

## **Modern Central Banking: an Academic's Perspective**

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### **Introduction**

I would like to thank the Central Bank of Armenia for inviting me to share in this celebration of the 110<sup>th</sup> anniversary of the State Bank in Armenia and the 10<sup>th</sup> anniversary of the dram. A currency can be an important symbol of national identity. But in introducing a national currency, a government also becomes responsible for ensuring its value. This responsibility has long been recognized. For instance, in 1839, while still a member of the legislative assembly in the state of Illinois, the future American president Abraham Lincoln said of government that "...no duty is more imperative on that government, than the duty it owes the people, of furnishing them a sound and uniform currency." Modern central banking is about fulfilling this duty.

While the title of my talk, modern central banking: an academic's perspective, suggests a focus on the present and possibly future directions for central banks, birthday celebrations provide appropriate occasions for both looking back and looking forward. I will try to do a little of both in my remarks today. Let me also add that, while my perspective is that of an economist from a developed economy, one of the most interesting developments over the past decade is has been the convergence of monetary policy strategies among central banks in both developed and developing economies.

There are two distinct perspectives in the literature on central banking, each offering its own focus on the roles and responsibilities of a central bank. One perspective, and the one that will form the chief focus on my discussion today, emphasizes the role of the central bank in providing a nominal anchor for the economy.

A second perspective, however, emphasizes the role of a central bank in ensuring domestic financial stability. The critical role for the central bank, from this perspective, is its ability to serve as a lender of last resort, thereby reducing or even preventing banking and financial crises. My focus on inflation should not be taken to minimize the importance of this second perspective; a strong and stable financial system is also a key pre-requisite for macro stability and successful monetary policy. In fact, financial sector problems have been at the heart of many if not most macroeconomic crises. Weak banks and/or other financial institutions have played critical roles in the prolonged depression of the 1930s in the US, Japan's lost decade, and the numerous financial crises that have hit developing economies over the past decade.

Let me now look backward. Over the past 20 years, central banks have much to be proud of. World CPI inflation declined from an average annual rate of 14% in 1980-84 to just 4% in 2000-2003, and this improvement occurred in both developed and developing economies, in Africa, Asia, Latin America, and among industrial and transitional economies (Rogoff 2003). Figure 1 shows median CPI inflation for developing and developed economies. For the developed economies, the 1980s witnessed a general disinflation, with generally low rates of inflation maintained since the early 1990s. For the developing economies, the success against inflation occurred about a decade later. If we focus on the period since 1990, the decline in inflation among developing economies stands out clearly, although the level has yet to reach that achieved among developed economies.

Some of the successes against inflation have been quite dramatic. Inflation averaged 232% in Latin America during 1990-1994; it has averaged just 8% in 2000-2003. In the transition economies, the comparable figures are even more startling (see Figures 2) -- during 1990-1994 inflation averaged 363%; it has averaged just 14.5% in the recent period. (Rogoff 2003) Armenia's experience reflects an extreme version of this general success story. After rising from 5.6% in 1990 to over 5000% in 1994, Armenia has had an average inflation rate of around 3% during the past three years.

While the process of disinflation has unique aspects in every country, the global decline in inflation hints of common factors. I would like to focus on three quite broad aspects of

modern central banking that have played a role in the successful fight against inflation. First, central banks throughout the world have, in recent years, clarified the objectives of monetary policy. Second, they have either adopted new institutional structures for the conduct of policy or reformed existing institutions. These institutional changes have all shared a common objective – to promote the credibility of low inflation policies. And third, many central banks have adopted inflation targeting as their strategy for implementing monetary policy. These changes have served to aid the achievement and maintenance of low inflation.

But before discussing these aspects of modern central banking in more detail, I would like to review what the last thirty years has taught us about the causes of inflation.

### **The causes of inflation**

Milton Friedman famously stated that “inflation is always and everywhere a monetary phenomenon.” This is certainly true if one simply means high inflation and high money growth go together. Figure 3 shows average rates of inflation from 1960 to 1990 for 110 countries plotted against average rates of money growth. The strong positive relationship is quite apparent.

But Friedman's statement is not very helpful in understanding *why* at some times and in some places money growth has been high, and in other times and places it has been low. Correlation does not establish causation.

To investigate causation, it is useful to begin with the three factors that modern economic theory points to as direct determinants of inflation: expectations, a “gap” measure that summarizes the effects of cyclical factors on inflation, and shocks. Now none of these are independent – shocks to inflation may and probably will affect expectations of future inflation, and *none can generate sustained inflation without the accommodation of monetary policy* – but still they provide a means of organizing a discussion of the causes of inflation. And each channel has yielded important lessons for modern central banks.

*Expectations*

Since Milton Friedman's presidential address to the American Economic Association in 1968, economists have been aware of the important role inflation expectations play in determining actual inflation. Inflation expectations affect the wage and price setting pattern in the private economy, thereby directly affecting the actual rate of inflation, making expectations central to most modern discussions of inflation.

Because fluctuations in the expected inflation rate will cause swings in actual inflation, low and stable inflation can only be maintained if the public's expectations are firmly anchored. Recent research has emphasized how the failure of monetary policy to react sufficiently strongly to inflation can lead to self-fulfilling expectational equilibria in which any shift in expected inflation pushes the economy to a new inflationary equilibrium. Essentially the economy has no nominal anchor to secure the rate of inflation. So lesson 1 is that central banks need to ensure the economy has a nominal anchor.

It is the role of the central bank to provide this nominal anchor, although there are many ways this can be done, from flexible inflation targeting to a fixed exchange rate to a currency board or monetary union. If monetary policy is implemented via an interest rate rule, reacting sufficiently strongly to inflation can rule out these self-fulfilling equilibria – the nominal interest rate needs to move more than one-for-one with inflation. This strong response of interest rates to inflation is sometimes referred to as the Taylor Principle, after John Taylor of Stanford and the US Treasury.

While the evidence for industrialized economies since the mid-1980s is consistent with central banks obeying the Taylor principle, some research has suggested that the US Federal Reserve's behavior violated the Taylor principle during the 1960s and 1970s. Thus, one possible explanation for what is sometimes called in the US the "Great Inflation" of the 1970s lays the blame squarely at the Fed's feet – it failed to provide a secure nominal anchor.

There are several reasons, however, to doubt this explanation. Let me mention two. The evidence that the Fed failed to react sufficiently to inflation ignores the more important role

money played in policy decisions during the 1970s. A weak response to inflation *can* be sufficient to ensure a nominal anchor if the central bank is also reacting to the money supply. Controlling the money supply is a direct way to provide a nominal anchor. Second, if one uses real-time data to estimate Fed behavior, rather than the final data now available, the evidence suggests the Fed did react sufficiently to inflation (Perez 2001).

While this means that pure, expectationally-driven inflation bubbles do not seem likely as an explanation for inflation in the 1970s, at least in countries such as the US, that does not mean that expectations aren't important. In fact, the role of the other two factors affecting inflation – the business cycle and shocks – depends critically on how expectations adjust.

The emphasis on expectations has yielded a second extremely important lesson for monetary policy and central banking. Credibility matters! A credible policy of low inflation anchors expectations, and, as a consequence, a central bank that has established its credibility for maintaining low and stable inflation is much better able to achieve the other objectives that it may wish to pursue – such as limiting real macroeconomic fluctuations.

### *Cyclical factors*

This brings me to the second factor affecting inflation – cyclical factors by which I mean movements of real output relative to some benchmark level. Recent theory suggests this benchmark level should be the path of output in the absence of any nominal rigidities. In practice, it is an estimate of trend or potential output. What is critical here is the definition of the appropriate benchmark for economic activity. Properly defined, the resulting gap averages to zero – it is not subject to permanent manipulation by the central bank, and, in the absence of effects on expectations, it cannot lead to permanent changes in the average inflation rate.

