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## An Overview of Central Bank Inflation Targeting: Theory and Experience

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**An Overview of Central Bank  
Inflation Targeting: Theory and  
Experience**

**Andrew Midgett**

**Spring 2007 Honors Thesis**

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## **1. Introduction:**

Modernity brings us the promise of continuous advancement: the assurance that tomorrow will be better than today. One of the most significant areas of innovation during the 20<sup>th</sup> Century and the years since has been that of monetary policy, which has emerged from relative obscurity as an essential science whose artful execution is of the utmost importance to the citizens of every industrialized nation on earth. Great advances and personalities have propelled us toward a present when central bankers wield a degree of control and precision concerning monetary variables that would have decades ago been unthinkable. Many democracies now empower their respective central banks with the autonomy and responsibility to achieve what international consensus has deemed the most economically healthful goals of monetary policy. As monetary economists worldwide have sought to perfect and codify the procedures necessary to the satisfaction of these ends, a debate has arisen in countries such as the United States about the policy known as inflation targeting.

It is the purpose of this thesis to explore the transformation of inflation targeting from a set of evolving central banking principles into a global policy framework. The paper will further demonstrate that countries whose central banks are governed by an inflation targeting regime have been able to keep inflation stable

and low with no significant detriment to output level or variation. One can interpret the facts and observations presented here to reasonably debate whether successful monetary policy is predominantly the result of shifting to inflation targeting or whether the realizations and adaptations necessary for the transition are the sole or primary cause of positive outcomes. Both perspectives are well-supported, but an evolutionary (rather than revolutionary) view of international monetary policy requires depicting inflation targeting as the gradual collaborative effect of the priorities of economists, politicians, businesspeople, and the general public. This paper is therefore most suitably read in the context that inflation targeting represents a much larger change in economic understanding and popular involvement than the legislative institution bearing its name. This thesis asks whether the institution of an inflation targeting regime is preferable for modern economies in terms of benefits and implications. In particular, the thesis will conclude whether it would be advantageous for the United States to enact inflation targeting legislation for the Federal Reserve System.

### *1.1 Inflation and the Modern Central Bank*

First it is vital to explore the concept of inflation and the role of central banks generally. Inflation may be defined as the continuous increase of the aggregate price level over time, and it is attributable to the growth rate of money and the

ongoing resolution of imbalances between aggregate demand and supply. Roughly speaking, a surge in demand or shortage of supply will pressure prices upward. High inflation introduces inefficiency to resource allocation because of confusion about relative prices and wages, especially when planning for future periods. It also diminishes the demand for securities denominated in domestic currency, as their decline in value over time is anticipated by the public. This places downward pressure on the price of bonds and upward pressure on the interest rate.

There are various avenues of effect by which high inflation can weaken long-run economic growth<sup>1</sup>. Economic decisions can be distorted by the interaction of inflation and the tax system, which cannot quickly adapt to changes in the price level. “Menu costs” describe the costs associated with the frequent need for price adjustments in high-inflation situations; these costs include actuarial, legal, and human resource expenses. High inflation also introduces an implicit tax on money balances such as checking deposits, which will steadily decline in value if not spent or saved. Whether this disincentive to hold currency will fuel inflationary spending or contractionary saving will depend on the economic climate and the preferences of businesses and consumers. One of the most serious problems associated with a persistent inflation problem is the peculiar development of “monetary substitution,” under which the domestic people attempt to avoid these costs by abandoning the domestic currency in favor of a more stable one for a means of payment and a store

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<sup>1</sup> Heenan, Peter, and Roger 2006

of value. When this practice is advocated or sponsored by the government or the central bank, it is known as “dollarization,” whose name originates from the practice in many emerging markets of accepting stable United States dollars more readily than the unpredictable domestic currency.

The deleterious effects of high inflation are considerable, but it is still considered desirable to maintain the rate of inflation at a low, positive, single-digit level. The foremost reason for this preference is that measures of inflation (especially those derived from the CPI) tend to be overestimated. Keeping the inflation rate positive leaves room for gradual price increases due to improvements in quality and also safeguards against the slippery slope of deflation, which is a painful development that is difficult to reverse once initiated. Deflation is the opposite of inflation, and the public expects domestic currency to increase in value in the future. People will consequently refrain from spending in order to save their money for the future.

In the case of deflation, the decrease in demand can actually cause the decline in prices to continue indefinitely. The central bank under deflation has limited policy options; if it has maintained relatively high target interest rates, it can pursue aggressive expansionary policy by cutting rates. But if the central bank has backed itself into a corner with target rates near zero, then it will be unable to

employ the interest rate transmission mechanism,<sup>2</sup> which is among its most powerful tools of monetary policy. The Bank of Japan, when faced with deflation, was forced to pursue an alternative policy of “quantitative easing,” which intended to stimulate growth and positive inflation by increasing the monetary base. In the context of inflation targeting ranges, the fear of inflation is the rationale for a lower target limit, which will prompt the central bank to halt monetary tightening as the nominal<sup>3</sup> interest rate approaches zero.

The central bank influences the money supply primarily through adjustments to the quantity of reserves in the system. Reserves are funds held by private banks, and they are used to settle accounts, lend money, and perform other financial transactions. The monetary base contains all cash and coinage outstanding together with the reserves belonging to private banks but on deposit at the central bank. The central bank therefore behaves as a quasi-public institution that interacts with the economic system to adjust the money supply toward a level consistent with any inflation or output objectives. Everything else held constant, an increased rate of money growth will increase the rate of inflation.

The quantity of money in the economy is inherently volatile and difficult to accurately predict. The total supply of money is actually much larger than the

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<sup>2</sup> This refers to the influence, as through open market operations, that the central bank is able to exert on saving and spending through manipulation of prevailing interest rates.

<sup>3</sup> “Nominal” as opposed to “real.” Real interest rates are adjusted for inflation while nominal interest rates are not.



monetary base because of the money multiplier, which is a dynamic factor greater than 1. The money supply equals the product of the monetary base and this multiplier, which exists because of the activity of financial intermediaries. A simple example is that of a bank holding the checking account of one of its clients. This money still exists in the checking account, but because the bank anticipates that only a small portion of the money will be withdrawn in the near future, it can make loans with these funds to at the same time. The bank has therefore created money in the economy, and this can proceed without incident as long as the bank is able to meet its liquidity demands as they arise. Everything else held constant, the volume of lending in the economy will increase the money multiplier and also the money supply. Central banks must therefore consider the interplay of the monetary base and the money multiplier when designing and executing policy decisions.

