Zentrum für Europäische Integrationsforschung
Center for European Integration Studies
Rheinische Friedrich-Wilhelms-Universität Bonn

Lucjan T. Orlowski

A DYNAMIC APPROACH TO INFLATION TARGETING IN TRANSITION ECONOMIES

Working Paper

B 11
2000

ISSN 1436-6053

Zentrum für Europäische Integrationsforschung
Center for European Integration Studies
Rheinische Friedrich-Wilhelms-Universität Bonn

Walter-Flex-Straße 3
D-53113 Bonn
Germany

Tel.: +49-228-73-9218
Fax: +49-228-73-1809
http: //www.zei.de

A DYNAMIC APPROACH TO INFLATION TARGETING IN TRANSITION ECONOMIES

by Lucjan T. Orlowski*

*Professor of Economics, Sacred Heart University, 5151 Park Avenue, Fairfield, CT 06432. USA. Tel. +1 203 371 7858. E-mail: OrlowskiL@sacredheart.edu or LTOrlowski@aol.com

Abstract:

This study views inflation targeting as a viable monetary regime for more advanced transition economies. A dynamic approach to the trajectory of disinflation and to the flexibility of direct inflation targeting is presented in the context of achieving monetary convergence to the EU/AMU. The candidate countries are advised to begin from strict inflation targeting and to follow with a more flexible inflation targeting regime before they establish a necessary 'foundational credibility' and monetary stability. These steps, ultimately followed by a euro-peg, are necessary in preparing for accession to the eurozone. The early experiences of the Czech Republic and Poland with inflation targeting are examined.

JEL classification numbers: E32, E52, P33

This version:

August 2000

* The author acknowledges support from the Center for European Integration Studies (ZEI) at the University of Bonn. He is indebted to Jürgen von Hagen, Jens Hölscher, Boris Hofmann and Birgit Uhlenbrock for valuable comments and suggestions to this study.

I. Introduction

Central European transition economies (TEs) have adopted more flexible monetary policies at various stages of their economic transformation. At the beginning of the transformation process, they generally applied a currency peg as a nominal anchor that was essential for initiating macroeconomic stability. This approach helped them eradicate corrective inflation and lay the foundations for establishing a credible monetary policy. [1]

TEs monetary authorities have gradually departed from fixed exchange rate regimes in an effort to slow down the real appreciation of their national currencies and thus to prevent the advancement of a large current account deficit and the development of an unfavorable risk structure of capital inflows. Since their 'exit strategies' resulted in losing an important disciplinary tool of monetary policy, they began searching for alternative regimes that would allow them to accomplish effectively the ultimate goal of price stability. However, neither the currency peg nor the diverse 'exit strategies' alone have been successful in eradicating the problems of high nominal indexation and inertial inflation.

This paper argues that the TEs monetary authorities will be well advised to focus on the projected path of disinflation in their monetary policy strategies and tactics. Their pursuit of price stability can be strengthened by applying *direct inflation targeting* (DIT), viewed here as a viable and desirable policy option for the economies in transition. This approach can help them bring inflation down to a low, sustainable level. Only when this task is reasonably accomplished can the candidate countries for accession to the European Union (EU) begin preparations for entry to the European Monetary Union (EMU).

For the purpose of this analysis, DIT is defined as a forward-looking monetary policy framework that rests upon the official forecast of disinflation as an intermediate policy target. Such a policy requires fully communicating and explaining key strategies, methods of

implementation and outcomes to the public at large [2]. This paper argues that DIT is likely to reduce the scope of nominal indexation, which has been ubiquitous during the economic transformation. It can also diminish the volatility of interest rates and exchange rates and ultimately contribute to the stability of financial markets, thereby extending the maturity of capital investment.

The analysis begins from the arguments in favor of DIT, in compliance with the objectives of developing the environment of price stability that are presented in section II. A model representing an optimal scenario of approaching the EU/EMU accession is developed in section III. Section IV advances a related model that represents central bank policy dilemmas and choices between DIT (in a strict and a flexible version) and convergence to a euro-peg. The theoretical analysis is followed by the description of inflation targeting regimes in the Czech Republic and in Poland, presented in section V. The early empirical effects of both regimes are examined in Section VI, followed by concluding remarks in Section VII.

II. Advantages of Direct Inflation Targeting for Transition Economies

By its design and implementation, DIT is distinct from former monetary policy targeting systems that were applied by TEs in the early stage of transformation, namely, the exchange rate peg, interest rate targeting and money growth targeting. Under the former regimes, central banks of TEs used to conduct their policies in a backward-looking and highly discretionary manner due to their rather limited experience with independent monetary policies. They tended to respond actively to any observed shocks in monetary variables. By contrast, DIT is essentially a forward-looking policy regime based on ‘constrained discretion’. In essence, it is still relatively discretionary, because it allows room for adjustments in monetary instruments, although these changes are constrained by adhering to the pre-determined inflation target. Since DIT is intended

to gear public expectations to the official target, it relies strongly on the rational expectations channel of monetary policy transmission and less on the exchange rate or the aggregate demand channels [3].

DIT has several intrinsic features that appear to be particularly beneficial to the more advanced reforming economies of Central Europe at the present stage of their economic transformation. Among such features are formulation and comprehensive disclosure of the official inflation forecast to the public at large. The central bank pursuing inflation targeting needs to present a credible outlook for inflation, along with an analysis of the economic conditionality. By doing so, the central bank reinforces a message about its unequivocal *commitment to price stability*. However, a vague statement about commitment to achieving the target is not sufficient for the policy success by itself. Central banks that engage in inflation targeting need to formulate a credible and transparent framework of DIT strategy, tactics and instruments. Therefore, DIT provides the opportunity to enhance *transparency, accountability* and, ultimately, *credibility* of monetary policies in TEs.

The formulation and public disclosure of a cohesive DIT framework would imply a certain degree of sophistication and maturity of monetary authorities in TEs. It would demonstrate an advancement of monetary policy from a backward-looking to a forward-looking regime. In this sense, DIT has a chance to contribute to the *institutional advancement of monetary strategy and tactics* in more advanced economies in transition. However, this premise can be accomplished only if the central bank has developed satisfactory technical capabilities to conduct this type of monetary policy [4]. At minimum, the central bank needs to gather a fair amount of knowledge about the internal and external factors contributing to inflation at the present stage of economic transformation. Moreover, it needs to become familiarized with causal effects, time lags and the significance of monetary transmission channels in order to devise proper responses to the deviation of the inflation forecast from the inflation target. This is a vulnerable feature of

monetary policies in Central European TEs. Some of the central banks in the region, including the National Bank of Poland (NBP) and the Czech National Bank (CNB), experimented with frequently adjusting the intermediate targets of monetary policy during the period between the adoption of the currency peg to the dollar at the beginning of the economic transformation and the inception of DIT regimes (Orlowski, 2000b). Particularly in the case of Poland during the period 1995-1999, the policy changes, which included interest rate targeting, monetary base targeting and money growth targeting, induced a considerable instability of monetary transmission channels. As shown in Orlowski (2000b), the exchange rate channel has been rather inactive in Poland and the Czech Republic during 1995-1999, in sharp contrast to Hungary, where monetary policy centers on exchange rate targeting.

In addition to gaining knowledge about transmission mechanisms, policy lags and causal interactions between monetary variables, central banks need to develop technical facilities to conduct a forward-looking monetary policy. They need to be able to develop an internal inflation forecast for the targeted period, conditional upon stable interest rates or stable exchange rates, so that they can monitor precisely the actual deviations between the forecasted inflation and the inflation target. The outcome of such observations is essential for making operational policy decisions. In addition, it is imperative that central banks rely on indirect instruments of monetary policy, mainly on open market operations based on repo and reverse repo transactions. In order to do so, they need well-developed and effective financial markets. Alternatively applying direct instruments and outright open market operations would introduce a high dose of policy unpredictability and would impair the transparency of monetary policies.

If the forecast of low inflation is credible and fully communicated to the public at large, there is a chance that the private sector will respond with a significantly lower nominal indexation of wages and prices, thus contributing to the disinflation process. Consequently, the DIT regime is likely to *lower the scope of nominal indexation* in TEs and, ultimately, to suppress the inertial

inflation. This precept of DIT is particularly pivotal for TEs because the price discipline stemming from the new, forward-looking policy regime is essential for facilitating the most critical long-term goals of transition, such as enhancing productivity, promoting competition and decomposing monopoly structures.

With respect to monetary policy instrumentalization, the central banks pursuing DIT as a forward-looking policy regime need to develop technical capabilities to monitor deviations between inflation forecasts (both the official and the private sector forecasts) and the inflation target. It is imperative that they do not rely exclusively on adjusting interest rates in response to any observed shocks that are perceived as potentially threatening to price stability. They may use announcements of a *future policy bias* instead. In particular, if they observe potentially destabilizing inflation shocks, they may announce a tightening bias for the pre-determined future operational period. This certainly may be considered a viable policy tool in response to globally rising inflation expectations and nominal interest rates. In this sense, the tightening bias announcement is likely to translate, with a relatively short impact lag, to lower inflation expectations. Therefore, it may play an important role in suppressing nominal indexation. But a future policy bias is a good substitute for the actual interest rate increase if monetary policy has already gained an initial or 'foundational' credibility. If the tightening bias announcement is not credible, it may aggravate rather than reduce inflation expectations, which would undermine the inflation targeting system. Moreover, the policy bias rather than an actual increase in interest rates may help maintain uncovered interest rate parity with foreign markets and, subsequently, prevent excessive nominal and real appreciation of the national currency. Therefore, the policy bias may provide some relief by means of pressures on the current account deficit accompanied by large inflows of short term capital, which would be otherwise instigated by rising interest rate differentials and by real appreciation of domestic currency. This is yet another attractive feature

of DIT for TEs that at the present stage of transition have been plagued by real currency appreciation and large current account deficits (Halpern and Wyplosz, 1999).

In general terms, the future policy bias relieves monetary authorities from unexpected, explicit increases in interest rates, which would lead to a credit squeeze and thereby inhibit growth and structural adjustments. Thus, in principle, the announcement of a tightening bias may alleviate high social and economic costs, which are otherwise induced by actual monetary tightening. Using a future bias as a policy tool reinforces a message about the institutional advancement of monetary policies in TEs. A future policy bias consistent with a forward-looking policy regime is certainly a step forward comparing to the backward-looking systems in which central banks have to rely on rising interest rates in response to inflation shocks.

Because of its forward-looking character, DIT requires a radical change in the operational system of central banks, primarily those in transition countries that have been accustomed to discretionary adjustments in interest rates. As stated above, the main monitoring devise within the DIT framework is the difference between the inflation forecast and the inflation target. Central banks will certainly announce a tighter future course of monetary policy or opt to raise interest rates if the inflation forecast exceeds the target by more than the margin of tolerance, thereby posing a danger to long-term price stability. Such a change in the operational framework of monetary policy not only requires a technical ability to forecast inflation, but it also necessitates a major adjustment in the degree of professional knowledge and in the cultural attitudes of policy makers and recipients. In particular, it is imperative that operational and policy research departments at central banks and ministries of finance fully understand the new monetary system. This may be a problem in TEs where it may be difficult for staff members of these institutions to give up the tradition of active management and monitoring of exchange rates and discretionary changes in interest rates. An introduction of DIT in these countries ought to be accompanied by the comprehensive training of personnel at these institutions.

Additional benefits of DIT applicable to TEs stem from the expanded flexibility of exchange rates. Because the new policy regime focuses on domestic inflation, it requires a simultaneous application of flexible exchange rates (Svensson, 1999a; Mishkin, 2000). While DIT is consistent with fully flexible exchange rates in principle, in practice its flexibility depends on the width of the inflation tolerance band, that is, on the rigidity of the DIT system. As argued by Svensson (1999a), a *strict inflation targeting (SIT),* which requires a firm adherence of inflation to a narrow band around the midpoint target, must be accompanied by a full float. A wider tolerance band implies a simultaneous consideration of output stability (minimizing variability of the output gap) by a central bank, and the corresponding stability of exchange rates. Therefore, a more *flexible inflation targeting (FIT)* may allow for the adoption of a concurrent band of permitted currency fluctuations, at least for monitoring purposes.