For central banks, cyclical factors play a dual role. First, because monetary policy acts with “long and variable lags,” to again quote Milton Friedman, and because cyclical factors can affect inflation, a central bank concerned with keeping inflation low and stable will need to monitor cyclical developments and react to them. But there is a second reason that cyclical factors are of concern to central banks. Reducing short-run fluctuations in the real economy is

something monetary policy *can* do, and it is something it *should* do. The state of the business cycle is of legitimate concern as an objective of monetary policy.

In practice, however, the short-run relationship between cyclical fluctuations and inflation has been the source of sustained periods of inflation. The possibility to expand output in the short-run, albeit at some cost in terms of inflation, may induce central banks to engage in overly expansionary policies. As the public comes to expect such actions, the net result is higher inflation without any permanent gain in output or reduction in unemployment. This problem, provided its classic formulation by Robert Barro and David Gordon in the early 1980s, arises when the central bank's goal for unemployment or output is unrealistically ambitious (Barro and Gordon 1983).

In addition, central banks have often focused on measures of real economic activity that are either incorrectly defined or incorrectly measured. Recent academic research has emphasized that, in the face of real shocks, completely stabilizing output (or employment) around some trend level is not efficient. Expressed alternatively, the benchmark level of output around which actual output should be stabilized is not constant, nor does it simply grow at a constant rate over time. Unfortunately, this fluctuating, efficient output level is not observable, so central banks face the difficult task of trying to estimate a target that is not only unobserved but constantly moving.

I have already mentioned one explanation for the run up in inflation beginning in the 1970s, an explanation based on the role of expectations. A second explanation focuses on the difficulties central banks face in measuring the level of productivity growth (Orphanides 2003). The 1970s saw a slowdown in productivity growth. The Federal Reserve, along with just about everyone else at the time, failed initially to recognize this slowdown. As a consequence, the Fed overestimated trend output and therefore thought the output gap was negative. The policies it implemented were too expansionary and this helped fuel the Great Inflation.

The reverse situation occurred in the 1990s – productivity growth increased. Because the Fed recognized that its objective was to stabilize the output gap, and not simply to stabilize output, it allowed an increase in growth so long as inflation did not seem to be heating up. At the time, however, there was considerable debate over whether the rapid real growth was a reflection of increased productivity growth or a harbinger of future inflation.

The problems of measuring the cyclical contribution to inflation must be of particular concern for the transition economies. If it is difficult for policy makers in the US to correctly estimate shifts in productivity growth and to estimate the underlying equilibrium level of output, these difficulties pale in comparison with the problems faced by transition economies undergoing tremendous structural change.

So what lessons can we draw from this consideration of cyclical factors? I think three are most important. First, central banks need to avoid overly optimistic targets. Second, they need to recognize that they have only short-run and not permanent or long-run effects on real economic variables. Finally, they need to recognize that not all fluctuations should be stabilized. Perhaps the best way to summarize these lessons is to simply say that central banks need to focus on achievable real objectives. Whether expressed in terms of output, unemployment, growth rates, or any other real variable, stabilization policy needs to be defined in terms of *gaps*.

### *Shocks*

The third factor affecting inflation is the catch all “shocks.” Whether called cost shocks or supply shocks, these represent factors that have effects on inflation that are conceptually independent of cyclical factors and expectations. If we look again at the historical record illustrated in Figure 1, the oil shocks of the 1970s clearly stand out as peaks in the inflation rate among both developed and developing economies. The breakup of the former Soviet Union was a huge economic shock to the countries affected. Terms of trade shocks are important. Fiscal shocks are too.

In thinking about the effects of shocks on inflation, two questions naturally arise. Why do shocks that should, in principle, represent one-off shocks to the *price level*, lead to persistent movements in the rate of inflation? And is the inflationary response to shocks the sign of bad monetary policy or is it a sign of good monetary policy?

Optimal monetary policy requires that a positive price shock be (partially) offset by a contractionary policy. That is, it calls for the central bank to deliberately slow the economy down, generating a rise in unemployment. This helps to moderate the rise in inflation, but it is still optimal to let inflation increase somewhat. The credibility of the central bank's policy is clearly important here – otherwise even allowing a temporary rise in inflation may risk a rise in the future inflation rate expected by the public. If the central bank is perceived as unwilling to impose a contraction, then the shock will lead to expectations of higher inflation and can lead the economy to a new, permanently higher inflation rate.

Here again expectations play a critical role. And so does credibility. If credibility can anchor the public's expectations – if they have enough confidence in the central bank to understand that any rise in inflation will be transitory in nature – then the ability of the central bank to help offset shocks and stabilize the economy is enhanced. The public will recognize that a rise in inflation following a price shock is a sign of good monetary policy, and that the rise will be temporary in nature.

So another lesson is that inflation needs to fluctuate in response to shocks, but credibility is critical for keeping these effects short lived and minimizing their real effects.

### **What solved the inflation problem?**

If expectations, cyclical factors, and shocks are the proximate determinants of inflation, what accounts for the decline in world inflation?

Among central bankers in developed economies – or at least among Fed policy makers in the US – the leading explanation seems to be good policy. Central banks have learned that they need to deliver low inflation, so they have. Or, to slightly misquote Ben McCallum, “they

have just done it.” They have accepted the natural rate hypothesis – that monetary policy has no long-run real effects on output or unemployment – and have therefore concentrated on ensuring inflation, which they can control, remains low. By anchoring expectations, central banks have been able to keep inflation low and stable, even in the face of cyclical fluctuations and economic shocks.

Of course, by accepting the credit for reducing inflation, central bankers must also accept the blame for letting inflation reach undesired levels in the 1970s and 1980s. The costs of lowering inflation has, however, served to reinforce in central banker's minds the importance of focusing on average inflation as the one thing that monetary policy can definitely determine.

Let me mention, however, two alternative hypotheses that do not give such a central role to the well-designed policies of central banks.

The first hypothesis locates the success against inflation in good luck and not good monetary policy. In particular, the argument is made that the last decade has seen an absence of the type of inflation shocks that drove inflation to high levels in the 1970s among oil importing countries. Jim Stock of Harvard and Mark Watson of Princeton made this argument at the recent Jackson Hole Conference sponsored by the Kansas City Fed. Their empirical work found little role for the Fed's policies in accounting for the macro stability of the 1990s (Stock and Watson 2003). Instead, they attributed it primarily to the absence of shocks. Not surprisingly, the Fed representatives at the conference, including Alan Greenspan, disputed that interpretation, arguing in part that it only looks as if there were an absence of shocks because the Fed was doing a good job.

The shock story is certainly relevant for understanding the behavior of inflation in the transition economies. Market reforms and the removal of price controls led to a one-time price level shock. In fact, the sharp run up in inflation, but also its temporary nature are similar to what we have seen in many other countries in times of war or other major upheavals. These periods are generally associated with the role of inflation as a source of revenue rather than

with the types of short-run macro stabilization policies that the recent central banking literature tends to emphasize. The fiscal or revenue aspects of inflation are a topic to which I will return.

The second hypothesis is that inflation is the result of an inflationary bias of discretionary policy – that is, the Barro-Gordon story is correct – but inflation has come down simply because the incentives for inflation have fallen. The incentive for expansions comes from the gap between the economy's efficient level of output and its normal equilibrium level. This gap introduces an incentive for the central bank to try to boost output. Since it cannot systematically raise equilibrium output, inflation is the inevitable result of attempts to do so.

One reason inflation might fall, then, is that this gap has declined. In fact, Ken Rogoff (2003) has argued that increasing globalization has reduced the gap by leading to increased competition. Increased competition reduces the efficiency loss due to monopoly power and imperfect competition. With the efficiency gap smaller, the central bank's incentive to expand output is smaller; as a result, average inflation falls.<sup>1</sup>

Under this story, it is not the enlightened ability of central bankers to resist the temptation to inflate that is at work in explaining the decline in inflation. Instead, the temptation has simply fallen.

One implication of this story is that should the temptation rise in the future, we will be right back in the high inflation environment of the past.<sup>2</sup>

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<sup>1</sup> To quote Rogoff, "In layman's terms, an increased level of competition in the economy – due either to globalization or deregulation – not only lowers real prices of goods, but helps coordinate a lower inflation equilibrium in the economy as well."