The modern central bank intervenes in the economy primarily to promote a low level of positive inflation. The central bank can employ different monetary policy, such as monetary targeting, inflation targeting, exchange rate<sup>4</sup> targeting, and monetary policy with an implicit nominal anchor to achieve price stability. There are a number of tools available to the central bank for achieving its monetary policy objectives. Discount rate policy allows a central bank to adjust its loans to private banks. This is a more localized policy that has fallen out of the spotlight, but it is still

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<sup>4</sup> This paper interprets the exchange rate as the units of domestic currency per unit of foreign currency.

used to some extent. The primary tool of modern central banks is the open market operation, which is the purchase or sale of government securities by the central bank on the open market. An open market purchase is expansionary (loosening) because the payment of reserves for a volume of government securities increases the monetary base, which increases the money supply. Because there are now fewer bonds available in the market, those bonds become more expensive. Since bonds are priced inversely with their interest rates, this forces bond interest rates downward. The result is decreased saving, which encourages spending and increases output, which is often expressed as the gross domestic product (GDP).

Conversely, a contractionary (tightening) open market operation involves the sale on the open market of government securities. This removes reserves from the economy and increases the supply of bonds. This pressures bond prices downward and interest rates upward. The public, wanting to take advantage of a higher interest rate, will show an increased preference for saving relative to spending, and output will decline as a result. This is the most unpopular choice that central bankers face; contractionary policy reduces output relative to its potential or natural level, but it is a necessary move for fighting inflation.

Measures of inflation are derived from the Consumer Price Index (“CPI”), which is a fairly straightforward and easily obtained proxy for the aggregate price level. The CPI measures the year’s prices for a set “basket” of consumer goods, and

it has generally proven to be closely correlated with the inflation rate. The greatest advantage of the CPI is that it is readily understood by citizens, who all participate in consumer activities. However, some goods in the economy demonstrate highly erratic price variation due to their dependence on factors outside of the economic system. It may not make sense to design a monetary policy for an entire economy based on the price behavior of its most volatile commodities. Items that are especially sensitive to exogenous shocks (such as food and oil) are often filtered out of the central bank's inflation assessment through various other price indices, especially the core Consumer Price Index ("core CPI"). This degree of precision is not gained without cost; the general public has much more difficulty understanding the meaning of the core CPI and applying it to decision-making.

One of the foremost concerns in the pursuit of inflation control is discovering what level of inflation strikes the best balance between steady economic growth and stable prices. Trend inflation can then be targeted, and policy actions can be taken if necessary. International studies of inflation outcomes have led to estimates of a "threshold level" for inflation beneath which any detriment to output appears negligible; these values range from as low as 1% to as high as 8%.<sup>5</sup> There is no "one size fits all" inflation policy, and the current level of inflation must always be taken into account to avoid painfully abrupt changes in economic conditions. Too

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<sup>5</sup> Heenan, Peter, and Roger 2006

aggressively pursuing policies favoring either inflation or output will greatly increase the costs of the trade-off between the two.

### *1.2 Basic Tenets and Features of Inflation Targeting*

Inflation targeting as it is both proposed and practiced takes on many forms, but each of these is based upon the generally accepted philosophy that controlling inflation should be the foremost priority of central bankers. The current U.S. Federal Reserve Board of Governors Chairman Ben Bernanke and others have defined the institution of inflation targeting as “a framework for monetary policy characterized by the public announcement of official quantitative targets (or target ranges) for the inflation rate over one or more time horizons, and by explicit acknowledgment that low, stable inflation is monetary policy’s primary long-run goal.”<sup>6</sup> Furthermore, inflation targeting involves “vigorous efforts to communicate with the public about the plans and objectives of the monetary authorities, and in many cases, mechanisms that strengthen the central bank’s accountability for attaining these objectives.”<sup>7</sup> The various components of this general definition warrant individual discussion, and there are still numerous criteria and considerations to explore. Each country and its unique set of economic circumstances will perform better when operating under a different style; it is, in

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<sup>6</sup> Brash, 2002

<sup>7</sup> Ibid.

practice, appropriate to view inflation targeting as a framework for “constrained discretion”<sup>8</sup> rather than a binding set of rules.

“Constrained discretion” is not a paradoxical term, and it differs markedly in practice from both strict rules and pure discretion. If the central bank is subjected to absolute rules about the goals and methods of monetary policy, then it will be unable to respond to unforeseen circumstances. Negative demand shocks, which result from a transitory decline in aggregate demand, will remain unabated until the price level drops sufficiently to promote a recovery. This self-correction of stagnant growth could last many excruciating years. At the other extreme, if the central bank lacks definite direction and commitment, then its credibility with the public for guiding inflation will falter. This purely discretionary central bank, which is already disadvantaged by the absence of defined objectives, will be rendered ineffective by its lack of public support.

The inflation targeting regime requires that its target be consistently stated in terms of a designated price series.<sup>9</sup> In order to be effective, the series should be as accurate and rapidly available as possible while remaining readily comprehensible in the eyes of the public. Optimally, it should be one that allows for one-time deviations that will not affect trend inflation, which is what the central bank seeks to stabilize. The overall or headline CPI may sometimes be inappropriate because it

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<sup>8</sup> Bernanke and Mishkin, 1997

<sup>9</sup> Ibid.

includes volatile commodities like food and oil, which are not accurate representatives of systematic price patterns. All inflation targeting countries instead use some variant of CPI, such as the core CPI, in order to filter out the effects of individual price shocks.

## **2. The Road to Inflation Targeting**

### *2.1 Considerations for Prospective Central Banks*

There are several reasons for a central bank to consider the transition to an inflation targeting regime. First and foremost is the need to establish a credible anchor<sup>10</sup> for monetary policy, especially following a period of high inflation. This need may also be caused by the loss of another anchor of monetary policy. For instance, a target for the exchange rate frequently becomes unmanageable amid international fluctuations. Also, some monetary aggregate<sup>11</sup> used in the past may be deemed both difficult to achieve and less closely related to inflation than was originally anticipated.<sup>12</sup>

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<sup>10</sup> An anchor is a variable that is targeted because of its reasonably stable relationship with the general price level.

