

S t u d i a i A n a l i z y
S t u d i e s & A n a l y s e s

*Centrum Analiz
Społeczno-Ekonomicznych*



*Center for Social
and Economic Research*

294

Lucjan T. Orłowski

**Monetary Policy Adjustments on the Final Passage
towards the Euro**

W a r s a w , 2 0 0 5



Materials published here have a working paper character. They can be subject to further publication. The views and opinions expressed here reflect the author(s) point of view and not necessarily those of the CASE.

The publication was prepared for the participants of the international conference "Europe after the Enlargement", organized by CASE – Center for Social and Economic Research in Warsaw on April 8-9, 2005. The publication was financed under the Matra Small Embassy Projects Programme of the Netherlands Ministry of Foreign Affairs.

Keywords: monetary convergence, euro adoption, ERM II, new Member States.

© CASE – Center for Social and Economic Research, Warsaw 2005

Graphic Design: Agnieszka Natalia Bury

DTP: CeDeWu Sp. z o.o.

ISSN 1506-1701, ISBN: 83-7178-368-X

Publisher:

CASE – Center for Social and Economic Research

12 Sienkiewicza, 00-944 Warsaw, Poland

tel.: (48 22) 622 66 27, 828 61 33, fax: (48 22) 828 60 69

e-mail: case@case.com.pl

<http://www.case.com.pl/>



Contents

Abstract	5
1. Introduction	6
2. Unsustainable Early Exchange Rate Regimes	6
3. Searching for Alternative Policy Anchors	9
4. Direct Inflation Targeting - A Viable Policy for Larger NMS	10
5. Sundry Recipes for Monetary Convergence	14
6. Coping with ERM II	16
7. A Synthesis – Some Stylized Facts	18
References	19



Lucjan T. Orłowski

Professor of economics and international finance and chairman of the Department of Economics and Finance at Sacred Heart University, Fairfield, Connecticut, USA. His research focuses on monetary economics and stabilization policies in transition economies as well as emerging financial markets. He has authored three books, several chapters in edited volumes and numerous articles in academic journals on monetary policy, exchange rates, interest rates, and international financial markets. His edited volume "Transition and Growth in Post-Communist Countries: The Ten-Year Experience", E.Elgar Publishing Inc., Cheltenham, U.K. and Northampton, Massachusetts, 2001 was honored with the 2002 Choice Magazine Award for Outstanding Title of the Year. He serves on the Editorial Board of Comparative Economic Studies, is an Associate Editor of Emerging Markets Finance and Trade, a Regional Editor of Journal of Emerging Markets and a Guest Editor of Open Economies Review. Professor Orlowski is a senior research fellow and a member of the Advisory Council of the CASE Foundation, a Research Fellow at the William Davidson Institute (WDI) at the University of Michigan School of Business and a Senior Fellow at the University of Bonn – Center for European Integration Studies. During 1997-2001 he was a member of the Macroeconomic Policy Council of Poland's Minister of Finance and currently advises the National Bank of Poland.



Abstract

This study reviews monetary policy options that are seemingly viable for adopting the euro by the new Member States of the European Union. A fully autonomous direct inflation targeting is believed to be suboptimal for convergence to the euro as it does not incorporate convergence parameters into the central bank reaction function and instrument rules. In an attempt to correct for such deficiency, this study advocates adopting a framework of relative inflation forecast targeting where a differential between the domestic and the eurozone inflation forecasts becomes the main objective of the central bank's decisions. At the same time, some attention to the exchange rate stability objective becomes necessary for facilitating the monetary convergence process. Foreign exchange market interventions, rather than interest rate adjustments, are viewed as a preferred way of achieving this objective.

I. Introduction

This study takes on the task of examining viable monetary policy options for the EU new Member States (NMS) on their final passage to adopting the euro. It advocates a modified version of inflation targeting as a viable alternative to the policy based on a hard currency peg, such as the euro-based currency board or an early full-fledged adoption of the euro in the form of a unilateral euroisation. It is further assumed that autonomous direct inflation targeting (DIT) regimes, particularly in their strict forms, are not conducive to executing the tasks of monetary convergence to the euro. Such regimes have enjoyed an extensive coverage in the literature from the standpoint of their feasibility in highly developed and seemingly closed economies, while their adaptability in the countries undergoing monetary convergence to a common currency system has not been addressed.

In order to incorporate the tasks of monetary convergence to a common currency, a standard DIT framework ought to be augmented by including the appropriate ‘convergence parameters’, namely, the policy objectives that are based on the differentials between the domestic and the euro-area monetary variables, such as inflation, short-term interest rates, the exchange rate, and possibly, output gap dynamics. Following up on this premise, this study advocates a monetary policy framework based on *relative inflation forecast targeting* (RIFT) that has been originally proposed by Orlowski (2005b). In quintessence, RIFT is composed of the central bank’s reaction function that includes the difference between domestic and the euro-area inflation forecast as a target variable. It also contains an instrument rule that incorporates the exchange rate and the inflation risk premia, in addition to short-term interest rate and inflation dynamics¹. Alternative policy options are also reviewed in this study.

Section II provides an abridged overview of the evolution of monetary and exchange rate regimes in the larger NMS since the beginning of their transition to the market economy in the early 1990s. The early policies have proven to be unsustainable for a number of reasons synthesized in this section. The efforts to correct basic deficiencies of the early regimes are addressed in Section III. The current monetary policies based on rather strict form of DIT are overviewed in Section IV. Proposals to ease the rigidity of strict DIT by incorporating the objective of exchange rate stability are summarized in Section V, along with the synthesis of key precepts of the RIFT framework. The policy dilemmas for NMS monetary authorities upon their mandatory entry to the ERM II are identified in Section VI followed by the synthesis and concluding remarks in Section VII.