<sup>2</sup> A related hypothesis for the US argues that the rise in inflation during the 1970s was the result of a rise in the natural rate of unemployment that increased the gap between the equilibrium unemployment rate and policy maker's target unemployment rate (Ireland 1999). The natural rate of unemployment then declined during the 1980s in the US and this accounts for the fall in inflation. Thus, this story, like Rogoff's, argues simply that the incentives to engage in inflationary policies have fallen in recent years rather than that central bankers are now able to resist the temptations provided by discretionary policies.

### **Gaining credibility**

I have reviewed some of the causes of inflation, and some of the reasons for inflation's decline. In reviewing the lessons we can draw from this discussion, the first, and most important one, is that credibility is crucial. When the public is confident that a low inflation environment will be maintained, wage and price setting behavior reflects expectations of low inflation.

In American, real estate agents have a saying. The three most important things for determining the value of a house are location, location, and location. Perhaps something similar applies to central banks – the three most important ingredients to a successful monetary policy are credibility, credibility, and credibility.

Credibility is a necessary precondition for fulfilling a primary responsibility of monetary policy, that of providing a nominal anchor. Even institutional frameworks and policy procedures that, in principle, serve to provide a nominal anchor – like a fixed exchange rate or a currency board – will not succeed if they are not credible.

Credibility is important, but how is it obtained? Unfortunately, the empirical evidence supports the proposition that there are no quick and easy ways to gain credibility. Instead, it must be earned. Announcements not supported by consistent policy actions are not credible.

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How plausible is this story? It is difficult to say. Inflation declined during the 1980s in Europe even though the level of unemployment rose significantly. While there was a great deal of debate over whether this rise was cyclical or structural, it seems that it must have reflected, at least in part, a rise in the natural rate of unemployment. This story would argue that the rising unemployment in Europe should have been associated with a rise in inflation rate rather than the decline actually experienced.

A final variant suggests the US Fed did not have an unrealistic target for unemployment; instead, it had asymmetric preferences, willing to act more strongly to prevent unemployment increases than counteract unemployment declines. The asymmetry produced a positive bias towards expansions and inflation (Ruge-Murcia 2003). There does seem to be some empirical evidence for such asymmetric preferences producing a bias towards expansion. The reverse argument has been made for some inflation targeting central banks – they prefer to undershoot their target than overshoot it. In this case, the asymmetry lends a contractionary bias to average policy.

Fortunately, there seem to be some explicit actions that governments and central banks can undertake that help to build credibility and that aid in maintaining it. We can distinguish between two approaches to institutionalizing a credible, low inflation policy. The first approach involves delegating monetary policy to an independence central bank with a clear mandate to maintain price stability. The second involves delegating monetary policy to another country via a fixed exchange rate, a currency board, or a monetary union.

The first approach has been widely followed among both developed and developing economies. The last 15 years has seen wide-spread reforms of monetary policy making institutions, all designed to promote longer term economic stability by controlling inflation.

My own interest in central banking reforms and institutional structures grew out the experience of being in New Zealand as a Fulbright Scholar during 1990, just as the 1989 Reserve Bank Act was being implemented. In talking to people about New Zealand's reforms, it struck me that the government was essentially structuring a contract between itself and the Reserve Bank. That got me thinking about what such a contract should look like – what was an optimal central bank contract? It turns out that such a contract is quite straightforward, linking the bank's incentives to the realized rate of inflation (Walsh 1995a). Lars Svensson then showed that the optimal contract I had derived could be implemented by assigning the central bank an inflation target (Svensson 1997). This research then formed the academic foundations for the development of inflation targeting, a form of policy I will return to in a moment.<sup>3</sup>

The most significant of recent institutional changes affecting monetary policy is the increasing prevalence of central bank independence. Countries with widely differing economies and backgrounds have reformed their central bank institutions to grant them

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<sup>3</sup> Inflation targeting is often interpreted as the practice implementation of Rogoff's conservative central banker (Rogoff 1985). However, Rogoff showed that a conservative central banker who reduced the inflationary bias of discretionary policy does so at the cost of increased output variability. However, advocates of inflation targeting generally feel that inflation can be maintained at low levels without any deterioration in the ability of the central bank to contribute to output stability, a view supported by the contracting approach.

greater independence in the conduct of monetary policy. These changes have been driven by the acceptance that political influence over monetary policy leads to excessive inflation while failing to produce more stable real economic activity. An extensive empirical literature developed that documented the negative correlation between average inflation and various measures of central bank independence among developed economies (see Cukierman 1992).

This empirical work, however, generally failed to find much relationship between inflation and central bank independence among developing economies. In part, this absence may reflect a failure of the constructed indices to fully capture the actual relationships between central banks and governments in developing economies. For this reason, measures of central banker turnover are often used as a proxy for political interference in monetary policy, with higher turnover found to be associated with higher average inflation (Cukierman 1992). Yet this interpretation is certainly debatable. High levels of turnover may be caused by high inflation – a failure to control inflation leading to central banker turnover, or high turnover may simply reflect more general political instability in a country.

Despite doubts over the causal link between central bank independence and low inflation (Posen 1993), independence is seen today as one of the key components of “best practices” in central banking. However, independence is multidimensional. And while there seems to be wide agreement that central banks should have instrument independence -- the independence to conduct policy to achieve stated goals -- there is less agreement over the desirability of goal independence -- the ability of the central bank itself to define its operational goals.

For example, in the case of New Zealand, the Policy Targets Agreement (PTA) between the government and the Reserve Bank Governor is a formal document that establishes numerical targets ranges for inflation. The Reserve Bank, however, has discretion in choosing the price index used to calculate the inflation rate. In the EU, the ECB is assigned the goal of price stability but has great freedom in translating this into an operational goal. In the U.K., the government sets the inflation target; the Bank of England is responsible for achieving it. In the U.S., the Congress defines the broad goals of monetary policy but it is left to the Fed to translate these into operational goals.

While the details of institutional reform have varied across countries, the general thrust of the reforms has been to promote credibility by incorporating three broad objectives. First, the policy framework must ensure the economy has a nominal anchor. This is achieved by establishing price stability as the primary objective of monetary policy.

Second, the policy framework should be transparent. Transparency reflects the ease and clarity with which the public is able to assess the central bank's success in achieving its policy objectives. Finally, the policy framework should contain mechanisms to promote accountability. These last two characteristics are related, as a policy that is not transparent is also unlikely to contain adequate measures for accountability. Economists have long recognized the need for a nominal anchor. Transparency and accountability have emerged as important properties only in recent years.

The reforms in New Zealand provide a good example of a reform that aimed to promote all three characteristics of policy. The central bank was formally assigned responsibility for ensuring a nominal anchor by making price stability its sole task. Transparency was promoted through the public announcement of the inflation target contained in the PTA, and accountability was ensured by requiring the Reserve Bank Governor to explain any breach of the inflation target and ultimately by giving the Minister of Finance the power to fire the Governor if the PTA is violated.<sup>4</sup>

Recently, Alex Cukierman and co-authors (Cukierman, Miller, and Neyapti 2002) have constructed indexes of central bank independence for the transition economies. The left-side of figure 4 shows their index of central bank independence as of 1989. With a single exception, all the transition economies inherited central banking institutions with little independence. However, as I am sure I do not need to tell this audience, these countries have undergone major institutional reforms over the past decade, as we can see by looking at

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<sup>4</sup> See Walsh (1995b) for an analysis of New Zealand's Reserve Bank Act. Svensson (2001) provides an assessment of the reforms in New Zealand and their effect on monetary policy as part of an independent review commissioned by the Minister of Finance.

current measures of central bank independence, shown on the right-side of the figure. As is clear, the transition economies have moved towards very independent central banks.

While the simple correlation between inflation and central bank independence seems to support the presumption that greater independence is associated with lower inflation (see figure 5), market liberalization also goes hand-in-hand with policies to lower inflation, as illustrated by figure 6 which shows inflation in the transition economies plotted against an index of cumulative market liberalization (Cukierman, et. al. 2002). This relationship is not surprising – establishing an independent central bank must be seen as part of a broader process of economic reform and liberalization, not as a single solution by itself.

