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**How Did We Get to Inflation Targeting and Where Do We Go Now? A Perspective From the U.S. Experience**

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# How Did We Get to Inflation Targeting and Where Do We Go Now? A Perspective From the U.S. Experience

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## *Abstract*

This paper advances the hypothesis that the transition from there-is-little-central-banks-can-do-to-control-inflation to inflation targeting occurred because central banks, especially the Federal Reserve, demonstrated that central banks can control inflation rather than a consequence of marked improvement in the professions understanding of how monetary policy controls inflation. As consequence, monetary theorists and central bankers have returned to a Phillips curve framework for formulating and evaluating the monetary policy. I suggest that the return to the Phillips curve framework endangers the continued effectiveness, and perhaps even viability, of inflation targeting, recommend three steps that inflation-targeting central banks should take to preserve and strengthen inflation targeting.

JEL Codes: E52, E58

Key Words: Monetary policy, Phillips curve, dual mandate, inflation targeting

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This paper provides a perspective on the evolution to inflation targeting based on economic theory and the U.S. experience. The Federal Reserve is not formally inflation targeting. Nevertheless, it is commonly believed to be an implicit inflation targeter. While the analysis presented here is based largely on the U.S. experience, I believe that it applies broadly to all central banks.

The economics profession has made considerable progress towards understanding the role of central banks in controlling inflation in the 45 years since I took my first economics course. Until at least the early 1970's the majority of the economics profession believed that central banks could do little to control inflation. Conventional wisdom had it that monetary policy was relatively ineffective for controlling inflation or for economic stabilization. Fiscal policy, not monetary policy, was the principle way that governments could stabilize the economy and keep inflation low by filling the gap between private demand and potential output. I review the evolution of economic thought from "there is little central banks can do to control inflation" to "inflation targeting."

My thesis is policymakers' belief in the efficacy monetary policy towards control inflation changed dramatically in spite of the fact that there was no fundamental refutation of what I call the *monetary-policy-ineffectiveness* proposition. The evolution to inflation targeting occurred because central banks, most importantly the Federal Reserve, demonstrated that monetary policy could control inflation. It is not a consequence of fundamental advancements in the professions' understanding of how monetary policy affects the economy. Consequently, the profession and policymakers returned, perhaps reluctantly, to the Phillips curve framework for conducting monetary policy. I argue that this framework endangers the continued effectiveness,

and perhaps even viability, of inflation targeting. I then recommend three steps that inflation targeting central banks should take to preserve and strengthen inflation targeting.

## **2. The Monetary-Policy-Ineffectiveness Proposition (MPIP)**

It is difficult to envision a central banker who would have recommended inflation targeting in the 1950s and 1960s. As Cagan (1978) pointed out, “the quantity of money was not considered important, indeed was hardly worth mentioning, for questions of aggregate demand, unemployment, and even inflation.”<sup>1</sup> This view of monetary policy’s effectiveness extended well into the early 1970s.

Just as today, the conventional view of inflation was it was caused by an excess of aggregate demand at or near the “full employment” level of output. The MPIP was the belief that monetary policy had relatively little effect on aggregate demand. Unable to affect aggregate demand, there is little monetary policy can do to control inflation. The MPIP has several components.<sup>2</sup> Important among these is the belief that monetary-policy-induced changes in the money supply have little or no *direct* effect on aggregate demand. The theoretical basis for the direct link between the supply of money and prices is the quantity theory of money or, more simply, the equation of exchange. As today, the quantity theory was widely viewed as a tautology, rather than an economic theory.<sup>3</sup> It was agreed that if the central bank simply handed everyone money, prices would increase; however, this is not how central banks increased the money supply. Policy-induced changes in the money supply are a consequence of open market operations, discount window lending, and changes in reserve requirements. These actions would

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<sup>1</sup> Cagan (1978), p. 85.

<sup>2</sup> There was also belief that inflation was caused by “cost-push” factors, not amenable to monetary policy actions (e.g., Nelson 2005). For example, Burns attributed inflation to a variety of “special factors.” As these special factors dissipated, but inflation did not, Burns blamed inflation on government deficits (Hetzel, 1998). Hence, cost-push inflation was not essential element of the MPIP.

<sup>3</sup> Cagan (1978), p. 86, notes that “textbooks in basic economics and even in money and banking mentioned the quantity theory of money, if at all, only to hold it up to ridicule.”

have an immediate effect on bank reserves and, hence, short-term interest rates. Critics argued that a policy-induced increase in the supply of money would cause interest rates to fall, which would in turn increase the quantity of money demand. The effect of an increase in the money supply would be largely offset by an endogenous decline in money's velocity. Consequently, there would be little or no effect on aggregate demand and, hence, on prices or output.<sup>4</sup>

The effectiveness of monetary policy is determined by the extent to which monetary policy actions affect interest rates—not the supply of money. The so-called interest rate channel of money policy was also thought to be relatively weak. Evidence suggested that consumption and investment spending were relatively interest inelastic. Consequently, the monetary authority would have to produce a relatively large change in interest rates to have a significant impact on aggregate demand. Investment decisions were determined more by expectations of future earnings than by interest rates. Changes in the interest rate not accompanied by changes in expectations about the economy would be of little consequence for aggregate demand. Some thought that the efficacy of monetary policy might be asymmetric: reducing interest rates during a period of economic slack would be less effective than raising interest rates during a period of economic expansion.<sup>5</sup> Monetary policy, it was said, cannot *push on a string*.