<sup>11</sup> A raw measure of money in the economy, such as M1, M2, and M3, which each provide for an increasingly broad definition of the money supply. By 1971, the Federal Reserve had published classifications through M5.

<sup>12</sup> Brash, 2002

Another motivation for the change is the need or desire for enhanced instrument independence for the central bank. As a counterbalance to this increased power and autonomy, the public often requires greater accountability of the central bank for achieving its monetary policy goals. This usually requires improved transparency of policy deliberations and the specification of ranges for major variables whose breach would indicate a failure of the discretion of the central bank. Finally, a country may wish to minimize the risks associated with disinflation,<sup>13</sup> such as reduced output and employment. The clear communication of public confidence in the judgment of the central bank in an inflation targeting regime may lower the inflationary expectations of the public, softening the blow of disinflation.<sup>14</sup> If people see disinflation coming, they will begin to refrain from upward price adjustments in anticipation of a more moderate inflation rate.

The choice of a disinflation path is a necessary first consideration for any adopting central bank with high existing inflation. A disinflation path is more effective than an aggregate price level path because past target misses do not require adjustment. If adherence to a price path is chosen, then any event that affects prices must be directly handled, regardless of its macroeconomic significance. Transitory events with no future relevance would nonetheless earn the

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<sup>13</sup> Distinct from undesirable “deflation,” which is a consistent decline in the general price level, “disinflation” is the term for a reduction in the rate of positive inflation. Most countries enter an inflation targeting regime in order to achieve some degree of disinflation.

<sup>14</sup> Siklos, 2002

central bank's full attention even in the event of a one-time increase in the price level. The choice of a disinflation path is far more difficult for countries where price stability has not already been established.<sup>15</sup> If the path seeks to cut inflation too ambitiously, the associated decline in economic activity could sap support for inflation targeting and diminish the central bank's credibility. On the other hand, if too moderate an approach is undertaken, the public may perceive this as a direct lack of commitment for price stability on the part of the central bank. In that case, the public will largely ignore the central bank's efforts and hold their inflationary expectations relatively constant at high levels.

Nonetheless, inflation targeting central banks have tended to favor relatively gradual disinflation paths. This approach also reveals two characteristics of inflation targeting.<sup>16</sup> First, for implementation to succeed, political consensus about its necessity must endure. Second, inflation targeting in practice inherently allows for the stabilization of output in the short run, so central banks making the transition must designate this as one of its monetary policy goals to some extent. A gradual disinflation path allows the central bank to more easily respond to threats to the output level while simultaneously attending to the price level.

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<sup>15</sup> Siklos, 2002

<sup>16</sup> Ibid.



## *2.2 Target Design and Central Bank Independence*

Inflation targeting requires fulfilling the objectives of monetary policy through the designation of an inflation target. An effective inflation target should serve to anchor the public's inflation expectations and be relevant to and readily understood by a broad range of economic agents. It is best to signal a medium-term dedication from the central bank for moderate and stable inflation.<sup>17</sup> This strikes the best balance between long-run maintenance of inflation and short-run handling of emerging economic developments. In a democratic society, the target must also provide for a benchmark of policy performance and be based on a price index or other variable that is easily obtained and frequently updated.

All inflation targeting countries currently use some variant of the Consumer Price Index ("CPI").<sup>18</sup> It is the index most relevant to the general public, and it is frequently published and easily understood. Financial indexation usually uses the CPI, so the business sector easily interprets its value. The general public easily comprehends variants of the CPI as well; they are all measures of the relative price of a specific set of consumer goods. In case of the majority of inflation targeting countries, the target is set in terms of the 12-month point-to-point rate of change in the target price index.

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<sup>17</sup> Heenan, Peter, and Roger 2006

<sup>18</sup> Siklos, 2002

A substantial degree of central bank independence from the control or influence of the elected government is indispensable for the adoption of an inflation targeting framework. Central banks have a variety of monetary policy tools available for use in achieving their goals, and their freedom to use them is known as their level of instrument independence. This broad category includes everything from the appointment cycles of the central bank's governor to the details of open market operations. Goal independence refers to the liberty of the central bank to choose its own ultimate objectives for monetary policy. Modern central banks have virtually no goal independence; their mandates are acts of law by the elected legislature. These goals can be as simple and subject to interpretation as "price stability." A global increase in *de jure* (legislated) independence has coincided with the international consensus on the urgency of price stability.<sup>19</sup> Nations with historically low and stable inflation tend to have less statutory independence, but this is by no means the rule. Germany's Bundesbank was one of the most successful central banks since World War II, yet it was also one of the most independent central banks according to legislation. This observation may lend support to a theory of correlation rather than causation between inflation history and statutory independence.

Inflation bias refers to the concern that government officials will pursue expansionary policies for political purposes. The reason for a separate entity from

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<sup>19</sup> Siklos, 2002

the government to serve as the central bank is that elected officials, who wish to be reelected, could ignore price stability and pursue policies to maximize output and employment. But there is a natural trade-off between independence and accountability. If the central bank is completely independent, then how is the public to know its decisions or the models and predictions that contributed to those decisions? Transparency through open communication with the public is the answer. If it is commonly known how the central bank conducts monetary policy, then there will be no apprehension about it abusing its independence. If an inflationary outcome emerged, the underlying policy would be scrutinized for any hint of incompetence or wrongdoing on the part of the central bank. This accountability to the public allows the central bank to retain its instrument independence while satisfying the need for demonstrable responsibility for appropriate monetary policy.

Another source of inflation bias is the practice known as the monetization of deficits. When the government's fiscal expenditures exceed its revenues, it must issue bonds to finance the shortfall. A central bank under the control of the government might pursue inflationary policies to reduce the value of the debt. The debt load of the government is lower in real terms because the currency in which it was denominated has now declined in value. This is a particularly dangerous source of high inflation in emerging markets, where fiscal abuses on the part of the government are more commonplace.

