Inflation Targeting:
True Progress or Repackaging of an Old Idea?

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In 1990, a new monetary strategy was born, inflation targeting. Inflation targeting embodies five key elements: 1) public announcement of medium-term numerical targets for inflation; 2) an institutional commitment to price stability as the primary, long-run goal of monetary policy and a commitment to achieve the inflation goal; 3) an information-inclusive strategy in which many variables and not just monetary aggregates are used in making decisions about monetary policy; 4) increased transparency of the monetary policy strategy through communication with the public and the markets about the plans and objectives of monetary policymakers; and 5) increased accountability of the central bank for attaining its inflation objectives. Since the initial adoption of inflation targeting in early 1990 by New Zealand, inflation targeting has grown in popularity: over twenty countries have adopted this monetary strategy, and no country has abandoned inflation targeting, once adopted. unless it opted to give up monetary policy independence altogether by joining the European Monetary Union (e.g., Finland and Spain).

How new an idea is inflation targeting? After all, many central banks have had a goal of price stability well before the advent of inflation targeting. Is inflation targeting really a major step forward in central bank practice, or is it just a repackaging of old wine in a new bottle?

This paper examines these questions by providing a history of economic ideas and central bank practices over the last forty-five years that have led up to the development of inflation targeting. I will argue that there has been an evolution of ideas and central bank practices that have led to current thinking on what constitutes best practice in central banking and inflation targeting is the culmination of this process. Inflation targeting is something new and is true progress because it has many advantages over earlier monetary policy strategies. It is not revolutionary, however: rather it is a refinement of what has gone on before. Indeed, inflation targeting continues to evolve as we speak and will continue to be refined in the future.

I.
Central Banking in the 1960s

The 1960s began with a relatively benign inflation environment, particularly in the United States where inflation was running at an annual rate of a little over one percent. (Inflation rates were at higher rates in countries such as the U.K., Germany, France and Japan, but were still below 4% in 1960.) The strategy at the Federal Reserve and many other central banks was one in which the central banks focused on "money market conditions": on variables such as nominal interest rates, bank borrowings from the central bank, and free reserves (excess reserves minus borrowings).[1] In addition, economists armed with Keynesian macro econometric models argued that they could fine tune the economy to produce maximum employment with only slight inflation consequences. Particularly influential at the time was a famous paper by Samuelson and Solow (1960) which argued that work by A.W. Phillips (1958), which became known as the Phillips curve, suggested that there was a long-run tradeoff between unemployment and inflation and that this tradeoff should be exploited. Indeed, Samuelson and Solow even mentioned that a nonperfectionists goal of a 3% unemployment rate could be attained at what they considered to be a low cost of inflation of 4 to 5% per year. This thinking by the then dominant Keynesian economists led to increased monetary and fiscal policy activism to get the economy to full employment. However, the subsequent economic record was not a happy one: Inflation accelerated, with the inflation rate in the U.S. and other industrialized countries eventually climbing above 10% in the 1970s, leading to what has been dubbed "The Great Inflation", while the unemployment rate deteriorated from the performance in the 1950s.

The counterattack to policy activism initially came from the Monetarists lead by Milton Friedman. Milton Friedman, in a series of famous publications in 1963 (Friedman

[1] See Mayer (1998) and Romer and Romer (2002) for a description of economic thinking and monetary policy practice in the 1960s.

and Schwartz, 1963a, b and Friedman and Meiselman, 1963) established that fluctuations in the growth rate of the money supply were far more capable of explaining economic fluctuations and inflation than nominal interest rates. Karl Brunner and Alan Meltzer in Congressional testimony(1964a, b, c) criticized the use of "money market conditions" to guide monetary policy and suggested that targeting monetary aggregates would produce better policy outcomes. In his famous 1968 presidential address to the American Economic Association, Milton Friedman (1968) along with Edmund Phelps (1967) argued that there was no long-run tradeoff between unemployment and inflation: rather the economy would gravitate to a natural rate of unemployment in the long run no matter what the rate of inflation was. In another words, the long-run Phillips curve would be vertical, and attempts to lower unemployment below the natural rate would only result in higher inflation. The Monetarist counterattack implied that monetary policy should be focused on control of inflation and the best way to do this would be the pursuit of steady growth in the money supply.

II.
Central Banking in the 1970s:
The Advent of Monetary Targeting

The Monetarist counterattack was not successful at first in getting central banks to increase their focus on controlling inflation and money supply growth. In the early 1970, estimates of the parameters of the Phillips curve did not yet suggest that the long-run Phillips curve was vertical. Economists and policymakers also were not as fully aware of the importance of expectations to the effect of monetary policy on the economy, which would have led them to accept the Friedman-Phelps natural rate hypothesis more quickly. Also, estimates of the natural rate of unemployment were far too low, thus suggesting that increases in inflation that were occurring at then prevalent unemployment rates were the

result of special factors and not overly expansionary monetary policy (Mayer, 1998, and Romer and Romer, 2002).