### **Policy objectives**

The idea that the primary responsibility of a central bank is to ensure price stability – in practice, low and stable inflation – is certainly not new.

What is new is the willingness of many governments and central banks to make low inflation an *explicit* policy objective. This is clearest in the case of central banks that have adopted inflation targeting as their strategy for implementing monetary policy, since one important component of such regimes is the public announcement of the target. But not all central banks have felt the need to make public commitments to low inflation. The Federal Reserve is certainly a prime example of a central bank that, in many ways, conducts policy similarly to an inflation targeter but, so far, has been unwilling to establish and announce an explicit target inflation rate.

Modern central banks, however, also must recognize that achieving and maintaining low inflation cannot be their only objective. Monetary policy has important short-run effects on real economic activity and there is, therefore, a role for monetary policy to play in conducting stabilization policy. While explanations for past inflation often lay the blame for inflation at the feet of central banks for trying to engage in overly expansionary policies, the solution is not to have central banks pretend as if they are unable to affect real economic activity.

The fact that there are goals for monetary policy other than low and stable inflation raises important questions about the degree of independence that is appropriate in democratic societies. Independent central banks committed to price stability accept that they can be criticized for missing their inflation targets. There seems to be more discomfort with the notion that they can also be criticized for failing to achieve goals associated with real economic stabilization. In the US, where the institutional independence of the Fed is quite secure, even Presidents are reluctant to comment on monetary policy. As Bill Poole of the St. Louis Fed asks, "How can an important area of public policy be off limits for comment and criticism by elected officials? Yet, such criticism clearly unsettles markets and damages the effectiveness of monetary policy." (Poole 2003, p. 3).

One way to promote constructive public discussion of monetary policy is to develop a language for debate that maintains the focus on the long-run primacy of the goal of price stability while still allowing a means of communicating how short-run objectives and long-run objectives remain consistent. The central bank's choice of a monetary policy strategy plays an important role in providing the framework for communicating policy to the public.

### *Policy Strategies*

So if agreement is reached over the appropriate objectives, and an institution is established that can conduct policy, what are the best monetary policy strategies for achieving macro stability?

Otmar Issing (2002) has described a monetary strategy as providing "a systematic framework for the analysis of information and a set of procedures designed to achieve the central bank's main objectives." Thus, a monetary policy strategy has three components; objectives, an information structure, by which I mean a framework for distilling relevant information into a form useful for guiding policy makers, and an operational procedure that determines the setting of the policy instrument. All three are dependent on the policy maker's understanding of the economy's structure, the sources of economic disturbances, the quality of data, and the transmission mechanism for monetary policy. In transition economics, the uncertainty about the economy's structure may be of particular import.

Since I have already discussed policy objectives, and will not focus here on information issues (see Walsh 2003b), let me turn to operational procedures. Reflecting the convergence of views on policy objectives, there has been a similar convergence on inflation targeting as a framework for the implementation of monetary policy.

*The rise of inflation targeting*<sup>5</sup>

The Reserve Bank of New Zealand is generally recognized as the first central bank to adopt inflation targeting.<sup>6</sup> By 2002, an IMF study listed 20 central banks as inflation targeters and more could be added today.<sup>7</sup>

While inflation targeting has become widespread, its popularity is due in part to the flexibility central banks have shown in interpreting it.<sup>8</sup> The essential ingredients of inflation targeting are an announced numerical target for inflation and a clear desire to achieve this target, as exemplified by evidence that the central bank actively adjusts its operational targets (instruments) in a way consistent with achieving the inflation target. Instrument independent is a necessary condition for this last aspect of an inflation targeting regime (see Amato and Gerlach 2002). Hence, the core ingredients of an inflation targeting regime seem to be 1) a commitment to a low and stable inflation rate, 2) this commitment is publicly expressed in

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<sup>5</sup> This section draws on Walsh (2002b).

<sup>6</sup> Amato and Gerlach (2002) note that Chile adopted numerical inflation targets in 1990, Israel in 1991. The experience of an early group of inflation targeters -- New Zealand, Canada, the United Kingdom, Sweden, Israel, Australia, and Spain -- is surveyed in Bernanke, Laubach, Mishkin, and Posen (1998). Leiderman and Svensson (1995) also contains chapters discussing inflation targeting in many of these same countries. Amato and Gerlach (2002) and Fraga, A., I. Goldfajn, and A. Minella (2003) discuss inflation targeting among emerging market economies. See also Ammer and Freeman (1995) and McCallum (1998).

<sup>7</sup> Carare and Stone (2002) list 20 full fledged inflation targeters. Mishkin and Schmidt-Hebbel (2001) list 19 central banks as inflation targeters. In contrast to Mishkin and Schmidt-Hebbel, Carare and Stone do not include Peru or Switzerland but they add Hungary, Iceland, and Norway.

<sup>8</sup> Mishkin and Schmidt-Hebbel identify five pillars that characterize inflation targeting: "absence of other nominal anchors, an institutional commitment to price stability, absence of fiscal dominance, policy instrument independence, and policy transparency and accountability" (Mishkin and Schmidt-Hebbel 2001, p. 3). Not all inflation targeters meet all five of these pillars, and the details of policy implementation differ substantially among inflation targeters. Because of these differences, it is perhaps useful to formulate a somewhat more parsimonious definition rather than these five characteristics.

terms of an announced numerical inflation target (including the definition of the relevant price index), and 3) to achieve its target, the central bank has instrument independence. Regardless of the specific definition of inflation targeting, one thing is clear; inflation targeting is not defined in terms of a specific instrument rule that describes how a monetary policy instrument should be adjusted in response to inflation.

Mishkin and Schmidt-Hebbel (2001) list 19 inflation targeters as of 2000; these are listed in Table 1. Inflation targeters are about evenly divided with regard to the price index used for the inflation target. A majority use the basic consumer price index (headline CPI), but almost as many focus on a core measure of inflation.<sup>9</sup>

This core CPI generally excludes direct interest rate effects on the CPI or volatile components such as food and energy prices. Some economists have argued that small open economies should define their inflation targets in terms of a domestic price index (Clarida, Galí, and Gertler 2002) while Frankel (2003) has proposed an export price inflation target. I will return to this issue below.

In ten of the 19 cases, the central bank sets the inflation target. Only in the case of the United Kingdom is the power to set the target vested solely in the government. In the other eight countries, the government and the central bank both play a role in determining the target, although in most of these cases, the role of the central bank is a consultative one.

Inflation targeting ranks highly with regard to the basic desirable characteristics of a monetary policy regime. First, it provides a nominal anchor. Second, it is a transparent framework. With the target publicly announced, the central bank makes it clear what its objectives are. In practice, many inflation targeters have taken special effort to provide timely and informative reports, including making their forecasts public. Third, the presence of an announced target provides the basis of accountability, although how this accountability is enforced in practice is less clear.

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<sup>9</sup> This was also the case in New Zealand before 1999 when interest charges were removed from the definition of the consumer price index.

The flexibility allowed under an inflation targeting regime is reflected in the time horizon associated with the target. It is clear that none of these countries have implemented a strict inflation targeting regime; each regime provides for a horizon of at least a year over which the target is to be achieved.<sup>10</sup>

*Criticisms of inflation targeting*

The major criticism levied against inflation targeting is that it elevates one desirable objective of economic policy -- low and stable inflation -- at the inevitable cost of diminishing other, perhaps equally important goals of macroeconomic policy, such as real income and employment stability. In principle, this conflict is not inherent in an inflation targeting regime. As former Bank of England Governor Sir Eddie George expressed it, "People think it's just about low inflation; it isn't. Low inflation is really a means to the end of stable growth." (Sir Eddie George, Governor of the Bank of England, *Financial Times*, May 7, 2002.)

Flexible inflation targeting regimes allow for both output and inflation objectives. The weight placed on output objectives governs the horizon over which the inflation target is achieved. Greater concern for output fluctuations calls for a more gradual return to target after any inflation fluctuation.