### *2.3 The Controversy of Constraint*

Varying degrees of commitment exist across inflation targeting countries.<sup>20</sup>

The most strict adherents are those referred to as “full-fledged inflation targeters” (“FFITs”), and these central banks have an explicit priority for price stability and have made public the details of its framework for inflation targeting. This adoption has generally implied a move away from monetary aggregate targeting for developed countries and away from exchange rate targeting in developing countries. The principal-agent relationship between the elected government and the central bank allows it to practice “constrained discretion.” Authority to conduct monetary policy is delegated to the central bank, which acts on behalf of the citizens and the elected government.

“Constrained discretion” also allows the central bank to monitor and respond to new information about economic events. The existence of information asymmetries<sup>21</sup> and policy lags makes this versatility important. In rare cases like New Zealand, incentives contracts provide for the censure or removal of central bankers whose administration fails to achieve the target. Perhaps not surprisingly, these

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<sup>20</sup> Tuladhar, 2005

<sup>21</sup> The circumstance where the understanding of relevant facts and/or intentions of economic agents is not uniformly understood.

central banks' governors, whose continued employment depends on performance, retain the final authority for all major policy decisions. The legislation of policy goals, discipline procedures, and reporting requirements are all potential incentive options. There are also rules guiding the appointment and reappointment process for members of the central bank's monetary policymaking committee. Longer, nonrenewable terms foster the most central bank independence because the central banker has minimal ties to the election cycle of the government and because the central banker does not need to concern himself/herself with being reappointed.

Opponents of inflation targeting cite numerous concerns that naturally arise from the theory of inflation targeting. First and foremost, a strict adherence to inflation targeting could render the central bank powerless to respond to other negative events in the economy. This single focus may lead the public to believe that the central bank will forsake other variables of the macroeconomy for the sake of inflation targeting. Such an expectation of volatility or weakness in the GDP or unemployment rate may in fact be a self-fulfilling prophecy. If the public views that the economy will enter a recession in the future due to negligence on the part of the central bank, business and consumer confidence will decline, and aggregate spending<sup>22</sup> will decrease. This reduction will immediately bring about the very

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<sup>22</sup> An amalgamation of the various components of national spending, expressed in measures such as GDP.

recession that was feared, regardless of whether it was really going to happen in the first place.

There is no more visible opponent of initiating an inflation targeting regime than Alan Greenspan, the former Chairman of the Federal Reserve's Board of Governors. This is one of the rare points on which he and his successor, Ben Bernanke, demonstrate philosophical differences. Greenspan fears that a strict set of targets for inflation alone will hinder any central bank's ability to deal with crises that threaten output (GDP), unemployment, and other factors. This was the case in New Zealand, where the Reserve Bank of New Zealand, during its early years of inflation targeting, ignored undesirable unemployment to demonstrate its resolve for fighting inflation. His opinion earns widespread attention because he argues for the same degree of discretion that was employed during the "Greenspan era" at the Federal Reserve.<sup>23</sup>

However, Greenspan and Bernanke share far more similarities than differences. Both would reject a proposal for absolute rules in monetary policymaking, and they embrace the well-established idea that inflation should be the explicit priority of the central bank. This perspective is a prerequisite of the inflation targeting central banker, and it adheres to the Monetarist philosophy that monetary policy can only impact prices in the long run and not real variables such as

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<sup>23</sup> This topic shall be discussed at greater length later in the paper.

GDP and unemployment, which will always tend toward their natural level in real terms regardless of the price level.

While these may be valid concerns in theory, it appears that they are less so in reality. Recent years have seen a growing acknowledgment about the costs of inflation, and this has coincided with a larger international focus on price stability. For instance, the Maastricht Treaty of 1992 mandated strict inflation limits for countries seeking entry into the European Monetary Union (EMU). Empirical evidence abounds to suggest a positive correlation between the focus on price stability and general economic performance, especially in terms of output level and volatility over time. Inflation targeting countries have performed especially well; this is perhaps because they have made an even firmer commitment to inflation control.

If interpreted as a rule, then inflation targeting is susceptible to a set of valid criticisms. The public and its elected officials would shy from altogether conceding that monetary policy can have no valid goals besides maintaining low inflation.<sup>24</sup> And they are not completely wrong in their hesitation; it is entirely conceivable that strict adherence to a rule of inflation targeting would render the central bank powerless to respond to adverse developments in the economy like supply shocks.

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<sup>24</sup> Tuladhar, 2005

Such inaction could be ruinous to the economy if a recession becomes deep<sup>25</sup> and persistent. On the whole, there appear to be no benefits of interpreting inflation targeting as a rule at the expense of flexibility.

Some hold the view that the publishing of inflation forecasts by the central bank (a measure of enhanced transparency) could be unnecessary or even detrimental to the economy.<sup>26</sup> It could be argued that if the inflation target were credible, then a forecast of inflation would not provide much additional information. Jobs for forecasters in the private sector would become superfluous. Some suggest that inflation volatility could increase if inflation forecasts are not precisely accurate, but this is a claim that is unsupported by empirical evidence.

Experience has alleviated these concerns to a considerable degree.<sup>27</sup> In practice, central banks under inflation targeting exercise more flexibility than would be possible if inflation targeting was a binding and exclusive rule. The view that published inflation forecasts create a negative externality for private sector forecasters is speculative at best. From an operational standpoint, inflation targeting is not a complete rule in that it does not provide precise methods of instructions. It

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<sup>25</sup> The depth of a recession refers to the distance of actual GDP below the natural level of GDP, or the negative output gap.

<sup>26</sup> Siklos, 2002

<sup>27</sup> Bernanke and Mishkin 1997



is merely a framework for monetary policy within which short-term discretion may be exercised. In practice, the only significant effect on output was a positive one.<sup>28</sup>

Inflation targeting has likely gained support in recent years from growing public sentiment that central banks of democratic societies should not be free to rely on the personality of their leadership for all monetary policy decisions. Activist, counter-cyclical policy actions in the past worry many that the central banker wields too much power and latitude in guiding the domestic economy.<sup>29</sup> Perhaps most importantly, increased awareness in the public that monetary policy only has a lasting effect on the price level has highlighted the urgency of formally designating inflation as the primary focus. It was also well-established by then that a commitment ahead of time by the central bank to an inflation target would anchor the public's expectations in a way that would complement the target. If the public knows what the central bank intends to do, it could invoke the desired outcome without any actual policy action. Allowing the economic agents on an individual basis to pursue the new course is always more efficient and effective than intervening action from the central bank, which is more of a "blunt instrument."