This tenet of the MPIP was reinforced by the fact that monetary policy actions only directly affect very short-term rates. However, spending decisions were thought to be determined by the behavior of long-term rates. But central banks' ability to affect long-term rates was problematic.

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<sup>4</sup> Attempts by monetarists made two attempts at incorporating money into the canonical model. One was to suggest that money effects aggregate demand through a "wealth effect." The other was the buffer-stock model of money demand. The profession was not impressed.

<sup>5</sup> Another reason is that if the central bank reduces the money supply individuals are forced to alter their behavior. On the other hand, the central bank increases the supply of money, individuals can simply hold the money in idle balances.

## 2.1 *The MPIP, Circa 2009*

The last 50 years has done little to change economists' and central bankers' views about the basic tenets of the MPIP. The supply of money is thought to inconsequential, consumption and investment spending are thought to be interest inelastic, short-term rates are thought to be relatively unimportant for spending, and the monetary authority's ability to influence long-term rates remains questionable.

Acknowledging that there is little agreement "on exactly how monetary policy exerts its influence" on the real economy, Bernanke and Gertler (1995) note that the conventional model, whereby "monetary policymakers use their leverage over short-term interest rates to influence the cost of capital and, consequently, spending on durable goods, such as fixed investment, housing, inventories and consumer durables," is incomplete in several important ways.<sup>6</sup> Important among these is the fact that "empirical studies of supposedly 'interest sensitive' components of aggregate spending have in fact had great difficulty in identifying a quantitatively important effect of the neoclassical cost-of-capital variable."<sup>7</sup> This evidence motivated Bernanke and Gertler (and others) "to explore whether imperfect information and other "frictions" in credit markets might help explain the potency of monetary policy."<sup>8</sup> One such attempt is called the credit channel of monetary policy, which has two separate channels: the "balance-sheet" channel and the "bank-lending" channel.<sup>9</sup> The balance-sheet channel suggests that restrictive monetary policy increases the wedge between the cost of internal and external finance. Specifically,

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<sup>6</sup> Bernanke and Gertler (1995), p. 27.

<sup>7</sup> Bernanke and Gertler (1995), p. 27.

<sup>8</sup> Bernanke and Gertler (1995), p. 28, emphasis added. In essence, Bernanke and Gertler are saying we know that monetary policy is efficacious, we just don't know why. The credit channel of monetary policy, as it is called, is an attempt to provide a theoretical basis for the belief in the efficacy of monetary policy. Also see Bernanke (2007).

<sup>9</sup> Skepticism over the interest rate channel also arose out of the Great inflation and Sargent and Wallace's (1975) demonstrated that interest rate targeting could lead to price level indeterminacy. McCallum (1981) changed that by demonstrating that indeterminacy could be eliminated if policymakers had a "nominal anchor," i.e., policymakers cared about inflation.

monetary-policy engineered increases in short-term interest rates adversely affect the value of potential borrower's assets, their cash flow and, consequently, their creditworthiness. This increases the external finance premium. For small borrowers, the external finance premium increases by more than the rise in short-term rates. While heterogeneity is important for the effect of changes in interest rates on firms and individuals, the empirical importance of the balance-sheet channel for the macroeconomy is unclear (e.g., Hubbard, 1995).<sup>10</sup>

The bank-credit channel (e.g., Bernanke and Blinder, 1988; Bernanke, 1993; and Gertler and Gilchrist, 1993), which asserts that restrictive monetary policy actions have a direct effect on bank lending, is generally recognized (e.g., Bernanke, 2007; and Thornton, 1994) to be “quantitatively important” because banks have access to external funds that are not constrained by the availability of reserves.<sup>11</sup>

Economists continue to believe that long-term rates, not short-term rates, matter for spending decisions (e.g., Blinder et al., 2001; Broaddus, 2002; Eggertsson and Woodford, 2003; Freedman, 2002; and Woodford, 2001). However, many economists and policymakers believe that central bank actions have a limited effect on long-term rates. For example, in his July 20, 1993, congressional testimony, Chairman Greenspan noted that “currently, short-term rates, most directly affected by the Federal Reserve, are not far from zero; longer-term rates, *set primarily by the market*, are appreciably higher.”<sup>12</sup>

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<sup>10</sup> The lack of empirical support for the interest rate channel of money policy led some analysts (e.g., Mishkin, 1995; Meltzer, 1995; and Taylor, 1995) to broaden the financial-asset-price channel of monetary policy to include exchanges rates, equity prices, and even land prices. There has been relatively little interest in or empirical support for these alternative asset-price channels of monetary policy, however.

<sup>11</sup> Bernanke (2007). Bernanke (2007) also suggests that restrictive monetary policy may affect banks by increasing the external finance premium paid by banks in much the same way that the balance-sheet channel is thought to effect individuals and firms. However, he does not say why restrictive monetary policy will increase banks' external finance premium. The spread between the equivalent-term Libor rate (the rate at which banks lend to each other) and the CD rate (the rate at which banks borrow externally) has been small historically.

<sup>12</sup> Greenspan (1993), emphasis added.

Conventional wisdom sees central banks influencing longer-term rates in accordance with the expectations hypothesis (EH) of the term structure of interest rates. The EH asserts that the long-term rate is determined by the market's expectation for the short-term rate over the maturity of the long-term asset plus a constant risk premium. The risk premium compensates investors for the higher degree of market risk associated with holding longer-term assets. The empirical evidence against the EH is overwhelming (e.g., Campbell and Shiller, 1991; Sarno, et al., 2007, and Della Corte, et al., 2008, and the references cited therein).<sup>13</sup> Nevertheless, because the ability of central banks to affect long-term rates in accordance with the EH depends on predictability of the short-term rate and the duration that the market believes the rate will stay at that level, a number of central banks have attempted to provide "forward guidance" about their policy rate.