While output concerns can be incorporated under inflation targeting, any system that stresses accountability and casts policy discussions in terms of a single variable risks creating policy

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<sup>10</sup> Relatively little research has tried to examine systematically the characteristics of inflation targeters. The studies that I am aware of (Gerlach 1999, Mishkin and Schmidt-Hebbel 2001) examined 22 countries, all OECD members. Of these, Australia, Canada, Finland, New Zealand, Spain, Sweden, and the United Kingdom are classified as inflation targeters (as of 1997). Countries that were more open and had more independent central banks tended to be less likely to adopt inflation targeting. Countries subject to large economic disturbances were less likely to adhere to fixed exchange rates and were therefore more likely to target inflation. Countries with characteristics associated with historical experience of higher average inflation (i.e., low central bank independence, low degree of openness) were more likely to adopt explicit inflation targeting. Perhaps not surprisingly, formal inflation targeting is more likely to be adopted in countries where inflation has been a problem in the past. For these countries, inflation targeting is viewed as a solution to the inflationary bias problems highlighted in the time inconsistency literature

biases.<sup>11</sup> This is a standard problem in incentive design; by defining a performance measure (inflation), the agent (the central bank) may neglect other outcomes (stable employment) that the principal (the public) also cares about.<sup>12</sup>

Interestingly, some have argued that the German experience with monetary targeting was successful, in part, because the targets allowed the Bundesbank to shift debate away from the effects of monetary policy on real economic activity (Laubach and Posen 1997). Central bankers often support inflation targeting by arguing that monetary policy cannot control real variables but can control inflation. But this confuses short-run and long-run effects of monetary policy. In fact, all current models of inflation are based on the assumption that a primary channel through which central banks control inflation is through the short-run impact of monetary policy on real economic activity.

These concerns are serious ones. One could argue that central banks are attracted to inflation targeting because it makes them responsible for a single task they know they can achieve. Holding central banks responsible for implementing socially optimal monetary policies presents central banks with a much more difficult task. However, presumably the point is not to make life easy for central bankers but to establish institutional structures that will promote good policy making.

#### *Other targeting regimes*

While inflation targeting has become the standard against which older, more traditional policy approaches such as monetary targeting or exchange rate targeting are compared, inflation targeting is not the only policy approach that has received active consideration in recent years.

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<sup>11</sup> As Ben Friedman (2002, p. 7) has noted, “Notwithstanding the compatibility in principle of inflation targeting as a conceptual framework for implementing a monetary policy in which real outcomes matter as well as inflation, an observer who has paid attention to the last quarter century of debate about monetary policy is entitled to suspect that a powerful motivation for adopting this framework, at least in some quarters, is the hope that if the explicit discussion of the central bank's policy is carried out entirely in terms of an optimal inflation trajectory, concerns for real outcomes may somehow atrophy or even disappear from consideration altogether.”

<sup>12</sup> This can be a particular problem if it is difficult to monitor the central bank's information. See Walsh (2002a).

Particularly in small, open economies, the merits of exchange rate targeting, currency boards, and monetary unions have been actively debated.

For developing and emerging markets, perhaps the most difficult issue is to determine the appropriate role of the exchange rate in the overall policy strategy. Frankel (2003) has recently provided an overview of exchange rate mechanisms and reaches the reasonable conclusion that there are pros and cons of each alternative regime, stating that “there is not one right answer for all countries.”

At one extreme is what Frankel calls the “firm fix corner,” consisting of countries that have adopted currency boards, dollarization or euro-ization, or joined a monetary union. In each case, the country essentially delegates monetary policy to another party. As long as that other party maintains a hard currency, a firm fix solves the problem of ensuring a nominal anchor. But only as long as the firm fix is credible. As Frankel also points out, passing a law permanently fixing the exchange rate may not be credible if the country does not have a well established history of respect for the law.

One criterion for adopting a firm-fix arrangement is a desire for closer economic integration with the country against whose currency the exchange rate is fixed. Thus, a firm fix with the euro may make sense for eastern European transition economies. It makes less sense for the trans-Asian transition economies.

A major argument in favor of fixed exchange rates, a currency board, or a monetary union as a commitment mechanism is their direct transparency – it may be hard to monitor policy under an inflation targeting regime since, in the short-run, actual inflation can be influenced by many factors that the central bank cannot control. This means that the public, when faced with a rise in inflation, must assess whether the increase was due to uncontrollable factors or whether the central bank has weakened in its commitment to low inflation. When a nominal anchor is achieved by fixing the exchange rate, monitoring difficulties are gone – either the exchange rate remains fixed or it doesn't, and if it doesn't, that will be immediately visible to all.

Adopting fixed exchange rates, either directly or via a currency board or by joining a monetary union, has costs. These costs arise because the exchange rate can no longer serve to help insulate and stabilize the economy, and because the ability of monetary policy to respond to shocks is eliminated. Thus, a negative domestic demand shock would call for a cut in interest rates to help offset the decline in output, but a central bank that must maintain a fixed exchange rate is unable to react flexibly. Similarly, a decline in export demand will not trigger the automatic depreciation that would serve to moderate the impact on domestic production.

While a pegged exchange rate eliminates one automatic stabilization mechanism, it also introduces a new source of shocks if the base currency fluctuates in value. The dollar or the euro, the two international currencies against which small economies might be likely to peg, have both experienced swings in value that are related to fundamentals in the US and Europe. The appreciation of the dollar during the late 1990s also forced Hong Kong and Argentina to suffer the effects of an appreciation. Similarly, the appreciation of the euro in recent years risks spreading a contractionary impact to those countries tied to the euro by reducing their non-euro-zone exports.

One difficulty that plagues many discussions of exchange rate regimes is that the distinction between policy objectives and policy strategy is often not made clear. Standard arguments about the costs of exchange rate variability – its negative effect on trade and uncertainty for example – do not necessarily argue for fixed exchange rates, only that exchange rate volatility, like inflation and output volatility, is an appropriate element in the policy maker's objective function. And that means that, depending on the nature of economic disturbances, there will be times when it is appropriate to trade-off greater exchange rate variability for lower inflation or output variability.

Thinking of exchange rate variability as costly, and therefore as something that policy might want to dampen, also emphasizes that it is important to define variability carefully. A parallel with output stability is relevant. Central banks generally recognize that they should not try to dampen all fluctuations in output. Instead, they should try to minimize fluctuations around

some estimate of potential output which itself might fluctuate due to shifts in productivity growth. Similarly, it is not the absolute volatility of exchange rates that should be a policy objective. Terms of trade shocks can be important in small exporting economies, and forcing all adjustment onto domestic prices can be costly.

Of course focusing on a gap measure – exchange rates adjusted for terms of trade effects – is difficult since the appropriate adjustment cannot be observed directly, but the same problem arises in defining the correct output gap.<sup>13</sup>

It is exactly because terms of trade shocks can be important for small open economies, particularly commodity exporters, that Jeff Frankel has proposed pegging the currency to the world price of the country's major export. That is, he proposes that a commodity exporting country might fix the domestic currency price of the export commodity. A fall in the world (dollar) price of the commodity (a negative terms of trade shock) would automatically trigger a depreciation to maintain the domestic currency price of exports. This depreciation would make exports more competitive and offset the impact of the terms of trade shock.

Of course negative terms of trade shocks are the type of shock to the domestic price level that a regime of flexible inflation targeting should also automatically respond to by engaging in an expansionary policy. Frankel criticizes inflation targeting by arguing that it would require that policy be tightened in the face of a negative terms of trade shock so as to prevent the resulting depreciation from raising inflation. But this confuses inflation targeting with *strict inflation targeting* – inflation targeting certainly allows for flexibility in the short-run, and any adverse supply shock should be allowed to *temporarily* cause inflation to deviate from its medium run target.