2. Unsustainable Early Exchange Rate Regimes

Exchange-rate-based monetary policies constituted one of the key pillars of economic reforms at the early stage of transition to a market economy in Central and Eastern Europe. The authorities of newly independent central banks faced the task of containing sizeable ‘corrective’ inflation that stemmed from far-reaching price liberalization. At the same time, they needed to establish a solid foundation of credibility in order to pursue effective monetary policies (Bruno, 1992). Hard currency pegs were the only policy

¹ A more comprehensive examination of monetary policies of the candidates to the euro that are based on active management of exchange rate and inflation risk premia can be found in Orlowski (2003 and 2005a).

option aimed at stemming the rampant wage and price indexation. But as the transition was progressing, the rigid currency pegs proved to be unsustainable and even harmful to economic stability and growth. Their obstructing effects became more pronounced particularly in the larger transition countries that within several years became ready to pursue more independent monetary policies as their financial markets became more developed, increasingly stable, and thus capable of sending meaningful signals for policy decisions.

The main reasons for the unsustainability of exchange-rate-based monetary policies can be summarized as follows.

1. A hard peg in the presence of considerably higher domestic than foreign inflation leads to real appreciation of domestic currency, which in turn makes it more difficult to balance the current account. This was certainly the case of the Central European transition countries in mid-1990s (Begg, et.al., 2003).
2. Correspondingly, real appreciation led to a deteriorating risk structure of capital inflows, or to the increasing proportional value of short-term relative to long-term capital, particularly that the Central European candidates to the EU had to liberalize their capital accounts in the second half of the past decade.
3. A stubbornly high inflation propelled by wage and price indexation urged policy-makers to devise more direct disinflation strategies than those assured by the transmission of a currency peg onto wholesale or retail prices. In hindsight, much higher interest rates became indispensable for containing inflation than those determined by the task of achieving currency stability.
4. In more general terms, the costs of achieving currency stability had gradually surpassed its benefits. A stable nominal exchange rate could no longer aid inflation when the latter crossed a single-digit range. Moreover, exchange-rate-based policies could not effectively deal with inflationary pressures stemming from the Balassa-Samuelson effects, which became more apparent in the late 1990s².

The drawbacks of currency pegs in Central Europe were manifested particularly at the time of the Asian financial crisis, whose contagion effects were most pronounced in the Czech Republic and the least in Poland. On the eve of that crisis in May 1997, the Czech Republic still maintained a hard peg with a narrow band of permitted fluctuations, while Poland had already enacted a crawling devaluation system with a limited flexibility (see Table I). In addition, a sizeable real currency appreciation in the presence of the hard peg made sustainability of the exchange rate regime highly questionable, which in turn led to a sharp deterioration of the risk structure of capital inflows in the Czech Republic (Brada and Kutan, 1999). A comparison of steps taken towards relaxation of the exchange rate rigidity by these two countries suggests that Poland's departure from the peg was seemingly 'orderly', while the Czech one was rather 'disorderly', based on the distinction proposed by Detragiache, Mody and Okada (2005). By their definition, 'disorderly' exit strategies take place when there are problems with real appreciation, falling reserves, deteriorating fiscal position and low domestic in relation to world interest rates that exacerbate capital outflows. In contrast, 'orderly' strategies take place in the absence of similar macroeconomic problems.

The mounting problems of real appreciation and increasing exposure to international financial contagion prompted monetary authorities in Central European countries to seek various exit strategies from hard pegs and, simultaneously, to search for alternative disciplinary anchors of monetary policy.

² According to the Balassa-Samuelson phenomenon, an increasingly open, growing economy is likely to experience a productivity shock in the tradable-goods sector that drives up wages of non-tradables, thus contributes to chronic inflation. A number of studies have found a pronounced contribution of such effects to inflation in NMS (Michajlek and Klau, 2004; DeGrauwe and Schnabl, 2004) while others have downplayed their role (Egert, et.al. 2004).

The diverse exit strategies from hard pegs towards greater exchange rate flexibility in the Czech Republic, Poland and Hungary are summarized in Table I. Without elaborating detailed steps, Poland embraced greater flexibility relatively early by enacting a crawling band system with a wide, 7 percent band of permitted fluctuations already on May 15, 1995. In contrast to Hungary and the Czech Republic, its eagerness to expand flexibility can be explained by its different structural characteristics and also by its share of external debt in GDP. Poland was (and remains) a larger and less open economy than the other two countries with the share of its external debt in GDP reaching merely 27 percent in 2000, compared to 53 percent in Hungary and 43 percent in the Czech Republic at that time. For these two reasons, there was a lesser danger that Poland's move towards greater flexibility would spill over real exchange rate volatility into real economic activity and into financial markets.