As was the case with inflation targeting, the Reserve bank of New Zealand took the lead. It began announcing a path for its policy rate in 1997. Norway followed in 2005: Sweden in 2007. It is thought that announcing the path for their policy rate permits the central bank to "steer" expectations.<sup>14</sup> Rosenberg (2007) suggests that "by affecting expectations of short-term interest rates, we as the central bank can also indirectly affect interest rates with a slightly longer duration, which in turn increases the effect of monetary policy."<sup>15</sup> However, Andersson and Hofmann (2009), Goodhart and Lim (2008), and Rudebusch (2007) show that forward guidance has not increased predictability of the path of the policy rate beyond a few months.

The Federal Reserve was a latecomer. In response to a presentation by Glenn Rudebusch on monetary policy inertia (Woodford, 1999) at the January 28-29, 2003, FOMC meeting, then-

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<sup>13</sup> One reason for the empirical failure of the EH is that conventional tests of the EH are based on the assumption that the expected future short-term rate deviates from the actual future short-term interest rate by a white noise error. Interest rates are notoriously difficult to predict, however. The empirical failure of the EH is likely a consequence of incompatibility of the assumption upon which tests of the EH are based and the unpredictability of interest rates (e.g., Guidolin and Thornton, 2009).

<sup>14</sup> For example, see Rosenberg (2007) and Gjedrem (2006).

<sup>15</sup> Rosenberg (2007).

Governor Bernanke asked Rudebusch “if there had been evidence on whether or not the responsiveness of long-term interest rates to movements in the fed funds rate was consistent with the predictability of the type” proposed by Woodford.<sup>16</sup> Rudebusch responded that he did not “think we have the empirical evidence of monetary policy inertia.”<sup>17</sup> Bernanke suggested that this only meant that it had not been tried—“there should be more [inertia in the policy rule] in order to get more effect on long-term rates. I think that’s an open question.”<sup>18</sup>

The Fed’s first attempt at providing forward guidance came in August 2003. At the June 2003 FOMC meeting Bernanke responded to several Committee members who voiced reservations about the Fed’s ability to influence longer-term interest rates saying,

if the policy is one in which we essentially try to lower the whole path of long-term interest rates and we enforce that with a package of complementary actions that includes trying to manage expectations along the term structure and taking a series of other actions such as purchasing long-term bonds and other kinds of instruments, I think that’s one of the first things we ought to be doing. I believe that would actually work and would in fact be a good approach.<sup>19</sup>

Consistent with Bernanke’s suggestion, the August 2003 FOMC policy statement included the sentence “in these circumstances, the Committee believes that policy accommodation can be maintained for a considerable period.”<sup>20</sup> At the September meeting Greenspan said he thought it a “mistake” to include the sentence.”<sup>21</sup>

Despite the concern among some members about the usefulness of forward guidance language, the FOMC’s May 2004 statement read, “the Committee believes that policy accommodation can be removed at a pace that is likely to be measured,” suggesting the FOMC

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<sup>16</sup> Transcript, March 2003, FOMC meeting, p. 31.

<sup>17</sup> For a description of Rudebusch’s argument and evidence, see Rudebusch (2007).

<sup>18</sup> Transcript, March 2003, FOMC meeting, p.p. 32.

<sup>19</sup> Transcript, June 2003, FOMC meeting, pp. 45-6.

<sup>20</sup> This sentence was not voted on by the Committee. Rather at the conclusion of a lengthy discussion of the sentence Chairman Greenspan took a vote of all FOMC participants. The vote was eleven to seven in favor of the sentence. Greenspan concluded, “on the basis of that vote it’s right on the margin. But I would say that we have to put in the truncated version of the final sentence” (FOMC Transcript, August 12, 2003, p. 95).

<sup>21</sup> FOMC Transcript, September 16, 2003, p. 80.

might start increasing its target for the funds rate at the next meeting.<sup>22</sup> The FOMC began increasing the funds rate from the then-historically low level of 1.0 percent at its June 2004 meeting and by 25 basis points at each of its next sixteen meetings. Forward guidance was dropped at the December 2005 meeting,

Forward guidance had relatively little effect on long-term rates. Not only did yields on longer-term securities generally increase from August 2003 to June 2004, but the yields across the term structure increased despite the historically low and unchanged target for the funds rate, and the FOMC's commitment by to keep the funds rate low. Moreover, longer-term rates declined during the first few months following the initial target increases in 2004. Indeed, Chairman Greenspan (2005) termed the fact that longer-term rates edged lower despite the 150-basis-point increase in funds rate target a "conundrum."<sup>23</sup>

The Fed's next attempt with forward guidance occurred at the March 17-18, 2009, the Fed implemented the Eggertsson and Woodford (2003) strategy, which Bernanke outlined at the June 2003 FOMC meeting.<sup>24</sup> Specifically, the FOMC announced that "economic conditions are likely to warrant exceptionally low levels of the federal funds rate for an extended period" and that the Fed would purchase "up to \$300 billion of Treasury securities over the next six months."<sup>25</sup>

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<sup>22</sup> Board of Governors, *Press Release*, May 6, 2003. The Committee considered several courses of action, including dropping the sentence. However, the sentence appeared unchanged in both the September and October FOMC statements. On a suggestion from Greenspan, the sentence was modified at the December 2003 meeting. Most thought that Greenspan's rewording made the statement more "conditional." However, four participants expressed a preference for removing the statement.