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<sup>13</sup> Mishkin and Schmidt-Hebbel (2001) argue that inflation targeting central banks that pay too much attention to the exchange rate can end up amplifying real fluctuations. They point to New Zealand during the 1997 Asian financial crisis as a case in point. The New Zealand dollar depreciated as a result of the negative terms of trade shock. Because the Reserve Bank of New Zealand was focusing on a monetary conditions index that depended on the exchange rate, it misinterpreted the depreciation as a sign of an expansionary shift in monetary conditions and so raised interest rates to counteract it.

The important point to make is that targeting regimes do not need to be strict – inflation targeting can accommodate short-run fluctuations in inflation designed to help stabilize the real economy. The advantage of inflation targeting over other targeting regimes is that it expresses policy in terms of the one goal that central banks *can* achieve and that it is their primary responsibility to achieve.

### **What's missing: fiscal policy**

There is one extremely important issue that I have so far failed to discuss – fiscal policy and its implications for monetary policy.

There are two approaches to thinking about the linkages between fiscal policy, monetary policy, and inflation. One might label these the traditional approach and the modern approach. The traditional approach focuses on the contribution of seigniorage, the revenue from money creation, on the government's budget balance. A government with current outstanding debt must run surpluses in present value terms. These surpluses can be generated by reducing future expenditures, raising traditional tax revenues, or by printing money. Running a deficit raises the present value of the necessary future surpluses. If the fiscal authorities do not adjust taxes or spending, the central bank will have to monetize the debt; inflation must rise to generate seigniorage revenues.

This traditional approach focuses on the budgetary implications of fiscal deficits for inflation and provides one of the chief rationales for central bank independence – independence means the central bank cannot be forced to monetize fiscal deficits. This does seem to be important. When one looks at the component measures that go into the standard indices of central bank independence, one very important aspect is the presence of barriers to the funding of fiscal deficits through money creation. This seems to be true of the transition economies, for example, where little relationship is found between inflation and central bank independence if the index of independence does not incorporate a measure of the separation between fiscal and monetary authorities.

While institutionalizing a barrier between fiscal and monetary policy can make sense by protecting the bank from pressures to inflate, such separation does come at a cost. There are times when it may make sense to rely, at least to some degree, on inflation as a source of revenue. Certainly this has been a common practice during wars.

In fact, because inflation represents a tax, it might be viewed as surprising that the recent tendency is to define the optimal inflation rate – currently taken to be in the zero to 2 or 3 percent range for most inflation targeters – as if the choice were independent of and separate from the choice of other taxes or of the government's expenditure requirements. Certainly this is not a view we would take with respect to other forms of taxation. Generally, an increase in the government's revenue needs should be met by an increase in all revenue instruments.

So the question is really whether there is a case for treating the inflation tax in a different category. I think there is. Relative to barter, monetary exchange is an efficient means of carrying out economic transactions. The willingness of individuals to hold money and use it in exchange is based on their expectation that the currency will hold its value. Inflation represents a capital tax on these holdings. Such taxes are efficient because they tax past decisions on how much money to hold. But this neglects the way future decisions are affected. And in many areas, nations develop institutional means to tie the government's hands so that they do not resort to these types of taxes – taxes that are tempting in the short-run but that have long-run negative consequences.

The more modern analysis of the fiscal implications for monetary policy goes under the name of “the fiscal theory of the price level.” The name is deliberately chosen to highlight its contrast with our traditional analysis which views the price level as determined by monetary policy.<sup>14</sup>

In contrast, the fiscal theory of the price level emphasizes the role of the government's outstanding nominal debt as a key determinant of the price level, regardless of what the monetary authority might do. Thus, even an independent central bank committed to price

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<sup>14</sup> For a discussion of the fiscal theory of the price level and references, see Walsh (2003a, Ch. 4).

stability may be ineffective in achieving its objectives if the fiscal theory of the price level is correct.

So what is this new theory? Basically, the fiscal theory views the price level as adjusting to ensure fiscal solvency. If the government raises expenditures without correspondingly raising taxes, this lowers the present value of any future government surpluses. Since the stream of revenue available to pay government bond holders has fallen, the real value of government debt must also fall, just as the value of a firm's stock falls if its expected future profits decline.

But what causes the government's real debt to fall in value? A jump in the price level. So under the fiscal theory, it is the relationship between the government's total nominal liabilities and its future surpluses that matters for determining the price level, not whether those nominal liabilities consist of interest bearing notes or non-interest bearing money. Without fiscal discipline, even an independent central bank cannot ensure a stable nominal anchor.

The fiscal theory of the price level is controversial. But it offers one explanation for the EMU's Growth and Stability Pact restrictions on member countries' fiscal policies. By requiring the members of the monetary union to limit their fiscal deficits, the Pact has the potential to lay the fiscal groundwork needed for the European Central Bank to successfully focus on price stability. Of course, I mentioned earlier that it is not always clear how credibility is gained, and institutions created by governments can be undone by governments; the recent debate in Europe over the deficits of France and Germany illustrates that commitments can be difficult to enforce.

### **Conclusions**

Let me briefly conclude. One can think of fiscal responsibility as both a key aspect of good overall macroeconomic policies but also as an important pre-requisite for successful monetary policy. Similarly, a strong and stable financial system is also a key pre-requisite for macro stability and successful monetary policy.

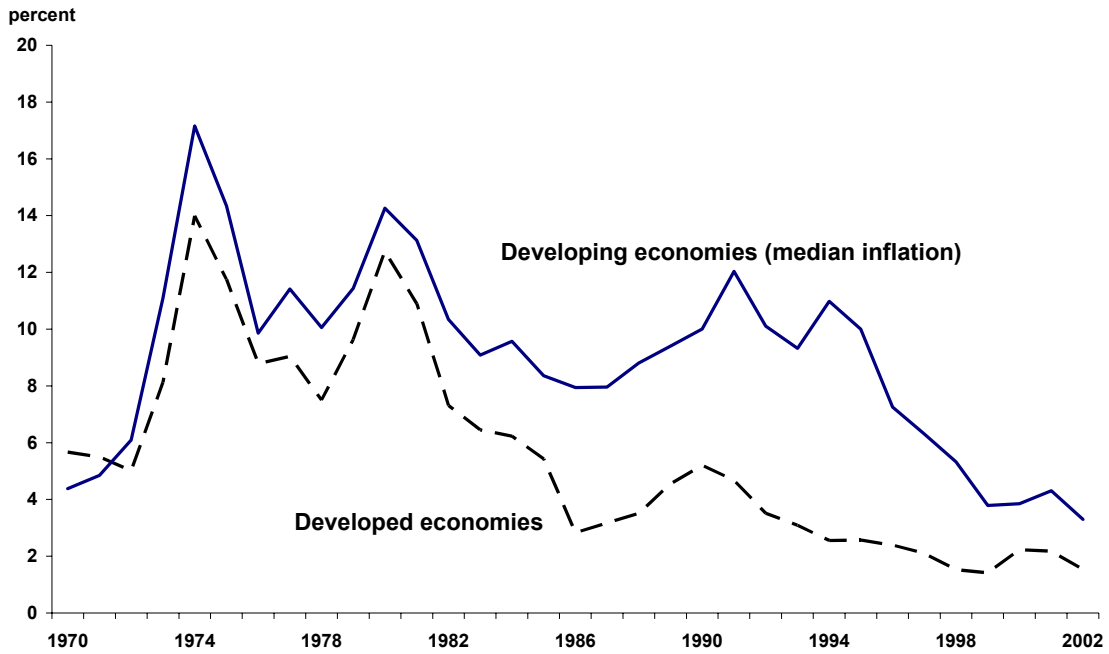
Given these pre-requisites, countries can delegate their monetary policy to others, a policy that can gain the advantages provided by the credibility of a hard currency country, but at the cost of no longer being able to use monetary policy to respond to domestic conditions. For most countries, the gains from monetary flexibility are likely to make delegating monetary policy completely, via say a currency board or monetary union, undesirable. Exceptions may be countries seeking close economic integration with the country with whom they have fixed their exchange rate or countries whose past monetary policies have left them with few other options for gaining credibility.

