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Monetary Policy and Inflation Targeting

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In the 1990s, several countries shifted to a new monetary policy regime: an announced quantitative inflation target. The reason for this shift was the unsatisfactory performance under previous regimes. New Zealand, Canada, Australia, and Spain all introduced inflation targets under persistently high inflation; the United Kingdom, Sweden, and Finland did so after having abandoned fixed exchange rates, which had failed to achieve low and stable inflation and had been subject to dramatic speculative attacks. Inflation targeting has received much recent attention, both among policymakers and academics. In the United States and in Europe it is debated as a possible monetary policy strategy for the Federal Reserve System and the future European Central Bank, respectively. Academic research on inflation targeting, both theoretical and empirical, has grown quickly.[1] My own research in the last few years has largely dealt with understanding inflation targeting in relation to other monetary policy regimes and investigating how practical monetary policy can best be conducted under inflation targeting.

Practical inflation targeting has several common characteristics: 1) an announced quantitative inflation target, varying across countries between 1.5 and 2.5 percent per year, in most countries with a tolerance band of plus/minus 1 percentage point around the target; 2) no explicit rule on how the central bank shall set its instrument; 3) a floating exchange rate (except for Finland and Spain, which are members of the Exchange Rate Mechanism, although the wide exchange rate bands there so far have not created any conflict between the inflation target and the exchange rate target); and 4) a high degree of transparency and accountability. Commentators

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[1] *See, for instance, L. Leiderman and L.E.O. Svensson,* Inflation Targets, *CEPR, London, 1995; A.G. Haldane,* Targeting Inflation, *Bank of England, London, 1995;* Achieving Price Stability, *Federal Reserve Bank of Kansas City, 1996, and B.S. Bernanke and F.S. Mishkin, "Inflation Targeting: A New Framework for Monetary Policy,"* Journal of Economic Perspectives *11 (1997), pp. 97-116.*

also often describe inflation targeting as a regime without an intermediate target for monetary policy (instead, targeting inflation "directly"). I have argued in some of my research that this is misleading and that inflation targeting actually implies a particular intermediate target, namely the central bank's inflation forecast.

Inflation Targeting as a Remedy Against High Inflation

Inflation targeting can be seen as a potential remedy for persistent high inflation. Other remedies discussed and suggested in the literature include: 1) accepting that the long-run Phillips curve is vertical and implicitly, or explicitly, setting any output or employment target equal to (rather than above) the "natural" level; 2) creating an independent and conservative central bank; and 3) setting up a performance contract (an "inflation contract") for the central bank governor or governing board. In one of my papers, I examine the relation between inflation targeting and these remedies. Inflation targeting indeed can involve elements of all three remedies. By announcing a rather low inflation target and creating some degree of commitment to it, inflation targeting can help to reduce inflation, even if an inflation bias remains, and if inflation more often exceeds than falls short of the target. This creates a "conservative" central bank in the sense of having a *lower inflation target* rather than, as is common in the literature since Rogoff's classic 1985 article, identifying "conservatism" with a *larger weight* on a *given* inflation target.

Incidentally, this interpretation of conservatism solves an empirical puzzle about independent central banks, inflation, and output variability. If independent central banks are more conservative in that they give more weight to a specific inflation target, then lower inflation should be correlated with higher variability of output. A large literature instead has stated that more independent central banks in industrialized countries are associated with lower inflation rates, but *not* with higher variability of output. This finding is instead consistent with independent central banks simply having lower inflation targets.[2]

[2] *The "inflation bias" result was demonstrated by F. Kydland and E. Prescott, "Rules Rather Than Discretion: The Inconsistency of Optimal Plans,"* Journal of Political Economy *85(3) (1977), pp. 473-90* and *R. Barro and D. Gordon, "A Positive Theory of Monetary Policy in a Natural Rate Model,"* Journal of Political Economy *91 (1983), pp. 589-610. The result on a "weight-conservative" central bank is due to K. Rogoff, "The Optimal Degree of Commitment to a Monetary Target,"* Quarterly

Price-Level Targeting vs. Inflation Targeting

Inflation targeting implies "base drift" of the price level, even if the target is set at zero: if inflation overshoots its target, then the inflation target for the next period is related to the new price level. This base drift means that the price level has a unit root; it also means that the variance of the future price level increases without bound with the horizon. Therefore, to say that (successful) inflation targeting leads to "price stability" is therefore not quite correct. Nevertheless, the terminology has stuck.