Escape clauses in the employment contracts for central bank governors allow a reasonable and temporary release from the inflation target in order to attend to new economic developments. This measure allows flexibility by specifying for the

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<sup>28</sup> Bernanke and Mishkin 1997

<sup>29</sup> Ibid.

central banker certain conditions under which the target may not be attained. These include stresses on the economy such as indirect taxes, supply shocks, and trade shocks, but they must be thoroughly demonstrated to be exogenous to the economy in terms of the central bank. In other words, it cannot be something that was foreseeable or preventable by the central bank, and it cannot be a shock that was generated by monetary policy or by the economy itself. The provision of escape clauses is, therefore, an important option for inflation targeting central banks that may dispel the apprehension of opponents who feel that the framework introduces too much rigidity to deal with unforeseen economic events. Legislation usually requires those invoking an escape clause to publicly explain the situation, but targets in practice are more flexible than this.

### **3. International Experience**

Any history of inflation targeting must feature the Reserve Bank of New Zealand (“RBNZ”), which has earned the distinction of being the world’s first inflation targeting central bank. Since it was the first of its kind, the RBNZ provides the most empirical data about the performance of inflation targeting outside of models and theories. It also serves as a thriving experiment of the various political considerations that arise in transitioning to and maintaining the realization of this policy. Most importantly of all, the RBNZ under inflation targeting has generally

been lauded for tremendous success. Inflation in New Zealand as measured by the CPI fell from 9 percent in April, 1988 to under 2 percent by 1991, and it has averaged approximately 2 percent ever since.<sup>30</sup> Inflation, which had been both higher and more volatile than comparable countries in the 1970s and 1980s, was relatively lower and more stable in the 1990s. Contrary to the fears of many, this disinflationary outcome was not accompanied by decreased or volatile output. This change in the early 1990s precisely coincided with the transition of the RBNZ to an inflation targeting regime.

The journey toward inflation targeting for New Zealand first began with enhanced accountability of the central bank for achieving the goals of monetary policy. In the late 1980s, there was increased academic and public support for instrument independence at the RBNZ. The Parliament allowed this with the passage in late 1989 of the Policy Targets Agreement (“PTA”), which mandated that the central bank would be held responsible for achieving price stability.<sup>31</sup> The legislation also held the provision that the Governor could be removed for “inadequate performance,” which would only conceivably apply in the event of a gross failure to achieve the target due to negligence or incompetence on the part of the RBNZ under that Governor’s leadership.

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<sup>30</sup> Brash, 2002

<sup>31</sup> Ibid.

New Zealand's Minister of Finance Roger Douglas was so intent on reducing the public's inflationary expectations that he recommended a 0% or 0-1% target for the inflation rate in an April 1<sup>st</sup>, 1988 television interview. This was a far tighter policy than that which would actually be pursued, but Douglas was worried that the public might view the rare achievement of single-digit inflation as a signal that the central bank would be content to stay at 6-7%, which would still be undesirably high.<sup>32</sup> It has been difficult to study the costs of disinflation during this period because of the nearly simultaneous passage of a Goods and Services Tax in New Zealand. Such a tax naturally distorts the price level because it gives greater inertia to expectations of a high price level. With the sudden appearance of this tax, it became difficult to isolate the effects of the RBNZ and disinflation from those of the Goods and Services Tax.

Despite these analytical setbacks, there are several reasons to believe that many costs of disinflation were successfully avoided. It is now widely believed that the openness of the RBNZ during the disinflation encouraged workers and unions to renegotiate wage contracts upward to an extent consistent with the published inflation targets.<sup>33</sup> This may have curtailed one of the greatest sources of inflation: the excessive adjustment of wages in the labor market. With wages in accordance with the inflation target, that target will be more easily achieved because spending

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<sup>32</sup> Brash, 2002

<sup>33</sup> Ibid.

and saving decisions will respond to the change in nominal purchasing power. The inflation targeting framework's very existence likely influenced markets and economic agents to predict that low inflation would, and so they invested accordingly.

Another piece of evidence suggesting the public's inflation expectations for New Zealand's dollar have decreased is the steady decline of the spread of the bond yield between American and New Zealand government treasuries and bonds. The bond yield measures the rate of return for holding these securities among various time horizons and is often measured in basis points, where 100 basis points (BPs) are equivalent to a single percentage point. The aforementioned spread was approximately 1000 BPs in the mid-1980s, around 400 BPs in the early 1990s, and well under 200 for the rest of that decade. What this means is the public began to perceive the disinflation and incorporate it into their inflation expectations. If they believe that the currency will decline relatively less in value over time, then they will incorporate this into their decision-making and desire relatively more of these securities today. This will put upward pressure on the price of these securities. Since bond prices and interest rates are inversely related, this development will force interest rates downward, toward those of the United States.

### *3.1 The Role of New Zealand's Elected Government*

It is apparent that elected officials seeking support or reelection have an incentive to favor inflationary policies. If the central bank consistently takes expansionary actions such as lowering an interest rate target, monetary reserves will be injected into the economy and fuel a short-run expansion. While this may be popular with the electorate today, it will have negative ramifications for the future. This induced increase in output will be accompanied by an increase in the price level. Since output returns to its natural level in the long run regardless of monetary policy, the only lasting effect will be the increase in prices. If officials consistently pursue this behavior, then a vicious cycle of inflation will develop. Inflation will be caused not only by the actions of the expansionary central bank but also by the price and wage adjustments of the public once it is realized that these policies will continue. Expecting higher prices tomorrow, markets will anticipate the effects early. Once the policy action is actually executed, the price level will increase by an even greater magnitude than was intended originally.

Since it is now generally accepted that the only variable on which the central bank may make a lasting impact is the price level, independence of the central bank from politicians has become widely favored. In New Zealand, the RBNZ and the Ministry of Finance (equivalent to the United States Department of the Treasury) have a public agreement on the goals of monetary policy, which prioritize price

stability. This arrangement precludes virtually all monetary policy disputes between the RBNZ and the government, which enhances the credibility of the RBNZ with the market. The Ministry of Finance theoretically possesses the power to interfere with the operations of the RBNZ, but the transparency of the bank and its operations would make this a matter of public record, and intense scrutiny of the decision would likely be ruinous for the politician(s) involved.