The key advantage of flexible exchange rates in TEs is their impact on a more favorable risk structure of capital inflows. By contrast, fixed exchange rates applied in various forms by those TEs that are continuously battling high inertial inflation instigate expectations of real currency appreciation. Such expectations normally contribute to large short-term capital inflows and, consequently, to an unfavorable risk structure of capital account balance (Halpern and Wyplosz, 1999; Masson, 1999; Orlowski 2000b). There is, however, the danger of large nominal currency appreciation if a transition country experiences a large, one-time inflow of privatization receipts, but this type of currency shock is generally not destabilizing, and it does not require a monetary policy response.

Although the benefits of DIT for countries in transition are quite apparent, the policy success depends on the methods and instruments of its implementation. Certainly, the key condition for the policy success is the government's ability to maintain fiscal discipline. It is, therefore, imperative that fiscal authorities share the responsibility for achieving inflation targets with central banks. They also need to become actively involved in establishing a feasible path of

disinflation consistent with fiscal policy conditions. Inflation targets and their current compliance ought to be a focal point of periodic consultations between finance ministries and central banks. It is desirable that such consultations, in the form of regular joint sessions of the respective governing councils responsible for policy strategies, are fully disclosed to the public at large in a timely fashion.

Since prudent fiscal policy is a strict perquisite for successful DIT, this type of monetary regime may not be feasible in the countries that have not yet reformed the fiscal system and established fiscal discipline (Mishkin, 2000). An outright fiscal dominance, leading to large budget deficits that are financed by money creation, inadvertently results in substantial currency devaluation that ultimately explodes public debt. This is likely to aggravate inflation, which in turn will erode credibility of monetary authorities. Consequently, the presence of fiscal dominance is likely to force monetary authorities to seek alternative means of establishing price stability, perhaps by returning to a currency peg.

A further threat to DIT in TEs may come from the scale of adjustments in administrative prices by fiscal authorities. Such adjustments are always subject to political pressures, which are strongly correlated with political instability. Although the share of items included in the CPI that are subject to administrative price adjustments is relatively low (not exceeding 20 percent) in the advanced Central European TEs, their price increases instigate strong feedback effects on unregulated prices. The regulated prices, mostly prices of energy and transportation, are often presumed to reflect the official inflation expectations of the government, since more comprehensive forecasts in TEs have been rather ambiguous and vaguely communicated to the public. Therefore, the scale of administrative price increases is instrumental in determining the scope of nominal indexation in these economies. In addition, increases in the regulated prices of energy and transportation have a widespread impact on the overall costs of production; hence they contribute to supply-side inflation that may inhibit successful implementation of DIT.

An additional constraint to full-fledged DIT in TEs comes from the high degree of openness of these countries, as implied by their high import-to-GDP ratios. It makes these countries vulnerable to external price shocks and strongly dependent on external business cycles. Under such circumstances, their monetary policies cannot be fully autonomous. For this reason, central banks of TEs cannot completely ignore external imbalances and exchange rates. Therefore, a FIT regime that allows paying some attention to exchange rate stability may be a more viable policy option for these economies. It would provide them with an opportunity to accommodate external price shocks and to diminish the risk of speculative attacks on their currencies.

It is rather difficult to find clear disadvantages of DIT for TEs, assuming the policy is properly designed and implemented. However, there are several *reservations* about its premature introduction in some of the transition countries (Masson, 1999; Christofferssen and Wescott, 1999; Orlowski, 2000a). In particular, an individual country may not be ready for DIT if its financial markets are underdeveloped. That would inhibit a central bank's ability to carry out open market operations. In addition, underdeveloped financial markets cannot provide adequate information about equilibrium interest rates, and they are not deep enough to provide public debt financing.

Before deciding to adopt a DIT regime, the central banks of TEs need to gather some preliminary knowledge about monetary policy transmission channels, their duration and optimal policy lags. This knowledge is essential for enabling a central bank to formulate an adequate reaction function and to produce inflation forecasts along their probability distribution. These forecasts need to include private sector inflation expectations, extra-model information, the status of leading indicators and other factors relevant for inflation forecasting. In the absence of such knowledge, inflation may become very difficult to control, and there may be a high risk of failure for the central bank to hit the inflation target. Missing the target by a wide margin may inhibit the central bank's accountability and credibility.

Countries in transition may also face serious difficulties with forecasting inflation because of the considerable degree of instability of relative prices in these economies as they are experiencing deep structural adjustments, shifting from the industrial structure developed under central planning to those determined by their re-integration with the world economy. These changes in relative prices are likely to continue, particularly as a result of the ongoing integration of their markets with the EU. In addition, TEs are predominantly small, open economies that are prone to absorb large external price shocks, the duration of which is highly unpredictable. Therefore, it is rather difficult for a single economic entity, including a central bank, to forecast the path and the volatility of inflation in an open economy environment. In order to overcome this deficiency at least partially, a central bank may choose to seek consultations with a broad range of independent institutions representing the private sector. Their independent inflation forecasts will serve as a valuable resource for assessing the expected path of inflation.

In sum, DIT is a beneficial monetary regime that can facilitate the process of the economic transformation in more advanced TEs. However, this type of monetary regime is not suitable for countries that have not moved to the advanced stages of transition. In particular, DIT requires that a certain degree of monetary credibility be established prior to its inception. It relies on the rational expectations channel of monetary transmission, which under low credibility conditions may yield perverse effects that jeopardize price stability. In addition, the DIT strategy can be effectively facilitated through indirect instruments of monetary policy that require sufficiently developed and relatively stable financial markets. Therefore, this type of monetary regime is not suitable for the economic systems that are still at the early stages of transition.

The net effects of DIT relative to the alternative monetary regimes depend on its proper design and implementation in TEs. The announcement of DIT alone is not a panacea for price stability. Upon the inception of the new policy regime, central banks as well as fiscal authorities need to demonstrate a firm commitment to disinflation, which will be supported by designing a

comprehensive DIT framework, including a system of communicating policy to the public at large.

III. DIT Design in Preparations for the EU/EMU

Among the key issues for the DIT design in TEs are the optimal speed of disinflation and the speed of reactions that offset temporary shocks to inflation. Designing the optimal speed (trajectory) of disinflation means choosing the long-term goal of inflation along with the intermediate midpoint targets. It is strongly affected by the reaction timing of private sector inflation expectations to the change in the policy regime. As King (1997) suggests, this timing is a relevant factor for countries moving from moderate inflation to price stability, while it becomes less relevant for those who have already reached a sustainable, low inflation environment. Designing the optimal trajectory of disinflation becomes important for TEs not only because they are moving from moderate to low inflation, but also because they are experiencing deep structural adjustments and decomposing monopoly structures. For these reasons, the realistic speed of disinflation may be slower in TEs than in most of the developed countries because of the longevity of their structural changes. The existing impediments to competitive markets compel us to question the viability of rapid trajectory disinflation. In addition, the speed of convergence to price stability may be slower due to the strong feedback effects of administratively regulated prices on unregulated prices. In general terms, the trajectory of disinflation is a function of the financial and commodity markets' ability to restructure, which directly depends on the flexibility of labor and capital markets. It is also the function of a central bank's already established fundamental credibility. The trajectory of disinflation needs to be slower if labor and capital markets are not flexible and the central bank has not established a solid credibility foundation.

The speed at which temporary inflation shocks are accommodated is reflected by the width of the tolerance band around the midpoint target of inflation. Therefore, it determines the inflation targeting regime's flexibility. This problem is highly relevant for TEs because of their small size and high openness. These factors affect their vulnerability to external price shocks, as well as to the contagion effects of financial crises and speculative currency attacks. These dangers are additionally amplified by the far-reaching liberalization of capital markets in Central European TEs. The large exposure of these countries to external shocks calls for a wider tolerance band. It is imperative that the band is wide enough to allow for a sufficient policy decision lag. This is a relevant issue for the monetary authorities of TEs since, due to their limited experience with autonomous monetary policy, they have been accustomed to discretionary, almost instantaneous reactions to most of the observed inflation shocks, regardless of their permanent or self-correcting nature. A narrower band, or a SIT system, imposes rigid constraints on the degree of discretion in policy decisions. Thus, it offers some important advantages at the early stage of DIT. However, the excessive width of the tolerance band may undermine credibility of the inflation target. Excessive flexibility could possibly weaken monetary discipline and send mixed signals about the central bank's commitment to price stability. Once monetary policy in a transition country becomes more credible and transparent, and the long-term price stability becomes predictable at least on the basis of endogenous or 'internal' factors, the TEs may switch to a FIT framework. By doing so, they will gain more leverage against external price shocks and possible speculative attacks on their currencies.

Taking into consideration the factors affecting the optimal trajectory of disinflation and the policy flexibility, this study proposes ***a dynamic model of DIT*** for TEs following the path of monetary convergence desirable for accession into the EU/EMU (Figure 1). The ultimate goal of price stability is viewed here as the inflation convergence π_n that is consistent with the price stability target upon the entry into the eurozone at time t_3.

.....insert Figure 1 around here .....

Source: the author.

Candidates for the EU/EMU integration start the process of monetary policy adjustment from a relatively high level of moderate inflation (as defined, for instance, by Fischer, Sahay and Végh, 2000). The initial tolerance band is reasonably narrow to underpin a commitment to disinflation and reinforce the discipline of price stability. In practical terms, for a country aiming to curb inflation from, say, 10 percent at the initial period t_0 to around 5 percent at the medium term period t_1, the band has a symmetric width of 1 percent around the midpoint that follows the assumed trajectory of disinflation.

When the lower bound of the tolerance band reaches a pre-determined inflation level of $\pi_{m,}$ the band of permitted deviations from the midpoint target can be expanded. The corresponding time frame t_1 will coincide with the institutional advancement of the DIT framework. At t_1, the new policy will be sufficiently credible as judged on the basis of achieving a closer match between the private sector inflation expectations and the official inflation forecast. The actual inflation will have to fall to a sustainable level that enables central banks to set up and to monitor its behavioral models with a fair degree of accuracy. It is imperative, that central banks in TEs will attempt to announce the intended timing of t_1 well in advance as a demonstration of their commitment to disinflation.

During the period t_1t_2, TEs may choose to expand the tolerance band and move to a more flexible variant of inflation targeting. This will enable them to take advantage of the enhanced flexibility, including a comfort of a longer policy decision lag and more leverage for accommodating external inflation shocks. Time t_2 is consistent with the official entry of the candidates to the EU that will simultaneously imply the early stage of active preparations for

accession to the EMU. During the following time period t_2t_3, it will be necessary to demonstrate a smooth convergence of inflation to the π_n target determined by the EMU entry conditions. Inflation targeting will be gradually phased out and replaced by exchange rate targeting. It is only at that, rather remote, period in which the candidates will be advised to join the exchange rate mechanism II (ERM II), which stipulations are still rather nebulous. That will essentially mean the end of the full-fledged inflation targeting regime for the TEs. Alternatively, they may want to preserve some elements of DIT, although in a restricted form, by applying a shadow peg to the euro that may occur even before the official accession to the EU [5]. The timing of t_2 does not have to coincide with the EU entry. It may be also advisable for central banks of TEs to determine a shadow peg to the euro relatively early in the prescribed scenario of monetary convergence, however, strictly for monitoring purposes. Nevertheless, it will make sense practically to do so only upon switching to a FIT system, since, in principle, currency stability shall not matter under the SIT regime.