Genuine price-level targeting is different: monetary policy then aims at keeping the price level constant, or around a steady increasing path. Price-level targeting need not imply zero inflation, if a positive inflation rate is deemed desirable. The big difference vis-a-vis inflation targeting is that the variance of the price level does not increase with the horizon. Thus, the uncertainty about the price level in the distant future is less than under inflation targeting, which should facilitate long-term decisions about savings and investment, and improve resource allocation.

The conventional wisdom is that price-level targeting would lead to increased inflation variability, as excessive inflation eventually would be followed by too little inflation in order to get the price level back in line. Such variability might then show up in increased output variability.

Closer study reveals that this issue is more complicated. In one of my papers, I show that price-level targeting very well may succeed in achieving lower level variability of *both* the price level *and* inflation, when the different incentives for monetary policy under inflation and price-level targeting, as well as the different expectations of future inflation and price levels, are taken into account. Experiments in large empirical macro models also have produced this result.

Journal of Economics *100 (1985), pp. 1169-1190*. *Inflation contracts are examined by C.E. Walsh, "Optimal Contracts for Independent Central Bankers,"* American Economic Review *85(1995), pp. 150-67, and T. Persson and G. Tabellini, "Designing Institutions for Monetary Stability,"* Carnegie-Rochester Conference Series on Public Policy *39(1993), pp. 53-84*. *L.E.O. Svensson, "Optimal Inflation Targets, 'Conservative' Central Banks, and Linear Inflation Contracts,"* American Economic Review *87 (1997), pp. 98-114, relates inflation targets to these results.*
The incentives to high inflation that a large nominal public debt creates are examined, with Sweden as an example, in M. Persson, T. Persson and L.E.O. Svensson, "Debt, Cash Flow and Inflation Incentives: A Swedish example," NBER Working Paper No. 5772, September 1996, forthcoming in The Debt Burden and its Consequences for Monetary Policy, *M. King and G. Calvo, eds, London, MacMillan, 1997.*

At present, more than half a dozen countries practice explicit inflation targeting (and certainly quite a few practice implicit inflation targeting, including Germany, the United States, and Switzerland). But there is only one historical example of price-level targeting: the successful but short experiment in Sweden in the 1930s. In the next few years, a move to inflation targeting may be sufficiently challenging for central banks. In about another decade, when central banks hopefully master all the intricacies of inflation targeting, the time might be ripe for seriously considering the pros and cons of the potentially more demanding alternative: price-level targeting.[3]

Implementing Inflation Targeting

How can inflation targeting overcome the major difficulty that central banks do not have perfect imperfect control over inflation? Inflation reacts with "long and variable lags" and with variable magnitude to changes in the monetary policy instrument. Inflation is also affected by factors other than monetary policy, and sometimes with a shorter lag than monetary policy.

Given these lags and imperfect control, the central bank necessarily must adopt a forward-looking perspective, attempting to control inflation one to two years ahead. Forecasts (projections) of crucial macrovariables become central, and inflation targeting becomes "inflation-forecast targeting": the bank's internal inflation forecast, conditional on current information and a given path for the monetary policy