<sup>23</sup> Elsewhere (Thornton, 2007) I show that there was a marked break in the relationship between the overnight funds rate and the 10-year Treasury yield that pre-dates the conundrum period. Moreover, it coincides with the FOMC switch from using the funds rate as an operational target to using it as a policy target. I hypothesize that the change in behavior reflects the fact that the FOMC, and not the market, began determining the path for the funds rate in the late 1980s. I also present evidence to support this hypothesis.

<sup>24</sup> Eggertsson and Woodford (2003), p. 200, note that the "effect [on long-term yields] follows not from the purchases themselves, but from how they are interpreted," but help overcome "private sector skepticism about whether the history-dependent interest rate policy will actually be followed."

<sup>25</sup> Board of Governors, *Press Release*, March 18, 2009.

This attempt was also unsuccessful. While there was an immediate “announcement effect” as yields on 10-year Treasuries most other long-term securities declined by about 50 basis points on March 18, the marked flattening of the yield curve, shown in Figure 1, was short-lived. Figure 1 shows that the announcement effect essentially vanished by April 6, 2009. By July 27, the yield was considerably steeper than it was on March 17. This experience is consistent with a high degree of substitutability across assets with differing maturities and suggests that the Fed’s ability to influence the behavior of long-term rates is limited at best.

Finally, there is little to indicate that the economics profession has changed its view about the effectiveness of changes in monetary and reserve aggregates. Indeed, Svensson (2008) suggests that, during the past 50 years, economists have learned that “monetary aggregates matter little, or even not at all, for monetary policy.”<sup>26</sup> The lack of importance of money is reflected in the fact that money is not explicit in the canonical New Keynesian model, commonly used to evaluate monetary policy.<sup>27</sup>

### **3.0 The Evolution to Inflation Targeting**

Skepticism about the ability of central banks to control inflation vanished despite essentially unchanged view about how monetary policy affects the economy. Consequently, it is natural to ask “what then caused the dramatic shift towards inflation targeting?” It is seldom if ever true that such an event is attributable to a single factor. Indeed, I believe a number of factors, in some way or another, contributed to the shift. Nevertheless, three factors or events were critical. The first, and most important, was the demonstration that central banks can control

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<sup>26</sup> Svensson (2008), p. 4.

<sup>27</sup> McCallum (2001) argues that money is implicit because “the central bank’s control over the one-period nominal interest rate ultimately stems from its ability to control the quantity of base money in existence” (p. 146). However, he suggests that the “error thereby introduced [by omitting money] is extremely small” (p.150). This conclusion is not surprising because money has no effect on economic activity, except through its effect through the interest rate. Hence, there is little difference is money implicit or explicit in such models (e.g., Leahy 2001).

inflation. The cornerstone event is Chairman Volcker's decision to reduce inflation by focusing on monetary aggregates. Inflation was double digit when Volcker became Chairman in 1979 and about 4 percent when he departed in 1987. This remarkable experience demonstrated beyond a reasonable doubt that central banks could control inflation.<sup>28</sup>

The German and Swiss also affected perceptions of inflation control. Both central banks were committed to keeping inflation low (Rich and Beguelin, 1985; Kohli and Rich, 1986; and von Hagen, 1999) and both emphasized monetary aggregates in the conduct of monetary policy. Moreover, both countries fared much better than their European and Scandinavian counterparts. This is illustrated in Figure 2 which compares the year-over-year CPI inflation rates for Germany and Switzerland to the envelope (the shaded area) of the lowest and highest monthly inflation rates of twelve European and Scandinavian countries over the period 1970-1985.<sup>29</sup> German inflation was low relative to the other countries over the entire period. Swiss inflation was in the middle of the range until the mid-1970s, but at or well below the envelope from the mid-1970s onward. Had the U.S. continued on its high-inflation path, it is possible that these experiences would have led to inflation-targeting. At a bare minimum, the U.S. experience accelerated the evolution to inflation targeting.

My second event is likely to be controversial. Nevertheless, I believe it to be extremely important, at least in the U.S. Beginning around 1970 the U.S. went from having cyclically balanced budgets, except during wars, to having then-historically large and persistent deficits. The practice of running large, persistent deficits played an important role in the shift to inflation targeting because it took counter-cyclical fiscal policy out of the policy mix. With fiscal policy sidelined, the reduction in inflation and perhaps more importantly, the subsequent Great

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<sup>28</sup> Others share my view, e.g., Goodfriend (2007), p. 8.

<sup>29</sup> The countries are: Austria, Belgium, Denmark, Finland, France, Italy, Luxembourg, the Netherlands, Norway, Spain, Sweden, and the U.K.

