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The Early Years of Inflation Targeting

— Review and Outlook —

by
Andreas Billmeier*

August 1999

Abstract

This paper deals with a “new” type of monetary policy making: Inflation Targeting (IT). It attempts to identify reasons for which countries might be inclined to adopt this framework for monetary policy. By reviewing recent experience of inflation targeting countries, the paper outlines the major operational arguments regarding the implementation of IT. Another important issue is the applicability of IT in transition countries: in the light of EU (and, in the longer run, EMU) accession, Inflation Targeting might be an interesting policy framework to at least some countries in Central and Eastern Europe.

Keywords: inflation targeting, monetary policy, Central and Eastern Europe

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1 Introduction

In 1989, the Reserve Bank of New Zealand Act introduced, among other important institutional features, a new monetary policy framework. In a Policy Targets Agreement (PTA) between the government and the central bank, numerical targets for the inflation rate were set out. This technique of conducting monetary policy has become known as Inflation Targeting (IT). Soon thereafter, other countries, all small- to medium-sized advanced economies, followed the New Zealand example (in chronological order): Canada (1991), Israel (1991), United Kingdom (1992), Sweden (1993), Finland (1993), Australia (1993), and Spain (1994). Recently, Korea selected price stability as the primary goal of monetary policy. Since the Bank of Korea is supposed to set an explicit target in terms of inflation (and to implement monetary policy accordingly) one might want to consider Korea as a future member of the IT community¹.

While there is no exact definition of IT that is generally agreed upon, the countries mentioned above share most of the following features. Firstly, low and stable inflation is not just one of several targets, but referred to as *the* overriding goal of monetary policy. This results, secondly, in the public announcement of quantitative targets for the inflation rate over a certain time horizon. Thirdly, the central bank forecasts future inflation and compares its forecast to the intended rate of inflation. A deviation is met by adjusting the monetary policy instrument. Finally, IT takes another step to foster transparency in monetary policy matters by explicitly promoting the communication of monetary policy making to the public.

One major reason for the adoption of IT as monetary policy framework had been the partly unsatisfying experience with intermediate targets during the 80s and early 90s. Whereas low and stable inflation has been among the ultimate targets of monetary policy for most countries (at least) since the first oil shock in 1973, it proved convenient for the policy maker to rely on an intermediate target such as a monetary aggregate or the exchange rate. These targets had two advantages: firstly, they responded quite accurately (and quickly) to the instruments of monetary policy, and secondly, inflation was empirically tied to this intermediate target via a stable

relationship in most economies for a long time. Financial sector deregulation during the 80s and the increasing instability of the demand for money during the 90s have, especially in Europe (German Unification and European Monetary Union in Western Europe, the decline of communism in Central and Eastern Europe) profoundly undermined the stability of intermediate targets (velocity shocks)².

More specifically, countries in Central and Eastern Europe have experienced a difficult period of transition during the last decade. Severe output decline together with strong inflation marked the turn from centrally planned economic systems to market-based economies. The rise of unemployment and growing international trade linkages necessitated prudent fiscal and monetary policies. The perspective of joining the European Union serves as an overarching goal, stressing the need for policy coordination. Furthermore, these countries will have to prove on institutional grounds that they have reached a certain level of economic development, including the capacity and the will to conduct sustainable fiscal and monetary policies.

This paper addresses several issues: in the following chapter, some background is provided on why IT might serve as a monetary policy framework. Section 3 briefly explores the prerequisites for IT and some of the more common operational problems in detail. In addition, we want to highlight how the implementing countries have dealt with some of these operational issues. In chapter 4, the focus is shifted towards the outcome of IT in terms of inflation performance. The following section turns to the important question of whether IT might be a viable monetary policy framework for Central and Eastern European Countries (CEEC), especially those acceding the European Union (EU). Section 6 concludes.

¹ See Hoffmaister (1999) for a detailed discussion of the Korean case.

² This holds for the U.S., too, see Friedman (1996).

2 The rationale for Inflation Targeting

In this chapter, we will identify the rationale behind adopting IT as monetary policy framework. Why should countries modify their monetary policy stance, including fundamental changes in central bank constitutions?

One simple, but promising answer is due to the former way of policy conduct that was no longer functional. To start, we will briefly explore why the predominating method during the 70s and much of the 80s, namely intermediate targeting of a monetary aggregate, became more and more flawed so that a wide variety of countries moved on to target other variables.

The next question to surface is which variables might be of interest for the monetary authority. Or, to put it the other way round, what variables can monetary policy effectively dictate? Not surprisingly, we find that in the long run, inflation is the only macroeconomic variable influenced by monetary policy decisions and, hence, the key variable or target for monetary policy.

Given that monetary policy is likely to target a specific level of inflation, we are making the case for low and stable inflation. With regard to the diverse –but difficult to identify– costs of inflation³, we will focus on two arguments, namely on the assertion that in presence of tax distortions, inflation accounts for major welfare losses and, on the other hand, on the link between inflation and long run growth.

2.1 Intermediate monetary targeting and the power of monetary policy

The collapse of the Bretton Woods fixed exchange rate system necessitated new monetary policy strategies. In Europe, several countries – Germany and Switzerland being the most prominent – started targeting a monetary aggregate. The underlying idea is simple: given that low and stable inflation is commonly agreed as the ultimate goal, the monetary authority will find it easier to control the intermediate monetary target than the goal variable inflation, provided a stable relationship exists between money and inflation⁴. The central bank will then chose a specific definition of the monetary aggregate (the broader, the less controllable) and a policy “rule”, ranging

³ For example, the notorious “shoe leather costs” first identified by Bailey (1956), but also costs arising from inflation variability, not only the level of inflation, see Romer (1996), chapter 9.8 for a summary.

⁴ The classic reference is Goldfeld (1973).

from very strict Friedman-type *k per cent* money growth to pragmatic, outcome-oriented behavior.

The *conditio sine qua non* in intermediate money targeting, i.e., the strong relationship between money and inflation turned out to become weaker in most adhering countries from the mid 70s onwards⁵. The major reasons for this destabilization are believed to be financial sector innovation (credit cards) and increased capital mobility. Both developments blur exact definitions of money and alter the money velocity coefficient.

Consequently, most countries have moved on to target variables other than money. There are countries, however, where the relationship is still believed to exist. In Germany, the Bundesbank has repeatedly made the point that no significant structural change has occurred, and that money demand is sufficiently stable in order to conduct money aggregate targeting⁶. Therefore, the Bundesbank officially chose not to follow the trend towards IT⁷.

The identification of the empirical relationship between inflation and unemployment, known as the Phillips curve⁸, provided a strong argument in favor of activist monetary policy during the 1960s in order to keep output at or even above full employment level for sustained periods. The belief in monetary activism became clouded with the “natural rate hypothesis” gaining prominence. According to this prevailing view, there is a “natural” level of unemployment in the economy – the so-called “non-accelerating inflation rate of unemployment” or NAIRU – not to be continuously overcome by activist policy. In other words, monetary means cannot permanently effect real economic variables⁹, there is no long-run trade off between inflation and unemployment. As a consequence, economic benefits of expansive monetary policy in terms of output (or lower unemployment) are of limited duration while the costs of higher inflation in terms of economic inefficiencies tend to be permanent. Hence, a

⁵ See Goldfeld (1976) or, for an overview, Goldfeld and Sichel (1990). In this sense, the relationship is a good example for Goodhart’s law. As soon as the regularity had been detected, it became unstable.

⁶ See, e.g., Bundesbank (1996), p. 72.

⁷ See however the discussion in footnote 56 below.

⁸ See Phillips (1958).

⁹ The natural rate hypothesis rests on Friedman (1968) and Phelps (1968), see also Lucas (1972). In this context, the emphasis lies on “permanently”: Friedman acknowledges the powerful (but short run) effects of monetary policy on the economy in Friedman and Schwartz (1963).

“pragmatic case”¹⁰ can be made that monetary policy is to focus on economic variables within its reach in the long run, namely the inflation rate.

2.2 The benefits of low inflation

In this section we will focus on two widely discussed arguments in favor of price stability as the primary goal of monetary policy. Whereas a distorted tax system “automatically” incorporates economic costs in terms of foregone growth, the direct link between inflation and growth is statistically significant, but not yet completely understood in theory.

Apart from these specific arguments in favor of low inflation, there is a broad consensus among economists that “price stability promotes an economic system that functions more efficiently”¹¹, and, hence, works as a prerequisite for other economic goals. FISCHER (1994) provides an exhaustive listing of the real effects of inflation by categories¹². He argues that the economic cost of inflation-related distortions can sum up to 2-3 *per cent* of GDP already at a relatively low inflation rate of 10 *per cent*. One category of the real effects of inflation mentioned by Fischer refers to institutional settings, namely the tax system.

2.2.1 Tax system distortions

Standard public finance theory emphasizes the non-neutral character of tax systems due to the non-existence of lump-sum taxes (“second-best solution”). This holds even with inflation not being present. Distortions related to inflation arise in different parts of the tax system, namely capital income taxation, but also personal income taxation.

With capital income taxation, distortions are created by the provision of most tax administrations to tax nominal rather than real interest payments. In fact, nominal interest taxation and inflation may add up to a negative real return.

A popular phenomenon in personal income taxation is the so-called bracket creep. With a tax system based on nominal income, doubling an individual’s income at an inflation rate of 100 *per cent* will result in a higher real tax burden, because the individual is pushed into tax brackets with higher marginal tax rates. This is true for

¹⁰ As opposed to the more theoretic argument based on the time-inconsistency literature, see McCallum (1996).

¹¹ Mishkin (1997), p. 13.

¹² See. *op. cit.*, p. 272ss.

any type of progressive tax system, even such systems with a flat rate, as long as exemptions and deductions are expressed in nominal terms.

The straightforward solution to these distorting effects of inflation on taxation is to index the tax system. However, there are strong theoretic and practical arguments against this remedy, e.g. the concern that indexing will reduce the public's awareness of inflation¹³.