[3] *S. Fischer "Modern Central Banking," in* The Future of Central Banking, *Cambridge: Cambridge University Press, 1994, expresses the conventional wisdom on price-level targeting vs. inflation targeting. The conference volume* Economic Behavior and Policy Choice under Price Stability, *Bank of Canada, 1994, contains several papers on price-level targeting. I. Fisher,* Stable Money: A History of the Movement, *Allen & Unwin, London, 1935, and L. Jonung, "Kurt Wicksell's Norm of Price Stabilisation and Swedish Monetary Policy in the 1930s,"* Journal of Monetary Economics *5 (1979), pp. 459-96, discuss the Swedish experience in the 1930s. L.E.O. Svensson, "Price-Level Targeting vs. Inflation Targeting," NBER Working Paper No. 5719, August 1996, compares price-level targeting and inflation targeting.*

instrument, becomes the intermediate target. If the inflation forecast is above (below) the inflation target, monetary policy should become more restrictive (expansionary).

The effect on the conditional inflation forecast is also the main decision criterion when new information arrives. If the new information is deemed to shift the inflation forecast at a horizon of one to two years, the policy instrument should be adjusted to dampen or nullify that shift. If the new information has no effect on the forecast, there is no need to react to it. In practice, inflation-targeting central banks construct their forecasts partly from structural models, partly from forecasting models, but also from judgements and extraneous information. Thus, inflation targeting uses all relevant information.[4]

Therefore, the implicit instrument rule that follows from inflation forecast targeting generally will differ from the well-known Taylor Rule, according to which the monetary policy instrument would react only to current inflation and output.

Strict or Flexible Inflation Targeting?

Under inflation targeting, what is the scope for stabilizing macrovariables other than inflation: for instance, output, employment, or the real exchange rate? Under "strict" inflation targeting, the central bank is only concerned with achieving the inflation target; under "flexible" inflation targeting, the central bank is also, to some extent, concerned with the stability of output and/or the real exchange rate. If inflation has deviated from its target, under strict inflation targeting the bank tries to get inflation back to target as quickly as possible. This requires considerable instrument movements which also are likely to move output or real exchange rates. Under flexible inflation targeting, concern about output and real exchange rate variability

[4] *See L.E.O. Svensson, "Inflation Forecast Targeting: Implementing and Monitoring Inflation Targets,"* European Economic Review *41 (1997), pp. 1111-46. Under inflation targeting, central banks will hence use a variety of indicators to extract useful information. A survey of ways of extracting information from financial markets is presented in P. Söderlind and L.E.O. Svensson, "New Techniques to Extract Market Expectations From Financial Instruments," NBER Working Paper No. 5877, January 1997, forthcoming in* Journal of Monetary Economics *40(2) (1997). Previously, I have worked on practical ways of estimating and interpreting forward interest rates for monetary policy purposes, see M. Dahlquist and L.E.O. Svensson "Estimating the Term Structure of Interest Rates for Monetary Policy Analysis,"* Scandinavian Journal of Economics *98 (1996), pp. 163-83; L.E.O. Svensson "Estimating and Interpreting Forward Interest Rates: Sweden 1992-94," NBER Working Paper No. 4871, September 1994; and L.E.O. Svensson, "Estimating Forward Interest Rates with the Extended Nelson & Siegel Method,"* Quarterly Review *3 (1995), pp. 13-26, Sveriges Riksbank.*

would lead the bank to take inflation back to the target at a more gradual pace. Indeed, I find that concern about output and real exchange rate variability translates into targeting inflation at a longer horizon, say 2.5 years rather than 1.5 years.[5]

Concern about output and real exchange rate variability is not the only reason for a longer horizon and a more gradual adjustment of inflation towards the target. Uncertainty about the lags and magnitudes in the transmission mechanism, that is, model uncertainty, as well as concern about interest variability (central banks seem eager to avoid whip-sawing the interest rate and prefer considerable smoothing) produce the same results.[6] Hence, strict inflation targeting is an extreme case. Indeed, it appears that real-world central banks pursue flexible inflation targeting and to some extent, stabilize output and real exchange rates, or at least smooth interest rates. All inflation targeting economies are very open. In an open economy, the exchange rate provides an additional channel for the transmission of monetary policy. There is also a choice between targeting domestic inflation (in the GDP deflator, for instance) or CPI inflation (the latter also takes the prices of imported final goods into account). All inflation targeting countries have opted for targeting CPI inflation rather than domestic inflation (in most cases some specific components are excluded from the index, for instance mortgage costs). Flexible CPI-inflation targeting appears to be better than targeting domestic inflation when it comes to stabilizing both domestic inflation and real exchange rates.[7]