Table I. Modes of Departures from Hard Pegs: Czech Republic, Poland and Hungary

	Exchange Rate Regime (Classification)*	Currency Basket	Tolerance Band
<i>Czech Republic</i>			
Sept. 1, 1990 – Dec. 31, 1993	hard peg (3)	DEM 100%	+/- 0.5%
Jan. 1, 1994-Feb. 29, 1996	hard peg (3)	DEM 65%, USD 35%	+/- 0.5%
March 1, 1996-May 26, 1997	soft peg (4)	same	+/- 7.5%
May 27, 1997 - present	managed float (12)	-	-
<i>Poland</i>			
Jan 1, 1990 – May 17, 1991	hard peg (2)	9500 PLZ/USD	-
May 17, 1991 – Apr 30, 1993	crawling peg (5)	USD	+/- 1%
May 1, 1993- May 15, 1995	crawling peg (5)	5-currency basket	+/- 1%
May 16, 1995 – Feb 24, 1998	crawling band (9)	basket	+/- 7%
Feb 25, 1998 – Dec 31, 1998	crawling band (9)	basket	+/- 10%
Jan 1, 1999 – Apr 11, 2000	crawling band (9)	EUR 55% USD 45%	+/- 15%
Apr 12, 2000 - present	free float (13)	-	-
<i>Hungary</i>			
Jan 1, 1990 – Nov, 1991	crawling band (9)	Basket	+/- 5%
Dec 1, 1991 – Jul 1, 1993	crawling band (9)	DEM 50% USD 50%	+/- 5%
Aug 1, 1993 – May 15, 1994	crawling band (9)	ECU 50% USD 50%	+/- 5%
May 15, 1994 – Dec 31, 1998	crawling peg (6)	ECU 70%, USD 30%	+/- 2%
Jan 1, 1999 – Dec 31, 1999	crawling band (9)	ECU 70%, USD 30%	+/- 2.25%
Jan 1, 2000 – Jan 5, 2001	crawling band (9)	EUR 100%	+/- 2.25%
Jan 5, 2001 – Oct 1, 2001	crawling band (9)	EUR 100%	+/- 15%
Oct 1, 2001 - present	soft peg (4)	EUR 100%	+/- 15%

* The exchange rate classification number is based on the "fine course" determined by Rogoff, et.al., 2003, p. 55, and it ranges from the least flexible (no separate legal tender = class 1) to most flexible exchange rate arrangements (free float, class 13; freely falling, class 14, and dual market in which parallel market data is missing, class 15).

Source: own compilation based on IMF Annual Report on Exchange Rate Arrangements and Restrictions - various editions.

In retrospect, exit strategies from fixed exchange rates became more plausible as the task of containing high inflation was achieved with the help of well-established "imported" credibility (Reinhart and Rogoff, 2004: Rogoff, et.al., 2003). By that time, considerably stronger financial institutions and markets allowed for providing central banks with important signals for conducting more autonomous monetary policies that could utilize indirect instruments, such as open market operations. It was also believed that more flexible real exchange rates might contribute to higher economic growth for such rates could function as the shock absorbers of foreign exchange market jitters, thus providing also an effective cushion against contagion effects from international financial crises. This was certainly the case of a generally effective defence of these countries against speculative attacks on their currencies at the time of the August/September 1998 Russian financial crisis (Orlowski, 2001).

In spite of apparent gains from embracing greater exchange rate flexibility, abandonment of currency pegs left Central European countries without a nominal anchor for monetary policy. It became, therefore,

imperative to devise a coherent, defensible and transparent new monetary policy framework that would properly replace the exchange rate based strategy (Eichengreen, 2005).

3. Searching for Alternative Policy Anchors

After abandoning the exchange rate pegs, monetary authorities in Central European countries did not follow a single 'one-size-fits-all' replacement strategy but rather experimented with a wide spectrum of monetary regimes. These experiments were particularly discernible in the case of Poland. After expanding the exchange rate flexibility in 1995, the National Bank of Poland (NBP) applied a monetary framework based on interest rate targeting in 1996. Then, it moved to targeting monetary base in 1997, and subsequently, to M2 money growth in 1998. None of these alternatives were suitable for a country undergoing deep structural changes and institutional transformation, including dramatic relative price adjustments and expanding monetization as reflected by the growth of M2-to-GDP ratio from 15 percent in 1991 to 43 percent in 2003 (Orłowski, 2005a).

On purely theoretical grounds consistent with the monetarist paradigms, monetary targeting could emerge as an ideal candidate for replacing the exchange-rate-based policies. Predetermined money growth rules could provide a necessary policy discipline that could generate price stability and expand the time horizon of (low) inflation expectations. This, in turn, would make it easier to devise long-term investment strategies and promote sustainable economic growth. But monetary targeting has proven to be implausible on purely technical grounds (Orłowski, 2004). As shown in Table 2, stability of the key monetary indicators that are crucial for devising and implementing reasonable money growth rules is still far from satisfactory in the three examined NMS.

Table 2. Selected Indicators of Monetary Instability

	Czech Republic				Poland				Hungary			
	2000	2001	2002	2003	2000	2001	2002	2003	2000	2001	2002	2003
CPI-inflation	3.9	4.7	1.8	0.1	10.1	5.5	1.9	0.8	9.8	9.2	5.3	4.7
M2V	1.37	1.35	1.32	1.31	2.42	2.22	2.34	2.32	2.21	2.13	2.12	2.17
OCM	1.9	2.1	0.5	0.7	2.4	0.2	-5.8	-3.6	1.5	2.4	1.5	-2.8
IEMD	3.49	1.16	1.48	10.1	0.75	2.74	-0.99	1.23	0.81	1.29	1.04	1.23
DoM	72.8	74.0	75.5	76.6	41.3	45.1	42.7	43.2	45.3	46.9	47.2	46.2
ERV (%)	1.6	2.0	2.2	1.1	2.5	2.1	2.8	2.4	1.2	3.0	1.2	3.4

Notes: M2V is velocity of M2 as a ratio of GDP to the average monthly M2; OCM is opportunity cost of holding money defined as a spread between three-month T-bill rates and the average bank deposit rate; IEMD is income elasticity of money demand measured by arc GDP elasticity of M2; DoM is degree of monetization as ratio of M2 to GDP; ERV is the coefficient of variation of monthly average domestic currency values of one euro.