For countries desiring to preserve monetary independence, modern central banking requires an institutional structure that emphasizes the importance of ensuring a nominal anchor and that provides the central bank with the instrument independence necessary to achieve its policy goals.

The ability to successfully react flexibly to economic disturbances in ways that contribute to overall macroeconomic stability is aided by a credible commitment to low inflation; therefore the credibility of monetary policy is a key component of any policy that aims to maintain low and stable inflation.

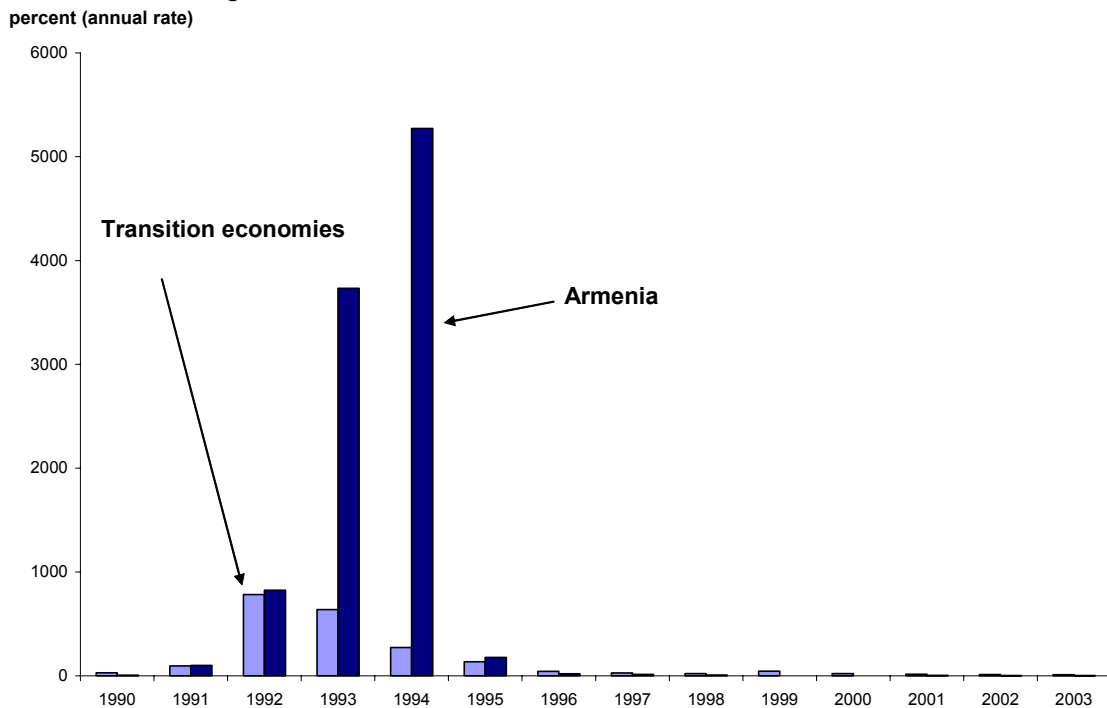
How central banks can achieve such credibility is less clear. Credibility must be earned; announcements or institutional reforms are not, by themselves, sufficient. However, institutional reforms, clear statements about objectives, transparency, and accountability – the hallmarks of a modern central bank – can serve to build credibility and help maintain low inflation once it has been achieved.

**Figure 1: CPI Inflation, 1970-2002**



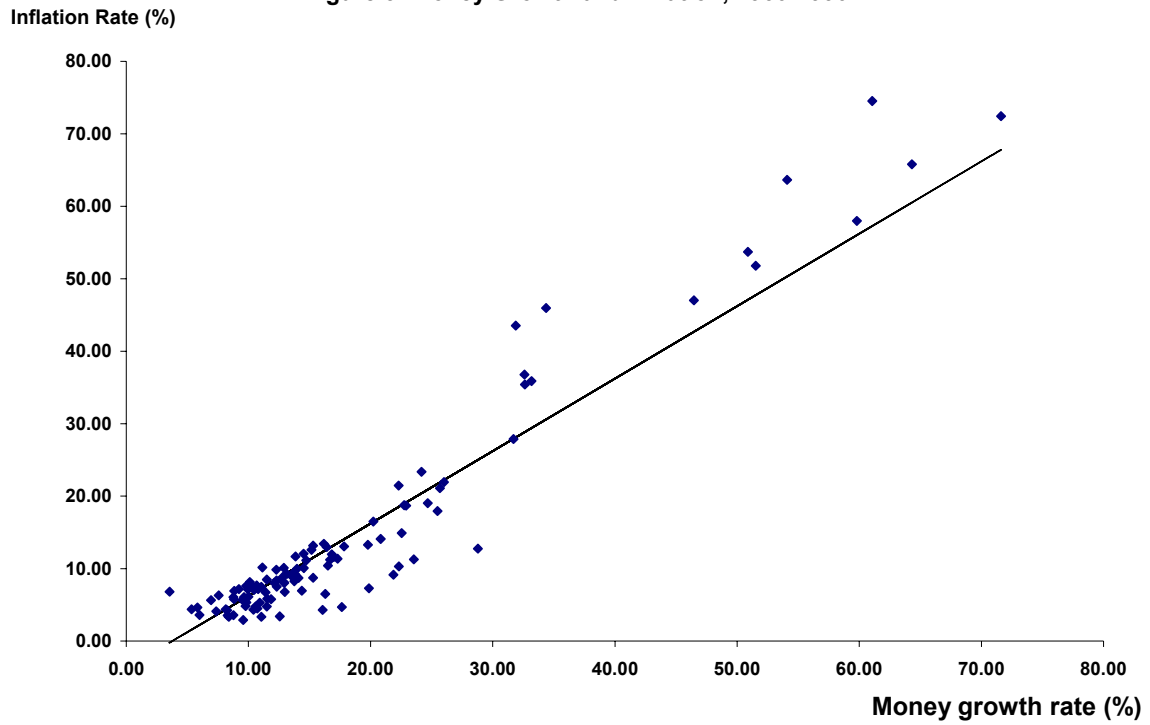
Source: IMF World Economic Outlook, 2003.

**Figure 2: Inflation in the Transition Economies and in Armenia**



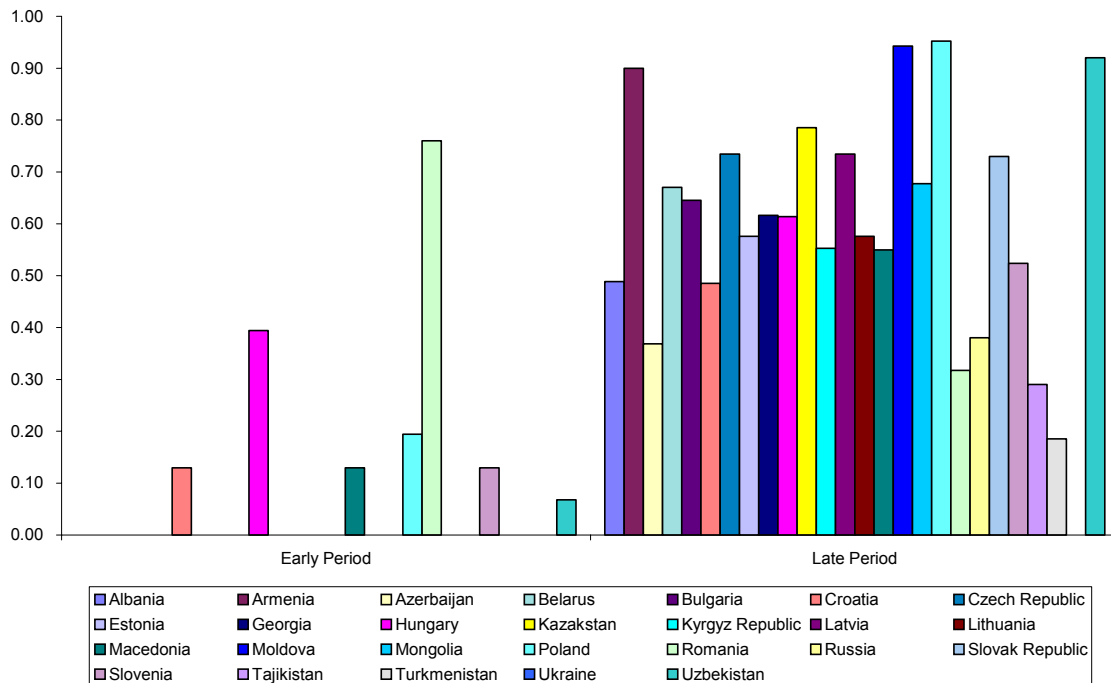
Source: IMF World Economic Outlook, 2003.