Monitoring inflation targeting

As mentioned earlier, inflation-targeting regimes may entail a high degree of transparency and accountability. Inflation-targeting central banks regularly issue "Inflation Reports," explaining and motivating their policy to the general public. In

[5] *These results are derived and discussed in "Inflation Forecast Targeting: Implementing and Monitoring Inflation Targets,"* European Economic Review *41, op. cit. G. Rudebusch and L.E.O. Svensson, "Practical Inflation Targeting," mimeo, 1997, examine different forms of inflation targeting for the U.S.*

[6] *These results are derived and discussed in L.E.O. Svensson "Inflation Targeting: Some Extensions," NBER Working Paper No. 5962, March 1997. The result for model uncertainty follows W. Brainard, "Uncertainty and the Effectiveness of Policy,"* American Economic Review *57, Papers and Proceedings (1967), pp. 411-25.*

[7] *These and other preliminary results for an open economy are reported in L.E.O. Svensson "Open-Economy Inflation Targeting," mimeo, 1997.*

New Zealand, the Reserve Bank Governor's job is at risk if inflation is higher than 3 percent per year or lower than zero. In the United Kingdom, the Chancellor of Exchequer recently announced that if inflation deviates more than 1 percentage point from the inflation target, Bank of England's Governor must explain in an open letter why the divergence has occurred and what steps the Bank is taking to deal with it. In the other inflation-targeting countries, the central bank's governor and board certainly suffer considerable embarrassment and criticism when inflation moves outside its designated tolerance interval.

An explicit inflation target and an informative inflation report make it relatively easy to monitor central-bank performance. The quality and results of the bank's analysis can be scrutinized by external experts and observers in order to discover biased arguments or wishful thinking. Even if the bank chooses to – or is not required to – publish any inflation report at all, interested observers can collect inflation forecasts from reputable external forecasters and check whether they are in line with the inflation target at an appropriate horizon.[8]

Transparency allows the private sector to better asses both the competence of the central bank and its commitment to the inflation target. If the bank's competence and commitment are deemed adequate, its credibility improves, and it is easier for the bank to fulfill its target, since private sector price- and wage-setting then adapts to the target. At the time, a lack of transparency may give the bank more discretion to pursue any idiosyncratic goals. The incentive for the bank to make monetary policy more or less transparent thus depends in an intricate way on its competence and its commitment. Since transparency normally seems to be socially desirable, conflicts of interest between the bank and society cannot be excluded.[9]

Still Too Early To Tell

Explicit inflation targeting appears to have many advantages compared to the available alternatives. Monetary policy becomes goal-directed, incentive-compatible, and transparent. Yet, flexible inflation targeting allows some concern about stability

[8] *These issues are further discussed in "Inflation Forecast Targeting: Implementing and Monitoring Inflation Targets,"* European Economic Review, *op. cit.*

of output, employment, and real exchange rates to influence policy-making. Inflation-targeting central banks are improving their ability to control inflation. More research adds to the understanding of the strong and weak sides of this regime, and to the central bankers' knowledge of how to best operate it. Still, these regimes are very young; the oldest one, in New Zealand, is barely 7 years of age. Any evaluation must be highly preliminary; we will have to wait for several more years of data, including several business cycles, until we can make a very reliable evaluation. Meanwhile, inflation targeting will provide ample opportunities for more research.

[9] *These issues are clarified and discussed more rigorously in J. Faust and L.E.O. Svensson, "Credibility and Transparency: Monetary Policy with Unobservable Goals," mimeo, 1997.*