentage point |
| Switzerland | < 2 | |
| Thailand | 0–3.5 | Quarterly average of core (annual) inflation |
| Turkey | 5 | In 2006; tolerance band of +/- 2 percentage points |
| United Kingdom | 2 | Tolerance band of +/- 1 percentage point |

Source: http://www.rba.gov.au/Education/monetary_policy.html

A longer target horizon makes quite a difference. If the inflation target horizon for the economy pictured in the graph were changed to 5 years, then, in the face of the pictured shock, monetary policy would not (necessarily) have to change. The shock would not (need to) be counteracted. The policymaker would hope that subsequent shocks would reverse the demand change. This could well happen, on average, if the target horizon is long enough, and depending on the distribution of shocks.

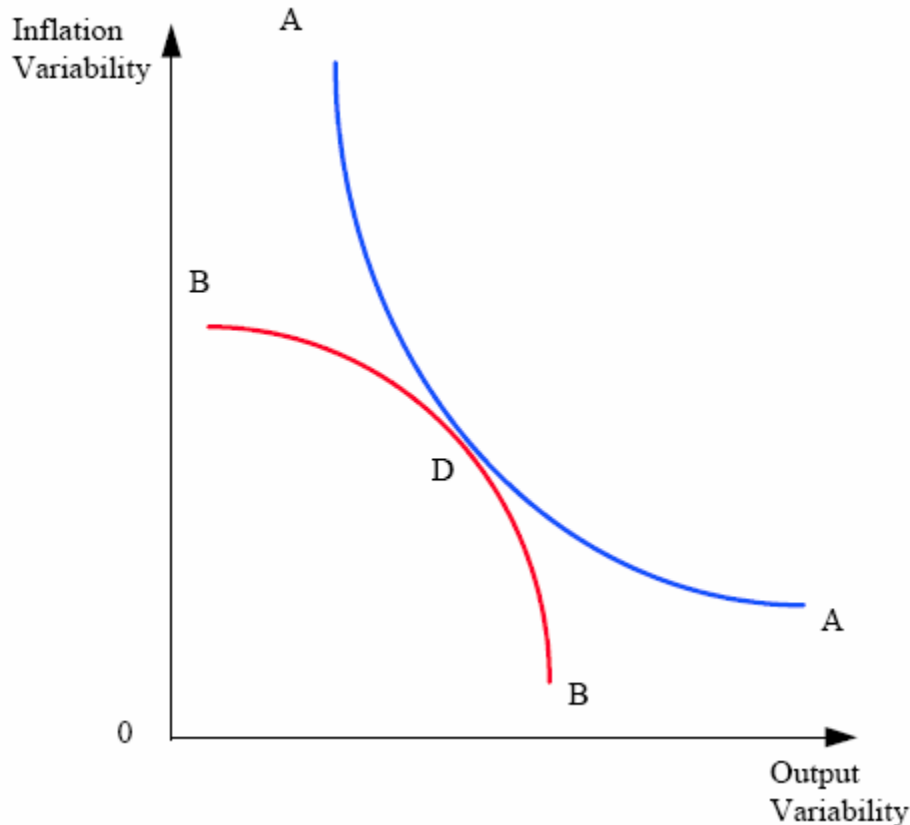
Supply shock

Take the case of a supply shock that affects inflation 2 years from now. E.g. a rise in the nominal wage level, shifting AS curve.

Under inflation targeting, the interest rate would have to be raised to bring prices back to the original level. Output would fall. The rise in interest rates and fall in output are large, as they absorb all of the shock: prices do not rise.

As before, if the inflation target horizon were lengthened, inflation targeting would not necessarily have to respond to a supply shock. As King (1997 sec.3) notes, “many supply shocks are price level effects” (p.8). With a long enough target horizon, policy does not have to counteract such shocks as the price level effect will ‘fall out’ of the inflation rate 12 months later, when the inflation rate will return to its long-run, underlying rate. E.g. indirect tax or commodity price changes lead to a one-off shift in the price level, but leave the underlying inflation rate unchanged. This one-off price level shift will change the inflation rate for 12 months, but after this inflation will return to the underlying rate. “An appropriate monetary response is to accommodate the first round price level effect, while ensuring that changes in the published twelve month inflation rate do not alter inflation expectations and lead to second round inflationary or deflationary changes in wages and prices” (King (1997), p.8).