Moderation could only be attributed to monetary policy. Had the government continued to conduct activist counter-cyclical fiscal policy, the relative importance of monetary and fiscal policy for inflation control and economic stabilization would have been less clear. Even those who continued to embrace the tenets of the MPIP conceded that monetary policy was effective, even if they were not exactly sure how it worked (e.g., Bernanke and Gertler, 1995, desire to “*explain the potency of monetary policy*”).<sup>30</sup>

A third factor that deserves credit for the shift to inflation targeting is the insightful “impossibility theorem” known as the Lucas Critique. Lucas’ (1976) work was motivated by the “mysterious transformation” of an “obvious fallacy [a permanent Phillips curve tradeoff] to the cornerstone of the theory of economic policy.” Economists were quick to understand that Lucas’ insight meant that (i) any effort to reduce inflation permanently must be credible and (ii) that credible disinflation might be achieved at a lower cost (Sargent, 1983). There is little doubt that credibility played an important role in the Fed’s decision to announce its intentions (Goodfriend, 2007; and Lindsey, Orphanides, and Rasche, 2005). Moreover, the need for a credible commitment is a cornerstone of inflation targeting, i.e., the announcement a specific numerical inflation target.<sup>31</sup>

Confronted with facts that (i) inflation was significantly reduced by monetary policy actions and (ii) no change in their understanding of how monetary policy worked, the economics profession and policymakers fell back to the pre-monetary-policy-appears-to-work inflation

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<sup>30</sup> A contributing factor was the experience of the Great Depression, which made economists and policymakers skeptical of the self-equilibrating nature of market economies. With fiscal policy sidelined and little or no faith in the self-correcting nature of market economies, the experience of the Great Moderation led many economists to conclude that monetary policy was much more effective than previously thought. The monetary and fiscal response to the most recent financial market turmoil suggests that policymakers remain skeptical of the self-equilibrating nature of market economies and the ability of existing institutions to deal with the current “crisis” (e.g., Miron, 2009).

<sup>31</sup> For example, see Federal Reserve Bank of New York (1997).

paradigm—the Phillips curve. The modern version of the Phillips curve paradigm takes the general form

$$(1) \quad \pi_{t+1} = E_t \pi_{t+1} - \beta y_t,$$

where  $E_t \pi_{t+1}$  denotes the expected rate of inflation,  $y_t$  denotes some measure of economic slack, e.g., the gap between actual and potential output, the unemployment rate, or a measure of the non-accelerating inflation rate of unemployment (NAIRU), and the coefficient  $\beta$  is strictly positive (note that Equation 1 implies that the long-run Phillips curve is vertical). Inflation targeting central banks anchor inflation by announcing a numerical inflation target to establish  $E_t \pi_{t+1}$ . Of course, the inflation target must be credible. This requires the central bank to take actions to keep inflation close enough to the target. Because the only thing that determines inflation, given inflation expectations, is the degree of slack in the economy, policymakers must adjust their policy instrument to changes in the measure of slack even if they have no specific objective for stabilizing the real economy, i.e., they are what Mervyn King (1997) referred to as “inflation nutters.”

The profession and policymakers have adopted this framework despite still believing that changes in short-term rates should have a relatively small impact on aggregate demand. Moreover, they adhere to the Phillip curve framework despite the facts that (i) the Phillip curve framework provides relatively poor forecasts of future inflation and (ii) the marginal contribution of the slack measures to in-sample or out-of-sample inflation forecasts is small (e.g., Stock and Watson, 2008; Atkeson and Ohanian, 2001, Fisher, Liu, and Zhou, 2002; and FOMC transcript, June 25-26, 2002).

## **5.0 Implications for Inflation Targeting**

I believe that the return to the Phillips curve framework may be a problem for the continued success and even viability of inflation targeting.<sup>32</sup> There are three main threats. The first is the increasing belief in the need for central banks to have a “dual mandate.” Meyer (2004) makes a distinction between a dual mandate—“monetary policy is directed at promoting both full employment and price stability, *with no priority expressed*”—and a hierarchical mandate—where “price stability is identified as the principal objective, and central banks are restricted in pursuing other objectives unless price stability has been achieved.”<sup>33</sup> It is important to note that (i) monetary policy only affects aggregate demand and (ii) the appropriate monetary policy response to aggregate demand shocks is invariant to inflation or output stabilization—when there are shocks to aggregate demand, inflation stabilization and output stabilization are complements, not substitutes.<sup>34</sup> For example, Bernanke (2004) notes that, “the ultimate source of this long-run tradeoff [between the variance of prices and the variance of output] is the existence of shocks to aggregate supply.”<sup>35</sup> Hence, having a dual mandate means that policymakers should *promote both full employment and price stability* when confronted with shocks to aggregate supply. Is this possible? Bernanke (2004) describes the problem:

According to conventional analysis, an increase in the price of oil raises the overall price level (a temporary burst in inflation) while depressing output and employment. Monetary policymakers are therefore faced with a difficult choice. If they choose to tighten policy (raise the short-term interest rate) in order to offset the effects of the oil price shock on the general price level, they may well succeed--but only at the cost of making the decline in output more severe. Likewise, if monetary policymakers choose to ease in order to mitigate the effects of the oil price shock on output, their action will exacerbate the inflationary impact. Hence, in the standard framework, the periodic occurrence of shocks to aggregate supply (such as oil price shocks) forces policymakers to choose between stabilizing output and stabilizing inflation.

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<sup>32</sup> For evidence on the success of inflation targeting see Rache and Williams (2007), Roger (2009) and Schmidt-Hebbel (2009).

<sup>33</sup> Meyer (2004), p. 151, emphasis added.

<sup>34</sup> Svensson (2008), p. 3.

<sup>35</sup> Bernanke (2004).

Bernanke appears to suggest that the answer is “no.” What should policymakers do? If the shock is temporary (a temporary oil price shock) it might be best to do nothing. If the shock is permanent, nothing might still be the best option, since there is no way for monetary policy to affect aggregate supply and the effect on inflation will be temporary, as the price level adjusts to a permanent new higher or lower level. This policy choice is reinforced by monetary policy neutrality. In any event, just how and under what circumstances policymakers should respond to aggregate supply shocks is unclear.