Phasing out DIT and simultaneously applying a formal shadow peg to the euro shall not be tied to the cumbersome and politically biased process of the EU accession. An early application of a shadow peg will enable the TEs to pursue the monetary convergence to the EMU more aggressively and to cut short the time frame between the EU and the EMU accession. The time of the EMU accession can be estimated roughly in advance, although the candidates cannot afford to be too optimistic about it. An official declaration of the EMU entry that is imprudent and premature may hurt their credibility and undermine the entire process of monetary convergence. A premature peg to the euro entails at least two hazards (Masson, 1999). It inadvertently leads to real currency appreciation due to faster labor productivity growth and due to a trend increase in non-traded goods in TEs. It also makes a defense of the currency peg very costly in quasi-fiscal terms in the presence of strong capital inflows to these fast growing economies.

The long-term scenario of monetary convergence ought to be supplemented by explicit and transparent rules for policy responses in the case of inflation exceeding the target. Such policy rules will resolve the issue of asymmetry of inflation targeting, or in other words, they will explain how rigorous and binding each of the boundaries of the inflation tolerance band are. It will be also necessary for central banks to design conditional reaction functions for inflation forecasts. Due to the special circumstances of pursuing a 'return-to-peg' strategy during the period t_2t_3, these reaction functions will need to be specified with a 'condition' of stable exchange rate. This logic departs from the widely analyzed models of inflation targeting regimes in which inflation targets are 'conditional' upon stable or, more recently, zero-bound interest rates (Svensson, 2000; Orphanides and Wieland, 1999; Woodford, 2000).

Therefore, it will be prudent for central banks of TEs to further the investigation of interactions between inflation and exchange rates, depending upon the application of alternative policy regimes. As documented by Orlowski (2000b), there were strong causal effects of inflation on exchange rates in Poland and in the Czech Republic during the period 1995-1999. But the exchange rate channel of monetary transmission, that is the impact of changes in the exchange rate on inflation was not significant in these inflation targeting countries, in a sharp contrast to Hungary, whose monetary policy focuses on exchange rate stability. Some of the implications of the variant monetary regimes in TEs are examined by the model representing a central bank reaction function that reflects policy choices between inflation forecast versus exchange rate stability targeting (DIT-ERT Model).

IV. The Model of Targeting Inflation vs. Exchange Rate Stability

The dilemmas of monetary policy in TEs related to switching between inflation targeting and exchange rate stability targeting regimes are shown in Figure 2. The concept is fundamentally

derived from various forms of central bank reaction functions advanced in the economic literature [6]. Most of these models focus on the central bank quadratic loss function representing a tradeoff between inflation variability and output gap variability.

In this analysis, policy makers can switch between applying SIT with fully flexible exchange rates on the one extreme, and a fixed exchange rate on the other. The model assumes a strong correlation between output and exchange rates, in a small, open economy environment. It further assumes, although reluctantly, that interest rates and exchange rates are perfectly connected satisfying the uncovered interest parity condition. Such flexibility of financial markets requires their full liberalization and a sufficient depth. Therefore, the central bank reaction function L_t can be prescribed as:

$$L_t = \frac{1}{2}[(p_t - p^*)^2 + j\,(e_t)^2] \tag{1}$$

where p_t is an index of inflation over time t and p^* is the midpoint inflation target. The variability of the exchange rate e_t is determined by:

$$e_t = d\,(E_t - E^*)/d\,t \tag{2}$$

E_t and E* are, respectively, the current nominal value of foreign currency in domestic currency terms, and the target exchange rate. For the purpose of this analysis, the latter is assumed to be consistent with the targeted exchange rate convergence to the EMU.

One of the most crucial decisions of a central bank is the choice of the parameter j that reflects the relative preference for exchange rate targeting. This parameter demonstrates how actively the monetary policy reacts to the exchange rate stability relative to its long-term target E*, which can be viewed, for the purpose of this analysis, as a currency convergence target that is desirable for a candidate entering the eurozone. A central bank is concerned about active

management of the exchange rate with j >0, presumably with an objective of stabilizing the current account position and managing a risk structure of capital inflows. But if the central bank wants to emphasize a full, unquestionable commitment to hitting the inflation target, it will ignore active management of the exchange rate and it will apply a fully floating currency regime. Then, j will be equal zero and the central bank will adopt a SIT approach to monetary policy. Consequently, the quadratic reaction function will become:

$$L_t = \frac{1}{2}(p_t - p^*)^2 \tag{3}$$

Because DIT is a forward-looking policy framework, it shall be viewed within the context of *inflation forecast targeting*, as implied by Svensson (1999a and 2000). Therefore, for practical reasons, inflation variability I_t^p can be stated as a deviation of the conditional inflation forecast $\Pi_{t+T/t}(e)$ from the inflation target p^*. Stating more precisely, $\Pi_{t+T/t}(e)$ represents the forecast of inflation for T-periods ahead, formulated at time t, which is conditional upon a stable exchange rate. The inflation variability assumes a form:

$$I_t^p = \Pi_{t+T/t}(e_{t-1}) - p^* \tag{4}$$

As a result, the central bank's reaction function representing the DIT-ERT model becomes:

$$L_t = \frac{1}{2}[(I_t^p)^2 + j(e_t)^2] \tag{5}$$

The preference parameter j is treated in dynamic terms as $j_{\Delta} > 0$, that is, as a process of moving from a stricter version of inflation targeting, through a more flexible variant, to a currency peg. This process is consistent with the exchange rate convergence to the euro-peg. It can be viewed as a 'smoothing objective' of the gradual adjustment of the exchange rate in response to the long-term objective of price stability.

It can be noted further that a periodic change in the inflation forecast assumes a form:

$$I_t^p - I_{t-1}^p = (j / k)\, \Delta(e_t) \qquad (6)$$

where k is the slope of the actual central bank reaction function in a given time period t. Both the parameter j and the slope k depend on the degree of the central bank's 'foundational credibility' understood as ex-post credibility earned prior to the policy application.

The examined process of monetary convergence focusing on transition from inflation targeting to a currency peg may be reiterated by a graphical presentation (Figure 2). A central bank begins the convergence from point C', consistent with a SIT approach to inflation targeting. It wants to minimize, at this stage, the deviation I_{t0} between the inflation forecast and the inflation target. By doing so, the central bank permits the exchange rate to fluctuate indefinitely (j =0). Such a strict adherence to the objective of minimizing inflation variability is aimed at enhancing the policy credibility, or building the foundational credibility over time. The credibility is initially very low, as represented by the locus l_2. When the credibility objective is successfully accomplished, the locus moves to l_1 , and the central bank may choose to move to a more flexible version of inflation targeting regime at point B. Without the credibility enhancement, the application of FIT would allow to combine the inflation and the exchange rate variability at point C along a more linear (k = constant) reaction function L_t. The higher credibility variant at point B

relative to point C denotes the ability to accomplish smaller deviations of the inflation forecast from the inflation target combined with a lower variability of the exchange rate ($I_{t1} < I_{t2}$).

..... insert Figure 2 around here .....

Source: the author

A further process of monetary convergence is consistent with the gradual closure of DIT and the introduction of the euro-peg. This process is reflected by the period t_2t_3 in Figure 1. In terms of the central bank reaction function shown in Figure 2, the monetary convergence process starts from B (or C) and moves toward the target exchange rate E*. If the move to the euro-peg is premature, thereby inhibiting the policy credibility, the point of convergence moves to C''. By comparison, if the move contributes to fostering credibility, the convergence may end up at point A, yielding a combination of a stable exchange rate and a low, sustainable inflation. It can be further noted that the distance between the origin and the point A is perceived as a credibility lag between the candidate's and the eurozone's monetary policies. This distance may well disappear when the program of monetary convergence becomes ultimately successful.

In sum, the presented theoretical exercise may provide a useful guidance for policy design in TEs that follow a prudent trajectory of monetary convergence to the eurozone. As emphasized before, the key to a successful peg to the euro that minimizes inflation forecast deviation from the inflation target is the ability of a central bank to foster credibility. This, in turn, depends strongly on the monetary policy communication and on the overall policy transparency. Therefore, it is imperative that central banks of TEs develop comprehensive programs of monetary convergence to the euro that are thoroughly communicated and explained to the public at large.

V. The Early Experience with DIT of the Czech Republic and Poland

The Czech Republic and Poland are the only two Central European TEs who have officially declared and adopted inflation targeting monetary regimes. In terms of the design and the instrumentalization of their DIT systems, they are both at an early stage of its advancement. Both the CNB and the NBP have considered DIT after being dissatisfied with the outcomes of the prevoius, alternative policy regimes. The early currency peg proved to trigger real currency appreciation in these economies, which aggravated the balance of payments problems. Subsequent regimes did not work neither. Poland tried to target interest rate in 1996, but in the presence of a strong economic recovery and the transition-related autonomous growth of credit, these targets proved to be difficult to achieve. Real interest rates were exorbitantly high and they hampered the economic growth. In essence, interest rate targeting is associated with a highly discretionary monetary policy that is not advisable for TEs because it aggravates the already high instability of money demand and fluctuations of financial markets. The NBP switched to targeting the monetary base in 1997 and to targeting broad money growth in 1998 but the monetary targeting could not be successfully implemented. Poland's economy experienced a strong growth of autonomous money demand, e.g. the monetization 'catching up' with the comparable levels in industrial economies. As a result, interest rates were lifted to such high levels, at which their ability to restrain money growth was rather neutral (Orlowski, 2000b). Consequently, the CNB and the NBP decided to search for alternative anchors for monetary policy that would work. At that point, DIT seemed to provide a needed monetary discipline and to serve as an effective policy tool enhancing the policy transparency and credibility.

The Czech central bank is a pioneer of DIT among TEs. It has applied the new policy regime as of January 1998, mainly in an attempt to seek alternative tools of monetary discipline after abandoning the currency peg in May 1997. The CNB strongly emphasizes in its annual reports

and policy statements that it has decided to apply *net inflation* (rather than CPI inflation) as an official policy target, in order to renounce responsibility for the inflationary effects that are independent of monetary policy, mainly, the effects of administrative price adjustments. The net inflation index is based on changes in unregulated prices. It excludes from the CPI basket the items, which prices and fees are either directly set by the central and local governments or that are subject to maximum price regulations (price ceilings). At the beginning of 2000, the Czech CPI basket included 754 items, 18 percent of which were subject to administrative price regulations and the remaining 82 percent were unregulated, thus served as a basis for the assessment of net inflation. Still, unregulated prices are heavily biased by the adjustments in administrative prices, particularly in TEs. The scale of increases in regulated prices, primarily the prices of energy and transportation, has strong feedback effects on all prices in the economy through higher overall costs of production. Moreover, such a scale conveys to the private sector the approximation of the official government inflation forecast and it often serves as a basis for nominal indexation.

The CNB adopted a strict version of DIT as a manifestation of a strong commitment to price stability and to the monetary convergence that will qualify the Czech monetary system for a relatively early inclusion in the EMU, preferably right after the accession to the EU. Consistently, a long-term net inflation target has been set at 2 percent for the end of 2005, with a tolerance band of 1 percent on either side of the midpoint target (as stated in the 'Long Term Monetary Policy Strategy' adopted by the CNB Board on March 8, 1999). The Czech central bank foresees a slow and very cautious long-term trajectory of disinflation recognizing that the Czech economy is a small and open system and taking into consideration strong feedback effects of administrative price adjustments on the overall inflation. Specifically, upon the adoption of DIT in January 1998, the Czech Government sharply increased administratively regulated prices, which in turn led to the upsurge in CPI and to the almost instantaneous increase in net inflation,

as shown in Figure 3. This strong adjustment cast doubts about feasibility of the net inflation target set in the range between 5.5 and 6.5 percent for December 1998. Responding to the uncertainty of attaining the target, the CNB applied a very tight monetary policy throughout 1998, while still recovering from the speculative attacks on the Czech Koruna (CZK) of mid-1997 and unable to forecast inflation accurately. It began to lower the interest rates only in the beginning of 1999. Meanwhile, the resulting high real rates and the inverted yield curve on government securities during the entire period led to a slowdown in investment and, consequently, to the overall economic recession of 1998-1999. High inflation expectations in the Czech Republic persisted until the second quarter of 1998. They were fueled by the feedback effects of increased administrative prices and by the instability of financial markets that was additionally exacerbated by strong contagion effects from the Asian financial crisis. Under such circumstances, the magnitude of the monetary tightness was justified as an attempt to suppress these expectations. The tight monetary policy eventually brought down the CPI and the net inflation well below the target levels. Net inflation ended merely at 1.7 percent in December 1998 (3.8 percent below the lower bound of the target range).