Another way to minimize distortions resulting from this tax-inflation interaction would be to neutralize inflation, in IT terms, to aim not only at low levels of price increase, but at a zero inflation target. FELDSTEIN (1996) has underlined that due to the presence of distorted tax schemes, the annual welfare loss of even a two *per cent* inflation rate amounts possibly to one *per cent* of GDP. He argues that the one-time cost of going from low to zero inflation is more than outweighed by the multi-period gain in returning to a second-best taxation scheme without inflation¹⁴.

2.2.2 Inflation and growth

As we have seen, a case can be made on Phillips-curve grounds for positive short-term effects of surprise inflation on output/employment. As the inflation-unemployment trade off breaks down in the longer run, the picture also changes for long-term effects of inflation on economic growth. Until the 1970s, the empirical evidence regarding the positive or negative impact of inflation on growth was, at best, mixed. In recent years, several empirical studies have underlined the costs of high (and variable) inflation in terms of economic growth.

FISCHER (1993) includes low and stable inflation as the cornerstone of a stable macroeconomic framework, which is, in turn, a necessary condition for sustained economic growth. In a growth accounting framework, he argues that inflation has detrimental effects on economic growth by substantially reducing investment and the rate of productivity growth. This runs counter to the conventional wisdom of the

¹³ See Feldstein (1996), chapter 7.

¹⁴ As Feldstein puts it: "The deadweight loss associated with the shift from zero inflation to a two per cent inflation rate is therefore not the traditional 'small triangle' that would result from distorting a first-best equilibrium, but is the much larger 'trapezoid' that results from increasing a large initial distortion" (p. 5). He estimates the one-time cost to be equal to between 4 and 6 *per cent* of initial GDP. Depending on the discount rate, the present value of the benefits deriving from price stability exceeds the cost of getting there within six to nine years.

1950s and 1960s, when the Mundell-Tobin effect predicted a positive impact of inflation on capital accumulation due to portfolio restructuring away from money¹⁵.

BRUNO AND EASTERLY (1998) go one step further by pointing out that the described inflation-growth regression is closely linked to discrete episodes of high inflation, i.e. it is statistically observable only with high-frequency data and single high inflation observations. They conclude that the rate of growth is significantly reduced during an inflation crisis, but strongly recovers once inflation is reduced to “normal” levels. This threshold level of inflation is suggested to be around 40% *per annum* with no significant inflation-growth correlation below this figure¹⁶.

SAREL (1996) focuses on the non-linear effects of inflation on economic growth. He finds a structural break at 8% CPI *per annum*. Below this level, inflation is not found to have strong effects on economic growth. Above 8%, however, a powerful negative impact exists. Not taking into account this type of structural break explains in SAREL’S view the fact that many studies in the past have found the overall effect (above and below the structural break) not to be highly significant, statistically.

Summing up, a case can be made for low inflation as the “cornerstone” of a stable macroeconomic framework, contributing significantly to long-run growth. Also, distortions in the tax system become costly in terms of foregone GDP already at very low levels of inflation. Thus, the adoption of a monetary framework based on an explicit inflation target should be oriented towards low levels of inflation.

¹⁵ Other advocates in favor of a negative inflation-growth relationship are Barro (1995), and De Gregorio (1992). Levine and Zervos (1993) find the relationship to be extremely fragile and attribute its statistical significance to single high-inflation-negative-growth observations.

¹⁶ Fischer (1993), p. 503, reaches the opposite conclusion: “It is thus not the case, as I had expected, that it is the high inflation outliers that are responsible for the overall negative correlations between inflation and growth... Rather the association between inflation and growth...is stronger at the low and moderate inflation levels than at high inflation.”

3 Inflation Targeting: framework or rule?

The issue of monetary policy effectiveness has been discussed for many decades along the lines of the prominent rules-versus-discretion debate. In a nutshell, it has been argued that only strict rules permit the central bank to be fully credible and hence overcome the problem of time-inconsistency¹⁷. Discretion in monetary policy, on the other hand, allows for a reaction to external shocks and reduces the negative effects on output and growth. The downside is that discretion introduces an inflationary bias, if the central bank's output target lies above society's target, because the monetary authority might not be able to credibly commit to an inflation target. Turning the argument around, a credible central bank will be able to (at least partly) remove the bias.

In light of this debate, merely all monetary policy procedures from simple base money rules to the many variants of money targeting can be classified as less or more discretionary. It has been argued that IT finds its place in the (mildly) more discretionary part of the spectrum¹⁸.

However, communication of monetary policy issues can be considered an integrative part of IT. The more open and transparent the process of policy formulation becomes to the public, the more the central bank is implicitly tied to "rules". Consequently, several authors have placed IT on the rules side of the spectrum¹⁹.

Again others have made the point that IT can not be classified along the rules-versus-discretion scheme, that "...this is not the best way to think about inflation targeting." In their view, *"there is no such thing in practice as an absolute rule for monetary policy"* and that, hence, monetary policy can only be classified as more or less discretionary, but never as "rule-based". They perceive IT as a new "...framework for policy within which 'constrained discretion' can be exercised"²⁰.

Without further investigation into this nearly philosophical question, we want to assess in this chapter the characteristics of Inflation Targeting as the process of monetary policy making.

¹⁷ This problem was introduced in a seminal article by Kydland and Prescott (1977).

¹⁸ See Masson *et al.*, p. 18 and table 1.

¹⁹ See Friedman and Kuttner (1996).

²⁰ See Bernanke *et al.* (1999), p. 21, p. 5 (italics in original), and p. 22. Their book provides a good introduction to the rules-versus-discretion debate.

We try to follow the logical order of policy implementation: before deciding on a certain type of policy, one has to make sure that this policy can be effectively installed. In other words: research has indicated a number of prerequisites for IT. In a second step, the paper focuses on the process of implementation: among the operational issues, a clear-cut target definition is fundamental to successful inflation targeting. Thirdly, we try to evaluate the role of communication between the monetary authority and the general public. With inflation being a final instead of an intermediate monetary goal, the process of monetary policy formulation becomes less straightforward. Hence, there is a growing need for communication with the public, since the understanding of monetary policy contributes strongly to the credibility of a central bank and therefore to its policy performance. A complete understanding of the monetary authority's behavior on the other hand reduces its discretion in policy making, simply because a certain, rule-like reaction is expected. That is, the central bank acts under "constrained discretion".

3.1 Prerequisites

Work done mainly by the IMF²¹ points to two fundamental criteria for implementation of an IT framework: so-called fiscal non-dominance and non-multiplicity of monetary policy targets.

The first criterion relates to the link between fiscal and monetary policy, more precisely to the assignment of the policy target. On some occasions, the fiscal policymaker might be able and willing to dictate monetary policy. However, in order to guarantee acceptable policy performance, the monetary authority should be able to independently choose its policy instruments. The latter criterion is of more general nature: as it is well known, more goals than instruments in policy making will prove difficult to handle. Hence, there is a question of target competition²². The question of the right target goes hand in hand with another major problem in monetary policy theory, which is fundamentally a measurement problem, but commonly referred to as "nominal anchoring".

²¹ See Debelle (1997) and Masson *et al.* (1997).

²² Since both criteria are seemingly fulfilled by the (well-developed!) countries actually targeting inflation, we will only briefly outline the argument in this part of the paper. We will deal more closely with these prerequisites in the section on *Perspectives for Central and Eastern Europe*, p. 33.

3.1.1 Target assignment and fiscal non-dominance

The problem of fiscal dominance in monetary policy is closely linked to the heavily discussed issue of central bank independence (CBI). Important contributions in the literature have focused firstly on the positive measurement of CBI²³ and, secondly, on the normative features of CBI, i.e. why should a central bank be independent and to what extent. In recent years, central banks worldwide have gained increased independence from the fiscal policy maker. This is obviously the case for transition countries, but also for most EMU members and the inflation targeting community. The degree of independence varies across countries, however. This is of major importance when it comes to the assignment of monetary policy goals.

DEBELLE AND FISCHER (1994) introduced the distinction between goal and instrument independence. Following them, a central bank is said to be goal independent, if it has the power to set its own goals. It is, in turn, instrument independent, if the goals of monetary policy are exogenous to the monetary authority, i.e., assigned in its charter or by the government^{24,25}. A consensus seems to emerge that a successful central bank should be to a large extent instrument independent, but not necessarily goal independent²⁶. The possibility to freely decide over the instruments of monetary policy rests on the fact that there are no constraints of fiscal nature, in other words, no signs of fiscal dominance.

Spill-over effects from fiscal to monetary policy might be due to (non-negligible) government borrowing from the central bank, to an underdeveloped taxation system relying on seigniorage revenues, to insufficient financial markets or to explosive dynamics of the public debt.

IT as monetary policy strategy requires instrument independence in order to remove the central bank from the daily fiscal policy agenda, but not necessarily goal

²³ See, e.g., the indices by Grilli *et al.* (1991), Alesina and Summers (1993), and the “Turnover Index” by Cukierman *et al.* (1992). All these indices in principle show a positive correlation between CBI (as measured) and successful monetary policy in terms of low inflation.

²⁴ This distinction is closely linked to “solutions” of the time-inconsistency problem: the Rogoff-type conservative central banker is goal independent in that he chooses an inflation target different (lower) from the public, the Walsh-type central banking agent is supposed to fulfil a contract in which the goals are set out, but the central banker retains independence in the choice of instruments. See Rogoff (1985) and Walsh (1995).

²⁵ IT countries differ in the way, inflation targets were announced for the first time: joint agreement between government and central bank (Canada, New Zealand) or announcement by the central bank with governmental endorsement later on (Australia, Sweden).

²⁶ See e.g. Masson *et al.* (1997) and especially Debelle and Fischer (1994). Romer and Romer (1996a) hold the opposite view.

independence. In fact, extreme goal independence (as it was the case for the Bundesbank) will reduce the authority's accountability within democratic institutions²⁷.