Starting in the early 1970s, Robert Lucas in a series of papers (1972, 1973, and 1976) launched the rational expectations revolution.[2] The theory of rational expectations made it immediately clear why there could be no long-run tradeoff between unemployment and inflation, so that attempting to lower unemployment below the natural rate would only lead to higher inflation and no improvement in performance in output or employment. Indeed, one implication of rational expectations in a world of flexible wages and prices was the policy ineffectiveness proposition (Sargent and Wallace, 1975) which suggested that a constant-money-growth-rate rule along the lines suggested by Milton Friedman does as well as any other deterministic policy rule with feedback. All that policy activism advocated by Keynesian economists would produce is higher and more variable rates of inflation.

The rational expectations revolution also made clearer the need for use of a nominal anchor, a nominal variable such as the inflation rate or the money supply, which ties down the price level to achieve price stability. Adherence to a nominal anchor which keeps the nominal variable within a narrow range promotes price stability by directly promoting low and stable inflation expectations.

Events on the ground were also leading to a rejection of policy activism. Inflation began a steady rise in the 1960s and then in the aftermath of the 1973 oil price, energy shock, inflation climbed to double digit levels in many countries. Research by economists (e.g., see the surveys in Fischer, 1993, Anderson and Gruen, 1995) but also the public and politicians began to discuss the high costs of inflation. The ideas espoused by Monetarists that central banks needed to control the growth rate of monetary aggregates now came to the

[2]The Lucas (1976) paper was already very influential in 1973, when it was first presented in 1973 at the first Carnegie-Rochester Conference. Note that although Muth (1960, 1961) introduced the idea of rational expectations over ten years earlier, his work went largely unnoticed until resurrected by Lucas.

fore.

In the mid-1970s, a number of industrialized countries (see Bernanke and Mishkin, 1992) began to engage in monetary targeting which involved three elements: 1) reliance on information conveyed by a monetary aggregate to conduct monetary policy, 2) announcement of medium-term targets for monetary aggregates, and 3) some accountability mechanism to preclude large an systematic deviations from the monetary targets. The Federal Reserve started to follow weekly tracking paths for M1 and indicated its preferred behavior for M2. Then in 1975, in response to a Congressional resolution, the Fed began to announce publicly its targets for money growth. The United Kingdom began informal targeting of a broad monetary aggregate, sterling M3 in late 1973 and began formal publication of targets in 1976. The Bank of Canada instituted monetary targeting in 1975 under a program of "monetary gradualism" in which M1 growth was to be controlled with a gradually falling target range. In late 1974, both the Bundesbank and the Swiss National Bank began to announce money stock targets: with the Bundesbank choosing to target central bank money, a narrow aggregate which was the sum of currency in circulation and bank deposits weighted by the 1974 required reserve ratios, and the Swiss National Bank targeting M1. In 1978, the Bank of Japan announced "forecasts" of growth rates of M2 (and after 1979, M2 + CDs).

III.
Central Banking in the late 1970s and 1980s:
The Failure of Monetary Targeting?

Monetary targeting had several potential advantages over previous approaches to the conduct of monetary policy. Announced figures for monetary aggregates are typically reported periodically with very short time-lags, within a couple of weeks, and so monetary targets can send almost immediate signals to both the public and markets about the stance of

monetary policy and the intentions of the policymakers to keep inflation in check. These signals can help fix inflation expectations and produce less inflation. Monetary targets also have the advantage of being able to promote almost immediate accountability for monetary policy to keep inflation low.

These advantages of monetary aggregate targeting depend on one key assumption: there must be a strong and reliable relationship between the goal variable (inflation or nominal income) and the targeted aggregate. If there is velocity instability, so that the relationship between the monetary aggregate and the goal variable is weak, then monetary aggregate targeting will not work. The weak relationship implies that hitting the target will not produce the desired outcome on the goal variable and thus the monetary aggregate will no longer provide an adequate signal about the stance of monetary policy. The breakdown of the relationship between monetary aggregates and goal variables such as inflation and nominal income was common, not only in the United States (Stock and Watson, 1989, Friedman and Kuttner, 1993) but also even in Germany (Estrella and Mishkin, 1997). A similar problem of instability of the money-inflation relationship has been found in emerging market countries, such as those in Latin America (Mishkin and Savastano, 2000.)

Monetary targeting in the United States, Canada and the United Kingdom did not prove to be successful in controlling inflation and there are two interpretations for why this was the case. One is that monetary targeting was not pursued seriously, so it never had a chance to be successful. The Federal Reserve, Bank of Canada especially the Bank of England, engaged in substantial gameplaying in which they targeted multiple aggregates, allowed base drift, did not announce targets on a regular schedule, used artificial means to bring down the growth of a targeted aggregate (the corset in the U.K.), often overshot their targets without reversing the overshoot later and often obscured why deviations from the monetary targets occurred (see Bernanke and Mishkin, 1992)

The second reason for monetary targeting's lack of success was the increasing

instability of the relationship between monetary aggregates and goal variables such as inflation (or nominal income) meant that this strategy was doomed to failure and indeed was not pursued seriously because to do so would have been a mistake. By the early 1980s, it was becoming very clear that the relationship between monetary aggregates and inflation and nominal income had broken down and all three countries formally abandoned monetary targeting. Or as a Gerald Bouey a former governors of the Bank of Canada, put it: "We didn't abandon monetary aggregates, they abandoned us."