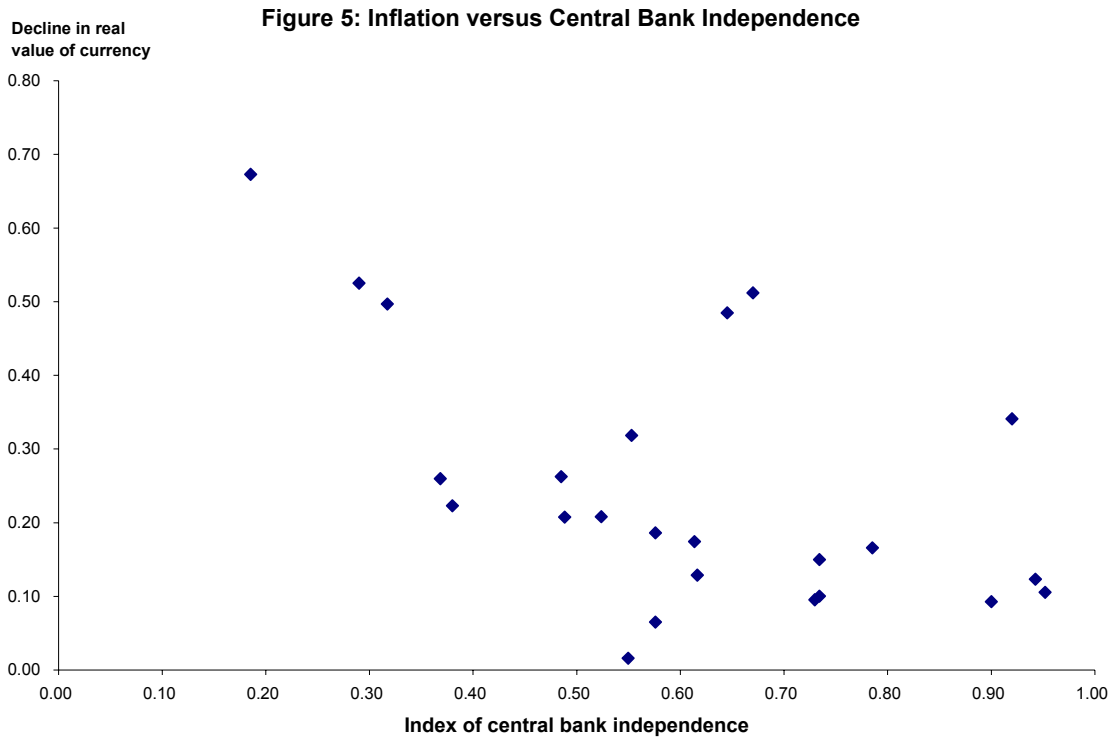
Figure 3: Money Growth and Inflation, 1960-1990



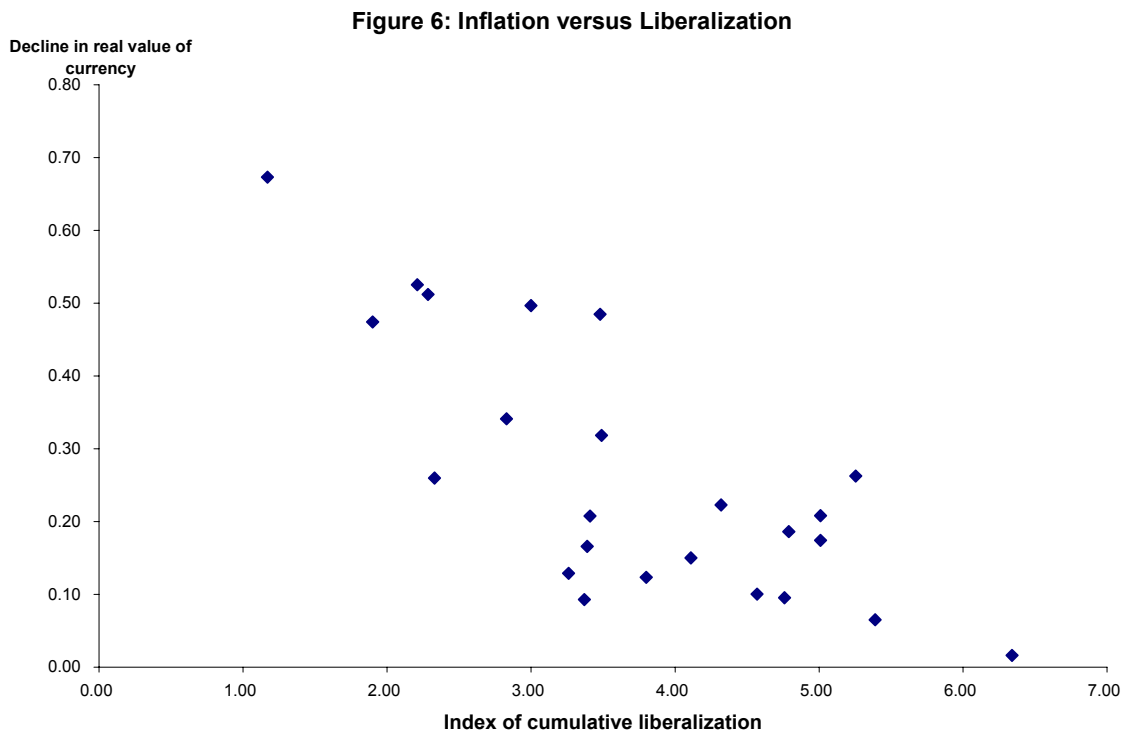
Source: McCandless and Weber (1995).

Figure 4: Increasing Central Bank Independence





Source: Cukierman, et. al. 2002.



Source: Cukierman, et. al. 2002.

**Table 1: Inflation Targeters**

Country	Adoption	Price Index	Current Target	Horizon	Set by*
Australia	9/1994	Core CPI	2-3%	1 cycle	Both
Brazil	6/1999	Headline CPI	4%(±2%)	1-year	Both
Canada	2/1991	Core CPI	1-3%	multi-year	Both
Chile	1/1991	Headline CPI	2-4%	indefinite	Both
Colombia	9/1999	Headline CPI	6%	1-year	Both
Czech Republic	1/1998	Core CPI	2-4%	1-year	CB
Finland	2/93-6/98	Core CPI	2%	indefinite	CB
Israel	1/1992	Headline CPI	2%	indefinite	CB
Korea	1/1998	Core CPI	2.5%	indefinite	CB
Mexico	1/1999	Headline CPI	3%	indefinite	CB
New Zealand	3/1990	Headline CPI	0-3%	indefinite	Both
Peru	1/1994	Headline CPI	1.5-2.5%	1-year	Both
Poland	10/1998	Headline CPI	<4%	indefinite	CB
South Africa	2/2000	Core CPI	3-6%	Multi-year	CB
Spain	11/94 - 6/98	Headline CPI	2%	1 year	CB
Sweden	1/1993	Headline CPI	2%(±1%)	indefinite	CB
Switzerland	1/2000	Headline CPI	<2%	3 years	CB
Thailand	4/2000	Core CPI	0-3.5%	indefinite	Both
U. K.	10/1992	RPIX	2.5%	indefinite	Gov.

Source: Mishkin and Schmidt-Hebbel (2001).

\* “Both” indicates that the central bank and the government are involved in setting the target. Except in the cases of Chile and Peru, the target is set by the government in consultation with the central bank.

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