3.1.2 Nominal anchoring and competing goals of monetary policy

A nominal anchor serves to tie down the public's expectations about the future. In absence of any *numéraire*, the monetary policymaker would not be able to commit to any sort of policy strategy. Hence, temporary shocks to the price level could alter the public's expectations in a substantial way, making monetary policy difficult. Accommodating the expected rise in inflation will endanger the central bank's reputation, tight monetary policy, on the other hand, bears the risk of recession. Thus, there is a firm need for expressing forecasts and expectations in terms of an "anchor". By credibly committing to such a longer run target the central bank can communicate its willingness to conduct coherent policy. Taking the nominal anchor as a means of communication and commitment also leads to the conclusion that an anchor, which is well understood by the public, will lead to superior policy outcomes. Within the IT framework, the communication of a specified inflation target to the public identifies the price level the central bank is aiming at in the future and serves therefore as a nominal anchor.

Apart from IT, however, we conceive several other nominal anchors or goals, which also contribute to control the public's expectations. While within the IT framework, the inflation target constitutes the nominal anchor, secondary goals might only be pursued, if they are consistent with the inflation target. Common goals of monetary policy include an exchange rate target, wages together with a full employment target, the national income level or financial sector stability.

The argument is straightforward for the exchange rate: given that monetary policy is endogenous in the presence of a fixed exchange rate regime, an inflation target cannot coexist. The case is weakened for "semi-fixed" exchange rate regimes where currencies fluctuate within a band centered on a parity value. Especially if the band is rather wide, there will be room for secondary targets. The underlying question is which target is estimated to be the more important one. Since price stability is the overarching goal of IT, pegging the exchange rate too rigidly will endanger the

²⁷ See *Communication, accountability, and transparency*, p. 25.

fulfillment of the low inflation target. Hence, “true” IT will override in conflicting situations any exchange rate target.

In this context, we want to make another point: inspecting well-known examples of exchange rate pegging, we note that countries often chose this strategy in order to overcome a credibility problem: they tied their hands together and to a prominent low inflation country in order to commit to sound monetary policy²⁸. This is the case for a variety of Central and Eastern European countries, which have pegged mostly to the Deutschmark or the Euro (then ECU). For them, as argued in more detail in chapter 5, targeting a particular currency relies on the same rationale than targeting the inflation rate directly. Turning the argument around, we should expect countries from exactly this group to become future inflation targeters (given that the prerequisites for successful IT be fulfilled).

The reasoning we made for possible conflicts between the overriding inflation goal under an IT framework and a secondary exchange rate goal is also valid for other goals. If they are non-competing, no conflict will arise. If they are, instead, not consistent with each other, the IT framework demands a credible commitment to the inflation goal. Consider the full employment goal: the Phillips curve states an inflation-unemployment trade off. In terms of IT, this means that low inflation policy is not contributing to full employment. But, as it is well known, this trade off holds only in the short run. In the long run, low and stable inflation provides a sound background for private sector decisions and contributes positively to the employment target. There is actually a considerable amount of evidence that high inflation endangers long-run growth²⁹.

As far as financial sector stability is concerned, we note that this is a goal of monetary policy, but also a prerequisite of IT. The importance lies in the fact that underdeveloped financial markets will lack the correct functioning of interest rates. Also, they might not be “deep” enough to accommodate major public or private debt instruments. Little empirical work has been done on the role of the financial sector in monetary policy and its impact on policy formulation and economic growth³⁰.

²⁸ See for the Italian case Giavazzi and Pagano (1988).

²⁹ See *Inflation and growth*, p. 8.

³⁰ See Johnston and Pazarbasioglu (1995).

Especially in the former communist states, financial sector deregulation is moving at a remarkable pace. Consequently, the role of the financial sector in these countries is subject to continuous redefinition.

Summing up, there seems to be no dichotomy between the goal of low and stable inflation under an IT framework and the stability of the financial sector.

Along these lines, the US constitute a good example for no explicit nominal anchoring at all, no policy framework has been indicated. The Fed's monetary policy follows what has been called a "just do it" strategy³¹. Comprehensive monitoring of inflation indicators goes in hand with "preemptive strikes" in case of inflationary threats. As it is well known, this "look at everything" strategy has made the Fed one of the world's most respected hawks in monetary policy matters. On the other hand, the US economy has performed successfully since the mild recession in 1990. It seems that even without a clear and visible target or anchor, a central bank can do good work as long as the strategy is credible. In addition, if there is an anchor, monetary policy becomes the easier the more credible the anchor is.

3.2 Operational issues

So far, we have outlined why a country might want to modify its monetary policy framework in order to implement IT, and what the prerequisites, in rather abstract terms, for such a policy stance are considered to be. In this section, we will turn to more practical problems of implementation.

By definition, Inflation Targeting implies the formulation (and announcement) of a monetary policy target. To start, we will discuss the different aspects of the target definition. Second, we will highlight the role of information in the policy formulation process. From this we hope to derive important lessons for inflation targeters-to-be.

3.2.1 Definition of the target

The definition of the inflation target varies considerably across countries and over time. We will discuss briefly the major arguments that have emerged from academic discussion and practical experience, namely the price level versus inflation rate targeting debate, the search for the right price index, a plausible numerical

³¹ See Bernanke *et al.* (1999) and Mishkin (1997).

specification of the target, the relevant time horizon, and finally, how to deal with the target bandwidth and deviations.

Price level versus inflation rate targeting

Price stability is commonly described as the main goal of monetary policy. Strictly interpreted, this goal implies that the purchasing power of money does not vary over time. Therefore, full price stability (as a goal) could be associated with a procedure aiming at keeping the price **level** constant. However, the desirability of a constant price level is at least questionable³².

The important distinction has to be drawn between a constant price level and a zero inflation rate due to substantial implications for the time series properties. The former implies policy path-dependence whereas the latter does not. In simple terms, a (constant) price level target requires a period of deflation to compensate for a period of unanticipated inflationary shocks. This leads to a stronger short-term variability of effective inflation rates and – due to nominal rigidities – output than under inflation rate targeting. On the other hand, with a period-by-period inflation rate target (and a possible drift in the price level), a one-time inflationary push is not automatically offset, “bygones are bygones”³³. The resulting base drift in the price level dampens the accurateness of long-term price level forecasts, which are subject to increasing variance³⁴. Price level targeting therefore encourages long-term nominal contracting. Still, most nominal contracts are short-term and indexation constitutes another way of reaping the benefits of long-term contracting. In consequence, there seems to be no outstanding reason in favor of price level targeting.

The discussion on whether to use a price level or inflation rate target seems somewhat far-fetched. For one, there is actually no country in the world that would apply a strict price level target³⁵. Furthermore, one has to acknowledge that there are several factors

³² See *Numerical target*, p. 19.

³³ Brunila and Lehdenperä (1995), p. 120.

³⁴ See Duguay (1994) for a review of the price level versus inflation rate discussion, and Svensson (1996) for a principal-agent set-up. The latter also stresses the importance of the nature of the shocks hitting the economy. With a large and eventually more-period shock, which induces continuous and similar target misses an inflation target might turn out to be less costly in terms of output reduction during the compensation period. In contradiction to conventional wisdom, Svensson also makes the point that a price-level target can be more attractive than inflation rate targeting in the realistic case of unemployment persistence. It is also considered to reduce the “inflationary bias” of monetary policy.

³⁵ Sweden is said to be the only country having pursued a price level target in the 1930s, see Jonung (1979).

(e.g., quality improvements), which realistically lead to moderate growth in the price level even without being considered inflation. In addition to that, a case can be made for the positive effects of non-zero inflation³⁶. Hence, a constant price level target lacks practical and theoretical meaning. A price-level target, which includes base drift, comes close to inflation rate targeting, but might be an interesting alternative to consider. The argument is easily reformulated: a tradeoff exists between short-term inflation rate variability (in the case of price level targeting) and longer-term price level uncertainty (inflation rate targeting).

Following the general view, we will focus in the remaining part of the paper on inflation rate targeting.

Price index

An inflation target refers to a specific price index, more precisely to its variation. Ideally, the price index accurately measures the overall change in price level in the economy, is timely, not subject to revisions and familiar to the general public. The GDP deflator offers a broad coverage, but is subject to the latter critique and has not been chosen in IT countries. Two possible ways have emerged from ten years of experience: targeting a "headline" or an "underlying/core" inflation rate. Both indices stem from the widely known Consumer Price Index (CPI). Targeting the published or "headline" CPI seems feasible, but comes with important drawbacks. Since it includes a number of potentially volatile components, regular CPI has to be "corrected" in several ways to form the "underlying" rate of inflation. First, monetary policy is formulated independently from fiscal policy. This implies in turn that changes in fiscal policy should not have implications for the measurement of the price index. In other words, direct (first-round) effects from, e.g., a change in the VAT rate on the price level will be of minor importance for the long-run inflation rate, whereas the second-round, indirect effects should be included. Another case can be made for supply shocks: monetary policy should not be held accountable for non-monetary influences on the price level. This is especially true for categories like energy/fuel, but also the food sector. In most IT countries, the former is imported from abroad and therefore subject to (marked) exchange rate movements³⁷. The latter category, in turn,

³⁶ For these arguments, see *Numerical target*, p.19.

³⁷ For an open-economy treatment of Inflation Targeting, see Svensson (1998).

might be excluded because of its generally remarkable weight in the specific country's index, implying large effects on CPI stemming from rather small changes in food prices. Third, it is common to exclude (mortgage) interest payments³⁸. Imagine a slight overshooting of the predicted interest rate over the target: tightening monetary policy by increasing short-term interest rates would result in an even larger burden on households.

Narrowing the CPI in the described way³⁹ raises the need for communication: the monetary authority has to explain in detail its assessment of the different components and the relationship between headline and core CPI. Furthermore, redefining the price index during the targeting period substantially reduces the central bank's credibility. This trap is conveniently avoided, if the index compilation lies not within the responsibility of the monetary authority, but is assigned to some other, independent agent like the Statistical Office. Given that the main differences between headline and underlying inflation are of temporary nature, the distinction between the two is somewhat overstated in the medium-term, i.e., the target horizon.