The problems that an unstable relationship between money and inflation create for monetary targeting is further illustrated by the experience of Switzerland from 1989-1992 which was not a happy one for the Swiss National Banks because it failed to maintain price stability after it successfully reduced inflation (e.g., see Rich, 1997). The substantial overshoot of inflation from 1989 to 1992, reaching levels above 5%, was due to two factors. The first was that the strength of the Swiss franc from 1985 to 1987 caused the Swiss National Bank to allow the monetary base to grow at a rate greater than the 2% target in 1987 and then caused it to raise the money-growth target to 3% for 1988. The second arose from the introduction of a new interbank payment system, Swiss Interbank Clearing (SIC), and a wide-ranging revision of the commercial banks' liquidity requirements in 1988. The result of the shocks to the exchange rate and the shift in the demand for monetary base arising from the above institutional changes created a serious problem for its targeted aggregate. As the 1988 year unfolded, it became clear that the Swiss National Bank had guessed wrong in predicting the effects of these shocks so that monetary policy was too easy even though the monetary target was undershot. The result was a subsequent rise in inflation to above the 5% level. As a result of this experience, the Swiss National Bank moved away from monetary targeting by first not specifying a horizon for its target when it announced it at the end of 1990 and then in effect moving to a horizon of five years for the target afterwards, until it abandoned monetary targeting altogether in 1999.

The German (and the initial Swiss) experience with monetary targeting was in general successful, and understanding why will help us to understand the evolution of monetary policy practice toward inflation targeting. As argued by von Hagen (1999), the adoption of monetary targeting by the Bundesbank in late 1974 arose from the decision making and strategic problems that it faced at the time. Under the Bretton Woods regime, the Bundesbank had lost the ability to control monetary policy and a focus on a monetary aggregate was a way for the Bundesbank to reassert control over the conduct of monetary policy. German inflation was also very high (at least by German standards) having reached 7% in 1974 and yet the economy was weakening. Adoption of a monetary target was a way of resisting political pressure and signaling to the public that the Bundesbank would keep a check on monetary expansion. The Bundesbank also was concerned that pursuing price stability and aiming at full employment and high output growth would lead to policy activism that would lead to inflationary monetary policy. Monetary targeting also had the advantage of indicating that the Bundesbank was responsible for controlling inflation in a longer run context, but should not try to fight temporary bursts of inflation, particularly if they came from non-monetary sources.

The circumstances of the adoption of monetary targeting regimes in Germany (and also Switzerland) led to several important design features. The first is that the monetary targeting regimes were not bound by monetarist orthodoxy and were very far from a Friedman-type monetary targeting rule in which a monetary aggregate was kept on a constant-growth-rate path and is the primary focus of monetary policy.[3] The Bundesbank allowed growth outside of its target ranges for periods of two to three years, and overshoots of its targets were subsequently reversed. Monetary targeting in Germany and Switzerland was instead primarily a method of communicating the strategy of monetary policy that focused on long-run considerations and the control of inflation.

[3]Otmar Issing, (1996).

The calculation of monetary target ranges put great stress on making policy transparent (clear, simple and understandable) and on regular communication with the public. First and foremost, a numerical inflation goal was prominently featured in the setting of target ranges which was a very public exercise. The Bundesbank's setting of targets used a quantity theory equation to back out the monetary target growth rate using the numerical inflation goal, estimated potential output growth and expected velocity trends. The use of estimated potential output growth and not a desired path of actual output growth in setting the monetary targets was an important feature of the strategy because it signaled that the Bundesbank would not be focusing on short-run output objectives. Second, monetary targeting, far from being a rigid policy rule, was quite flexible in practice. The target ranges for money growth were missed on the order of fifty percent of the time in Germany, often because the Bundesbank's did not completely ignore other objectives, including output and exchange rates.[4] Furthermore, the Bundesbank demonstrated its flexibility by allowing its inflation goal to vary over time and to converge to the long-run inflation goal quite gradually.

When the Bundesbank first set its monetary targets at the end of 1974, it announced a medium-term inflation goal of 4%, well above what it considered to be an appropriate long-run goal for inflation. It clarified that this medium-term inflation goal differed from the long-run goal by labeling it the "unavoidable rate of price increase". Its gradualist approach to reducing inflation led to a period of nine years before the medium-term inflation goal was considered to be consistent with price stability. When this occurred at the end of 1984, the medium-term inflation goal was renamed the "normative rate of price increases" and was set at 2% and continued at this level until 1997 when it was changed to 1.5 to 2%. The Bundesbank also responded to negative supply shocks, restrictions in the supply of energy or raw materials which raised the price level, by raising its medium-term inflation goal: specifically it raised

[4]See von Hagen (1995), Neumann and von Hagen (1993), Clarida and Gertler (1997), Mishkin and Posen (1997) and Bernanke and Mihov (1997).

the unavoidable rate of price increase from 3.5% to 4% in the aftermath of the second oil price shock in 1980.