In the mid-1990s, the Ministry of Finance released an expansionary budget that was widely criticized. The RBNZ responded automatically in accordance with its inflation targeting framework by immediately increasing the long-term interest rate target and decreasing the exchange rate. This routine action exposed the fiscal policy of the Ministry of Finance as inappropriate and spurred the Opposition Party into action. That party sought to “give monetary policy some mates” through tighter fiscal policy and deregulation of the labor market, which would mitigate some of the costs of adjustments in wage contracts.<sup>34</sup> Within five years, the government cut taxes (another expansionary fiscal policy) only after first obtaining the permission of the central bank, which confirmed that the cuts would not require additional monetary tightening. In practice, therefore, the independence and transparency inherent in the inflation targeting framework empower a central bank to check the impulses of elected officials who might seek to manipulate monetary policy for political advantage.

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<sup>34</sup> Brash, 2002

### *3.2 Lessons of New Zealand's Transition*

The RBNZ began its progress toward “flexible inflation targeting” with its first formal PTA in 1988, which simply expressed a range of 0-2 percent to be undertaken in 1990 and achieved by late 1992. The second PTA revised this deadline outward to 1993; it also further defined “underlying inflation” as a variant of the CPI excluding “caveatable items,” which are those that are found to be either exogenous or too volatile to be used effectively in monetary policy designed for the whole economy. The early years of the new regime, however, were actually quite strict rather than flexible, and the RBNZ deliberately ignored unemployment increases to demonstrate its singular commitment to price stability. Public faith in price stability was a major obstacle because of years of failed promises by the government to control inflation. In 1989, price stability was first legislated as the single mandate for the central bank in conducting monetary policy. This naturally resulted from the acknowledgment that the only lasting contribution a central bank can make to sustaining economic growth is the maintenance of low inflation; in the long run, market forces will bring output and unemployment toward their natural level, but the impact of monetary policy on the price level will remain.

One unusual point about the RBNZ is its decision-making hierarchy. While the central bank's structure contains a Monetary Policy Committee (analogous to the Federal Open Market Committee) as well as a governing Board, in practice it is



only the Governor who makes significant policy decisions. This rare practice is currently only shared by the central banks of Canada and Israel. While this concern has repeatedly been the subject of discussion for the government of New Zealand, it has yet to be altered. The reason for this reluctance to act is that the inflation targeting framework compensates for the downside risk of having such an extremely centralized policymaking authority. The accountability for monetary policy and the increased roles of communication and transparency serve to mitigate the risks of incompetent or self-interested policy devised by the RBNZ's Governor. Public scrutiny and analysis of decisions would, therefore, expose any abuses by an autocratic policymaker.

The RBNZ learned quickly after adopting inflation targeting that credibility with the public could, to an extent, allow them to enact policy decisions without any formal action from the central bank. In fact, the existence of the target and the public's perception of the central bank's achievement for committing it were usually enough to invoke the necessary adjustment toward the inflation rate. This acknowledgment that the RBNZ would stand ready to adjust settlement cash in the economy has been effectively received in the capital markets, where investors now base their decisions upon inflation expectations consistent with the target. When credibility alone was not sufficient, "open-mouth operations" were often employed. These are public statements by central bank officials that give direction to the inflation expectations of the public. Open-mouth operations are not performed to

warn the public against future risks; they are performed to incite the public to behave in a manner consistent with the central bank's goals. As the RBNZ continued to develop its understanding of the inflation process in its new framework, the time horizon used in its forecasting methodology shifted outward from the direct price effects of nominal exchange rate movements to the comparatively intermediate-term effects of the real exchange and real interest rates on inflation through the output gap.<sup>35</sup>

However, the RBNZ still, at this time, employed a fairly lax array of controls over monetary policy. It continued to target quantities of settlement cash (a monetary aggregate), and its "open-mouth operations" would spiral out of control indefinitely unless it issued another proclamation several days later that inflation was once again within its target range. This is because the RBNZ could do a fine job communicating a general policy direction to the public, but it had no way of communicating how much change was enough. Over time, this combination of outmoded methods and reliance on public action led to widespread sentiment that the RBNZ lacked definite direction. The general public began to fear that the RBNZ

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<sup>35</sup> The output gap defines the magnitude of the distance between the actual level of GDP in the economy and the natural level, where unemployment is optimal (however always non-zero) and sustainable output is maximized. A positive gap generates excess inflation, while a negative gap is marked by stagnant economic growth.

had put into practice a price floor<sup>36</sup> on the New Zealand dollar in order to maintain the exchange rate within a “comfortable” range.<sup>37</sup>

In June of 1997, as a response to this crisis of confidence, the central bank began to express its open mouth operations in terms of a Monetary Conditions Index (“MCI”), which held a movement of 100 BPs in 90-day interest rates to be equivalent to a 2 percent movement in the trade-weighted<sup>38</sup> measure of the exchange rate.<sup>39</sup> While this move was not a total revolution of policy, it did convince the public that price stability based on inflation was the sole priority of monetary policy and that it was not pursuing a secret exchange rate targeting policy. The RBNZ, which formerly had no way of communicating a magnitude of desired effect to the public (they could only recommend a general direction of tightening or loosening), now had its first quantitative means of doing so. Decision-makers could now consult the exchange rate and the MCI to discover whether the appropriate level of public response had already been achieved. If it had not, an idea of how far conditions lay from target could also be reasonably ascertained.

Shortly after its initiation, the MCI became discredited as a result of the Asian crisis, which caused a decline in demand for New Zealand’s exports. This translated

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<sup>36</sup> A level below which the central bank would not permit the dollar to decline.

<sup>37</sup> Brash, 2002

<sup>38</sup> Adjusted for the balance of imports and exports in New Zealand.

<sup>39</sup> Brash, 2002

into a dramatic decline in the exchange rate of the New Zealand dollar,<sup>40</sup> and this effect was initially underestimated by the RBNZ. As a result, the MCI was reduced far too gradually for a time, and a sharp adjustment to the 90-day interest rates suddenly became necessary to offset the decline of the exchange rate. This likely intensified the short and shallow recession which existed in New Zealand during the second half of 1997 and into early 1998. However, the observation that the recession was largely contained through a focus on price stability lends credit to the RBNZ's inflation targeting framework. A more severe or protracted recession could have proven ruinous both for the economy and for the central bank's reputation.