With regard to European Monetary Union, the point has been made⁴⁰ that any form of CPI targeting might not be acceptable for a group of countries at different stages of economic development because of the relatively strong weight of non-traded goods in the index. Focusing on a goods basket where the law of one price is more likely to rule (like wholesale price indices), reduces this problem, but creates another one: volatility of the index will be more accentuated than with a "classic" CPI. Concluding, one might argue that using more than one (price) index is a good way of equilibrating the different points that have been made. In effect, Canada is using a "monetary conditions index" in the conduct of monetary policy⁴¹.

³⁸ Debele (1997) notes that these interest payments might even be excluded from headline CPI. This is the case for the US, but also for Korea. See Hoffmaister (1999) on this point.

³⁹ See Yates (1995) for a more technical discussion of this issue. Bryan and Cecchetti (1994) provide a feasible way of "trimming" the headline CPI. Put simply, they eliminate the upper and lower k% of the distribution in price changes among the main CPI categories in order to obtain an average change in prices. Christoffersen and Wescott (1999) apply this method to Poland.

⁴⁰ By Artis *et al.* (1998).

⁴¹ This index is a weighted combination of interest and exchange rates, see Bernanke *et al.* (1999), chapter 6.

Numerical target

In implementing its policy, the monetary authority will have to commit to a specific numerical value for the inflation target. There is widespread debate on how to concretize Alan Greenspan's notorious, but qualitative definition of price stability – the rate of inflation, which does not materially influence economic behavior⁴². Along the lines of the price level versus inflation rate targeting debate, one could argue that the goal of monetary policy, price stability, might be described as zero inflation. However, there are a variety of good reasons to aim for positive (but moderate) inflation.

Fundamentally, there is a methodological issue: CPI measurement is endemically biased. The "Boskin Report" has outlined⁴³ several sources of overestimation of the CPI. Defined as a fixed-weight Laspeyres index⁴⁴, the CPI does not provide for short-term substitution effects due to changes in relative prices. Since households are likely to redirect their consumption towards goods, which have become relatively less expensive, a fixed-weight good basket will overestimate the effective expenditure⁴⁵.

Other obvious sources of upward biases in estimating CPI, mentioned by BOSKIN *ET AL.* (1996), are outlet substitution, the invention of new products, and the change in quality of goods, the latter two accounting for more than half of the bias. Even though the computing agencies (the Bureau of Labor Statistics in the US, Eurostat for the European Union) use sophisticated techniques to minimize these deviations, the estimation error, according to BOSKIN, adds on average to some 1.1 *per cent per annum* for the US⁴⁶. Put simply, an officially measured inflation rate of 2.5 *per cent* implies a "true" rate of inflation of 1-1.5 *per cent per annum*⁴⁷.

⁴² Greenspan (1989), p. 141.

⁴³ Boskin *et al.* (1996).

⁴⁴ As opposed to a Cost of Living Index COLI, which was favored by the Commission. The COLI does not aim at the necessary expenditure for a constant basket, but at the necessary expenditure for constant household welfare, allowing for substitution effects.

⁴⁵ As long as no (costly) redefinition of the goods bundle takes place (every 11 years in the US on average).

⁴⁶ See the Boskin Report, Table 3, p. VI-4. For the European Union, the corresponding figure can be expected to lie somewhat below this figure since Eurostat uses for its Harmonized Index of Consumer Prices a different formula (geometric mean instead of arithmetic mean), which leads to lower results by definition.

⁴⁷ Fischer (1994), p. 284, fn. 49 offers another bias, which he calls the „logarithm bias“: the decline in price for a good in one period and a subsequent rise of the same nominal magnitude would be shown as a positive over-all rise. This point obviously depends on the definition of a period.

For Germany, the Bundesbank estimated the ‘Boskin effect’ to total *.75 per cent per annum*⁴⁸.

Leaving aside pure measurement issues, important economic arguments in favor of low, but positive inflation have been put forward. First, with zero inflation, the real interest rate cannot be negative because the nominal interest rate is bounded below by zero. This considerably limits the policymaker’s ability to respond to shocks. Negative real interest rates might be useful during severe recessions in order to boost private investment and facilitate economic recovery⁴⁹.

The second argument⁵⁰ relies on the existence of nominal rigidities in the goods and labor markets. Consider the labor market: at very low rates of inflation, no adjustment in real terms (e.g., a reallocation of labor necessitated by a drop in the demand of labor in a certain sector) will take place. In this situation, positive inflation reduces the real wage, smoothing relative adjustment, and, thus, enhancing economic efficiency. This argument depends crucially on the existence of nominal rigidities. Empirical evidence is mixed, however. Still, for certain countries this argument will hold.

Third, it can be argued that the welfare loss function is asymmetrical around the optimal inflation rate. The costs of deviation from a zero inflation target are distributed unevenly: whereas deflation, by raising the real interest rate, can create costly liquidity and solvency problems, and result in a lower steady-state capital stock, the costs of small positive inflation are difficult to identify. On the other hand, these severe effects are not likely to follow from time-to-time dips into negative rates of price level changes, but from “real” deflation, i.e., substantial, and more-period price declines.

A fourth argument⁵¹ in favor of positive inflation relates to the theory of optimal taxation. Put shortly, in presence of distortionary taxes, inflation (as a tax on nominal assets) may be part of the optimal tax mix. This holds especially for countries, which encounter problems in raising tax revenue, i.e., developing countries, since the inflation tax can hardly be avoided. The argument is weakened by the fact that inflation is considered a rather inefficient and costly way of collecting taxes.

⁴⁸ See Hoffmann (1998).

⁴⁹ This point was made by Summers (1991). However, the restriction on policy making seems of minor importance in terms of welfare losses, see Fuhrer and Madigan (1994) on this point.

⁵⁰ Attributed to Tobin (1972).

⁵¹ First made by Phelps (1973).

Furthermore, as FELDSTEIN (1996) pointed out, due to distortions in tax schemes, even low positive inflation will cause substantial welfare losses.

Summing up, most inflation targets have centered around 2 to 3 *per cent per annum*, as it has been proposed in the literature⁵². This value is also pivotal to explicitly non-inflation targeting central banks like the ECB⁵³.

Time horizon

The announcement of an inflation target refers to a certain time horizon. One can establish upper and lower bounds for a reasonable horizon by taking into account the controllability aspect. Inflation will not be controllable by monetary policy instruments in the very short run of, say, less than one year due to Friedman's "long and variable lags", meaning the time a change in the policy stance (short term interest rates) takes to work through the transmission mechanism. On the other hand, with a time horizon of more than, say, five years, IT will lose its meaning and therefore lack credibility. Hence, the monetary authority faces a tradeoff between flexibility and transparency: the shorter the time horizon, the less the central bank will be able to act under discretion. A high degree of short-run accountability runs counter mid- and long-term discretionary stabilization measures. Another problem derives from the so-called "instrument instability"⁵⁴: the shorter the time horizon for monetary policy to obey the target, the more volatile or even unstable (due to lagged and possibly reinforcing effects) the instrument might be. This is of course not a desirable property, in effect it is well known that strong variability in short-term interest rates has detrimental effects on long-run growth by reducing investment.

In practice, time horizons vary across countries and over time, also depending on the actual rate of inflation at the time of IT implementation. In countries, where disinflation⁵⁵ was a major policy goal (and actual inflation above desired inflation, e.g. Canada and New Zealand), it proved helpful to allow for an implementation period of one to two years and to set rather short intervals, stressing the accountability point. Countries, which had already achieved low inflation were able to adhere

⁵² See, e.g., Fischer (1994), p. 284.

⁵³ See e.g. European Central Bank (1998).

⁵⁴ Developed by Holbrook (1972).

⁵⁵ As opposed to deflation.

immediately to their respective long-run inflation target, and, hence, define longer target horizons (of up to five years).

Target band width and deviations

Here, three alternative formulations of the inflation target are imaginable: the numerical value can be specified in terms of a (thick) point, as a range around some center value, or as an upper bound (but, considering the nature of IT, not as a lower bound). The rationale for a range lies in the imperfect control of monetary policy over the target. The central bank's decision on the bandwidth is characterized by the same flexibility-credibility tradeoff that impinges on many other choices in this field. This can be easily seen in the case of a range. Narrowing the range around the focal point shows the central bank's strong commitment to achieving the focal point inflation target. On the other hand, it restricts its ability to act discretionary in implementing monetary policy. Even optimal monetary policy may not be able to forecast inflation perfectly and is definitely subject to unforeseen external shocks, thus driving the inflation rate out of the target band. This event is the more likely to occur, the smaller the band. Not hitting the target is likely to be destructive for central bank's credibility⁵⁶. A target point will realistically never be hit. Turning the argument around, the Swiss National Bank has repeatedly made the point that missing a band is worse than missing a point⁵⁷.

It should have become clear so far that setting the bandwidth is somehow analogous to setting the target horizon. Here, too, we encounter the problem of instrument

⁵⁶ Here, one could argue that one of the most credible monetary authorities, the German Bundesbank, was not a very prominent "target hitter": between 1975, when the targeting process was initiated after the breakup of Bretton Woods, and 1996, when the Bundesbank adopted two-year targets in preparation of the common European monetary policy, the yearly published target corridor for growth of the monetary aggregate M3 was missed, 11 out of 22 times completely, and the Bundesbank found itself just on the edge of the corridor another six times. However, M3 has been in official language an intermediate target of the Bundesbank's monetary policy, not the final target. Along these lines, the convincing argument was made (see Clarida and Gertler (1997), Bernanke and Mihov (1997), Bernanke *et al.* (1999), and von Hagen, 1995) that German monetary policy has effectively been targeting inflation for a long time, since missing the corridor for the monetary aggregate seemingly did not undermine its credibility in terms of inflation performance. In effect, the corresponding inflation target has been hit (undershot or overshot by less than one percent point) 15 times during the same period. The misses, however, are chronologically attributable to the second oil shock and to German Reunification.