The choice of how quickly policy should respond to (supply) shocks embodies a short-run trade-off between inflation and output. This inflation-output trade-off may exist only in the short run, but it implies a permanent trade-off between inflation volatility and output volatility (see King, 1997 sec.3). The choice facing policy-makers can be illustrated diagrammatically.

Figure 1: Taylor Curve

Source: King (1997)

Curve AA is the ‘Taylor curve’ embodying the trade-off that exists in reality between output and inflation volatility. Empirically, it is usually found that at low levels of inflation volatility, a very large increase in output volatility is needed to reduce inflation volatility further (and vice versa). Lengthening the target horizon is captured by a move up curve AA, allowing greater inflation volatility (and gaining lower output volatility).

The BB curve embodies policymakers’ preferences (they dislike extremes of output and inflation volatility, so they obtain the same utility from a medium amount of both as they do from a much smaller amount of one and only a limited increase in the other).

Point D (tangency between the two curves) gives the optimal target horizon. It will clearly depend on preferences and on the distribution of shocks to the economy. The situation is complicated by the fact that AA is only an average representation of the effect of shocks. Each individual shock may have different effects on output and inflation volatility (i.e. a different slope and position of the AA curve). Hence it is ideally necessary for the central bank to consider the effect of each shock individually.

The issue when choosing the target horizon is *the benefits of credibility versus the costs of disinflation*. A longer target horizon has similar problems to a price level target: periods when inflation is above the central point need to be matched by periods of relative disinflation [deflation in the case of a price target], when inflation is below the central (long-term desirable) rate, to maintain credibility. There is a severe problem that asymmetries in inflation and disinflation mean that the costs of disinflation rise considerably relative to the short-run benefits of inflation (‘greasing the wheels’) when target horizons lengthen. Having a longer target horizon is advantageous in that monetary authorities don’t have to respond to the first sign of inflationary pressure, which prevents unnecessary intervention. But a longer horizon might mean that price and inflation instability are higher.

Band width and Symmetry

In the same way that a longer target horizon gives more flexibility, so does a wider band width: policy does not have to respond to shocks, so the costs in terms of output volatility are lower. Similar issues arise: there is a trade-off between flexibility and credibility, in that if a wider band (or longer horizon) is exploited to take advantage of this greater flexibility, it may be costly in terms of lost anti-inflation credibility.

The UK now has point target (2%). Since 1997 the point target has been symmetric: the Bank is allowed to go 1pp above or below the point target. Deviations either side have, equally, to be explained. Prior to 1997 the target could have been said to have had elements of asymmetry, often being stated as 2.5% or less. Prior to 1995 the UK had a band target (1-4% officially, with the aim of 1-2.5% by 1997).

We can use data from New Zealand to illustrate some possible problems with a wide band – problems that only arise, though, if the policymaker acts in a certain way. Hargreaves (2002),² writing at a time when the NZ target was 0-3% over 12 months, notes that RBNZ monetary policy “always gradually attempts to return inflation to the centre of the target band” (i.e. 1.5%). He investigates via simulations (based on very simple models) what would happen if instead the RBNZ had a ‘zone of inaction’, i.e. only acted when inflation went towards to outside of the target band. Three different zones of inaction are defined, as shown in Table 2.

Table 2

Aiming points and outcomes

| 1. Aiming point or zone | 2. Intended range of outcomes | 3. Expected probability of outcomes outside 0 to 3 percent | 4. Expected probability of average inflation outside of target band over any given five year period |
|-------------------------|-------------------------------|--|---|
| 1.5% | 0 to 3% | 15% | 1.5% |
| 1 to 2% | 0 to 3% | 18% | 6% |
| 0 to 3% | 0 to 3% | 35% | 31% |
| 2 to 3% | 0 to 3% | 34% | 28% |

Source: Hargreaves (2002), p.58.