The Czech cautious approach to the trajectory of disinflation continued in 1999. The net inflation target was set at 4.0-5.0 percent for the end of that year, but the net inflation scored merely 1.5 percent in December 1999. Moreover, it fell into a negative, deflationary territory between February and October of that year, primarily as a result of declining food prices (CNB, 2000). For the end of 2000, the CNB has set a midpoint target of 4.5 percent and for the end of 2001 a midpoint target of 3.0 percent, maintaining the same tolerance band of 1 percent on either side of the midpoint. In April 2000, the CNB disclosed the net inflation forecast for the end of 2001, set at 2.2-3.9 percent year-on-year, certainly more optimistic than the assumed trajectory of disinflation consistent with the long-term goal. One may question reliability of CNB forecasts considering the recognized deficiencies of technical forecasting of inflation in TEs, including

short-term time series for reliable econometric tests, the bias of structural changes associated with the transition process, and the vulnerability to internal price shocks (administrative price hikes) and to external price shocks (rising import prices). In an attempt to overcome these constraints, the CNB has established an effective communication with independent forecasters representing the leading Czech financial institutions. It conducts a survey of inflation forecasts of ten largest financial market participants, five of whom represent domestic institutions and the other five foreign financial institutions. Their inflation expectations are incorporated in the official CNB inflation forecast.

It appears that the linear trajectory of disinflation aimed at reaching the long-term goal and reflecting a 0.5 percent annual decline in net inflation is extremely and, perhaps, excessively cautious. In fact, the net inflation at the end of the first quarter of 2000 scored 2.1 percent, in spite of strong external inflationary pressures. This cautious approach seems to reflect the CNB's concerns about the scale of administrative price adjustments and their impact on inflation. The year-end increases in regulated prices reached 22.7 percent in 1997, 20.4 percent in 1998, and 4.2 percent in 1999, well above the actual net and the CPI inflation rates. From the standpoint of our DIT-ERT model, the linear trajectory implies a low credibility assumption of the Czech monetary convergence program. However, it gives the CNB a strong cushion in case of unexpected shocks. It also proves an asymmetric weight to the range boundaries. While an excessively high net inflation will be decisively suppressed, net inflation running below the intermediate target range is likely to be ignored. Moreover, the actual net inflation score below the target can be also viewed as an additional factor enhancing the Czech monetary policy credibility.

The choice of net inflation as the main targeting devise of the Czech monetary policy is not very fortunate. A broader approach to inflation is generally regarded as a superior policy (Svensson, 1999b). A CPI-based inflation directly affects the cost of living index for an average consumer, thus it has an explicit effect on consumer decisions. Moreover, it is easily understood

and widely published both by central banks and by outside organizations engaged in monitoring inflation. Therefore, a stronger reliance on CPI is likely to improve transparency of DIT. Considering these advantages, the CNB has decided to put a stronger emphasis on CPI targeting, beginning from 2001 (CNB, 2000). The overall CPI inflation end-of-year target has been set at 5.0 percent, with the tolerance band of 4.3-5.8 percent, which is viewed by the CNB as corresponding to the net inflation target. However, this CPI band appears to be contentiously narrow, in view of the previously examined constraints with technical forecasting. Specifically, the volatility of inflation increases the risk of missing the narrowly defined target.

The CNB has been encouraged to apply both CPI and net inflation targeting by the Ministry of Finance, which in February 2000 introduced the new requirement of advanced public disclosure of intended changes in regulated prices, taxes and fees that would take place at times of future CNB decisions on intermediate inflation targets. At that time, the CNB started the practice of announcing inflation targets for the following year in April of the preceding year. Such long time horizon may impair the adequacy accuracy of inflation target.

The tolerance band for the Czech net inflation appears to be too narrow. After all, the actual net inflation fell well below the target range in both 1998 and 1999 and it is forecasted below the target range again for the end of 2000. These developments may instigate criticism of the CNB for applying excessively tight monetary policy (or acting as an ‘inflation nutter’ using Mervyn King’s (1999) terminology). The policy approach brings about high social costs of disinflation – the economic stagnation and high unemployment.

The CNB follows a well-designed framework of policy communication, making the DIT system highly transparent. This is underpinned by the above-mentioned survey of inflation expectations of ten representative financial market participants. In addition, the Czech central bank has developed a comprehensive system of monitoring the actual developments in various inflation categories – net, core, overall inflation indexes, as well as durable and non-durable

prices developments. These inflation trends are thoroughly communicated and explained to the public at large through inflation reports, press conferences, testimonies to the legislature and the informative CNB web site. For these reasons, the Czech DIT system may well be characterized as a 'full-fledged' DIT.

Figure 3 **CPI and Net Inflation in the Czech Republic, January 1996-March 2000**

..... insert Figures 3 around here .....

Data source: The Czech National Bank

Figure 4 **CPI Inflation in Poland, January 1996-March 2000**

..... insert Figures 4 around here .....

Data source: Poland's Ministry of Finance

The Polish regime of DIT was introduced a year later than the Czech system. As shown in Figures 4, the CPI inflation in Poland was considerably higher at the time of the DIT introduction than in the Czech Republic. The long-term CPI inflation convergence goal has been set at 4.0 percent for the end of 2003. As in the Czech case, the Polish regime began from a stricter version of DIT. The band of permitted fluctuations has been maintained at 0.6 percent around the midpoint CPI inflation targets of 7.2 percent for the end of 1999 and of 6.0 percent for the end of 2000. However, considering renewed inflationary pressures during the second half of 1999 and in the first half of 2000, these targets are not very realistic. The actual year-on-year inflation exceeded the upper bound of the target range by 2.0 percent in December 1999 and it remained stubbornly at 10.0 percent in May 2000. Nonetheless, without the 2000 inflation shocks induced by the external factors and by the domestic political instability these targets would likely be

attainable. In essence, they reflect the long-term path of disinflation that is affected by monetary policy and does not account for exogenous shocks.

Unlike the CNB, the NBP has chosen to target CPI inflation. The choice appears to be well understood by the private sector and the targets are transparent. The NBP Monetary Policy Council reinforced its commitment to the DIT strategy by moving to a fully floating exchange rate and abandoning the wide, plus-minus 15 percent band of currency fluctuations in April 2000. Since March 2000, the Polish central bank has been using announcements about its future policy bias as a policy tool, rather than adjusting interest rates. This demontrates that the NBP conducts monetary policy in a forward-looking manner and that its decisions are sensitive to the deviations of the CPI forecast from the target. Using the policy bias is a superior policy for Poland, considering its very high interest rates. (Polish real three months treasury bills rates were 8.5 percent at the end of May 2000, in contrast to the corresponding real interest rates in the Czech Republic of 2.6 percent.) Such high real interest rates reflect the risk premium related to the inflation bias and to the continuous instability of financial markets.

There is still room for improvements in transparency of the Polish DIT system. Despite publishing comprehensive and informative inflation reports, the information about inflation forecasting methodology remains rather ambiguous. There have been also several conflicting statements by Poland's monetary authorities in terms of considerations for the exchange rate management, particularly since Poland is experiencing a large current account deficit expected to reach seven percent of GDP at the end of 2000. The NBP has yet to develop a system of adequate policy consultation and communication with financial market representatives. It will be well advised to adopt a system similar to the CNB surveys of inflation forecasts provided by leading financial institutions. On the positive side, the NBP and the Ministry of Finance reached an agreement in the beginning of 2000 about conducting regular quarterly consultations on macroeconomic policy conditions, including coordination of inflation forecasts and targets. Such

meetings are likely to improve fiscal and monetary policy coordination and to draw the Ministry of Finance into sharing responsibility for attaining the inflation targets.

The Czech and the Polish DIT systems are summarized in Table 1. In general terms, both countries are presently applying a stricter variant of inflation targeting. The tolerance bands around target midpoints are fairly narrow. The targeting regimes are accompanied by flexible exchange rates. The CNB has established a comprehensive and transparent DIT framework while the NBP policy still needs further refinement in terms of forecasting methodology and monitoring rules.

TABLE 1 **Summary of DIT Regimes: The Czech Republic and Poland**

	The Czech Republic	**Poland**
The policy inception date	January 1998	January 1999
Current long-term target	Net inflation of 2%, plus-minus 1% band for the end-of 2005	CPI inflation of 4% for the end of 2003
Intermediate targets (end of period, year-on-year inflation)	Net inflation: 1998 = 5.5-6.5% 1999 = 4.0-5.0% 2000 = 3.5-5.5% 2001 = 2.0-4.0% and CPI inflation of 4.3-5.8%	CPI inflation 1999 = 6.6-7.8% 2000 = 5.4-6.8%
Recent target fulfillment (end-of-1999 results): *a. inflation scores* *b. corresponding short-term interest rates (on 3 mos. Treasuries)*	a. actual NI of 1.5%, (3.5% below the lower bound of the target range) b. 5.62%	a. actual CPI inflation of 9.8%, (2.0% above the upper bound of the target range) b. 17.24%
Inflation measure	net inflation, from 2001 both net and CPI inflation	CPI inflation
Target announcement	CNB Board, in April each year	NBP Monetary Policy Council, quarterly consultations with Finance Ministry
Inflation reports	quarterly and annual	quarterly and annual
Target information on central bank's website	full disclosure and comprehensive information	reports only, limited data on inflation series
Published inflation forecasts	transparent methodology	limited disclosure of methodology

Source: author's compilation.

It appears that both countries have applied the DIT regimes at an earliest feasible time, after they had established a foundational credibility of monetary policy and once their financial markets had reached a sufficient depth. At the present time, the CPI inflation targeting appears to be more appropriate in TEs because of the transparent nature of the CPI itself. In the near future, CNB and NBP may consider applying more precise measures of inflation, such as a CPIX that neutralizes the impact of rising interest rates on inflation. By all means, these central banks need to use future policy bias announcements as an effective, truly forward-looking tool of monetary policy. In the presence of inflationary pressures, the announcement of a tightening bias for the specified future period of time may relieve central banks from raising interest rates. Such approach is likely to lower social and economic costs of disinflation.

Both the Czech and the Polish DIT systems are likely to contribute to the long-term price stability. When the stated long-term inflation targets appear attainable, both central banks may consider moving to a more flexible variant of inflation targeting by expanding the inflation tolerance band and paying more attention to the exchange rate convergence. This can be accomplished through an early agreement on the appropriate target levels for the exchange rate convergence required for the EU and EMU accession. Having the ultimate target could aid designing an exchange rate trajectory in compliance with the dynamic trajectory of domestic disinflation, certainly, assuming stability of external factors. Useful guidelines for the future coordination of DIT and exchange rate policies can be derived by the candidate countries from the dynamic policy adjustment framework presented in the preceding section of this study. At the present time, Central European countries are still at the very early stage of this long-term process. As implied by the DIT-ERT model, the advancement of transparency aimed at strengthening credibility is absolutely critical for achieving the monetary convergence to the eurozone. A non-transparent pursuit of inflation targeting could easily backfire and produce perverse effects,

because the private sector inflation expectations would then be raised if the future goals of monetary policy were perceived as ambiguous and unrealistic.

VI. Initial Conditions and Empirical Results

Until the end of the first quarter of 2000, DIT regimes have not altered significantly the inflation process in Central European TEs. Inflation in Poland and in the Czech Republic remains to be a non-stationary and highly persistent, although its deceleration is indisputable.

The non-stationary path of inflation is demonstrated by the unit root test, the results of which are shown in Table 2.