⁵⁷ Consequently, Switzerland has chosen a point monetary aggregate target, see Bernanke *et al.* (1999), chapter 4.

instability⁵⁸: the narrower the band is, the more abrupt the instrument will have to react in order to cope with unforeseen shocks to the price level.

Another point in the discussion of target ranges is whether, given an optimal inflation rate, the range should be symmetric around this value or skewed to one side or the other. Given that target band deviations result in a credibility loss, one has to consider the nature of deviations from the target value. Major upward shifts can be due to the introduction of taxes or other supply factors. Since this type of disturbance is commonly excluded from the relevant price index⁵⁹, there seems to be no major reason for asymmetric bands.

A deviation from the target, be it a point or a range, calls for a modification of the policy stance. The question is, however, whether this deviation is of transitory nature or does it constitute a substantial threat to price stability over the medium term. Only the latter necessitates a policy response. Some inflation targeting central banks (e.g., New Zealand) even preannounce precise situations, which are considered to work as “escape clauses”, in the sense that no policy reaction is needed.

Difficulties in maintaining the established bandwidth point to a necessary adjustment/enlargement: in effect, in 1996, New Zealand adjusted its range, widening it by 1 to 3 percentage points. The focal point of the range remained stable, however.

3.2.2 The role of information: indicators for inflation

As it has already been noted, intermediate money targeting in a extended number of countries during the 70s and early 80s rested on two propositions: first, intermediate targets (e.g., money growth) are subject to greater controllability by the central bank than final targets. Second, the link between money growth and inflation proved rather stable over this period. So why target the inflation rate directly, with no added value in terms of inflation outcome, but greater controllability problems?

As it has been alluded to in the introduction, the quality of money growth as an estimator for future inflation declined for most countries during the 80s and 90s. Since

⁵⁸ See *Time horizon*, p. 21.

⁵⁹ See *Price index*, p.17.

money growth is of no intrinsic value, apart from being an indicator for inflation, the controllability argument favoring intermediate targets breaks down as well⁶⁰.

In this sense, choosing IT as monetary policy framework fundamentally means to **internalize** the controllability problem. Missing the *ex ante* inflation target is no longer a consequence of flaws in the money growth-inflation relationship (velocity shocks, money demand instabilities), but the outcome of imperfect inflation forecasts. This points to the importance of information and forecasting under an IT regime. But what information should be used?

Due to the “long and variable lags” of monetary policy, IT shows a forward-looking character: instead of relying on present or past intermediate targets/indicators, it makes explicit use of forward-looking indicator variables. The main difference is that these indicator or information variables contribute to monetary policy making without being a target of monetary policy themselves⁶¹. In addition to that, the information variable approach does not rest on a causal relationship between indicator and inflation. Therefore, structural variables with no direct financial implication might also serve as indicators.

A number of potential indicators have been tested for their informational content in different countries. Since the indicator quality is closely linked to the financial system and the transmission mechanism, no cross-country first-best indicator can be established.

For the UK, BAUMGARTNER AND RAMASWAMY (1996) conclude, using nonstructural VAR methods, that narrow money has strong leading indicator quality while broad money has not. This result is straightforward considering the fact that velocity and money demand side shocks impinge on broad, not on narrow money⁶². Furthermore,

⁶⁰ Svensson (1997) has made the often-cited point that IT countries actually do use an intermediate goal, namely the forecast of inflation. He argues that “it is by definition the current variable that is most correlated with the goal, it is more controllable than the goal, and it can be made more observable than the goal.” (p.1114). If the inflation forecast is (too) different from the target, the central bank’s response will be a modification of monetary policy. In this sense, the inflation targeting central bank uses more information in the policy making process than intermediate target strategies, although already at the intermediate level policy has a scent of “look at everything”, at least everything that is supposed to be relevant for inflation performance.

⁶¹ One example is Canada’s monetary conditions index, see footnote 41.

⁶² Regarding the transmission mechanism, the authors argue that “a full understanding of the structural features of the transmission mechanism is not a necessary condition for targeting inflation successfully.”... “More generally, given the lack of consensus on the structural properties of the monetary transmission mechanism, the information variables approach may, paradoxically, provide stronger theoretical underpinnings for the conduct of monetary policy [than an intermediate targeting

they point out that long and short interest rates provide some information for inflation. Quite interestingly, the yield curve as well as interest rate spreads and nominal exchange rates on the other hand show little predictive power. However, the authors also make the point that information deriving from the information variable approach might not be sufficient for successfully conducting monetary policy and that additional “out of model” information is needed.

CECCHETTI (1995) uses simple correlation analysis as a test for the predictive power of different candidate indicators for inflation in the US. Here, the case for money growth as inflation estimator is much weaker. In conclusion, there is no good (in the sense of time-invariant) estimator of inflation among those assessed by the author. He draws, however, another important lesson, which is valid not only for the US: the difficulty of forecasting inflation. Following CECCHETTI, even at very low time horizons, the error of inflation forecasts is remarkably high⁶³.

3.3 Communication, accountability, and transparency

Taking into account the described features of IT, this monetary strategy can still be perceived as a more or less rigid rule to be followed. However, it is sometimes stressed that IT does not constitute “just another rule”, but a new “framework for policy within which ‘constrained discretion’ can be exercised”⁶⁴. So what is it that goes beyond the classic conduct of monetary policy?

By stressing the importance of continuous communication between the central bank and the general public, IT enables transparency in the process of monetary policy making. For many years, central banks had been pursuing their rather general goals under the veil of a democratic institution without too much attention being paid to these long-run goals of monetary policy by the general public. This point leads instantly to another positive by-product of IT, namely the accountability-based approach.

strategy].” (pp. 4s). For explicit modeling of different transmission mechanisms in monetary union countries, see Giovannetti and Marimon (1998). See also the papers for the Journal of Economic Perspectives Symposium on the monetary transmission mechanism, Mishkin (1995), Taylor (1995), and Bernanke and Gertler (1995).

⁶³ He finds a RMSE of 1.54, implying a 90% confidence interval of over five percentage points for one-quarter-ahead US inflation forecasts between 1982 and 1994. Debelle and Stevens (1995) find RMSEs for OECD data on G7 countries from 0.5 to 1.5 percent between 1987 and 1992. See also Hoffmaister (1999) for a detailed assessment of inflation predictability in Korea.

⁶⁴ Bernanke *et al.* (1999), p. 22.

To begin with the latter, there has been increasing concern during the last decade regarding the institutional foundations of modern central banks. In recent years, a large number of central bank laws have been modified⁶⁵ in order to reflect the growing need to pin down a more clear-cut democratic role of the central bank, including the question of accountability.

The general trend moves into the direction of making central banks increasingly more independent, respecting the empirical finding⁶⁶ of an inverse relationship between central bank independence and inflation.

The distinction already drawn between goal and instrument independence of the central bank⁶⁷ and the target assignment problem in this context leads to a different conclusion. In terms of accountability, the outside assignment of the IT target to the central bank provides a benchmark to evaluate the authority's performance. Derivations from the established target have to be explained by the bank, i.e., the central bank is held accountable for achieving its targets. In New Zealand, the governor can even lose his job in case of continuous (unexplainable) target misses. Three problems arise, however: first, there is a large gap between the assigned target (in terms of inflation) and the instrument, commonly the short-term interest rate. As a consequence, target misses might be attributable to inadequate policy measures, but also to external shocks.

Second, the role of "lags" in monetary policy has already been acknowledged. The fact that policy results become visible only after several quarters (implying also a mid-run target horizon), again stresses the importance of communication: providing information to the public will increase the central bank's accountability (which can be even seen as a bad), but also its credibility if not the reputation.

Finally, there is considerable concern that the central bank is not the only powerful institution to provide inflation measurement. In most countries, statistical offices are responsible for *ex post* assessment of price behavior. However, policy actions are based on inflation forecasts several years in advance. It is clear that these forecasts have to be impartial and reliable. This point gains even more importance with the

⁶⁵ Most Western European central bank laws had to be harmonized with EMU standards (see European Monetary Institute (1995)) whereas most CEECs have tried to model successful Western central bank charters (see Loungani and Sheets (1997) for the transition countries and Knight *et al.* (1997) for the Baltics and countries of the Former Soviet Union). The role of central banks in developing countries however differs radically from that in advanced economies, see Fry *et al.* (1996).

⁶⁶ See footnote 23.

⁶⁷ See *Target assignment and fiscal non-dominance*, p. 12.

SVENSSON-argument of intermediate inflation forecast targeting: using the monetary authority's own forecast allows for biased information in order to ease and/or improve policy outcome. Private sector forecasts, on the other hand, suffer possibly from serious information asymmetries (the central bank's reaction function)⁶⁸. The "solution" lies once more in the bank's openness to the public. It could, e.g. publish its forecast models or provide them to an independent (governmental) authority, which would be responsible for bringing together public and private inflation forecasts.

As we have seen, monetary policy can only be held accountable, if changes in the policy stance are made public. This holds also for the process of policy formulation, i.e., the IT framework, the mid-run policy strategy and the rationale behind it. The monetary authority should also provide information about the outlook of the economy, confronting its own analyses with private sector forecasts. Most importantly, in order to gain sustained public credibility, the central bank is supposed to publish progress reports, which the achievements of monetary policy relative to its targets are discussed and, in case of failure, explained.

In practice, all IT central banks have attained high levels of communication. In fact, the degree of transparency is often considered a striking feature of this group⁶⁹. The classic vehicles of accountability include annual reports and testimonies to democratic institutions like the parliament or committees. IT countries have begun to publish so-called inflation reports, the prototype being the semi-annual Monetary Policy Statement by the Governor of the central bank of New Zealand. This type of report focuses explicitly on the inflation target, discussing whether it has been met and why not. In addition to that, most IT countries provide supplementary documentation on the economic background. Some even publish the minutes of the central bank's board meetings⁷⁰. A very common way (heavily used by the ECB) of communicating the monetary authority's intentions is to publish speeches of board members and regular bulletins.