Moreover, in a thoughtful analysis of the causes of the Great Moderation, Bernanke (2004) describes four ways that improved price stability has reduced the volatility of output.<sup>36</sup> If long-run price stability generates greater economic stability for the reasons Bernanke suggests, and perhaps others, it is difficult to understand why policymakers would sacrifice price stability in order to temporarily offset the effect of a permanent adverse supply shock on output and employment.<sup>37</sup>

While most inflation-targeting central banks do not appear to give equal weight to economic stability and price stability, many (perhaps all) follow a hierarchical mandate—the second threat to inflation targeting. Meyer (2004) indicates that “inflation-targeting countries today have moved away from the initially austere implementation, more in line with the spirit of a hierarchical mandate, and have become flexible inflation targeters, close cousins of dual mandate central banks.” Consistent with Meyer’s statement, former Deputy Governor of the Reserve Bank of New Zealand, Murry Sherwin, noted that the RBNZ has moved along the “spectrum between what Svensson refers to as “strict” and “flexible” inflation targeting.”<sup>38</sup> The

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<sup>36</sup> Also see Taylor (2008a).

<sup>37</sup> This point is directly related to the theoretically correct measure of the output gap discussed later.

<sup>38</sup> Sherwin (1999).

danger of a hierarchical mandate for inflation targeting comes from three sources. First, while both economic theory and experience suggest that central banks can achieve price stability, there are important reasons to be skeptical of central bankers' ability to stabilize output around potential. This skepticism is embedded in the MPIP and supported by empirical evidence. For example, Rasche and Williams' (2007) review of the empirical literature of the effectiveness of monetary stabilization policy "failed to determine a major role for monetary policy in short-run stabilization."<sup>39</sup>

Indeed, much of the evidence that monetary policy actions affect the real economy comes from a handful of episodes where an economic recession appears to be "caused" by a monetary contraction.<sup>40</sup> Such episodes provide no basis for believing that monetary policy can successfully stabilize the economy. Moreover, because they are one sided, these episodes are not a basis for concluding that expansionary monetary policy can significantly increase output.

Successful economic stabilization policy requires a good, or at least reliable, measure of potential output. Yet, it is widely accepted that potential output is difficult if not impossible to measure (Orphanides, 2003, and references cited therein, and Federal Reserve Bank of St. Louis, 2009). Failure to have good and reliable measures of the output gap or NAIRU can result in destabilizing policy errors. Indeed, Orphanides (2004) argues that overemphasis on the output gap and its mismeasurement significantly contributed to the Great Inflation.

At a more fundamental level, economic theory suggests that the conventional "steady-state" definition of potential output, which is commonly used by policymakers to construct output gap and NAIRU, is ill-suited for economic stabilization policy. The policy-relevant definition is "the rate of output the economy would have if there were no nominal rigidities, but

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<sup>39</sup> Rasche and Williams (2007), pp. 469 and 474.

<sup>40</sup> See Rasche and Williams (2007) for a discussion of these "case studies."

all other (real) frictions and shocks were unchanged.”<sup>41</sup> This policy-relevant definition accounts for the effect of supply shocks on potential output.<sup>42</sup> Consequently, even if the conventional definition of the output gap could be measured precisely, monetary policy actions based on it run a significant risk of being destabilizing.

Successful stabilization policy also depends on the ability of policymakers to forecast what would happen if they did nothing. Economic forecasting has always been difficult, forecasting economic turning points, which is critical to successful economic stabilization policy, is particularly difficult. This is evidenced by the significant lag in dating both the beginning and end of recessions.<sup>43</sup> There is considerable evidence that both survey and econometric forecasts have considerable difficulty improving upon naïve forecasts. This has been particularly true since the mid-1980s (Atkeson and Ohanian, 2001; Campbell, 2007; d’Agostino, Giannone and Surico, 2006; d’Agostino and Whelan, 2008; Stock and Watson, 2007 and 2008; and Tulip, 2005).<sup>44</sup>

The inability to make accurate forecast beyond very short horizons means that it will be very difficult, if not impossible, for policymakers to anticipate the longer-run consequences of their actions. For example, the FOMC reduced its funds rate target to the, then, historically low level of 1.0 percent at the June meeting and kept the target at 1.0 percent until the June 2004 meeting. The staff had revised up its forecast for the output gap for 2003 and 2004 at the previous meeting, noting that “Any serious delay in the recovery... would imply a larger output

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<sup>41</sup> Basu and Fernald (2009), p. 3. For estimates of the theoretically correct output gap, see Nelson and Neiss (2005).

<sup>42</sup> The idea that aggregate supply shocks reduce potential output relative to its steady-state level is not new. For example, see Rasche and Tatom (1977) and reference therein.

<sup>43</sup> For example, the NBER dating committee announced on December 2, 2008 that the recession began on December 2007.