TABLE 2 **Unit Root Test of Polish and Czech Inflation Indicators**[a]

Number of lagged differenced terms	Poland's CPI Inflation	Czech CPI Inflation	Czech Net Inflation
1	-1.1147	-1.7196	-1.6758
2	-1.0005	-1.9406	-2.7313
3	-2.0269	-1.8962	-2.5417
4	-2.0726	-2.2001	-3.2532
5	-2.3308	-2.1659	-3.2600
6	-2.0090	-2.9449	-3.2264
7	-2.0559	-3.1265	-3.5089
8	-1.8089	-2.8505	-2.9461

[a] Actual t -values are based on January 1996-March 2000 monthly year-on-year data. The test includes the time trend and the constant term. McKinnon critical values are: -4.1458 at 1 percent, -3.4987 at 5 percent, and -3.1782 at 10 percent probability for the examined sample.

Source: Author's calculations based on CNB and the Polish Ministry of Finance data.

The available limited serious of observations implies that the year-on-year CPI inflation in Poland and in the Czech Republic is non-stationary. It does not follow a linear stochastic trend, since the actual t -values in the augmented Dickey-Fuller (ADF) test are all lower than the McKinnon critical values. The Czech net inflation comes closer to stationarity for four to seven lagged differenced terms; the t -values are higher than the McKinnon critical values, but only at

10 percent probability. The non-stationary path of inflation in both countries makes it difficult to forecast inflation using simple econometric models and to set time-trend consistent policy targets.

In addition to following a non-stationary trend, the inflation series in both countries display a strong autoregressive tendency with a high degree of persistence. This problem is demonstrated by the estimation of the time series trend of inflation with the autoregressive and the moving-average components ARMA (p,q):

$$p_t = a + b_0 t + b_1 AR(+1) + b_2 MA(+1) + m_t \qquad (7)$$

The empirical results of estimation of (7) are shown in Table 3. In all observed cases, the first-order autoregressive process AR(+1) shows a high statistical significance. This implies a strong influence of nominal indexation based on adaptive expectations. In addition, the inflation path is highly persistent since the estimated values of b_1 coefficients are all close to unity. The MA(+1) component is statistically significant for the Polish CPI inflation, while it is not significant for the Czech CPI and net inflation series. However, the time trend component is more significant for both measures of inflation in the Czech Republic, but not for the Polish CPI inflation, at least in the investigated period between January 1996 and March 2000 [7].

TABLE 3 **Estimation of Equation (7)**[a]

p	a	b_0	b_1	b_2	$\mathbf{R^2}$	**d**
Polish CPI Inflation	14.048 (39.284) (0.358)	-.048 (0.297) (-0.160)	0.956 (0.245) (21.054)	0.591 (0.118) (4.959)	0.988	2.033
Czech CPI Inflation	29.567 (11.862) (2.493)	-0.215 (0.106) (-2.014)	0.916 (0.043) (20.838)	0.263 (0.143) (1.839)	0.943	1.883
Czech Net Inflation	20.227 (8.566) (2.361)	-0.154 (0.076) (-2.008)	0.936 (0.041) (22.415)	0.261 (0.143) (1.815)	0.974	1.720

[a] Based on January 1996-March 2000 monthly year-on-year data. Standard errors are in upper and t-statistics in lower parentheses; d = Durbin-Watson statistics.

Source: Author's estimation.

A further empirical inquiry focuses on the structural consistency of the inflation process that is prescribed by (7). It attempts to answer the question whether the introduction of DIT regimes has contributed to a significant structural change in the inflation pattern in both countries. As argued above, the primary goals of DIT as a forward-looking monetary policy are to reduce volatility of inflation and to bring down the trajectory of inflation by stemming nominal indexation. At the time of this writing, as of August 2000, the preliminary results of the empirical tests of structural changes in the inflation pattern can be reported, although they ought to be interpreted with caution due to the limited number of observations. In order to detect structural breaks in the inflation series within the examined period between January 1996 and March 2000 a dynamic Chow-split procedure has been applied. Selected results are shown in Table 4.

TABLE 4 **Chow Split Estimation - Selected, Meaningful Results.**

Variable	**Break Points**	**F-stat.**	**Probability**	**Likelihood Ratio**	**Probability**
Polish CPI Inflation	January 1999	5.865	0.001	22.205	0.000
Czech CPI Inflation	*January 1998* June 1998 January 1999	*1.237* 3.114 3.678	*0.031* 0.025 0.012	*5.530* 12.975 15.006	*0.237* 0.011 0.005
Czech Net Inflation	*January 1998* December 1998	*1.531* 3.401	*0.021* 0.017	*6.790* 14.019	*0.147* 0.007

Source: Author's estimation.

A meaningful break point indicating a structural change in the CPI inflation pattern in Poland is indeed consistent with the introduction of the DIT regime in January 1999. By contrast, the introduction of DIT in the Czech Republic in January 1998 does not coincide with structural changes in the time trend of CPI and net inflation measures. Instead, the most meaningful change in the net inflation pattern occurred in December 1998, when the net inflation sharply fell as a result of lagged effects of very high interest rates maintained throughout 1998. The net inflation

has remained low, or even negative since that time. A meaningful change in the Czech CPI inflation pattern occurred in January 1999 possibly as a result of abandoning the practice of large increases in administrative prices by the Czech Government prevalent at the beginning of each previous year.

The estimation of structural changes in inflation in both countries can be further supplemented by the assessment of changes in the volatility of inflation. This allows to ascertain whether the DIT regimes have in fact contributed to more stable inflation trends. As shown in Table 5, both the standard deviation and the coefficient of variation of a pre-DIT inflation series in Poland are higher than in the period following the DIT introduction. Therefore, the Polish DIT regime has been somewhat successful in reducing volatility of inflation. On the contrary, the volatility of both CPI and net inflation series in the Czech Republic after the DIT introduction actually increased, at least on the basis of simple measures of standard deviation and the coefficient of variation. However, these results are certainly not very robust due to a limited number of observations. Nevertheless, based on the presented evidence, the Czech DIT regime has been successful in lowering the overall inflation, but so far it has failed to reduce its volatility. The uncertainty about administrative price adjustments and the strong impact of external price shocks in the Czech small, open economy evidently inhibit accomplishing the goal of price stability.

TABLE 5 **Inflation Stability Measures** [a]

Variable	*Period*	$\bar{p}$	*d*	*u*
Polish CPI Inflation	Overall	13.31	4.78	0.359
	Jan. 1996-Dec. 1998	15.58	3.67	0.235
	Jan.1999 - March 2000	7.86	1.73	0.220
Czech CPI Inflation	Overall	7.30	3.63	0.496
	Jan. 1996-Dec. 1997	8.63	1.19	0.138
	Jan.1998-March 2000	6.13	4.57	0.747
Czech Net Inflation	Overall	4.56	3.06	0.670
	Jan. 1996-Dec. 1997	6.62	0.93	0.141
	Jan.1998-March 2000	2.73	3.12	1.147

[a] Based on January 1996-March 2000 monthly year-on-year data. $\bar{p}$ = the average monthly year-on-year inflation, d = standard deviation, u = coefficient of variation.

Source: Author's estimation.

A more detailed investigation of variations can be conducted using the recursive residuals test on the expectations-determined inflation function with one and two months lags [8]. The underlying function follows the Dickey-Fuller procedure:

$$\Delta p_t = g_0 + g_1 p_{t-1} + g_2 p_{t-2} + x_t \qquad (8)$$

Figures 5, 6 and 7 show the distribution of shocks to (8) using the recursive residuals test for the Polish CPI, the Czech CPI and the Czech net inflation respectively.

FIGURE 5 **Recursive Residuals of Poland's CPI Inflation as Determined by (8)**

…….. insert Figure 5 here …….

January 1996-March 2000 series, recursive residuals with plus-minus 2 standard error band.

Source: Author's estimation.

FIGURE 6 **Recursive Residuals of the Czech CPI Inflation as Determined by (8)**

…….. insert Figure 6 here …….

January 1996-March 2000 series, recursive residuals with plus-minus 2 standard error band.

Source: Author's estimation.

FIGURE 7 **Recursive Residuals of the Czech Net Inflation as Determined by (8)**

…….. insert Figure 7 here …….

January 1996-March 2000 series, recursive residuals with plus-minus 2 standard error band.

Source: Author's estimation.

In all three cases, there were upward pressures on inflation expectations in mid-1997, apparently in response to the contagion effects of the Asian financial crisis that added instability to Central European financial markets. These pressures were more pronounced in the cases of the Czech CPI and net inflation (Figures 6 and 7) than in the case of Poland's CPI inflation (Figure 5). The surge in inflation expectations in the Czech Republic was triggered by the concurrent Czech financial crisis, which was instigated by the banking crisis and by the real currency appreciation at the final period of the fixed exchange rate regime. In mid-1997, the currency peg was increasingly perceived as unsustainable as implied by the large current account deficit that was accompanied by large short-term capital inflows. The expected change in the monetary regime ultimately added to inflation expectations and forced the Czech authorities to actually abandon the currency peg in May 1997.

By contrast, 1998 was a much better year for disinflation in both countries as evidenced by the negative residuals prevailing for that year in all three cases. Renewed inflation shocks reappeared in 1999, more vigorously in Poland than in the Czech Republic. This suggests that the Czech DIT regime may be more credible. As shown in Figure 5, a strong positive jump in the residuals in February and March 1999 in Poland coincides with the development of some external inflationary pressures. They were, however, accompanied by large interest rate hikes by the NBP that had sent inflationary signals to the private sector. Very likely, the private sector inflation expectations could be considerably lowered if the NBP reacted to inflationary shocks either by increasing interest rates more gradually or by using a tightening bias announcements instead of sharply increasing the target interest rates at the early stage of the DIT regime.

The distribution of the residuals for the Czech CPI and net inflation further indicates that the tight monetary policy maintained throughout 1998 resulted in downward pressures on net

inflation earlier than on the CPI. A sharp correction of the CPI inflation came only at the end of that year. These reactions reflect some feedback effects of net inflation on the overall inflation. Yet, the intensity and lags of these effects are difficult to determine and to predict.

Although the empirical results presented in this section are preliminary, they seem to confirm that the introduction of DIT regimes in the Czech Republic and in Poland has indeed contributed to a successful disinflation. Nevertheless, the external inflation shocks of 1999 have somewhat interfered with the new forward-looking policy mechanism in both countries and, in the Czech case, also with the goal of reducing volatility of inflation. The 1999/2000 wave of external inflationary pressures requires central banks to strengthen their commitment to inflation targeting. Unfortunately, it may delay feasibility of switching to a FIT regime until first signs of its expiration are in sight.

VII. Concluding Remarks

DIT is a beneficial policy framework for the EU/EMU candidates who, before the actual accession, need to undergo an effective monetary convergence. Prior to joining the EU and, possibly, entering the ERM II, the candidates will need to develop independent and credible monetary policy geared toward long-term price stability. As argued by the presented DIT-ERT model, a vigorous pursuit of disinflation within the DIT framework is initially accompanied by high exchange rate volatility. Once the candidates reach a satisfactory level of price stability supported by the institutional advancement of transparent and credible monetary policy, they may apply a FIT framework, gradually expanding the inflation tolerance and paying more attention to the exchange rate stability. At some future point when the candidates enter the final stage of preparations for the EMU accession, they may consider abandoning DIT regimes by focusing on the exchange-rate-based monetary policy instead. But this option still remains out of sight.

Based on our analysis, the Czech Republic may be closer to that stage than Poland at the present time.

However, both countries are still at the early stage of the process outlined by the model presented in this study. Their plans to advance DIT are very cautious, as demonstrated by rather slow trajectories of disinflation. Based on the empirical assessment of their monetary convergence and on the institutional advancement of the DIT framework, it appears, at this time, that they are ready to increase the policy flexibility by widening the inflation tolerance band and simultaneously paying more attention to decreasing the volatility of exchange rates. A wider band allows for better absorption of unexpected external price shocks. It also allows the policy to focus on determining an exchange rate target that is more suitable for conversion to the euro.