As Table 2 shows, the larger the zone of inaction, the more likely is the target to be missed. Also, a relatively small zone of inaction that is close to the edge of the target band also leads to a relatively large probability of target misses.

This demonstrates that a band target doesn't really give the luxury that might be thought to accompany it, of substantial leeway before counteractive measures need to be taken when an inflationary (or disinflationary) shock hits. (However, aiming to act only when inflation is outside the central 1pp portion of the target band is not that much worse than aiming for a precise point in the middle of the band.)

The situation in reality is likely worse if there are zones of inaction, as Hargreaves' (2002) simulations don't take account of the adjustment of expectations to the various monetary policy (implicit) rules. Clearly once agents learn that the central bank only acts once inflation reaches a

² David Hargreaves (2002), “The implications of modified inflation targets for the behaviour of inflation”, *The Policy Targets Agreement: Reserve Bank briefing note and related papers*, September.

certain value, their behaviour will change accordingly, and it is likely that these changes will make it even more likely that inflation will breach the target.

There is the possibility that agents would treat upper limit of a band target as the effective policy target (emphasised by Finnish central bank, writing in Haldane, Andrew (ed.) (1996), *Targeting Inflation*). So if the range were set around a desired rate of inflation, this would induce an upward inflationary bias. Similarly, if policymakers set a large range – e.g. a range sufficiently large to encompass likely inflation forecasting errors – this might induce a large upward bias. Finland opted for a point target for these reasons; other countries have adopted relatively narrow ranges. Note any correlations between the credibility of monetary policy in different countries and the specification (or indeed, existence, in the case of the Bundesbank, for example) of their inflation target. When credibility is low, there may be a need to choose a narrow band width or a point target and / or a relatively short time frame.

In relation to the point/band argument,

Svensson was very critical of the ECB's 1998 definition of price stability: “an increase in HICP of below 2%” (October 13, 1998).

- ambiguous and asymmetric, apparently no lower bound.
- so not a good expectations anchor, leaves open question whether ECB would sanction deflation.

Explicit point target would be better.

“Having an explicit point target is more important than the precise level of the target, 1.5, 2 or 2.5%” (Svensson, 2002, “A good thing could happen at the ECB: an improvement of the Eurosystem's definition of price stability”

<http://www.princeton.edu/~svensson/papers/ep209.pdf> p.2)

“As long as there is a clear point target to aim for, it is not important whether there is a range or not. Unanticipated shocks will in any case make ex post inflation deviate from the target”

So Svensson (2003a, “How should the Eurosystem reform its monetary strategy”,

www.princeton.edu/~svensson/ep302.pdf) recommended that the ECB's inflation target be redefined to either 1.5 or 2 % annual increase in HICP.

Svensson also believes that asymmetry is detrimental

- de-emphasises any point within the band (target no longer the central point), may increase uncertainty

Svensson (2003a) recommended that the ECB's inflation target be redefined so as to be symmetric.

The ambiguous lower bound underwent a very slow (and not transparent) process of clarification.

[Clarification 1] 1 month after definition announced, Wim Duisenberg said that “increase” implies no deflation (speech, Nov.10 1998): definition now 0-2%. But the lower bound remained less clear than the upper: asymmetry remains. Still no central point.

Uncertainty is increased by the fact that sometimes the ECB mentioned (downward) measurement bias in inflation, which could imply they do not want inflation to fall as low as zero.

[Clarification 2] Ottmar Issing (speech, June 2002) mentioned 1% as a possible lower bound for an inflation target 3 times (!) and called “below 1%” “an excessively low level” of inflation.

Svensson (2003a) suggested that this implies a 1-2% “soft-edged” target, which is effectively identical to a 1.5% point target. Svensson (2003a) also pointed out that 1.5% had also been the inflation target implied by the ECB’s two-pillar strategy (see later lecture notes for details of this).