The monetary targeting regimes in Germany and Switzerland demonstrated a strong commitment to the communication of the strategy to the general public. The money-growth targets were continually used as a framework for explanation of the monetary policy strategy and both the Bundesbank and the Swiss National Bank expended tremendous effort, both in their publications and in frequent speeches by central bank officials, to communicate to the public what the central bank was trying to achieve. Indeed, given that both central banks frequently missed their money-growth targets by significant amounts, their monetary-targeting frameworks are best viewed as a mechanism for transparently communicating how monetary policy was being directed to achieve their inflation goals and as a means for increasing the accountability of the central bank.

Germany's monetary-targeting regime was successful in producing low inflation and its success was envied by many other countries, explaining why it was chosen as the anchor country for the Exchange Rate Mechanism. One clear indication of Germany's success occurred in the aftermath of German reunification in 1990. Despite a temporary surge in inflation stemming from the terms of reunification, high wage demands, and the fiscal expansion, the Bundesbank was able to keep these temporary effects from becoming embedded in the inflation process, and by 1995, inflation fell back down below the Bundesbank's normative inflation goal of 2%.

The experience of Germany and Switzerland illustrate that much of the success of their monetary policy regimes stemmed from their active use of the monetary targeting strategy to clearly communicate a long-run strategy of inflation control. Both central banks in these two countries used monetary targeting to clearly state the objectives of monetary policy and to explain that policy actions remained focused on long-run price stability when targets were missed. The active communication with the public by the Bundesbank and the Swiss National

Bank increased transparency and accountability of these central banks. In contrast, the game playing which was a feature of monetary targeting in the United States, the United Kingdom and Canada hindered the communication process so that transparency and accountability of the central banks in these countries was not enhanced.

The German and Swiss experience also show that they were quite flexible in their monetary targeting approach and did not come even close to following a rigid rule. Despite a flexible approach to monetary targeting which included tolerating target misses and gradual disinflation, Germany and Switzerland demonstrated that flexibility is consistent with successful inflation control. The key to success was seriousness about pursuing the long-run goal of price stability and actively engaging public support for this task.

The weak relationship between money and nominal income, however, implies that hitting a monetary target will not produce the desired outcome for a goal variable such as inflation. Furthermore, the monetary aggregate will no longer provide an adequate signal about the stance of monetary policy. Thus, except under very unusual circumstances, monetary targeting will not provide a good nominal anchor and help fix inflation expectations. In addition, an unreliable relationship between monetary aggregates and goal variables makes it more difficult for monetary targeting to serve as a communications device that increases the transparency of monetary policy and makes the central bank accountable to the public.

IV.
The Search for a Better Nominal Anchor: The Birth of Inflation Targeting in the 1990s

The rational expectations revolution also led to a more subtle reason for a nominal anchors importance in the papers by Kydland and Prescott (1977), Calvo (1978) and Barro and Gordon (1983) on the time-inconsistency problem, in which monetary policy conducted on a discretionary, day-by-day basis leads to poor long-run outcomes. Optimal monetary policy

should not try to exploit the short-run tradeoff between unemployment and inflation by pursuing overly expansionary policy because decisions about wages and prices reflect workers and firms expectations about policy; when they see a central bank pursuing expansionary policy, workers and firms will raise their expectations about inflation, and push wages and prices up. The rise in wages and prices will lead to higher inflation, but will not result in higher output on average. Monetary policymakers, however, are tempted to pursue a discretionary monetary policy that is more expansionary than firms or people expect because such a policy would boost economic output (or lower unemployment) in the short-run. In other words, the monetary policymakers will find themselves unable to *consistently* follow an optimal plan over *time;* the optimal plan is *time-inconsistent* and so will soon be abandoned.

One undesirable feature of the time-inconsistency literature first raised by McCallum (1995) and elaborated on by Mishkin (2000a), is that the time-inconsistency problem by itself does not imply that a central bank will pursue expansionary monetary policy which leads to inflation. Simply by recognizing the problem that forward-looking expectations in the wage- and price-setting process creates for a strategy of pursuing expansionary monetary policy, monetary policymakers can decide to "just not do it" and avoid the time-inconsistency problem altogether. Indeed, central bankers are fully aware of the time-inconsistency problem, but the time-inconsistency problem remains nonetheless because politicians are able to put pressure on central banks to pursue overly expansionary monetary policy.[5]

Putting in place a strong nominal anchor can help prevent the time-inconsistency problem in monetary policy by providing an expected constraint on discretionary policy. A strong nominal anchor can help ensure that the central bank will focus on the long run and resist the temptation or the political pressures to pursue short-run expansionary policies that are

[5]For an example of how the time-inconsistency problem can be modeled as resulting from political pressure, see Mishkin and Westelius (2005).

inconsistent with the long-run price stability goal. However, as we have seen, a monetary target will have trouble serving as a strong nominal anchor when the relationship between money and inflation is unstable. The disappointments with monetary targeting led to a search for a better nominal anchor and resulted in the development of inflation targeting in the 1990s.

Inflation targeting evolved from monetary targeting by adopting its most successful elements: an institutional commitment to price stability as the primary long-run goal of monetary policy and to achievement of the inflation goal; increased transparency through communication with the public about the objectives of monetary policy and the plans for policy actions to achieve these objectives; and increased accountability for the central bank to achieve its inflation objectives. Inflation targeting, however, differs from monetary targeting in two key dimensions: rather than announce a monetary aggregates target, it publicly announces a medium-term numerical target for inflation; and it makes use of an information-inclusive strategy, with a reduced role for intermediate targets such as money growth.