Source: own calculations based on the data from IMF International Financial Statistics - various editions, Eurostat, CNB, NBP and NBH.

Most importantly, the data show a high degree of instability of the coefficient of income elasticity of money demand, which suggests that it is not possible to devise sensible money growth targets. This instability stems from two factors: strong, yet uneven nominal GDP growth rates, and a highly unstable growth of M2 money balances. The latter is a combination of large swings in interest rates and the growing degree of monetization that only recently has reached a more stable level that roughly corresponds with that in the euro area and in other leading industrial countries. The presented stability indicators also imply a sharp decline in the opportunity cost of holding money, computed as an average monthly spread between the three-month T-bill rates and the bank deposit rates. The narrowing spread implies a growing degree



of competitiveness in the banking sector in the presence of fairly restrictive monetary policies. In sum, the unstable monetary indicators suggest that devising a sensible framework of monetary targeting or interest rate targeting is not plausible; particularly that the credit or the aggregate demand channel of monetary policy transmission is likely to be highly unpredictable, exhibiting ambivalent lagged effects of changes in policy instruments (interest rates) on the key target variables (inflation and income).

The task of achieving sustainable price stability was not fully completed at the end of the 1990s, particularly in the cases of Poland and Hungary, as a double-digit inflation lasted in these countries until the beginning of the present decade. Needless to say, the failure to bring inflation down in the presence of soft pegs coupled with crawling devaluation called for more decisive disinflationary policies. Since the systems based on variations of soft pegs and questionable exit strategies failed to generate a stable price environment, a system of direct inflation targeting emerged as a viable policy option. By embracing DIT, the monetary authorities in Central Europe underpinned realistic hopes for bringing inflation down to the level prescribed by the Maastricht criteria of monetary convergence to the eurozone. In fact, the two countries that introduced DIT relatively early, the Czech Republic as of 1998 and Poland as of 1999, have been more successful in lowering inflation than Hungary, which enacted a similar policy regime only in 2001. By 2001, disinflation in the two DIT countries clearly outperformed that of Hungary, which has entered a more decisive disinflation path only with the DIT inception. However, the Hungarian DIT initially exacerbated exchange rate volatility, as shown by the surge in the coefficient of variation of the exchange rate in 2001 relative to 2000. Nevertheless, the declaration of the dual targeting strategy by the National Bank of Hungary (NBH), based on supplementing the inflation target with the exchange rate stability objective, contributed to lower exchange rate volatility in 2002. In comparison, the coefficient of variation for the Polish Zloty (PLN) relative to the euro (EUR) was considerably larger than that for the Czech Koruna (CZK) value of euro, which might be explained by the difference in prevalent exchange rate regimes. In recent years, the CNB has followed a managed float strategy with active foreign exchange market interventions, while the NBP has espoused a pure float.

4. Direct Inflation Targeting – A Viable Policy for Larger NMS

It is a well-established opinion in the literature pertaining to monetary policies in NMS that DIT offers an effective anchor for monetary policy that got lost by departing from currency peg (Jonas and Mishkin, 2003; Eichengreen, 2005; Orlowski, 2005a). DIT underpins the central banks commitment to disinflation. It is an intrinsically transparent strategy as it is based on a publicly-disclosed inflation goal that is explicit and well-understood by the financial markets and the public at large. Certainly, DIT could not be introduced in Central Europe at earlier stages of economic transition for at least two reasons. First, inflation targets must be believable, i.e. credible in order to be effective. The central banks in question had to have established a certain degree of foundational credibility in order to devise a sensible DIT system. Opting for currency pegs had helped them infuse the initial policy credibility. Second, DIT requires fairly-specific knowledge about monetary policy transmission channels on the part of central banks, so that they can make appropriate interest rate decisions leading to hitting the inflation target (Jonas and Mishkin, 2003). But it was not until late 1990s, that the three central banks were able to gain such knowledge, having by then almost a decade of fairly reliable data, even though the stability of the main monetary indicators was probably still insufficient for introduction of full-fledged DIT (Christoffersen and Wescott, 1999). Yet, a firm commitment to disinflation embodied in the early strict variant of DIT was critical for the indisputable

success of the new policy, in spite of numerous technical difficulties in its formulation and implementation (Orlowski, 2005a)³.

An additional advantage of DIT that is particularly pertinent to the economies converging to the eurozone is related to its ability to insulate the economy from balance of payments shocks. The empirical proof underpinning this feature is provided by Dibooglu and Kutan (2005) who show that inflation fluctuations in Poland are predominantly influenced by nominal supply-side and monetary shocks, in contrast to Hungary, where real exchange rate and balance of payments shocks strongly affect price level movements. These empirical results certainly depend on the prevalent monetary regime in each country – the timely exit from currency peg in Poland and the delayed one in Hungary.