<sup>44</sup> Reifschneider and Tulip (2007) analyse the forecasting accuracy of the FOMC, the Greenbook, the Congressional Budget Office, the Administration, the Blue Chip consensus forecast, and the Survey of Professional Forecasters short-run forecasts of GDP growth, the unemployment rate and CPI inflation over the period 1986 to 2006. Their estimates suggest that with the exception of the unemployment rate the forecasts provide little information beyond that contained in the historical average.

gap...and by our analysis would result in an even lower inflation rate.<sup>45</sup> The presumption was that the FOMC would reduce the funds rate target at the June meeting unless there was new evidence. Governor Ferguson summarized the evidence, noting “that the output gap still closes relatively slowly...the unemployment rate hangs up above the NAIRU through next year...core PCE even before the adjustment stays at what I would consider to be the very low end of an acceptable range.”<sup>46</sup> The funds rate target was reduced to the then-historically low level of 1.0 percent, with several members had a desire or a willingness to accept a larger cut. Only President Moskow voiced concern about the action saying “of course the data we talk about are always looking backward, and the key is the forecast going forward. As we’ve often said in these meetings, sometimes the last cut or the last increase in the funds rate target is the one that’s not needed because we didn’t have perfect information at the time we made that cut or increase.”<sup>47</sup>

By the December 2003 meeting the data suggested the economy grew at a 3.3 percent rate in the second quarter and at an extremely rapid 8.2 percent rate in the third quarter.

Greenspan summarized the situation by noting that

it has almost invariably been the case that the Federal Reserve would tighten under such conditions. Indeed, preemption is something that has filtered its way into the monetary policy lexicon. The issue of preemption implies, of course, that we will adjust our policy ahead of anything that we can readily foresee. In current circumstances, therefore, there is and there will continue to be a lot of pressure on us to move rates higher. We have resisted because of a quite considerable and significant difference in the present economy from what we have observed in the past. In recent decades, the turning point toward accelerating economic activity usually occurred when the inflation rate was 3 percent or 4 percent, sometimes even higher, and the necessity for preemption was critically obvious. The problem with preemption, though it is something that is very interesting to observe in retrospect, is that it doesn’t necessarily follow that we are preempting future developments that will actually occur the way we expect. So, we have to be

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<sup>45</sup> FOMC Transcript, May 6, 2003, p. 13.

<sup>46</sup> FOMC Transcript, June 24-25, 2003, p. 130.

<sup>47</sup> FOMC Transcript, June 24-25, 2003, p. 153.

careful not to try to preempt something that is not fairly likely to happen. There is a risk and indeed a cost to being wrong.<sup>48</sup>

No one expressed concern about the longer-run consequences of what was recognized as an excessively easy policy.<sup>49</sup> Even though inflation had increased substantially and by December the FOMC acknowledged that “the probability of an unwelcome fall in inflation has diminished in recent months and now appears almost equal to that of a rise in inflation,” the FOMC did not increase the target until the June 2004.<sup>50</sup>

The FOMC was effectively pursuing a hierarchical mandate. With inflation in check, presumably because of well-anchored inflation expectations, the FOMC was free to pursue its objective of “maximum sustainable economic growth.” Taylor (2009a) and others have suggested that “this extra-easy policy was responsible for accelerating the housing boom and thereby ultimately leading to the housing bust.”<sup>51</sup>

While there will undoubtedly be much analysis and debate over the Fed’s role, the decline in housing prices and resulting financial market turmoil generated an unprecedented monetary policy response. Initially, the Fed attempted to ease credit conditions by simply reallocating credit (e.g., Thornton, 2009).<sup>52</sup> When the Fed was no longer able to sterilize the effects of its credit allocation program on the monetary base, the base increased rapidly to an unprecedented level. The massive quantitative easing has generated concerns of future inflation (e.g., Taylor, 2009b). As Al Broaddus noted at the June 2003 FOMC meeting “common sense tells us...that a determined expansion of the monetary base has to be effective against deflation at the zero bound. If that were not the case, we could eliminate all taxes, and the government

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<sup>48</sup> FOMC Transcript, December 9, 2003. pp. 88-89.

<sup>49</sup> Greenspan noted that “the current federal funds rate is well below any estimate of the equilibrium rate. That is, when we start to raise the rate, we may have the problem of having to return to the equilibrium rate relatively quickly.”

<sup>50</sup> Board of Governors, *Press Release*, December 9, 2003.

<sup>51</sup> Taylor (2009a), p. 343-44.

<sup>52</sup> Taylor (2009b) calls this “industrial policy.”

could permanently finance its operations with money creation alone.”<sup>53</sup> What the ultimate verdict will be is uncertain. That the Fed’s behavior was motivated by a hierarchical mandate is not.<sup>54</sup>

Policymakers appear to have replaced their belief in a permanent Phillips curve tradeoff with the belief that “a little inflation is good for economic growth,” which is the third threat to inflation targeting. Most policymakers believe that the long-run Phillips curve is vertical, which implies same long-run real outcome can be achieved with zero as with 2 or 3 percent inflation. Nevertheless, most policymakers also profess that the “optimal,” “appropriately measured” inflation rate is positive. The theoretical justification for the various hypotheses that motivate the belief that a little inflation is good for economic growth are highly questionable or simply unsound (Marty and Thornton, 1995). Nevertheless, many policymakers believe that “inflation can be too low as well as too high.”<sup>55</sup>

The belief that positive inflation is somehow optimal is reflected in the fact that all inflation-targeting central banks have a non-zero inflation target. It is also consistent with the fact that nearly all inflation-targeting central banks have an inflation performance recently that is in the upper end of their target ranges. It could be that central bankers might simply believe that

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<sup>53</sup> FOMC Transcript, June 24-25, 2003, p. 35. Chairman Burns had a similar belief. At the March 18-19, 1974, FOMC meeting, Burns noted while he was “not a monetarist, he found a basic and inescapable truth in the monetarist position that inflation could not have persisted over a long period of time without a highly accommodative monetary policy” (Memorandum of Discussion, 1974, pp. 110-12).