⁶⁸ Romer and Romer (1996b) show that the Federal Reserve has continuously outperformed private sector inflation forecasts.

⁶⁹ See, e.g. Haldane (1997).

⁷⁰ In the UK, these minutes refer to the meetings between the Chancellor and the Governor of the Bank of England.

A handsome byproduct of central bank openness derives from the fact that monetary policy discussions under an IT framework are automatically geared towards a mid-run time horizon of, say, not less than two years. If the public understanding of (monetary) policy problems is notably increased by this communication-oriented approach, then the central bank's inflation forecasts might become an effective counterweight to shortsighted political pressures.

Summing up, we find that communication of monetary policy matters increases transparency and creates greater public understanding, which, in turn, is extremely helpful for the successful conduct of IT. On the other hand, making the central bank accountable for policy outcomes works as a counterweight to the growing trend towards increased (instrument) independence.

4 Country experience

This chapter will review the actual implementation of IT frameworks. Without going into country-specific details of how to “fine-tune” the new regime of monetary policy, we consider two major aspects: first, the timing of the framework’s adoption. So far, a handful of countries have started targeting inflation, dispersed over the last ten years. How did these countries determine when to introduce IT? And second, how about the outcome? Did these countries perform well over the years of targeting inflation, also in comparison to countries not adhering to IT?

4.1 The timing of implementation

The story told by history is straightforward: major changes in the monetary policy regime take place under extreme economic conditions, e.g. ending Argentine hyperinflation by converting the central bank into a currency board arrangement (CBA). Hence, one might suspect the introduction of IT to be an answer to periods of high or growing inflation. Without going into detail, there is one fundamental difference, however: while a CBA is credible by definition, the IT-introducing central bank is not. In order to build up reputation, the monetary authority has to make sure that the initial inflation targets are met with high probability. These targets in turn lie supposedly at or below the lower bound of the specific country’s inflation track record. Introducing IT during a period of falling inflation can thus be considered a tactical decision, but it is one that proves to be extremely helpful. By fulfilling the early goals, the monetary policy maker should be able to “lock in” disinflationary expectations of the public. Credible mid-run inflation targets then contribute to anchor inflation expectations in the longer run, even in the case of inflationary shocks.

Summing up, the introduction of an IT framework in general has not served as a means to end a period of unsustainable monetary policy and high inflation⁷¹.

In our sample of countries, IT has been introduced in two ways: several countries, such as New Zealand or Sweden, have made a discrete effort to communicate to the public that “a new era has begun”. Adoption of the IT framework as part of a major (not only monetary) policy reform, or after the breakdown of the European Exchange

Rate Mechanism, mark a one-stop strategy. The opposite is true for countries such as Canada: slow and gradual introduction of IT procedures aimed at conserving the public's belief in monetary policy institutions, given that there was no economic rupture causing distrust.

The countries differed also in another way: While in New Zealand and Canada IT came as an agreement between government and central bank, other countries, e.g. Finland and Sweden, lacked the explicit endorsement of this new monetary policy framework by the fiscal policymaker. It goes without saying that endorsement by the government substantially increases the credibility of IT.

4.2 Inflation performance

Table 1 shows the path of inflation in eight inflation targeting countries, as well as a control group, consisting of the US, Germany, France, Japan, and a more generic set of industrialized countries. The years in which IT was introduced are framed.

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
New Zealand	15.7	6.4	5.7	6.0	2.6	1.0	1.4	1.7	3.7	2.3	1.1	1.2
Canada	4.4	4.0	5.1	4.7	5.6	1.5	1.9	0.2	2.2	1.5	1.7	1.0
United Kingdom	4.1	4.8	7.8	9.5	5.9	3.7	1.5	2.5	3.4	2.5	3.1	3.4
Finland	4.1	5.1	6.6	6.2	4.1	2.6	2.2	1.1	0.9	0.6	1.3	1.4
Sweden	3.9	6.3	7.1	9.9	9.0	2.8	4.5	2.6	2.5	0.5	0.8	-0.1
Australia	8.5	7.3	7.5	7.3	3.2	1.0	1.8	1.9	4.7	2.6	0.3	0.9
Spain	5.3	4.8	6.8	6.7	5.9	5.9	4.5	4.8	4.6	3.6	2.0	1.8
Israel	19.8	16.4	20.1	17.2	19.0	11.9	11.0	12.3	10.1	11.3	9.0	5.5
US	3.7	4.0	4.9	5.4	4.2	3.1	3.0	2.5	2.8	2.9	2.4	1.5
Germany	0.2	1.2	2.8	2.7	3.6	5.1	4.4	2.7	1.9	1.5	1.8	0.9
France	3.3	2.7	3.4	3.4	3.2	2.4	2.1	1.7	1.7	2.1	1.1	0.7
Japan	0.1	0.7	2.2	3.1	3.3	1.7	1.2	0.7	-0.1	0.2	1.7	0.6
Industrial countries	3.2	3.5	4.6	5.2	4.4	3.3	2.8	2.3	2.5	2.4	2.0	1.4

Source: Author's calculations, based on IMF, International Financial Statistics.

At first glance, IT seems to have been a full success in all adhering countries. In fact, during the year after introduction, every country, but Australia (and perhaps Spain) recorded a discrete drop of its inflation rate, Israel being the extreme case of -7% .

⁷¹ The commonly overlooked IT country Israel serves as (the only) counterexample: IT had been introduced in 1991 when inflation was in the 20%-range and the fiscal deficit at unsustainable 14% of

Since the Australian Reserve Bank's target range amounted to 2-3 per cent, the continuity comes as no surprise. Spain, on the other hand, being a member of the ERM, had to respect margins of $\pm 15\%$ for its Peseta to fluctuate around the ECU parity. In this sense, IT was of secondary importance in Spain and the monetary policymaker could not adjust its instruments more drastically in order to reduce further the rate of inflation.

We hereby mean any action aiming at reducing inflation **expectations**. Of course, driving up interest rates has only limited effect on the inflation rate in the short run (the year after IT introduction). As a corollary, we observe that there is an expectation component in actual inflation, which is reduced markedly with the introduction of an IT framework. Turning the argument around, we conclude that IT is a credible way of communicating inflation aversion and thus, conducting monetary policy.

Turning from the absolute drop in inflation to relative goal achievement, i.e., in terms of the inflation target, we observe without giving further evidence that actual inflation was in general within the bandwidth or close to the thick point after a relatively short adjustment period⁷².

The apparent success of the IT framework is somehow qualified by the lower part of Table 1. On average, all industrialized countries have experienced a decline in inflation during the 90s⁷³. Loosely speaking, the IT group (with the exception of Israel) has experienced a sharper decline in inflation from above the industrial countries' level to find themselves at a comparable level from 1994 onwards⁷⁴. Chart 1, which is based on Table 1, visualizes this fact: the inflation path in IT countries as opposed to the one of the industrial countries⁷⁵. Excluding Israel (as statistical outlier) from the IT community makes the point even clearer.

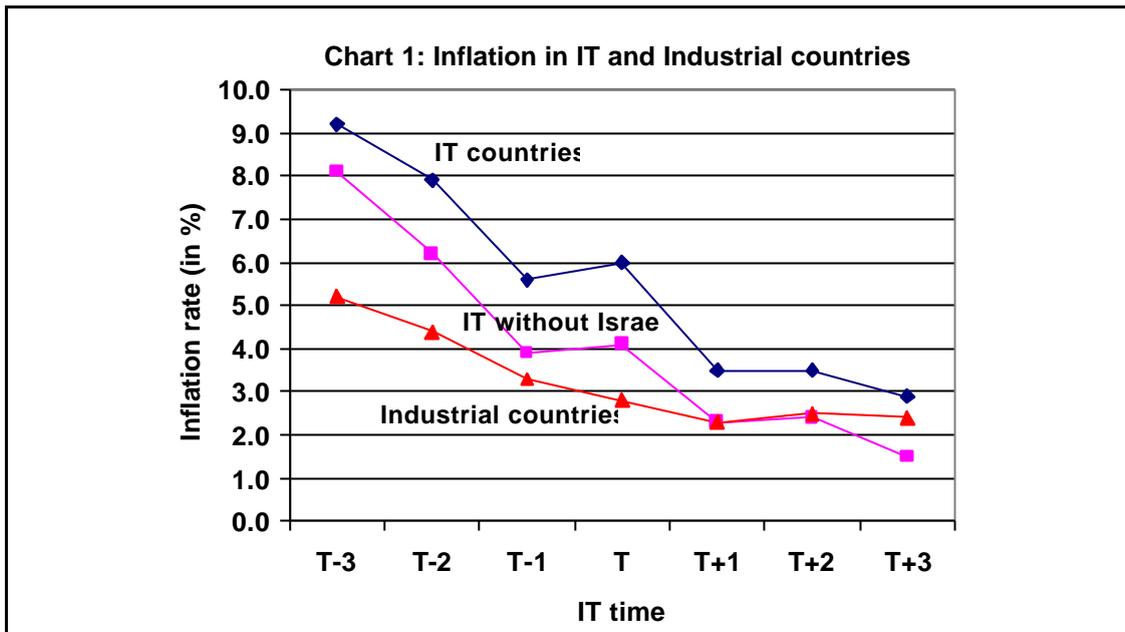
GDP, see Bernanke *et al.* (1999).

⁷² See Debelle (1997) for a detailed assessment by country.

⁷³ Here, "industrial countries" as defined by the IMF include most of the IT countries.

⁷⁴ We notice however, that the UK lately reveals rather high rates of inflation, not in coherence with the US pattern.

⁷⁵ In order to account for the differing chronological points in time when IT was introduced, we follow Fischer *et al.* (1998) and compute the data relative to the year of its introduction, referring to "IT time" as opposed to "calendar time". The inflation rate for IT countries is a non-weighted average. The time anchor for the OECD group is 1993, since most IT countries adopted the new framework during this calendar year.