On theoretical grounds, a specific variant of DIT is fully consistent with the choice of weights assigned to key parameters in the standard central bank's quadratic loss function that for open-economy conditions can be stated as

$$L = \omega_1 (\pi_t - \bar{\pi}_t)^2 + \omega_2 (y_t - y_t^*)^2 + \omega_3 (s_t - s_t^*)^2 \quad (1)$$

where π_t is the actual (or expected) inflation, $\bar{\pi}_t$ is the pre-announced inflation target, $(y_t - y_t^*)$ is the output gap (the difference between actual and potential output), and $(s_t - s_t^*)$ is the difference between the nominal actual and the dynamic equilibrium exchange rate. In theory, the exchange rate could be treated here in a more conventional way as a real rate, but in more practical and feasible terms it is determined as a nominal rate. Following the logic of this open-economy loss function, a monetary authority needs to prioritize the inflation, output stability and the exchange rate objectives. If the weight on inflation target (ω_1) is equal to unity and the remaining weights are zero, the central bank assigns an exclusive priority to the inflation target and the policy framework that follows this logic is defined as *strict DIT*. But when the central bank lowers the weight on inflation target and raises either one of the two remaining ω -weights, it switches to *flexible DIT* strategy (Svensson, 1999).

Table 3. Loss Function Parameters under Strict and Flexible DIT

Variants	Parameters	Advantages	Dangers
Strict DIT	$\omega_1 = 1, \omega_2 = 0, \omega_3 = 0$	Effective strong disinflation, improved c. b. credibility	Potentially high welfare costs
Flexible DIT in developed closed economy	$\omega_3 = 0$	Disinflation and growth, lower welfare costs, condition: ex ante credibility	Exch. rate instability (depending on the level of openness)
Flexible DIT in open economy under monetary convergence	$\omega_2 = 0$	Disinflation, stable exchange rate	Some welfare costs

Source: the author.

The main features of different variants of DIT policies with respect to different weights assigned to the components of the central bank loss function are summarized in Table 3. A strict DIT is appropriate when a central bank has not yet established sustainable price stability and needs to underpin firm commitment to disinflation and to building foundations of monetary policy credibility. On the negative side, strict DIT, at least at its initial stage, always entails high welfare costs since it is implemented by applying high real interest

³The distinction between strict and flexible variant of DIT has been proposed by Svensson (1999). Strict DIT takes place when the central bank's reaction function encompasses only the low inflation objective. DIT becomes more flexible when a positive weight is also assigned to alternative variables, such as output growth, or exchange rate stability as proposed for an open-economy setting by Ball (1999) and Svensson (2000) and adopted by Orlowski (2003; 2005a) for the economies acceding to the economic and monetary union.

rates that hinder economic growth and employment. Once manageable price stability is achieved, the central bank will be well-advised to consider increasing weights on the output gap or exchange rate stabilization. It will then follow a flexible DIT strategy. The central bank facing the task of monetary convergence to a common currency system needs to signify exchange rate stabilization, in addition to its continuous commitment to price stability, which cannot be neglected during the convergence process. An excessive weight on the exchange rate objective would likely derail price stability and question viability of the monetary convergence process. It is worthy noting that flexible DIT under convergence that requires commitment to low inflation and exchange rate stability will necessitate some welfare costs, although not as high as those brought about by strict DIT. It is because this type of flexible DIT can only be carried on given a prior achievement of policy credibility and can be, therefore, implemented with lower interest rates than those required under strict DIT. It is further reasonable to assume that central bankers fully realize that it is impossible to commit to all three objectives implied by the loss function due to unavoidable conflicts between them. Upbeat aspirations to lowering inflation, stimulating growth and reducing exchange rate volatility at the same time could seriously undermine the central bank's credibility.

When the knowledge about the aggregate demand and the exchange rate channels of monetary policy transmission is limited, strict DIT is the only viable and credible option for the central bank. Therefore, at the early stages of DIT, the CNB and the NBP could only follow such a policy framework. Their strong emphasis on disinflation needed to be underpinned by a simple instrument rule that called for very high interest rates that could break the spiral of wage and price indexation, and thus put inflation on a declining path. But once the price stability was achieved in 2002 and 2003, both central banks began discussions about infusing some flexibility into their DIT frameworks by increasing weights on either the output or exchange rate stabilization.

It further becomes apparent that the criteria for a successful monetary convergence to the eurozone, at least the Maastricht convergence benchmarks, call for achieving low inflation as well as the exchange rate stability, without taking into consideration the output growth⁴. Therefore, plausible directions for increasing the DIT flexibility need to consider a proper balance between the weights assigned to inflation and exchange rates with disregard of ω_2 . By a general rule, the proportionate weighting of ω_1 and ω_3 depends directly on the degree of openness, as a susceptibility factor to external shocks. More open economies, such as the Czech Republic or Hungary, may embrace greater DIT flexibility by increasing weight on the exchange rate stabilization, while less open economies may wish to stick to prioritizing the strict inflation target.

According to a well-established consensus in the literature, a declaration of DIT by itself is insufficient for guaranteeing its success (Taylor, 2000; Jonas and Mishkin, 2003; Eichengreen, 2005). In addition to a mere announcement of inflation goals, an effective DIT requires an analytical model outlining a set of monitoring formulas, such as money demand functions, core inflation forecasts, exchange rate behavioural models, etc., as well as instrument rules, generally based on various forms of open-economy Taylor rules. More advanced and also practical and credible versions of full-fledged DIT ought to encompass such well-prescribed behavioural and policy-reaction functions. For the countries aspiring to adopt the euro, simple strict DIT regimes cannot work. Such policies are suitable only for closed economies that can resort to autonomous monetary regimes and are not conducive to a successful monetary convergence to a common currency system. Therefore, in order to aid the monetary convergence to the eurozone, the current DIT regimes in the three examined countries need to be modified by encompassing appropriate 'convergence parameters', namely, exchange rate stability objectives.