[Clarification 3] “Following a thorough evaluation of its monetary policy strategy in 2003, the Governing Council clarified that, within the [1998] definition, it aims to maintain inflation rates below but close to 2% over the medium term” (ECB (2004) “The monetary policy of the ECB”, <http://www.ecb.int/pub/pdf/other/monetarypolicy2004en.pdf>, p.51).

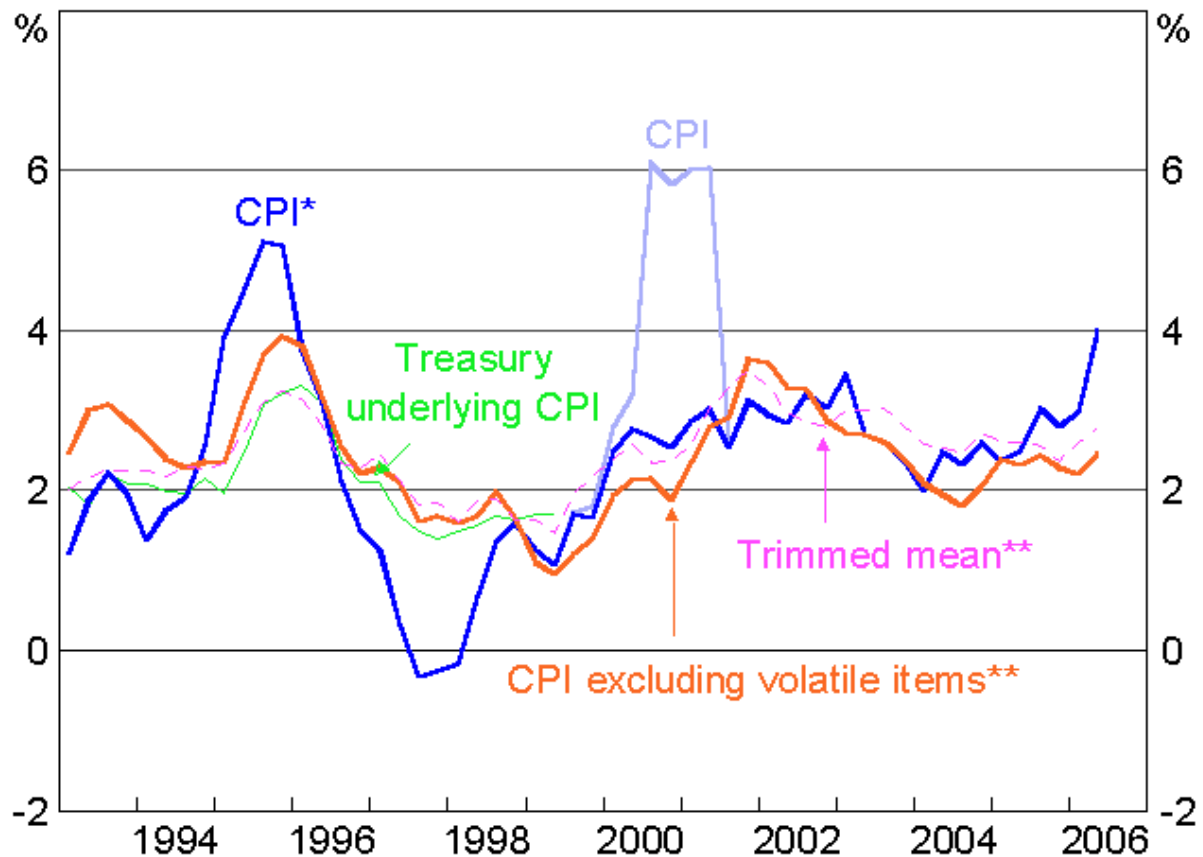
What does “below but close to” mean, though? Issing claimed (ECB Press Conference 8 May 2003) that this value was consistent with inflation expectations between 1.7% and 1.9% (Svensson (2003b), “In the right direction but not enough: the modification of the monetary-policy strategy of the ECB”, www.princeton.edu/~svensson/papers/ep305.pdf). Svensson (2003a) notes that this did not sit happily with the fact that the ECB had said in 1998, when it first defined the policy aim as “below 2”, that the then-current inflation rate of around 1% was consistent with their objective.