<sup>54</sup> This danger associated with a hierarchical mandate is exacerbated by political pressures. In his Per Jacobsson Lecture, which was delivered just six days prior to Volcker’s FOMC dramatic change in monetary policy, Burns (1979) noted prophetically that “the Federal Reserve System had the power to abort the inflation at its incipient stage fifteen years ago or at any later point, and it has the power to end it today. At any time within that period, it could have restricted the money supply and created sufficient strains in the financial and industrial markets to terminate inflation with little delay,” but asserted that political pressures limited the “practical scope for restrictive actions (p. 15).”

<sup>55</sup> Meyer (2004), p. 160. Also, at the June 2003 FOMC meeting then-Governor Bernanke stated “I think the May 6 statement left the mistaken impression with some that the Fed was concerned about the threat of imminent deflation as opposed to what really concerned us—namely, the possibility of a decline in inflation to a level that, *while below the desirable range*, would still be greater than zero.” Transcript of FOMC meeting, June 24-25, 2003, p. 131, emphasis added.

the inflation measures they target overestimate the true unobservable inflation rate. However, it seems unlikely that the bias is large enough to explain the observed behavior.

## **6. Implications for Inflation-Targeting Central Banks**

The analyses in the previous sections have implications for evolution of inflation-targeting. First and foremost, inflation-targeting central banks should be dissuaded from having a dual mandate. If they decide to have a dual mandate, they should inform the public of this policy and the rationale for adopting it.

Second, inflation-targeting central banks should carefully and honestly evaluate the extent to which they can effectively stabilize the real economy around potential output. This analysis should provide a realistic assessment their ability to measure potential output, the extent to which they believe inflation is related to the output gap, and other impediments to successful economic stabilization discussed above, as well as some others not discussed here (e.g., lags in the effect of policy actions on the economy). The end product of this analysis should be a statement indicating the extent to which the inflation-targeting central bank believes that it can pursue a hierarchical mandate.

Third, inflation-targeting central banks should engage in a serious dialogue with their constituents about the optimal rate of inflation. In particular, if it believes that the appropriately-measured, long-run inflation rate is positive, it should state the reasons for this belief.

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Figure 1: Treasury Coupon Rate Yield Curves

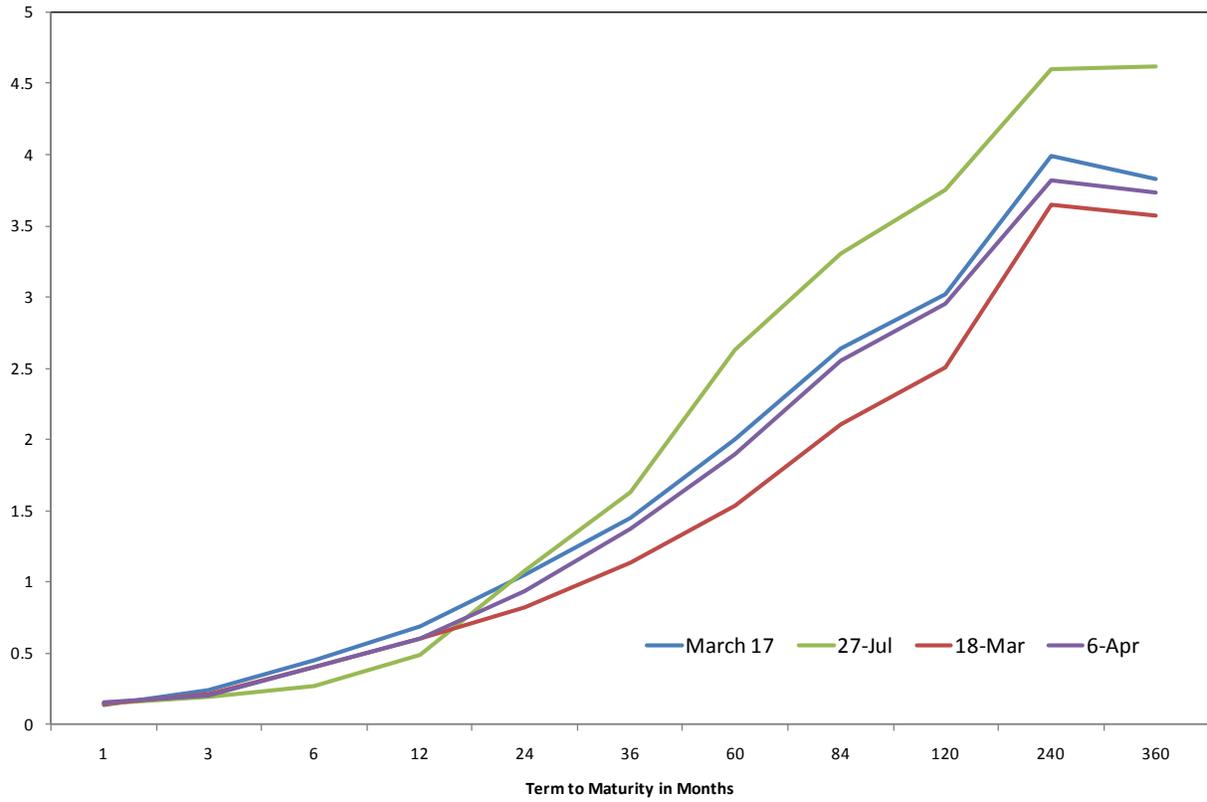


Figure 2