⁴ Nevertheless, viability and applicability of the Maastricht convergence criteria to NMS are subject to intense scrutiny and debates, as they reflect the European Commission's apparent precept that the euro candidates should be treated as an isomorphic block, with disregard to their prevalent structural and institutional differences (Szapáry, 2000; Kenen and Meade, 2003).

Before examining several proposals for DIT extensions, it is useful to synthesize key features of the present DIT regimes in the three NMS (Table 4).

Table 4. Characteristics of Current Inflation Targeting Regimes

	<i>Type of Monetary Policy (adopted since)</i>	<i>Main target(s)</i>	<i>Actual annualized CPI inflation Dec 2004</i>	<i>Corresponding exchange rate regime</i>	<i>Policy Transparency</i>	<i>Formal Plan for Euro Adoption</i>
Poland	DIT single target (Jan 1999)	CPI inflation trajectory: midpoint 2.5%, +/- 1% tolerance band	4.4%	Float	High, published: inflation projection, reports and policy assumptions	Yes, in 2009
Czech Republic	DIT single target (Jan 1998)	CPI inflation trajectory: midpoint 3.0%, no specified tolerance band	2.8%	Managed Float	High, published: inflation forecasts, reports and policy assumptions	Yes, in 2009 or 2010, ERM II for max. 2 years
Hungary	DIT dual targets (June 2001)	CPI inflation 4.0% - Dec 05 3.5% - Dec 06 with +/- 1% band	5.5%	ERM II shadowing, forint-per-euro reference rate of 282	Relatively high, published: inflation reports and policy assumptions	Vague, as early as possible

Source: Own compilation based on CNB, NBP and NBH various reports.

The DIT policy frameworks in the three NMS are quite distinct. While the tradition of these policies is longer in the Czech Republic and Poland (dating back to January 1998 and January 1999 respectively), in Hungary it is relatively newer (as of June 2001) and also seemingly different from that of the early entrants to the international 'inflation targeters' club. Unlike the CNB and the NBP, the NBH follows a dual targeting system combining year-end inflation targets with an explicit exchange rate stability objective. Hungary has already (and perhaps prematurely) entered an ERM II-shadowing mechanism, setting the current reference rate at 282 HUF per EUR⁵. It seems that the late adoption of DIT along with the suboptimal reference exchange rate at HUF value set below its dynamic equilibrium contribute to some extent to higher actual inflation in Hungary relative to the remaining two countries. In addition, the CNB and the NBP specifications of inflation targets along a flat linear trajectories offer superior features in comparison with the NBH commitment to year-end targets. A linear trajectory allows for expanding the time horizon of low inflation expectations, which in turn contribute to lower inflation risk premium and to an improved overall investment climate. Nevertheless, there are two important common features of DIT regimes in all three NMS. First, all three base their inflation target on CPI rather than core or other measures of inflation. This choice is seemingly prudent, as financial markets expectations are normally geared to CPI inflation forecasts, which allows for a more straightforward monitoring of the differentials between the inflation forecast and the target. Second, all three conduct highly transparent policies; policy assumptions are routinely published, so are the exhaustive inflation reports. The CNB and the NBP also disclose their inflation forecasts. The CNB, however, seems to be ahead of its counterparts on two other aspects. First, it has refrained from specifying a tolerance band around the inflation target, which is a prudent move allowing it to accommodate possible temporary price shocks, such as those that occurred at the time of the actual EU accession in May 2004. By comparison, similar shocks in Poland stemming from accession-related increases in indirect taxes along with the unexpected surge in food prices caused overshooting of the upper boundary of its target band. Second, the

⁵ As shown in Orlowski (2004), it is extremely difficult to determine an appropriate euro reference rate for the three examined NMS that ideally corresponds with the dynamic equilibrium exchange rate, which would guide the euro-convergence process. The Johansen cointegration tests (max-eigenvalue and trace test) employed in that study produced no conclusive results for the Czech Republic and Poland, but implied the equilibrium exchange rate of 242 HUF per EUR for Hungary (see Orlowski, 2004, p. 832). Incidentally, the actual rate on March 10, 2005 at the time of this writing was exactly 242, and oscillating for some time around this level.

CNB has formally announced a managed float policy. Its readiness to intervene is apparently reducing foreign exchange markets vicissitudes, judging from the lower exchange rate risk premium. The managed float option seems, therefore, more conducive to the convergence process.

Regardless of their advanced features and effective implementation, the DIT strategies in the examined NMS still need to be modified to incorporate the key tasks of monetary convergence to the euro. There have been several noteworthy proposals in the literature pertaining to reformulation of the present monetary policies in NMS on the final passage to the euro - some of them call for a radical regime switching while others devise a smooth transition. Nonetheless, the majority of studies voice concerns that the current DIT strategies are not compatible with the exchange rate convergence criterion embodied in the ERM II arrangement. Their authors anticipate high costs of regime switching back to exchange-rate-based monetary policy upon the entry to ERM II (Natalucci and Ravenna, 2002; DeGrauwe and Schnabl, 2004; Kocenda, Kutan and Yigit 2005).