The first country to adopt inflation targeting was New Zealand. After bringing inflation down from almost 17% in 1985 to the vicinity of 5% by 1989, the New Zealand parliament passed a new Reserve Bank of New Zealand Act in 1989, that became effective on February 1, 1990. Besides increasing the independence of the central bank, moving it from being one of the least independent to one of the most independent among the industrialized countries, the act also committed the Reserve Bank to a sole objective of price stability. The act stipulated that the Minister of Finance and the Governor of the Reserve Bank should negotiate and make public a Policy Targets Agreement which sets out the targets by which monetary policy performance would be evaluated. These agreements have specified numerical target ranges for inflation and the dates by which they were to be reached. The first Policy Targets Agreement, signed by the Minister of Finance and the Governor of the Reserve Bank on March 2, 1990, directed the Reserve Bank to achieve an annual inflation rate of 3 to 5% by the end of 1990 with a gradual reduction in subsequent years to a 0 to 2% range by 1992 (changed to 1993),

which was kept until the end of 1996 when the range was changed to 0 to 3% and then to 1 to 3% in 2002.

New Zealand was followed by Canada which announced inflation targets in February 1991, by Israel in January 1992, by the United Kingdom in October 1992, by Sweden in January 1993 and Finland in February 1993. (Chile adopted a softer form of inflation targeting in January 1991).[6] Since its inception, more than twenty countries have adopted inflation targeting, including Switzerland in January 2000,[7] and new ones are added to the inflation targeting club every year.

Inflation targeting superceded monetary targeting because of several advantages. First, inflation targeting does not rely on a stable money-inflation relationship and so large velocity shocks which distort this relationship are largely irrelevant to monetary policy performance.[8] Second, the use of more information, and not primarily one variable, to determine the best settings for policy, has the potential to produce better policy settings. Third, an inflation target is readily understood by the public because changes in prices are of immediate and direct concern, while monetary aggregates are farther removed from peoples' experience. Inflation

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[6]The dating of adoption of inflation targeting is not always clear cut. The dates used here are from Mishkin and Schmidt-Hebbel (2002).

[7]Switzerland does not like to refer to its regime as inflation targeting, but it meets all of the criterion for inflation targeting outlined above. The Swiss regime does differ in some elements from inflation targeting regimes in countries like the United Kingdom and New Zealand in that the central bank determines the numerical inflation goal and not the government, and the time horizon for achievement of the inflation goal is not announced. The Swiss monetary policy regime is therefore more flexible than some other inflation targeting. Nonetheless, there are differing degrees of flexibility as inflation targeting is practiced and the Swiss regime fits the definition of inflation targeting used in Bernanke et. al (1999) and in much of the literature. When I have asked officials at the Swiss National Bank why they do not like to use the term inflation targeting, they explain that they see their regime as highly flexible and the use of the word target might be misconstrued by the public.

[8]An unstable relationship between money and inflation could make inflation targeting more difficult because there is less information in the monetary aggregates to help forecast inflation. However, successful inflation targeting is not dependent on having a stable money-inflation relationship as long as other information enables the monetary authorities to forecast future inflation and the impact of the current monetary policy stance on the economy.

targets are therefore better at increasing transparency of monetary policy because they make the objectives of the monetary authorities clearer. This does not mean that monetary targets could not serve as a useful communication device and increase accountability to control inflation as they did in Germany and Switzerland, but once the relationship between monetary aggregates and inflation breaks down, as it has repeatedly (and especially in Switzerland), monetary targets lose a substantial degree of transparency because the central bank now has to provide complicated discussions of why it is appropriate to deviate from the monetary target. Fourth, inflation targets increase central bank accountability because the performance of the central bank can now be measured against a clearly defined target. Monetary targets work less well in this regard because of the unstable money-inflation relationship which makes it harder to impose accountability on the central bank because the central bank will necessarily miss its monetary targets frequently, as occurred for the Bundesbank which missed its target ranges over half of the time.

A key feature of all inflation targeting regimes is that they have put enormous stress on transparency and communication. Inflation targeting central banks have frequent communications with the government, some mandated by law and some in response to informal inquiries, and their officials take every opportunity to make public speeches on their monetary policy strategy. Communication of this type has been prominent among central banks that have not adopted inflation targeting, including monetary targeters such as the Bundesbank and Switzerland, as well as non-targeters such as the Federal Reserve, but inflation-targeting central banks have taken public outreach a number of steps further: not only have they engaged in extended public information campaigns, even engaging in the distribution of glossy brochures, but they have engaged in publication of *Inflation Report* type documents (originated by the Bank of England).