A premature rush to the euro-peg would be a mistake. A strong weight on the euro-peg, as required by the active preparations for entry into the EMU, is certainly incomparable with the DIT framework. An early entry, would make the TEs particularly vulnerable to speculative attacks due to the structural differences between these economies and the EMU members (Masson, 1999). More specifically, a premature euro-peg entails at least two hazards. First, it may aggravate real currency appreciation and current account deficit problems. The real appreciation is still apparent in TEs that are battling high inflation, which is instigated by the rising productivity of labor, by the trend-increase in prices of non-traded goods, and by the surging autonomous demand for money (Halpern and Wyplosz, 1997; Masson, 1999; Orlowski, 2000b). Second, defending a currency peg would be very costly in quasi-fiscal terms since capital inflows to these countries are presently very strong and volatile. A currency peg in the presence of moderate inflation leads unavoidably to real currency appreciation, which in turn deteriorates the risk structure of capital inflows. This means that in the presence of a euro-peg, the TEs would face large inflows of short-term, relative to long-term, capital, thereby making

their financial markets more vulnerable to speculative attacks. In principle, DIT with relatively flexible exchange rates excludes the need to sterilize short-term capital inflows.

A possible future monetary policy regime for Central European TEs could be monetary targeting. But a monetary policy framework based on simplified money-growth rules always needs to be supported by prior institutional advancement of policy making. As von Hagen (1999) emphasizes, monetary targeting demonstrates the advancement in maturity of monetary policy. To guide the policy on the basis of simple rules, a central bank needs to develop stable relationships between income and money growth (a relatively stable velocity of money and a stable income elasticity of the money demand coefficient). The corresponding interest rates and monetary transmission channels also ought to get settled at stable and predictable relationships. Nevertheless, at a later stage, the DIT framework can be officially replaced by monetary targeting once stable relationships between monetary aggregates are developed.

Moreover, the difference between the inflation targeting and monetary targeting policy frameworks might well be illusive. Von Hagen (1995) reveals a remarkable proximity between DIT and the Bundesbank-style of monetary targeting by focusing on the concept of ‘unavoidable inflation‘ as a future policy target, which may be roughly equal to the inflation convergence target. In this sense, there is no substantive difference between DIT and monetary targeting, since both of them are forward-looking policy regimes that focus essentially on the same long-term target. This reasoning may send an encouraging and valuable message to monetary authorities in TEs about possible future consideration of a monetary targeting regime.

An urgent task for advancing the current DIT framework, both in the Czech Republic and in Poland, is to develop reliable models and tools of technical forecasting. Both central banks should be able to do so as their DIT systems mature and as longer series of observations on monetary variables become available. In addition, both central banks may still want to bolster the policy communication channels. In particular, a closer discussion and policy coordination

between fiscal and monetary authorities is essential for a DIT success. Fiscal authorities must bear at least partial responsibility for achieving price stability.

Once the TEs central banks adopt the FIT framework and, later, the euro-peg, their policy instrumentalization and monitoring devices will have to be redesigned to ensure a systemic link between inflation forecasting, interest rates, exchange rates, and inflation targets. At the stage of active preparations for EMU accession, they may consider applying an asymmetric approach to inflation targeting as, perhaps, a more pragmatic policy. If adherence to the upper bound of the inflation tolerance band is more requisite than to the lower bound, the policy discipline will be greater than in a symmetric system. At the same time, if the distance from the midpoint to the upper bound is larger than to the lower bound, there will be a longer policy decision lag, which will ultimately allow for a more effective absorption of temporary external price shocks. A lower bound may be less binding and closer to the midpoint, in order to diminish the possible risk of falling into a liquidity trap situation and deflation.

In general terms, DIT is likely to serve as an effective source of enhancing transparency, accountability and credibility of monetary policies in TEs. In this sense, the DIT framework is fully consistent with the crucial tasks of the economic transition from central planning to a deregulated, competitive market economy.

* * *

ENDNOTES

[1] For a detailed analysis of the advancement of monetary policies in Central European transition economies see, for instance, Masson (1999).

[2] The applied definition is similar to Bernanke, et. al. (1999).

[3] A comprehensive overview of inflation targeting can be found in Bernanke, et.al. (1999) and Svensson (1999a). The prerequisites and the requirements of inflation targeting in emerging market economies are discussed by Mishkin (2000).

[4] This requirement is strongly emphasized by Mishkin (2000).

[5] This approach is consistent with the Bank of England and the Swedish Riksbank current policy regimes. Their experiences may provide valuable lessons for future developments of inflation targeting among the Central and East European EU candidates.

[6] An overview of various forms of central bank reaction functions can be found in Svensson (1999c).

[7] The earlier period has been omitted due to a strong structural bias of highly unstable inflation that prevailed in both countries until the end of 1995.

[8] In the three investigated inflation series, both one and two months differenced terms are statistically significant. The one month lag is certainly more significant than the two months lag, and g_1 has a positive sign proving that the private sector expectations are very sensitive to the most recently reported inflation level. By contrast, g_2 is negative, thus suggesting a quick correction of actual inflation to the longer trend in the following period.

REFERENCES

Bernanke, Ben S., Thomas Laubach, Frederic S. Mishkin and Adam S. Posen (1999) *Inflation Targeting: Lessons from the International Experience.* Princeton, New Jersey: Princeton University Press.

Christofferssen, Peter R. and Robert F. Wescott (1999) “Is Poland Ready for Inflation Targeting?” *IMF Working Paper*, No. WP/99/41, Washington, D.C.: International Monetary Fund.

Czech National Bank (2000) “The Setting of the Inflation Target for 2001”. Prague: The Czech National Bank, April 20.

Fischer, Stanley, Ratna Sahay and Carlos A. Végh (2000) “Modern Hyper-and High Inflations” *Paper to the Conference of the American Economic Association,* Boston, MA, January.

Halpern, László and Charles Wyplosz (1997) “Equilibrium Exchange Rates in Transition Economies”, *IMF Staff Papers,* **44** (4), 430-461.

King, Mervyn A. (1996) “How Should Central Banks Reduce Inflation? - Conceptual Issues” in: A Symposium Sponsored by the Federal Reserve Bank of Kansas City *New Challenges for Monetary Policy*. Kansas City: Federal Reserve Bank of Kansas City, 53-92.

King, Mervyn A. (1997) “Changes in UK Monetary Policy: Rules and Discretion in Practice” *Journal of Monetary Economics,* **39** (1), 81-97.

King, Mervyn A. (1999) “Challenges for Monetary Policy: New and Old” in: A Symposium Sponsored by the Federal Reserve Bank of Kansas City *New Challenges for Monetary Policy*. Kansas City: Federal Reserve Bank of Kansas City, 11-58.

Masson, Paul R. (1999) “Monetary and Exchange Rate Policy of Transition Economies of Central and Eastern Europe after the Launch of EMU”, *IMF Policy Discussion Paper,* No. PDP/99/5, Washington, D.C.: International Monetary Fund.

Mishkin, Frederic S. (2000) “Inflation Targeting in Emerging-Market Countries”, *The American Economic Review: AEA Papers and Proceedings,* **90** (2), 105-109.

Orlowski, Lucjan T. (1998) “Exchange Rate Policies in Central Europe and Monetary Union”, *Comparative Economic Studies,* **40** (3), 58-78.

Orlowski, Lucjan T. (2000a) “Direct Inflation Targeting in Central Europe”, *Post-Soviet Geography and Economics,* **41** (2), 134-154.

Orlowski, Lucjan T. (2000b) “Monetary Policy Regimes and Real Exchange Rates in Central Europe’s Transition Economies”, *Economic Systems,* **24** (2), 27-48.

Orphanides, Athanasios and David W. Wilcox (1996) "The Opportunistic Approach to Disinflation" *Federal Reserve Board: Finance and Economics Discussion Series* No. 1996-24, Washington, D.C.: Federal Reserve Board.

Orphanides, Athanasios and Volker Wieland (1999) "Efficient Monetary Policy Design Near Price Stability" *Federal Reserve Board: Finance and Economics Discussion Series* No. 1999-67, Washington, D.C.: Federal Reserve Board.

Svensson, Lars E.O. (1999a) "Inflation Targeting as a Monetary Policy Rule", *Journal of Monetary Economics,* **43** (3), 607-654.

Svensson, Lars E.O. (1999b) "How Should Monetary Policy Be Conducted in an Era of Price Stability?". in: A Symposium Sponsored by the Federal Reserve Bank of Kansas City *New Challenges for Monetary Policy*. Kansas City: Federal Reserve Bank of Kansas City, 195-260.

Svensson, Lars E.O. (1999c) "Monetary Policy Issues for the Eurosystem", *Carnegie Rochester Series on Public Policy,* **51** (1), 79-136.

Svensson, Lars E.O. (2000) "The First Year of the Eurosystem: Inflation Targeting or Not?", *The American Economic Review: AEA Papers and Proceedings,* **90** (2), 95-99.

von Hagen, Jürgen (1995) "Inflation and Monetary Targeting in Germany" in: Leiderman, Leonardo and Lars E.O. Svensson (eds.) *Inflation Targets,* London: Centre of Economic Policy Research, pp. 107-121.

von Hagen, Jürgen (1999) "Money Growth Targeting by the Bundesbank" *Journal of Monetary Economics,* **43** (3), 681-701.

Woodford, Michael (2000) "Pitfalls of Forward-Looking Monetary Policy", *The American Economic Review: AEA Papers and Proceedings,* **90** (2), 100-104.

Figure 1 **A Long-Term *DIT* Scenario for Transition Economies Approaching the Euro Peg**

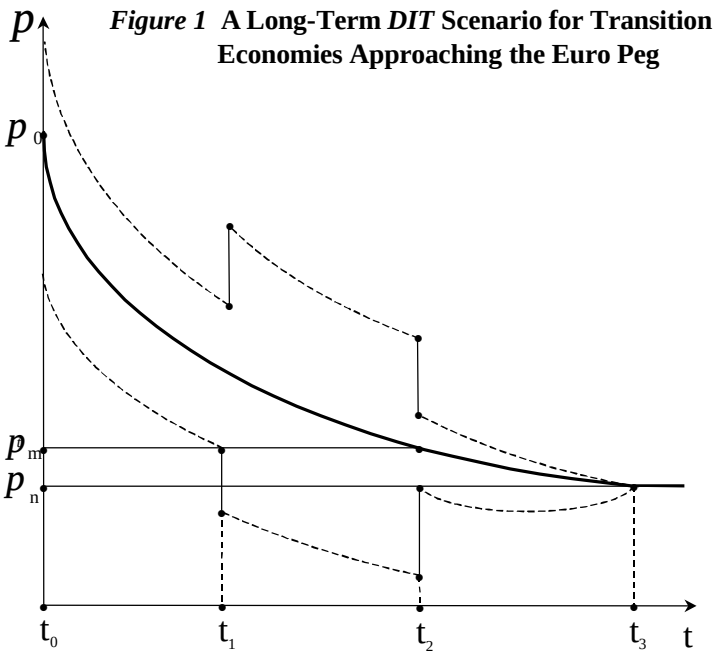


Figure 2 **Central Bank Reaction Function: Inflation vs. Exchange Rate Targeting**