The RBNZ consequently relaxed its "comfort zone" for the MCI in the second half of 1998. In March of 1999, reliance on monetary aggregates was finally swept away as part of a more conventional implementation routine. The quantity target for settlement cash was abandoned, and so was the use of the MCI. In its place, New Zealand moved to terms of an Official Cash Rate ("OCR"), which sought to maintain the interest rate on overnight money<sup>41</sup> within a range of 25 BPs above or below the target rate. This change brings it more into line with common international practices.

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<sup>40</sup> Everything else held constant, a decrease in demand from abroad for a country's exports will also cause demand for its currency to decline, thus decreasing its exchange rate.

<sup>41</sup> "Overnight money" refers to the interest rates offered by banks lending to other banks through the central bank and is a fairly commonly-used indicator for the overall interest rate. In the United States, this is referred to as the Federal Funds Rate ("FFR"), and policy decisions are expressed in terms of this rate.

*3.3 Global Trends in Monetary Policy*

New Zealand is not alone in the experiment of inflation targeting. Since it began the first inflation targeting regime, other countries have followed suit. Inflation targeting countries generally begin with inflation reduction targets, and these are replaced by inflation control targets.<sup>42</sup> However, no two inflation targeting central banks observe an identical framework, and each has a style based on the needs and preferences of its respective country. The following table compares the initial legislative mandates for several of these central banks.

*Enacting Legislation of Inflation Targeting Central Banks*

<u>Country</u>	<u>Time of Adoption</u>	<u>Target Rate</u>
<i>New Zealand</i>	<i>March, 1990</i>	<i>0-2%</i>
<b>Canada</b>	February, 1991	1-3%
<b>Israel</b>	December, 1991	8-11%
<b>The United Kingdom</b>	1992	2.5% or less
<b>Sweden</b>	January, 1993	1-3%
<b>Finland</b>	February, 1993	About 2%
<b>Australia</b>	1993	2-3%
<b>Spain</b>	January, 1995	Below 3%

Source: Bernanke and Mishkin, 1997

<sup>42</sup> Siklos, 2002

There is virtually no goal autonomy for an inflation targeting central bank, but this has not been the direct effect of legislation in all cases. Often the adoption of inflation targeting has predated formal legal codification.<sup>43</sup> In developing countries, legislation was first passed to alter the structure of the bank itself in order to improve independence and credibility in preparation for inflation targeting. Some Latin American and newer European Union countries reflect regional tradition or a history of inflation by making the central bank's objective a constitutional provision. Some countries opt instead for currency stability, which includes both domestic price stability and exchange rate stability. Hungary and New Zealand, for example, have formally prioritized domestic price stability over exchange rate stability, but both are still viewed as desirable objectives.

Central banks worldwide are largely bereft of target autonomy as well.<sup>44</sup> The target is a quantitative policy interpretation of a goal. For the objective of price stability, a target might be a specific range for the inflation rate as measured by the 12-month movement of the core CPI. Monetary policy targets generally are determined by the government alone or jointly between the government and the central bank. Emerging market countries fare a little better in terms of target autonomy. The central banks of Brazil, Chile, Colombia, the Czech Republic, Peru, Poland, and Thailand allow the central bank's board of governors to set the inflation

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<sup>43</sup> Tuladhar, 2005

<sup>44</sup> Ibid.

target. However, the elected governments of Thailand and Columbia have some presence and influence over board decisions. The additional statutory independence in these countries is likely due to a history plagued by the monetization of deficits.

#### **4. Evaluation and Conclusions**

##### *4.1 The Post-War Evolution of American Monetary Policy*

The Federal Reserve Act of 1913 created the Federal Reserve, which is the central bank of the United States. A touch of federalism is present in its organizational structure; there are 12 Federal Reserve District Banks, each with its own management and governor, spread throughout the United States. Combined, they form the Federal Reserve System, which is overseen by the Board of Governors. There are matters on which these District Banks may act independently, such as discount rate<sup>45</sup> policy on loans to banks. However, open market operations are decided by the Federal Open Market Committee (“FOMC”),<sup>46</sup> which is led by the Chairman of the Board of Governors. Dissent in FOMC voting is rare, and the decisions of the Chairman are generally upheld unanimously. For this reason, the

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<sup>45</sup> “Discount rate” refers to the interest rate at which creditworthy banks may borrow reserves from a Federal Reserve District Bank.

<sup>46</sup> This committee was not added until the 1930’s, when more was known about open-market operations.

philosophy of the Chairman has a tremendous impact on the policy actions of the Federal Reserve.

In the United States after World War II, the first major period of monetary policy pursued by the Federal Reserve came to be known as “go/stop,” which began in the late 1950’s and endured until the late 1970’s<sup>47</sup>. It was characterized by sudden and violent swings above and below the natural level of output. Fear of reliving the Great Depression supported this policy, which inherently promoted high inflation. The “go” phase occurred when the Federal Reserve consistently pursued expansionary policies, which inject reserves into the system and fuel inflation. The promise of a coming expansion encouraged spending, and this hastened the arrival of that expansion. Anticipation by the public that the Federal Reserve would begin increasing the money supply caused the upward adjustment in prices and wages to occur immediately- long before the delayed effect of the bank’s action actually impacted them. When it finally did, the surge in the price level was severe.

Since the Federal Reserve during this time did not have the methods and experience to adequately forecast inflation, it waited until inflation was noticeably above that of the previous go/stop cycle. Once inflation was well above past levels, the Federal Reserve initiated the “stop” phase, where it stamped out the fire under the economy through aggressive monetary tightening. Whereas the “go” phase

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<sup>47</sup> Bernanke and Woodford, 2005



improved employment and output at the expense of high inflation, the “stop” phase combated inflation but created a negative output gap. The public, now anticipating tighter economic policy and a potential recession in the future, spent less in advance. This reduction in spending accomplished the ends of the “stop” phase without any actual “stop” action from the Federal Reserve. Inflation was now reduced, but so were output and employment. By the time the Federal Reserve was able to identify an unacceptable negative output gap and switch back to “go” policy, the recession had worsened far more than was necessary. The repetition of this two-step pattern caused a periodic vacillation between stagnant growth and runaway inflation. The lasting result was a dramatic increase in the general price level during the period as well as wildly varying output gaps with frequent recessions.