The publication of *Inflation Reports* is particularly noteworthy because these documents depart from the usual, dull-looking, formal reports of central banks to take on the best elements

of textbook writing (fancy graphics, use of boxes) in order to better communicate with the public. *Inflation Reports* are far more user friendly than previous central bank documents and explain the goals and limitations of monetary policy, including the rationale for inflation targets, the numerical values of the inflation targets and how they were determined, how the inflation targets are to be achieved, given current economic conditions, and reasons for any deviations from targets. Almost all *Inflation Reports* also provide forecasts of inflation, while the majority provide output forecasts, and some provide a projection of the policy path for interest rates.[9] These communication efforts have improved private-sector planning by reducing uncertainty about monetary policy, interest rates and inflation; they have promoted public debate of monetary policy, in part by educating the public about what a central bank can and cannot achieve; and they have helped clarify the responsibilities of the central bank and of politicians in the conduct of monetary policy.

Because an explicit numerical inflation target increases the accountability of the central bank to control inflation, inflation targeting also has the potential to reduce the likelihood that a central bank will suffer from the time-inconsistency problem in which it reneges on the optimal plan and instead tries to expand output and employment by pursuing overly expansionary monetary policy. But since time-inconsistency is more likely to come from political pressures on the central bank to engage in overly expansionary monetary policy, a key advantage of inflation targeting is that it is better able to focus the political debate on what a central bank can do in the long-run – that is, control inflation – rather than what it cannot do – raise economic growth and the number of jobs permanently through expansionary monetary policy.[10] Thus inflation targeting appears to reduce political pressures on the central bank to pursue inflationary monetary policy and thereby reduces the likelihood of time-inconsistent

[9]See Table 1 in Mishkin (2004).

[10]A remarkable example of this occurred in Canada in 1996, when a public debate ensued over a speech by the president of the Canadian Economic Association criticizing the Bank of Canada. See Mishkin and Posen (1997) or Bernanke et al. (1999).

policymaking.

Although inflation targeting has the ability to limit the time-inconsistency problem, it does not do this by adopting a rigid rule, and thus has much in common with the flexibility of earlier monetary targeting regimes. Inflation targeting has "rule-like" features in that it involves forward-looking behavior that limits policymakers from systematically engaging in policies with undesirable long-run consequences. But rather than using a rigid rule, it employs what Ben Bernanke and I (1997) have dubbed "constrained discretion." Inflation targeting, allows for some flexibility but constrains policymakers from pursuing overly expansionary (or contractionary) monetary policy.

Inflation targeting also does not ignore traditional output stabilization, but instead puts it into a longer run context. Inflation targeting regimes allow for flexibility to deal with supply shocks and have allowed the target to be reduced gradually to the long-run inflation goal when inflation is initially far from this goal (also a feature of monetary targeters such as Germany) . As Svensson (1997) had shown, a gradual movement of the inflation target toward the long-run, price-stability goal indicates that output fluctuations are a concern (in the objective function) of monetary policy. In addition, inflation targeters have emphasized that the floor of the range should be as binding a commitment as the ceiling, indicating that they care about output fluctuations as well as inflation. Inflation targeting is therefore better described as "flexible inflation targeting".

The above discussion suggests that although inflation targeting has evolved from earlier monetary policy strategies, it does represent true progress. But how has inflation targeting fared? Has it actually led to better economic performance?

The simple answer to this question is generally, yes with some qualifications.[11] This

[11]This is the conclusion in a recent paper presented to the Executive Board of the IMF. Roger and Stone (2005).

conclusion is derived from the following four results:[12]

- Inflation levels (and volatility), as well as interest rates, have declined after countries adopted inflation targeting.
- Output volatility has not worsened, and if anything improved, after adoption of inflation targeting.
- Exchange rate pass-through seems to be attenuated by adoption of inflation targeting.[13]
- The fall in inflation levels and volatility, interest rates and output volatility is part of a worldwide trend in the 1990s, and inflation targeters have not done better in terms of these variables or in terms of exchange rate pass-through than non-inflation targeting industrialized countries such as the United States or Germany.[14] [15]

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[12]There is also some mildly favorable evidence on the impact of inflation targeting on sacrifice ratios. Bernanke et al. (1999) did not find that sacrifice ratios in industrialized countries fell with adoption of inflation targeting, while Corbo, Landerretche and Schmidt-Hebbel (2002) with a larger sample of inflation targeters have concluded that inflation target did lead to an improvement in sacrifice ratios. However, defining sacrifice ratios is extremely tricky, so I would put less weight on this evidence. Sabban, Rozada and Powell (2003) also find that inflation targeting leads to nominal exchange rate movements that are more responsive to real shocks rather than nominal shocks. This might indicate that inflation targeting can help the nominal exchange rate to act as a shock absorber for the real economy.

[13]Lower exchange rate pass-through might be seen as a drawback because it weakens this channel of the monetary policy transmission mechanism. As long as other channels of monetary policy transmission are still strong, however, the monetary authorities still have the ability to keep inflation under control.

[14]For evidence supporting the first three results, e.g., see Bernanke et. al. (1999), Corbo, Landerretche and Schmidt-Hebbel (2002), Neumann and von Hagen (2002), Hu (2003), Truman (2003), and Ball and Sheridan (2005).