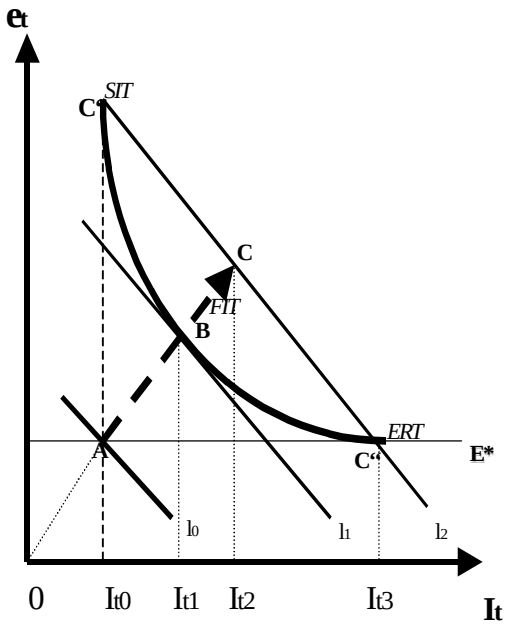
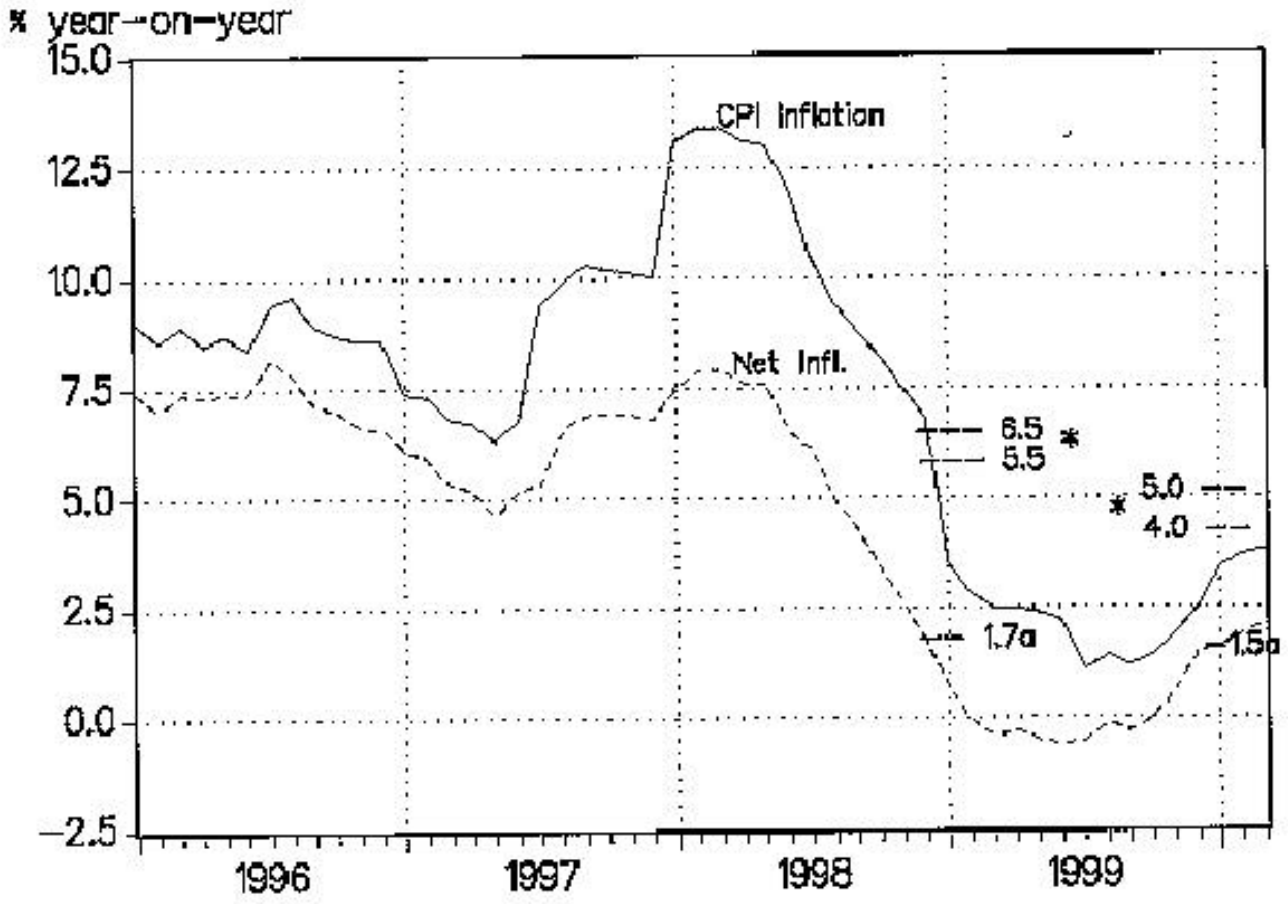
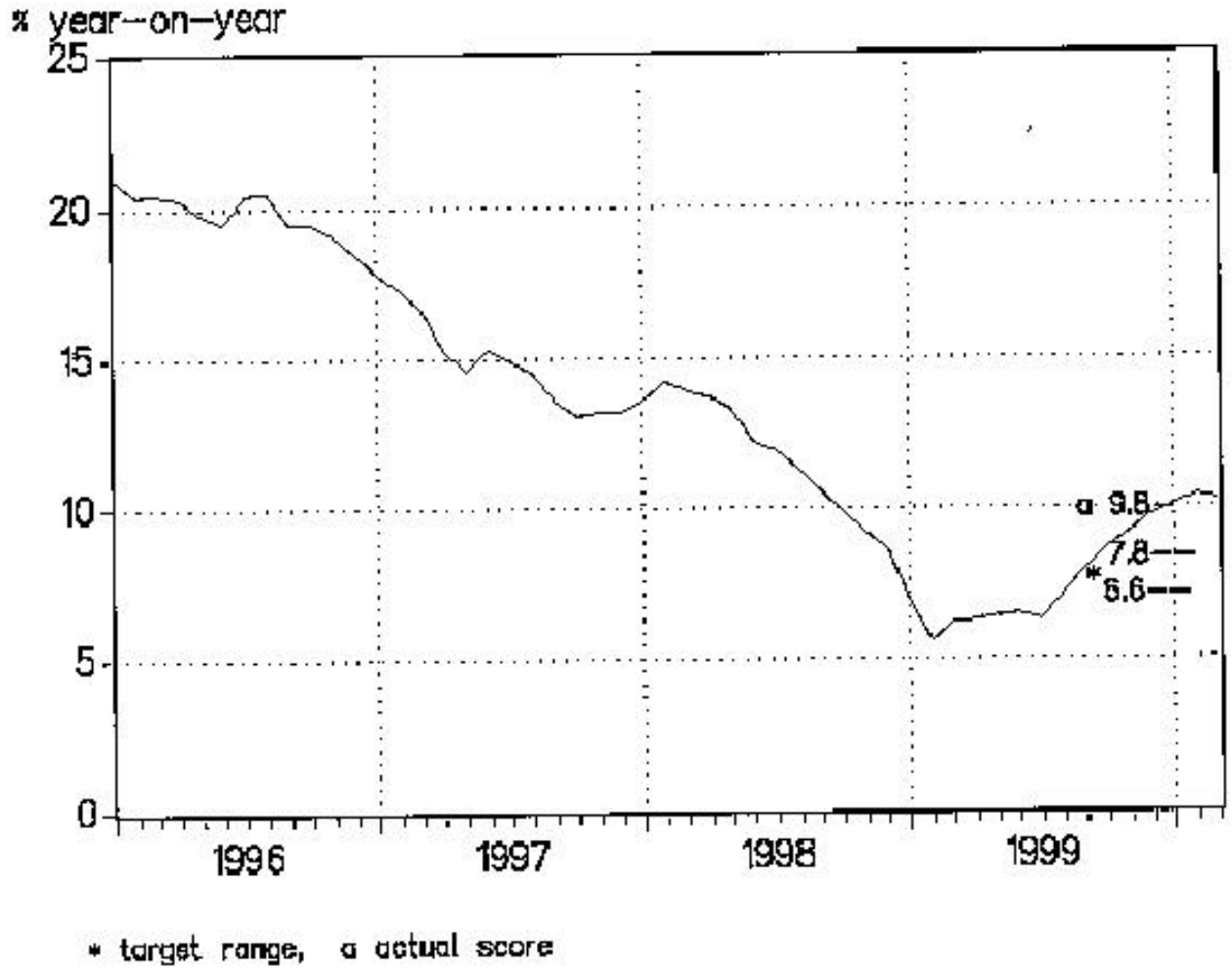


Figure 3



* target range for net inflation, a actual score

Figure 4



* target range, a actual score

Figure 5

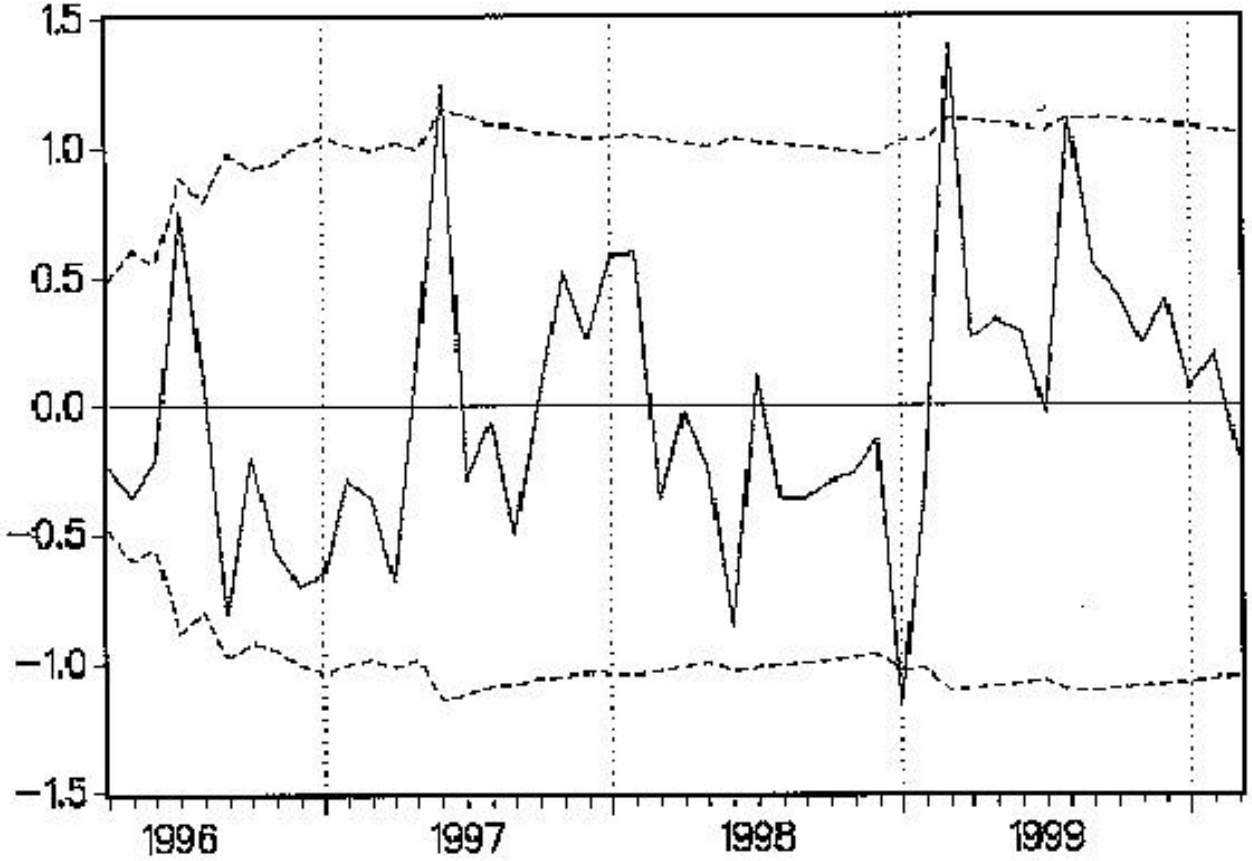
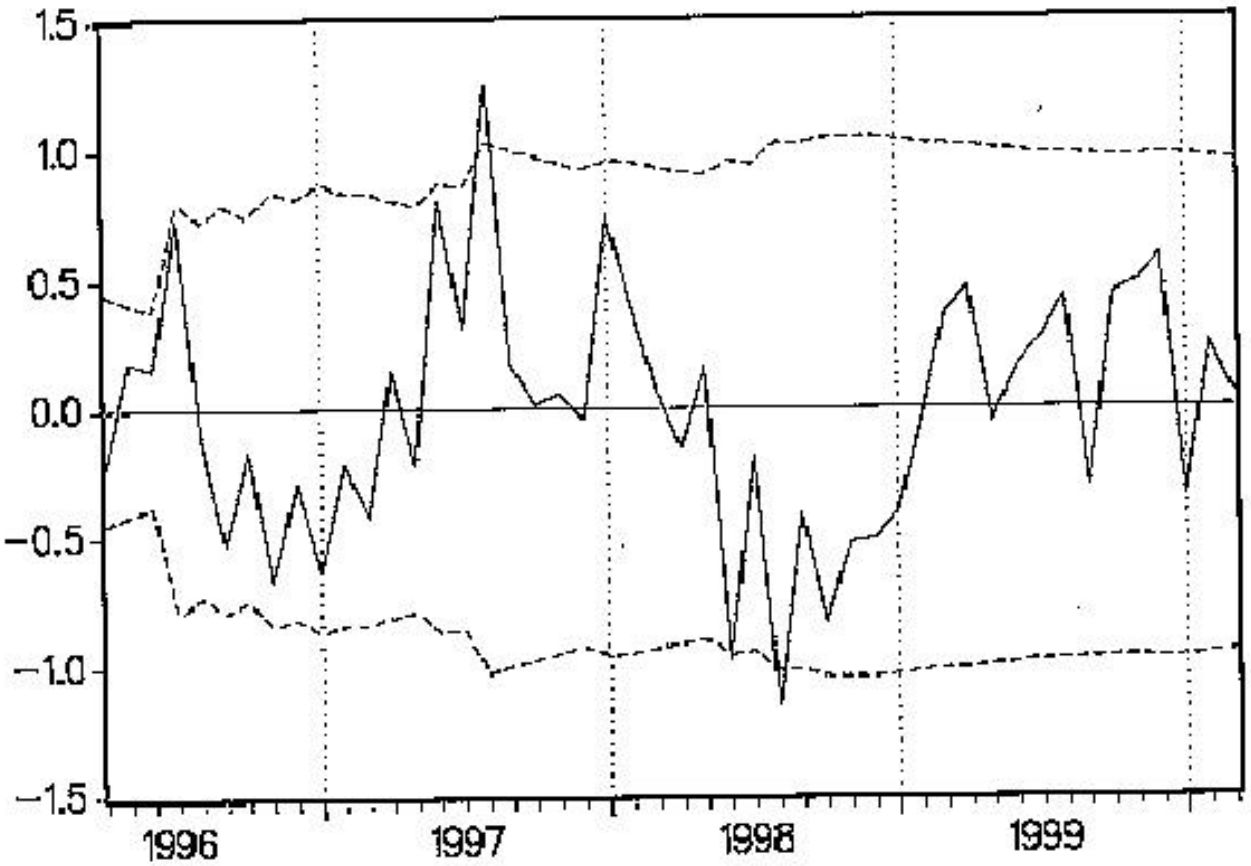