The poor experience of developed countries (including the United States) in the 1970s signaled that monetary policy was inadequate to simultaneously achieve low, stable inflation and healthy economic performance<sup>48</sup>. Desperation led to attempts of “moral suasion,” where the central bank tried to convince certain groups such as banks to change their behavior to suit the interests of the Federal Reserve in achieving its goals. Common sense and history agree here; this was neither effective nor reliable. Disappointing inflation and economic performance led to the realization that the central bank should be far more than just a lender of last

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<sup>48</sup> Bernanke and Woodford, 2005

resort<sup>49</sup>. With this came the emergence of public interest in communication from the central bank about policy decisions.

A second distinct era in post-war American monetary policy was that of Paul Volcker's tenure as Chairman of the Federal Reserve's Board of Governors. He inherited from go-stop the unfortunate legacy of a partial commitment to output stabilization, and the public was used to repeating cycles of inflation and recession. One of the first steps toward a single focus on price stability was Volcker's acknowledgment of the difficulty of fighting high inflation once it had already begun<sup>50</sup>. A lack of credibility with the public for fighting inflation rendered many policies ineffective. Furthermore, the large adjustments that were needed confused the public, and this further hindered the Federal Reserve's ability to anticipate public reactions. Volcker appreciated the need to repair the credibility of the Federal Reserve for achieving price stability, so during 1983 and 1984, Volcker defied public opinion and refused to reduce interest rates. His policy kept inflation under control, and there was no accompanying decline in employment or output.

Credibility problems can lead to "inflation scares," which are characterized by a spike in long-term interest rates signaling increased expectations for long-term inflation. The United States was experiencing an inflation scare when Greenspan

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<sup>49</sup> The "lender of last resort" function of central banks refers to the central bank's supplying of reserves to banks during liquidity (cash demand) crises.

<sup>50</sup> Bernanke and Woodford, 2005

replaced Volcker as Chairman in the summer of 1987; this marked the beginning of a third major post-war era in monetary policy. Greenspan could not pursue monetary tightening because of the October 1987 Stock Market Crash, which actually prompted expansionary monetary policy. The Federal Reserve waited until spring of 1988 to begin raising target interest rates, and long-term bond interest rates did not come down to their early 1987 levels until 1992. It can therefore be inferred from the bond rates that the inflation scare took five years to properly handle.

An increase in the target federal funds rate of 300 BPs between February of 1994 and 1995 was the Greenspan Federal Reserve's first preemptive policy against inflation. Despite the immediate absence of an inflation-generating expansionary gap, Greenspan's Federal Reserve used improved forecasting methods to not only detect the coming danger but also to devise appropriate counter-cyclical<sup>51</sup> policy to stop it. Holding steady against inflation led in 1996 to a very low long-term bond rate (6%) and talks of the "death of inflation"<sup>52</sup> Between 1996 and 1999, high GDP growth of about 4% annually coincided with constant price stability. While productivity increases during these years probably contributed to this outcome, the public still gave the Federal Reserve credit for strong growth with low inflation.

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<sup>51</sup> Against the direction of the "business cycle," which describes the frictional movements of the economy above and below the natural levels of output and unemployment.

<sup>52</sup> Bernanke and Woodford, 2005

Congressional testimony by Greenspan in 1989 advocated a “qualitative zero-inflation objective” for the Federal Reserve. This means that the expectation of increases in the general price level will cease to be relevant to economic decision-making. It also resembles inflation targeting, and this was a milestone on the way to an explicit priority for low inflation. Studies of the Federal Reserve from the mid-1990’s through the end of Greenspan’s administration suggest that an implicit target range of 1-2% was pursued.<sup>53</sup> At the same time, the Federal Reserve’s excellent credibility for price stability allowed the exercise of flexibility; interest rates were drastically cut in 2001 to avert a predicted recession. A gradual, almost reluctant increase in transparency with the public about monetary policy began in 1994 with the first formal announcement of the target for the federal funds rate. The steady rate of increased transparency in subsequent years is undoubtedly related to Greenspan’s evolving acceptance of transparency during his term as Chairman. Greenspan’s initial reluctance may have paid dividends in the form of a smooth transition; gradual enhancements of transparency may have been more palatable for the general public.

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<sup>53</sup> Bernanke and Woodford, 2005

#### *4.2 Conclusions*

Greenspan, whose success in anticipating and responding to economic events has attained almost mythological status, no longer runs the Federal Reserve. In times of less economic stability, activist leadership at the Federal Reserve may have been beneficial, but this is no longer the case. It is far wiser to invest in institutional stability than to rely on virtuosic leadership; the talents of the central banker cannot be passed to successors, but a legislated policy framework most certainly can. It may not be ignored that the Federal Reserve under Greenspan demonstrated virtually all of the quantitative and qualitative measures associated with inflation targeting. The fact that little or no initial policy action would be needed to make the transition is an enormous advantage with which very few central banks have been presented. Congress and the Federal Reserve should take this relatively cost-free opportunity to join this overwhelmingly beneficial global evolution in monetary policy.

The transition to inflation targeting will solidify the Federal Reserve's credibility for price stability. There is no guarantee how long this public goodwill will endure in the Bernanke administration. The position of Chairman remains an appointed position of the elected government, and without any formal dedication to price stability, this subjects an entire modern economy to the monetary philosophy

of one person. Such autarky and potential for abuse is out of place in monetary policy and democracy itself.

There are benefits of having Inflation targeting as a model for monetary policy worldwide. The overwhelming success of inflation targeting countries not only in the explicit goal of price stability but also in output level and variability cannot be emphasized strongly enough. It is also apparent that the concomitant gains in independence, experience, accountability, and transparency associated with undertaking an inflation targeting regime achieve rapid and significant benefits. In experience, the gains due to inflation targeting are achieved without any sacrifice to economic health. Inflation targeting therefore maximizes the central bank's ability to pursue its most worthwhile objective and provides assurance to the public of continued price stability.

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