[15]Ball and Sheridan (2005) is one of the few empirical papers that is critical of inflation targeting: it argues that the apparent success of inflation targeting countries is just a reflection of regression towards the mean: that is, countries that start with higher inflation are more likely to find that inflation will fall faster than countries that start with an initially low inflation rate. Since countries that adopted inflation targeting generally had higher initial inflation rates, their larger decline in

The fourth result that inflation and output performance of inflation targeting countries improves but is no better than that of countries like the United States and Germany also suggests that what is really important to successful monetary policy is establishment of a strong nominal anchor. As pointed out in Bernanke and Mishkin (1992), Mishkin and Posen (1997), Bernanke et al. (1999) and Neumann and von Hagen (2002), Germany was able to create a strong nominal anchor with its monetary targeting procedure. In the United States the strong nominal anchor has been Alan Greenspan (e.g., Mishkin, 2000a). Although inflation targeting is one way to establish a strong nominal anchor, it is not the only way. It is not at all clear that inflation targeting would have improved performance in the United States during the Greenspan era, although it well might do so after Greenspan is gone (Mishkin, 2005). Furthermore, as has been emphasized in Calvo and Mishkin (2003) and Sims (2005), an inflation target by itself is not capable of establishing a strong nominal anchor if the government pursues irresponsible fiscal policy or inadequate prudential supervision of the financial system, which might then be prone to financial blow ups.

There is, however, empirical evidence on inflation expectations that is more telling about the possible benefits of inflation targeting. Recent research has found the following additional results:

- Evidence that adoption of inflation targeting leads to an immediate fall in

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inflation just reflects a general tendency of all countries, both targeters and nontargeters to achieve better inflation and output performance in the 1990s when inflation targeting was adopted. This paper has been criticized on several grounds and its conclusion that inflation targeting had nothing to do with improved economic performance is unwarranted: see Hyvonen (2004), Gertler (2005) and Mishkin and Shmidt-Hebbel (2005). However, Ball and Sheridan's paper does raise a serious question because inflation targeting is clearly an endogenous choice and so finding that better performance is associated with inflation targeting may not imply that inflation targeting causes this better performance. Mishkin and Shmidt-Hebbel (2005) does attempt to explicitly deal with potential endogeneity of adoption of inflation targeting through use of instrumental variables and continues to find favorable results on inflation targeting performance.

inflation expectations is not strong.[16]

- Inflation persistence, however, is lower for countries that have adopted inflation targeting than for countries that have not.
- Inflation expectations appear to be more anchored for inflation targeters than non-targeters: that is, inflation expectations react less to shocks to actual inflation for targeters than non-targeters, particularly at longer horizons.[17]

These results suggest that once inflation targeting has been in place for a while, it does make a difference because it better anchors inflation expectations and thus strengthens the nominal anchor. Since, as argued earlier, establishing a strong nominal anchor is a crucial element in successful monetary policy,[18] the evidence on the inflation expectations provides a stronger case that inflation targeting has represented real progress.

V.
Where is Inflation Targeting Heading?

Just as inflation targeting evolved from earlier monetary policy strategies, inflation targeting will continue to evolve over time. There are three major issues that are being actively debated on where inflation targeting should be headed in the future.

Currently all inflation targeting countries target an inflation rate rather than the price level. The traditional view, forcefully articulated by Fischer (1994), argues that a price-level

[16]For example, Bernanke et al.(1999) and Levin, Natalucci and Piger (2004) do not find that inflation targeting leads to an immediate fall in expected inflation, but Johnson (2002, 2003) does find some evidence that expected inflation falls after announcement of inflation targets.

[17]Levin, Natalucci and Piger (2004) and Castelnuovo, Nicoletti-Altimari and Palenzuela (2003).

[18]The importance of a strong nominal anchor to successful monetary policy is also a key feature of recent theory on optimal monetary policy, referred to as the new neoclassical synthesis (Woodford, 2003, and Goodfriend and King, 1997).

target might produce more output variability than an inflation target because unanticipated shocks to the price level are not treated as bygones and must be offset. Specifically, a price-level target requires that an over-shoot of the target must be reversed, and this might require quite contractionary monetary policy which, with sticky prices, could lead to a sharp downturn in the real economy in the short run. Indeed, if the over-shoot is large enough, returning to the target might require a deflation, which could promote financial instability and be quite harmful.

On the other hand, theoretical models with a high degree of forward-looking behavior, a price-level target produces less output variance than an inflation target (e.g., Clarida, Gali, and Gertler 1999; Dittmar, Gavin and, Kydland 1999; Dittmar and Gavin 2000; Eggertson and Woodford 2003; Svensson 1999; Svensson and Woodford 2003; Vestin 2000; Woodford 1999, 2003). (A price-level target was used in the 1930s in Sweden, Berg and Jonung, 1999).) Empirical evidence, however, (e.g., Fuhrer 1997) does not clearly support forward-looking expectations formation, and models with forward-looking behavior have counter-intuitive properties that seem to be inconsistent with inflation dynamics (Estrella and Fuhrer 1998). Thus the jury is still out on whether the monetary policy regime should move from inflation targeting to price level targeting. Indeed, in the future central banks might experiment with hybrid policies , which combine features of an inflation and a price-level target by announcing a commitment to some error correction in which target misses will be offset to some extent in the future.[19] Evaluating these hybrid policies should be a major focus of future research.