FISCHER (1995) concludes that the impressive success of New Zealand and other countries is due to the fact that IT was introduced during a period of generally falling rates of inflation. He argues that the real test of its credibility and power is to come with an overheating economy. A transitory shock to the price level could probably not single out the countries where the central bank has effectively lowered the public's inflation expectations because of the target rate's definition⁷⁶.

This assessment of inflation performance is of very preliminary nature, however. More sophisticated tests could focus on the terms of the inflation-output tradeoff⁷⁷, the behavior of inflation with and without IT, or on the question, if and how the private sector's inflation expectations have been lowered⁷⁸.

⁷⁶ By this, we mean the exclusion of first-round effects of exogenous shocks on the price level, see *Price index*, p.17.

⁷⁷ I.e. the sacrifice ratio, see Fuhrer (1994).

⁷⁸ See Bernanke *et al.* (1999) on this.

5 Perspectives for Central and Eastern Europe

5.1 Overview

Merely all countries in CEE have embarked on the journey from a centrally planned state economy to a market economy by Western standards. The most advanced among these transition countries have moved impressively down the road to macroeconomic stabilization. The marked output decline, which stood at the very beginning of the transformation process, due to labor reallocation within each country, has been stopped everywhere and several countries have already rebounded to pre-crisis levels⁷⁹.

In terms of inflation, most transition countries have experienced triple digit rates of price increases. Table 2 summarizes the history of inflation in ten CEECs, as well as Malta and Cyprus⁸⁰. Quite interestingly, the disinflationary process in the first five countries seems to have slowed down at a low double-digit level, whereas several second-tier countries, which are generally considered less advanced relative to their neighbors, have come down even further.

Table 2: Consumer Price Inflation (change in % from previous year)

	1990	1991	1992	1993	1994	1995	1996	1997	1998
Czech Republic	9.5	56.7	11.1	20.8	10.1	9.1	8.8	8.4	10.7
Estonia	23.1	212.5	1069.3	89.0	47.7	28.8	23.1	10.6	10.7
Hungary	29.2	34.2	23.0	22.5	18.9	28.3	23.5	18.3	14.4
Poland	600.0	76.4	43.0	35.3	33.3	26.8	20.1	15.9	11.7
Slovenia	549.7	117.7	201.3	31.9	19.8	12.6	9.7	9.1	8.6
Bulgaria	23.9	339.0	79.4	73.1	95.9	62.1	123.0	1082.3	22.3
Latvia	10.5	124.7	958.0	108.8	35.9	25.0	17.6	8.5	4.6
Lithuania	8.4	224.7	1020.5	409.6	72.1	39.7	24.6	8.9	5.1
Romania	4.7	174.4	211.2	255.2	136.8	32.2	38.8	154.8	59.1
Slovak Republic	10.8	78.3	9.0	25.1	13.4	9.9	5.8	6.1	6.7
Cyprus	4.5	5.0	6.6	4.8	4.7	2.6	3.0	3.6	2.2
Malta	3.0	2.5	1.7	4.1	4.1	4.0	2.6	3.1	n.a.

Source: Author's calculations, based on IMF, International Financial Statistics.

⁷⁹ See Fischer *et al.* (1998).

⁸⁰ We note that these 10/12 countries have been admitted to enter negotiations with the European Commission in order to prepare their accession to the EU. In May 1998, the Commission started negotiations with the five most advanced applicant countries, the so-called first-tier acceding countries, namely Czech Republic, Estonia, Hungary, Poland, and Slovenia. The second tier comprises Bulgaria, Latvia, Lithuania, Romania, and the Slovak Republic. Malta and Cyprus do not count among these (Eastern) enlargement candidates due to their distinct political and economic background.

With the implementation of the Euro as of January 1, 1999, the next milestone in European integration will be the accession process of Central and East European Countries (CEEC) to the European Union. As the European Commission puts it in the Agenda 2000:

“Enlargement is expected to take place in stage 3 of EMU. All Member States must endorse the aim of EMU, and thus should be able to participate in time in the Euro area. While it is unlikely that at the time of their entry, the new Member States will be in a position to participate fully in the Euro area, the major challenge for them will not be to enter the Euro area, but to adopt the Community acquis in the area of EMU even as non-participating countries.”⁸¹

Along these lines, “upgrading” monetary policy institutions and strategies to acceptable levels of performance has been a major task for CEECs. Following OECD examples, low and stable inflation has quickly been accepted as a necessary condition for sustained economic growth⁸². Partly due to the lack of institutional capacity, several countries have relied on “simple” monetary strategies, most prominently an exchange rate anchor in order to govern public expectations⁸³.

As these countries move on towards EU membership and as their institutional capacity grows, the choice of an exchange rate target might turn out to be a good point to start monetary policy, but probably not one to end up with. Hence, the question of a “natural sequencing”⁸⁴ of monetary policy regimes comes up. In this context, we obviously focus on the point whether IT could be a viable strategy for CEECs.

In the remainder of this section we will discuss the applicability of IT following a couple of criteria established by the IMF, namely fiscal non-dominance over monetary policy and the question of target competition in monetary policy.

⁸¹ See European Commission (1997).

⁸² Ghosh (1997) identifies for the transition countries a threshold effect at 10 per cent inflation per year, above which high economic growth is unlikely to occur.

⁸³ See Feldman and Temprano-Arroyo (1998).

⁸⁴ See Begg (1998).

5.2 Applicability of Inflation Targeting in developing/transition countries

MASSON *ET AL.* (1997) established the prerequisites already introduced for the adoption of an IT framework (fiscal non-dominance, no competing targets/anchors)⁸⁵. These criteria have been widely accepted as a way to describe a promising environment for successful monetary policy. Few authors have looked after the applicability of IT in developing/transition countries⁸⁶. WAGNER (1998) focuses on transition countries, describing monetary policy in more general terms, however. He concludes briefly that “in particular in transition countries, adopting ... inflation targeting would probably be unwise” (p. 24), arguing that none of the criteria he describes (fiscal non-dominance, inflation as the sole target, technical capacity for policy formulation and implementation) can be deemed fulfilled for most of the countries in question.

This preliminary conclusion lacks a detailed assessment of the multiple prerequisites. Furthermore, we suspect that CEECs will eventually diverge in their institutional setting and economic background, and therefore in their readiness to apply IT.

5.2.1 Central bank independence and seigniorage

The first point to consider, fiscal non-dominance, has two main aspects. First, there is the institutional question of whether central banks in CEE have already attained *de jure* a level of independence similar to Western central banks. As we outlined above, this is not to say complete (i.e. goal and instrument) independence from the fiscal policymaker, but the possibility to freely choose the instruments in order to fulfill a target, which may be set by the government.

All EU-acceding countries in Central Europe have adopted new central bank laws during the 90s. This issue has emerged as a crucial element of financial sector reform, and of the transformation process in general. Amendments shadowed Western prototypes more or less rigorously. Most contributions, which focus on the institutional aspects⁸⁷, come to the conclusion that especially the more advanced reform states have implemented central banks which “enjoy a high degree of

⁸⁵ See *Prerequisites*, p. 11.

⁸⁶ Exceptions are Debelle and Lim (1998) for the Philippines, and Christoffersen and Wescott (1999) for Poland.

statutory, political, and policy independence.”⁸⁸ This comprises a clear definition of the role and responsibilities of the governor, financial/budgetary and personal independence, and clear accountability provisions. Most authors, however, make the point that statutory independence may differ from *de facto* independence due to political influence. Especially if central bank laws are incomplete, the door is opened to asymmetric interaction between the monetary and the fiscal policymaker.

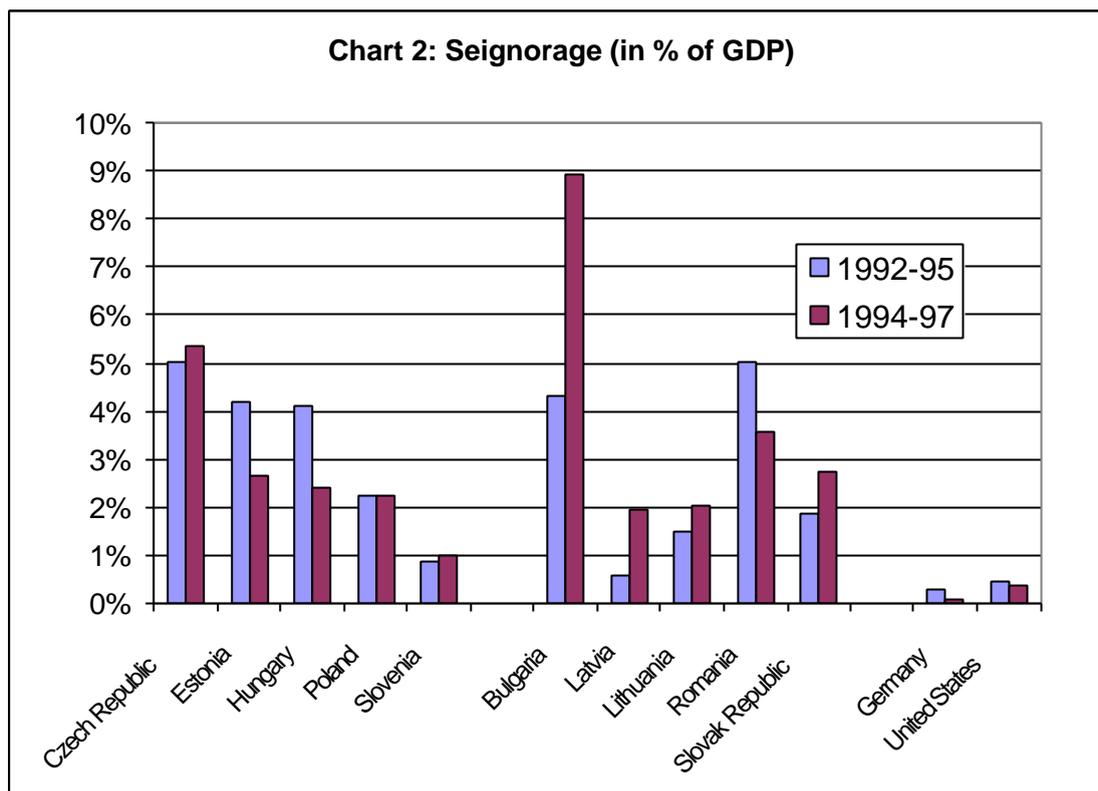
Second, leaving legal aspects aside, fiscal dominance is hard to describe and even harder to measure. Here, we use a common indicator, namely the degree to which governments recourse to seigniorage revenues due to a weak tax system. While in advanced countries seigniorage is negligible, developing countries do rely on this way of raising revenue. Seigniorage obviously reduces statutory independence. In the context of developing countries, it is hence the *de facto* central bank independence that is important.