Figure 6

Figure 7



ZEI Papers

ZEI Policy Paper B97-01	A Stability Pact for Europe (a Forum organized by ZEI)
ZEI Policy Paper B97-02	Employment and EMU (Deutsch-Französisches Wirtschaftspolitisches Forum/ Forum Economique Franco-Allemand)
ZEI Policy Paper B97-03	Liberalising European Markets for Energy and Telecommunications: Some Lessons from the US Electric Utility Industry (Tom Lyon and John Mayo)
ZEI Policy Paper B97-04	Macroeconomic Stabilization with a Common Currency: Does European Monetary Unification Create a Need for Fiscal Insurance or Federalism? (Kenneth Kletzer)
ZEI Policy Paper B98-01	Budgeting Institutions for Aggregate Fiscal Discipline (Jürgen von Hagen)
ZEI Policy Paper B98-02	Trade with Low-Wage Countries and Wage Inequality (Jaleel Ahmad)
ZEI Policy Paper B98-03	Central Bank Policy in a More Perfect Financial System (Jürgen von Hagen and Ingo Fender)
ZEI Policy Paper B98-04	The EMU`s Exchange Rate Policy (Deutsch-Französisches Wirtschaftspolitisches Forum/ Forum Economique Franco-Allemand)
ZEI Policy Paper B98-05	Estimating a European Demand for Money (Bernd Hayo)
ZEI Policy Paper B98-06	Monetary Union, Asymmetric Productivity Shocks and Fiscal Insurance: an Analytical Discussion of Welfare Issues (Kenneth M. Kletzer)
ZEI Policy Paper B98-07	Designing Voluntary Environmental Agreements in Europe: Some Lessons from the U.S. EPA`s 33/50 Program (John W. Maxwell)
ZEI Working Paper B98-08	Money-Output Granger Causality Revisited: An Empirical Analysis of EU Countries (Bernd Hayo)
ZEI Working Paper B98-09	US Monetary Policy AND Monetary Policy and the ESCB (Robert L. Hetzel)
ZEI Policy Paper B98-10	Der Wettbewerb der Rechts- und politischen Systeme in der Europäischen Union (Martin Seidel)

ZEI Working Paper B98-11	Exchange Rate Regimes in the Transition Economies: Case Study of the Czech Republic: 1990-1997 (Julius Horvath)
ZEI Policy Paper B98-11A	Die Bewertung der „ dauerhaft tragbaren öffentlichen Finanzlage“ der EU Mitgliedstaaten beim Übergang zur dritten Stufe der EWWU (Rolf Strauch)
ZEI Working Paper B98-12	Price Stability and Monetary Policy Effectiveness when Nominal Interest Rates are Bounded at Zero (Athanasios Orphanides and Volker Wieland)
ZEI Working Paper B98-13	Fiscal Policy and Intranational Risk-Sharing (Jürgen von Hagen)
ZEI Working Paper B98-14	Free Trade and Arms Races: Some Thoughts Regarding EU-Russian Trade (Rafael Reuveny and John Maxwell)
ZEI Working Paper B98-15	Can Taxing Foreign Competition Harm the Domestic Industry? (Stefan Lutz)
ZEI Policy Paper B98-16	Labour Market & Tax Policy in the EMU (Deutsch-Französisches Wirtschaftspolitisches Forum/ Forum Economique Franco-Allemand)
ZEI Working Paper B99-01	The Excess Volatility of Foreign Exchange Rates: Statistical Puzzle or Theoretical Artifact? (Robert B.H. Hauswald)
ZEI Working Paper B99-02	The Consequences of Labour Market Flexibility: Panel Evidence Based on Survey Data (Rafael Di Tella and Robert MacCulloch)
ZEI Working Paper B99-03	The Macroeconomics of Happiness (Rafael Di Tella, Robert MacCulloch and Andrew J. Oswald)
ZEI Working Paper B99-04	The Finance-Investment Link in a Transition Economy: Evidence for Poland from Panel Data (Christian Weller)
ZEI Working Paper B99-05	Tumbling Giant: Germany`s Experience with the Maastricht Fiscal Criteria (Jürgen von Hagen and Rolf Strauch)
ZEI Working Paper B99-06	Productivity Convergence and Economic Growth: A Frontier Production Function Approach (Christopher M. Cornwell and Jens-Uwe Wächter)

ZEI Working Paper B99-07	Comovement and Catch-up in Productivity Across Sectors: Evidence from the OECD (Christopher M. Cornwell and Jens-Uwe Wächter)
ZEI Working Paper B99-08	The Connection Between More Multinational Banks and Less Real Credit in Transition Economies (Christian Weller)
ZEI Working Paper B99-09	Monetary Policy, Parameter Uncertainty and Optimal Learning (Volker Wieland)
ZEI Working Paper B99-10	Financial Liberalization, Multinational Banks and Credit Supply: the Case of Poland (Christian Weller)
ZEI Policy Paper B99-11	Financial Supervision and Policy Coordination in the EMU (Deutsch-Französisches Wirtschaftspolitisches Forum / Forum Economique Franco-Allemand)
ZEI Working Paper B99-12	Size Distortions of Tests of the Null Hypothesis of Stationarity: Evidence and Implications for Applied Work (Mehmet Caner and Lutz Kilian)
ZEI Working Paper B99-13	Financial Fragility or What Went Right and What Could Go Wrong in Central European Banking? (Christian E. Weller and Jürgen von Hagen)
ZEI Working Paper B99-14	Industry Effects of Monetary Policy in Germany (Bernd Hayo and Birgit Uhlenbrock)
ZEI Working Paper B99-15	Financial Crises after Financial Liberalization: Exceptional Circumstances or Structural Weakness? (Christian E. Weller)
ZEI Working Paper B99-16	Multinational Banks and Development Finance (Christian E. Weller and Mark J. Scher)
ZEI Working Paper B99-17	Stability of Monetary Unions: Lessons from the Break-up of Czechoslovakia (Jan Fidrmuc, Julius Horvath and Jarko Fidrmuc)
ZEI Working Paper B99-18	Why are Eastern Europe`s Banks not failing when everybody else`s are? (Christian E. Weller and Bernard Morzuch)
ZEI Working Paper B99-19	The Evolution of Monetary Policy in Transition Economies (Ali M. Kutan and Josef C. Brada)
ZEI Working Paper B99-20	Subnational Government Bailouts in Germany (Helmut Seitz)

ZEI Working Paper B99-21	The End of Moderate Inflation in Three Transition Economies? (Josef C. Brada and Ali M. Kutan)
ZEI Working Paper B99-22	Partisan Social Happiness (Rafael Di Tella and Robert MacCulloch)
ZEI Working Paper B99-23	Informal Family Insurance and the Design of the Welfare State (Rafael Di Tella and Robert MacCulloch)
ZEI Working Paper B99-24	What Makes a Revolution? (Robert MacCulloch)
ZEI Working Paper B99-25	Micro and Macro Determinants of Public Support for Market Reforms in Eastern Europe (Bernd Hayo)
ZEI Working Paper B99-26	Skills, Labour Costs, and Vertically Differentiated Industries: a General Equilibrium Analysis (Stefan Lutz and Alessandro Turrini)
ZEI Working Paper B00-01	Monetary Union and Fiscal Federalism (Kenneth Kletzer and Jürgen von Hagen)
ZEI Working Paper B00-02	Inflation Bias and Productivity Shocks in Transition Economies: The Case of the Czech Republic (Josef C. Brada, Arthur E. King and Ali M. Kutan)
ZEI Working Paper B00-03	Integration, Disintegration and Trade in Europe: Evolution of Trade Relations During the 1990`s (Jarko Fidrmuc and Jan Fidrmuc)
ZEI Policy Paper B00-04	A New Political Culture in the EU – Democratic Accountability of the ECB (Christa Randzio-Plath)
ZEI Working Paper B00-05	Liberalization, Democracy and Economic Performance during Transition (Jan Fidrmuc)
ZEI Working Paper B00-06	The Demand for Money in Austria (Bernd Hayo)
ZEI Policy Paper B00-07	EMU and Economic Growth in Europe (Deutsch-Französisches Wirtschaftspolitisches Forum / Forum Economique Franco-Allemand)
ZEI Working Paper B00-08	The Effectiveness of Self-Protection Policies for Safeguarding Emerging Market Economies from Crises (Kenneth Kletzer)
ZEI Working Paper B00-09	Rational Institutions Yield Hysteresis (Rafael Di Tella and Robert MacCulloch)
ZEI Working Paper B00-10	The Importance of Domestic Political Institutions: Why and How Belgium and Italy qualified for EMU (Mark Hallerberg)

ZEI Working Paper B00-11	A Dynamic Approach to Inflation Targeting in Transition Economies (Lucjan T. Orlowski)
ZEI Policy Paper B00-12	Rechtsetzung und Rechtsangleichung als Folge der einheitlichen europäischen Währung (Martin Seidel)
ZEI Working Paper B00-13	Back to the Future: The Growth Prospects of Transition Economies Reconsidered (Nauro F. Campos)