Inflation-targeting central banks have also been moving to greater and greater transparency over time. More inflation-targeting, central banks have been publishing their forecasts and several central banks have recently been announcing projections of their policy path for interest rates in the future (New Zealand, Colombia and most recently, Norway).

[19]Research at the Bank of Canada and the Bank of England (Black, Macklem and Rose, 1998, Battini and Yates, 1999, and King, 1999) suggests that an inflation target with a small amount of error correction can substantially reduce the uncertainty about the price level in the long run, but still generate very few episodes of deflation.

Publication of forecasts and policy projections can help the public and the markets understand central bank actions, thus decreasing uncertainty and making it easier for the public and markets to assess whether the central bank is serious about achieving its inflation goal.

Lars Svensson (2002) argues that not only should central banks announce their projections of the future policy path, but also announce their objective function (the relative weights they put on output versus inflation fluctuations in their loss function). I have argued elsewhere (Mishkin, 2004) that central bank transparency can go too far if it complicates communication with the public. Announcing a policy path may confuse the public if it does not sufficiently convey that the path is conditional on events in the economy. The public may then see a deviation from this path as a central bank failure, and the central bank would then be vulnerable to attacks that it is flip flopping which could undermine the support for its independence and focus on price stability. This objection does not mean that providing information about the future policy path in some form would not have value. It does mean that there are nuances as to how this should be done. Providing information about the future policy path in more general terms or in terms of fan charts that emphasize the uncertainty about the future policy path might achieve most of the benefits of increased disclosure and still be able to make clear how conditional the policy path is on future events.[20] Inflation-targeting, central banks are likely to experiment further with different approaches to providing more information about future policy.[21]

A final issue confronting inflation-targeting central banks is how they should respond to movements in asset prices. It is generally agreed that inflation targeters should react to asset prices when changes in these prices provide useful information about future inflation

[20]However, announcing a specific policy path as has recently occurred in the United States when it announced that it would remove accommodation at a measured pace and then had 13 straight FOMC meetings (as of this writing) in which it raised the policy rate by 25 basis points each time did not sufficiently convey the degree of uncertainty about the future path.

[21]For reasons outlined in Mishkin (2004), I think it is far less likely that central banks will increase transparency in terms of announce their objective function.

and the path of the economy. The tougher issue is whether central banks should react to asset prices over and above their effects on future inflation. Bubbles in asset prices, when they collapse, can lead to financial instability and as a result some researchers (e.g., Cecchetti, Genberg, Lipsky and Wadhwani, 2000 and Borio and Lowe, 2002) have argued that monetary policy should act to limit asset price bubbles to preserve financial stability. To do this successfully, the monetary authorities need to know when a bubble exists, yet is unlikely to think that government officials, even central bankers, know better what are appropriate asset prices than private markets.[22] Bernanke and Gertler (1999, 2001) find that an inflation targeting approach which does not focus on asset prices over and above their effect on the economy, but does make use of an information-inclusive strategy in setting policy instruments, does have the ability to make asset prices bubbles less likely, thereby promoting financial stability. With the recent sharp run up of housing prices in many countries and the possibility of bubbles, central banks concerns about asset price movements and what to do about them are unlikely to abate..

Fluctuations in exchange rates, another important asset price, are also a major concern to inflation-targeting central banks, particularly in emerging market countries because sharp depreciations can trigger a financial crisis (Mishkin, 1996, 1999). Because these countries have much of their debt denominated in foreign currency, when the currency depreciates, it leads to a deterioration of firms' balance sheets. The deterioration of balance sheets then leads to adverse selection and moral hazard problems that interfere with the efficient functioning of the financial system, thereby leading to a sharp decline in investment and economic activity. Inflation-targeting central banks therefore can not afford to pursue a policy of benign neglect to exchange rates, as is emphasized in Mishkin (2000b) and

[22]Bernanke and Gertler (2001) point out that Cecchetti et al (2000) only find that asset prices should be included in the central bank's policy rule because they assume that the central bank knows with certainty that the asset price rise is a bubble and know exactly when the bubble will burst.

Mishkin and Savastano (2000). They may have to smooth "excessive" exchange rate fluctuations, but how they should do this is still an open question. Indeed, there is a danger that focusing on exchange rate movements might transform the exchange rate into a nominal anchor that interferes with achievement of the inflation target.[23] In addition, when inflation targeters have focused on exchange rate movements, they have often made serious errors (e.g., New Zealand and Chile in 1997 and 1998, Mishkin, 2001). Dealing with exchange rate fluctuations is one of the most serious challenges for inflation targeting regimes in emerging market countries.

VI. Conclusions

The practice of central banking has made tremendous strides in recent years. We are currently in a highly desirable environment that few would have predicted fifteen years ago: not only is inflation low, but its variability and the volatility of output fluctuations are also low. For many countries, inflation targeting has been a key element to their success. Inflation targeting is not a radical new invention, but instead has built on what we have learned over the years both from economic research and experience on what is best practice in the conduct of monetary policy. Progress in our understanding of monetary policy will continue, and hopefully inflation targeting will continue to evolve in a direction that continues to improve monetary policy performance.

[23]This indeed happened in Israel (Bernanke et al., 1999) and Hungary (Jonas and Mishkin, 2005).

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