5. Sundry Recipes for Monetary Convergence

Reviewing a plethora of viewpoints within the discussion on optimal monetary strategies for adopting the euro one may quickly notice a lack of consensus or even a uniform direction for policy solutions. Evidently, a 'one-size-fits-all' policy prescription remains out of sight. Yet, there is a common understanding that the euro adoption means relinquishing the monetary autonomy of individual countries, which will entail certain short-run costs. These costs are likely to be minimized if adjustments in monetary policy regimes are properly designed and tailored to the individual country's circumstances during the course of active preparations for the euro adoption. There is also a consensus that the smaller candidate countries, such as the Baltic States that rely on currency board arrangement for guiding their monetary policies, will be best served by upholding their existing monetary regimes during their final passage towards the euro. It is because their financial markets are relatively less-developed, thus susceptible to large, potentially destabilizing shocks. If they embraced greater monetary flexibility, their vulnerability to nominal shocks would be exacerbated posing a higher country risk to investors.

In contrast to a common recipe for the smaller NMS, there is little consensus in the literature about effective monetary policies for adopting the euro by the larger NMS. The ongoing debate includes a variety of policy proposals ranging from calls for a leap to unilateral euroisation, to a prolonged reliance on autonomous monetary regimes based on direct inflation targeting (DIT).

The proponents of a unilateral adoption of the euro, including Bratkowski and Rostowski (2001), Buiter and Grafe (2002) and Begg, et.al. (2003), have identified a number of benefits that can result from such a bold political move. Certainly, a prompt entry to the euro area would entail considerably lower costs for both current and capital transactions. It would also bring forth lower interest rates. There are, however, concerns that interest rates after euroisation would not be fully aligned with those in the eurozone as the banking system in NMS is considerably less competitive (Nutti, 2002). Moreover, the lending rates in a prompt euro entrant would still carry a risk premium as long as the institutional convergence of the financial systems is incomplete. Without much controversy, the most apparent benefit from a prompt euroisation would be the elimination of the exchange rate risk. As a consequence, a related country exposure to speculative attacks on the currency would be lower. However, similar effects can also be achieved by implementing fully autonomous, yet disciplined fiscal and monetary policies. Possible direct costs associated with a rush to euroisation may entail the initial drainage of international reserves, a loss of seigniorage revenues to the government and giving up the lender-of-last-resort function of a central bank. The

seigniorage argument may be easy to rectify as seigniorage revenues or central bank emergency lending activities are quite negligible in NMS at the present time. More qualified are reservations about the leap to euroisation that are related to sacrificing the ability to adequately respond to asymmetric shocks, particularly in the countries where institutional convergence is lagging behind. In the absence of necessary institutional reforms, a leap to euroisation may exacerbate the default risk of some domestic financial institutions that are not adequately prepared for a head-on competition with their stronger foreign counterparts.

In general terms, a unilateral euroisation by itself is unlikely to resolve the remaining problems related to the institutional fragility of the real economy and the financial system; neither will it guarantee a necessary fiscal discipline. It is because the institutional deficiencies have much deeper roots than simply the monetary regime, and fiscal problems are a function of more than just the availability of seigniorage revenues (Eichengreen, 2005). Thus in essence, selecting the timing of the formal euro adoption should matter less than devising well-coordinated monetary, real and institutional convergence policies (Nuti, 2002). Having a few more years of monetary independence combined with disciplined fiscal policies may allow borrowing time for the necessary completion of institutional reforms.

Alternative proposals for more gradualist adjustments in monetary policies are based on reformulation of the current, rather strict DIT regimes. They embrace greater flexibility of these regimes to various degrees. In other words, they put more or less balanced weights on inflation and exchange rate stability targets. In all cases, infusion of the exchange rate stability objective is believed to be critical for achieving a successful monetary convergence to the euro. In spite of the differences in specific policy prescriptions among the discussed proposals, the gradualist approach recognizes the importance of allowing sufficient time for a successful coordination of monetary, real and institutional convergence.

As a somewhat extreme solution, a far-reaching departure from the current strict DIT policies is proposed by Bofinger and Wollmershäuser (2001, 2002) who advocate adopting a monetary regime based on flexible exchange rate targeting for the final passage to the euro. In their policy scenario, exchange rate stability becomes the key policy objective, while price stability plays a secondary role, as it is presumed to be derived from less volatile exchange rates. In terms of the central bank's loss function (Eq. 1), they prioritize ω_3 over ω_1 . However, their stance also implies a significant regime switch that might prove to be costly. It is because the primary commitment to the exchange rate stability objective may entail frequent and costly interventions, particularly if financial markets are institutionally unprepared for absorption of nominal shocks. In addition, it is highly uncertain whether the monetary regime focusing on exchange rate stability (even in a stricter form than the one allowed by the ERM II) will actually contribute to price stability. It is because the exchange rate channel of monetary policy transmission in the larger NMS is rather unstable (Orlowski, 2003)⁶. Therefore, a smooth transmission of more stable exchange rate into low inflation is not automatically guaranteed upon adopting a flexible exchange rate targeting regime.