As Svensson (2002) remarks, it would have been best to hear the ECB’s redefinition more clearly. “It is a shame and reflects badly on the transparency of the Eurosystem, if external observers have to resort to word-for-word analysis of this kind in order to find the true objectives of the Eurosystem (cf. The detailed interpretations that Federal Reserve Chairman Greenspan’s speeches are sometimes subject to).” (p.3)

Choosing the price index

It is important to note that the policy objective is *not* to stabilise the cost of living, but to minimise the costs of inflation. These are not necessarily the same thing.

Several countries exclude mortgage interest payments, as these change automatically with interest rate changes, distorting the apparent effect of monetary policy on inflation. Some countries have also excluded: interest and credit charges; administered prices (those controlled by government); indirect taxes; government subsidies; energy prices; food prices; commodity prices.

Figure 2: Inflation in Australia (year ended)

* Adjusted for the tax changes of 1999–2000.

** Excluding interest charges prior to the September quarter 1998 and adjusted for the tax changes of 1999–2000. The trimmed mean is also seasonally adjusted.

Source: http://www.rba.gov.au/Education/monetary_policy.html

Excluding commodity, energy, and food price changes is equivalent to allowing for or adjusting the price index for terms of trade shocks. Along with the exclusion of tax changes, this excludes significant *supply* shocks. Monetary policy is then left to react solely to *demand* shocks. The theoretical rationale behind this is that supply shocks tend to shift the equilibrium price level, but (in terms of first-round effects) often have no effect on underlying inflation. There is a problem, however, with second-round effects from supply shocks. There is also the problem of how to exclude supply shocks.

The practical rationale for exclusion of these items is that energy, food, and commodity prices are particularly volatile - their inclusion might lead to unnecessary intervention. However, sometimes volatile items can make up a large proportion of goods purchased, and the upward drift (i.e. average inflation) of these prices may differ from that of the remainder of the price index, so their exclusion might not be neutral. For example, if excluded volatile goods inflation exceeds that of other goods, policy might not be sufficiently tight to minimise the costs of inflation.

The exclusion of volatile goods can have a similar effect to a lengthening of the target horizon. The case of Australia is informative. Until 1998, Australia removed goods likely to be subject to supply shocks from their targeted index. The Reserve Bank of Australia explained that “This did not entail any change in the practical operation of policy, but was designed to make the inflation objective clearer to the public. Over time, measures of underlying inflation and the CPI move closely together, though the headline CPI is more volatile [see Figure 2] as it is more affected by

temporary factors, such as changes in petrol prices. The medium-term focus of the inflation target provides the Bank with the flexibility to 'look through' temporary fluctuations in the CPI.” (http://www.rba.gov.au/Education/monetary_policy.html)

In many cases, there has been a move over time away from allowing exclusions. In addition to the RBA, the NZ Policy Targets Agreement (PTA) used to specify a list of circumstances which could justify breach of the target (see Scrimgeour (2002)), but now (under the 2002 PTA) the RBNZ targets the all-groups CPI.

Rather than have permanent exceptions from the targeted price index, there is now a tendency to allow the target to be missed in the face of large shocks. For example, the Czech National Bank (CNB) states that it will not respond to the primary impacts of large exogenous shocks (particularly supply-side shocks) that are “largely or completely outside the purview of monetary policy”, but will accept the subsequent deviation of the inflation forecast from target. Examples of such shocks include shocks to prices of energy, raw materials, agricultural products, and administrative measures (such as regulated price or tax changes) (see http://www.cnb.cz/en/monetary_policy/inflation_targeting.html#c3). The Canadian framework provides for target renegotiation under exceptional circumstances (such as an oil price shock) (Scrimgeour (2002)).