Chart 2 presents some evidence on seigniorage in CEECs⁸⁹ and industrialized countries.

⁸⁷ See for EU accession countries Hochreiter and Riesinger (1995), and Radzyner and Riesinger (1997). Lybek (1999) focuses on the Baltics, Russia, and the Former Soviet Union; Äimä (1998) on the Baltics.

⁸⁸ See Hochreiter and Riesinger (1995), p. 20.

⁸⁹ We follow Masson *et al.* (1997) in defining seigniorage as the annual change in the monetary base divided by nominal GDP. This simple measure suffers from methodological shortcomings, but has the advantage of cross-country comparability, see Masson *et al.* (1997) footnote 29, 30, and appendix 1.



Source: Author's calculations, based on IMF, International Financial Statistics.

While first-tier accession countries seem to reduce or hold constant their recourse to seignorage financing, there is no clear message regarding second-tier countries. The level of seignorage in CEECs, however, lies considerably above developed country standards. It goes without saying that this approach suffers from serious data restrictions. First, it is difficult to estimate seignorage behavior before the opening of the Eastern Hemisphere, due to lack of data and/or incomparability. Second, even during the transition process, data will be incomplete or, in some cases, at least questionable. This is why we restrict our assessment to the rather short periods of 1992-95 and 1994-97.

A further exercise is to compare these results to the reliance on seignorage in IT countries before implementation of the new framework. MASSON ET AL (1997) estimate that for the seven major IT countries⁹⁰, the average annual rate of seignorage between 1980 and 1991 has amounted to 0.59 percent of GDP (and, interestingly enough, has not moved significantly after IT introduction)⁹¹. This figure is well below the level in Central and Eastern Europe (annual average 4.24% for the period 1992-

⁹⁰ See Table 1, except for Israel.

97), but most IT countries have not experienced an economic history, which comes close to the transformation process. As already stated, we observe a trend towards lower levels of seigniorage in first-tier accession countries. The point we want to make here is that the remodeling of central bank laws in CEE has created dynamics, which take time to become effective. The decline in seigniorage is in our view a first sign of diminishing influence of the fiscal policymaker on the monetary policy stance. In other words, new central bank laws in more advanced reform countries have been slightly more effective in terms of *de facto* central bank independence than those in second-tier accession countries.

Summing up, the main conclusion of this investigation into seigniorage behavior is that first-tier accession countries seem to qualify for an Inflation Targeting framework as soon as central bank law amendments have become effective. This will surely be the case several years from now. As far as second-tier accession countries are concerned, a less optimistic view arises: not only that seigniorage levels are too high to indicate a *de facto* independence of the central bank, even a clear trend seems to be lacking towards a (slow) fading out of the creation of revenue by seigniorage. Hence, these countries cannot be considered ready for the adoption of a policy framework building on *de facto* central bank independence.

5.2.2 Competing goals in EU-Accession: The role of the exchange rate

It is commonly argued that Inflation Targeting requires inflation to be the only or overriding target of monetary policy⁹². CEECs however have made substantial use of the exchange rate during the 90s in order to facilitate economic stabilization. As in the case of Italy⁹³, pegging the exchange rate to a “stable” currency will reduce inflation since inflationary effects of devaluation are eliminated. Furthermore, a sustainable peg will allow transferring credibility from the strong to the weak country. A drawback of an exchange rate peg is the danger of continuous real appreciation, if the domestic inflation rate lies above the rate of the main trading partners. With increasing overvaluation, the peg becomes less credible and the country in question faces speculative attacks.

⁹¹ See Masson *et al.* (1997), table 3.

⁹² See, e.g. Bernanke *et al.* (1999).

Several countries in Central and Eastern Europe (Estonia being the most prominent) have adopted credible pegs in the form of a currency board arrangement (CBA). Others employ a crawling peg (Hungary, Poland) or a managed float exchange rate regime (Czech Republic, Slovenia), *de facto* shadowing a Western currency or a basket⁹⁴. These middle-of-the-road arrangements imply considerable discretion for the monetary authorities in ranking their policy goals. The common focus on the exchange rate however is closely linked to the fact that all these countries can be considered “small open economies”. The more open an economy is, the heavier it depends on the exchange rate as a policy instrument. One simple measure of openness is to set average ex-/imports in relation to GDP. A quick look at the data given in Table 3⁹⁵ reveals that the sample IT countries have not experienced dramatic modifications in their degree of openness before and after the adoption of the new framework⁹⁶. Also, deviations from the mean are rather negligible. Poland and Hungary can be considered similar in this sense: their degree of openness lies in the 20-30 percent range, too, with rather small deviations over time. Czech Republic and Estonia appear considerably more open (a caveat regarding Estonian data applies), presumably relying to a larger extent on the exchange rate⁹⁷.

	Average 1990-98	Standard deviation	Average 1980-89	Standard deviation
Czech Republic	45.44%	3.23%		
Estonia	51.04%	18.34%		
Hungary	30.07%	1.94%		
Poland	20.98%	2.35%		
New Zealand	22.64%	0.77%	22.69%	2.58%
Canada	27.68%	5.08%	23.28%	1.28%
Australia	15.13%	0.99%	14.10%	0.69%

Source: Author’s calculations, based on IMF, International Financial Statistics.

⁹³ See Giavazzi and Pagano (1988).

⁹⁴ For the remainder of this chapter we focus on these first-tier accession countries since they are more likely to adopt an IT framework.

⁹⁵ Imports are measured on c.i.f. basis, except for Czech Republic (f.o.b.). We exclude Slovenia from our sample due lack of data. In the Estonian case, serious concern about the data reliability is adequate.

⁹⁶ Taking two periods from 1980-89 and from 1990-98 is coherent with the introduction of IT in New Zealand (1990) and Canada (early 1991), less so with Australia (1993). Since Australian figures hardly vary over time, a more adequate period subdivision does not modify the results.

⁹⁷ Note that, following this measure, the US and the EU are extremely closed economies, ranging slightly below (EU) or above (US) 10 percent. For a discussion of the role of the Euro exchange rate for European monetary policy, see Scheide and Solveen (1997).

Among IT countries in the sample, Canada is the most open one. Furthermore, the degree of openness has grown from 22% in 1990 to almost 35% in 1998. Interestingly enough, Canada uses as information variable in the forecasting process a monetary conditions index (MCI), which is based on interest and exchange rates.

In our view, this constitutes a viable road for CEECs, willing to target inflation. Due to the openness of most Central and Eastern European Countries (including those in the second tier), the exchange rate constitutes a pivotal policy instrument. However, this does not imply that these economies have to “content” themselves with simple exchange rate targeting. As transition economies grow, external stabilization via the exchange rate loses importance to domestic policy goals, which can be better pursued by following other monetary strategies. At this point, IT comes into the game: openness does not impede successful targeting of inflation, since there is an easy way to account for it. Following the Canadian example, transition economies could rely on a monetary conditions index as an information variable to predict future inflation. Stressing the predominant role of exchange rates in the MCI, these countries could arguably respect the importance of international trade for their country and, on the other hand, move from a merely exchange-rate-based approach to a more sophisticated framework for monetary policy.

6 Conclusion

There is a clear trend towards Inflation Targeting as monetary policy framework. Roughly ten countries have already adopted it or are in the process of implementation, Korea, Poland, and possibly the Philippines being the latest arrivals.

After the breakdown of intermediate monetary targeting, the inflation rate has emerged as “natural” goal of monetary policy. A case can be made for targeting low and stable inflation on a wide variety of grounds. Most importantly, a number of studies have found an inverse relationship between inflation and economic growth.

IT cannot be viewed as a strict “rule” of monetary policy. In a promising environment for IT, the central bank is able to freely choose and set its instruments in order to accomplish the overriding goal of price stability and possible non-competing secondary goals. On an operational level, most adhering monetary authorities target the inflation rate (instead of the price level) as measured by a corrected CPI (core inflation). Accounting for a measurement bias, they commonly target a range of two to three percent around the actually intended value for inflation. Given that Inflation Targeting essentially means inflation forecast targeting, the role of inflation indicators cannot be overestimated. Indicator quality varies across countries, but forecasting errors remain considerable. Increased transparency of monetary policy and clear accountability of the central bank comes as a by-product of IT: adhering countries have reached a high degree of communication between the monetary authority and the public.

Regarding the outcome of IT, the empirical data is overwhelming: nearly all countries have experienced a discrete drop in actual inflation right the year after introduction. This can be seen as a secondary effect of IT. We argue that the adoption of the new framework lowered the public’s inflation expectations, actual changes in monetary would have taken more time to work through the transmission mechanism.

Turning to Central and Eastern Europe, we conclude that seigniorage revenues are a distinct feature of all transition economies, especially those which form the second-tier EU-accession countries. On the other hand, all countries have modified their

respective central banking laws along Western European lines. Taking into account the time these constitutional changes take to become effective, we see a case for several advanced transition economies, such as Czech Republic or Hungary, to follow the Polish example and seriously consider Inflation Targeting as a possible framework for monetary policy.

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