A more balanced weighting of inflation and exchange rate stability targets is advocated by Jonas (2004). His 'dual target-one instrument' policy scenario is an extension of the present DIT regimes as it calls for assigning equal importance to inflation and the exchange rate stability targets, $\omega_1 = \omega_3$. Yet, the actual implementation of such policy may pose serious difficulties as there are several identifiable conflict areas between both targets. Among them is a possible combination of currency appreciation and high inflation in the presence of large capital inflows to NMS. A proper response to a stronger national currency would require lowering interest rates that subsequently could jeopardize the inflation target. On the contrary, raising interest rates by the central bank in response to higher inflation may lead to currency appreciation and exacerbate exchange rate volatility. Moreover, the conflicts between both targets are likely to persevere

⁶ A more optimistic view is presented by Golinelli and Rovelli (2005) whose empirical tests indicate a seemingly robust channel of monetary policy transmission in the NMS.



in the presence of the Balassa-Samuelson effects, which are believed to be prevalent in transition economies (Buiter and Grafe, 2002; Begg, et.al., 2003; Mihaljek and Klau, 2004; DeGrauwe and Schnabl, 2004). However, if the pro-inflationary impact of such effects is believed to be evaporated by now, as argued by Égert, et.al., (2003), the potential conflicts between both inflation and exchange rate stability targets may have little merit; so do the arguments for early euroisation that are derived on the basis of these effects.

Among the proponents of gradual policy adjustments, Orlowski (2005b) puts the highest weight on the inflation target and proposes a policy framework based on *relative inflation forecast targeting* (RIFT). In quintessence, it is a forward-looking DIT extension, which is based on targeting the differentials between the candidate country and the eurozone inflation forecasts. As such, it allows for combining a decisive commitment to disinflation with an effective price convergence. In such monetary policy framework, the inflation forecast differential becomes the key operating target while the exchange rate stability is treated only as one of the main indicator variables, and not as an auxiliary operating target. The proposed regime allows policy-makers to focus exclusively on price stability, as the main criterion of monetary convergence, thus to underpin their strong commitment to achieving price convergence prior to the euro adoption. Moreover, the proposed policy regime underscores the commitment to price stability when possible conflicts between disinflation and exchange rate stability arise.

In order to ensure a successful monetary convergence to the euro, the RIFT framework assumes a perfect identity between the long-term inflation targets of the candidate country and the eurozone. Therefore, in practical terms, the candidate's inflation based on HICP (harmonized index of consumer prices) can be reasonably expected to converge to less than 2 percent by the time of the euro adoption, which shall not be significantly different from the Maastricht convergence benchmark of 1.5 percent above the average of the three lowest inflation rates among the EU members (specified at 2.4 percent in the 2004 ECB Convergence Report). The RIFT operational procedure is based on effective policy instrument adjustments in response to the difference in CPI-inflation forecasts between the candidate and the eurozone for a specified period ahead. If the candidate's expected inflation rises relative to that in the eurozone, its central bank may either raise domestic interest rates or allow domestic currency to depreciate in euro terms, but only if the anticipated inflation shock is perceived as temporary. Moreover, since the ancillary exchange rate stability objective is treated only as an indicator, not as a target variable, the central bank of the converging economy will respond to an observed excess exchange rate volatility (or a surge in the exchange rate risk premium) with foreign exchange market intervention, while the interest rate instrument will react mainly to changes in the relative inflation forecast. In this way, RIFT can be described as a combination of a forward-looking DIT and a managed float. However, if the observed exchange rate volatility is destabilizing and is likely to endanger realization of the inflation target, it may be also curtailed with higher interest rates.

It seems that the central banks in the three NMS are presently well-suited for adopting the proposed RIFT strategy as they are now equipped with advanced inflation forecasting methodology, as well as the ability to apply efficiently indirect instruments of monetary policy implementation. Although the operational viability of such a complex monetary policy framework is yet to be tested, according to Orlowski (2005b) there is no potential conflict between the RIFT mechanism and the ERM II ramifications.

6. Coping with ERM II

As commonly believed in the literature, the smaller NMS will be well-served by upholding their present currency board arrangements, while the larger ones that target inflation will have to modify their monetary

policies in order to accommodate the objective of exchange rate stability (Jonas and Mishkin, 2003; Jonas, 2004; Orlowski, 2005b). Regardless of the applied adjustment, the NMS can and should avail themselves of the exchange rate flexibility afforded by ERM II, providing that the ‘standard’ plus-minus 15 percent band of currency fluctuations will be upheld, rather than the ‘normal’ band of 2.25 percent prescribed originally by ERM I. Certainly, their participation in ERM II will necessitate a reorientation of their monetary regime in order to account for possible shocks to exchange rates. In essence, the standard band offers enough flexibility to accommodate these shocks, particularly in the absence of active interventions of the central banks pursuing DIT policies.

This analysis clearly favours the inflation targeting policies as more conducive to an effective monetary convergence to the euro than those based on exchange rate targeting. Flexible inflation targeting regimes offer attractive advantages over those based on currency stability objectives, particularly the ones based on soft pegs. It is because focusing exclusively on the exchange rate target does not necessarily foretell the absence of large currency shocks; especially if the country’s financial system is inadequately prepared for their absorption. In addition, a currency peg, particularly the one associated with the narrow 2.25 volatility margin, increases the risk attributable to misspecification of the reference rate. If the official reference rate is too weak, i.e. set well-below the dynamic equilibrium rate, it would inflate the domestic value of foreign currency debt and raise the default risk. If it is too strong, it would precipitate significant short-term capital inflows exacerbating inflation. In any case, a wider tolerance band would provide a cushion preventing such undesirable effects. Thus in essence, the candidate countries face the challenge of a careful specification of the ERM II official reference rate that will roughly correspond with the dynamic equilibrium exchange rate.

A proper choice of the official reference rate is absolutely critical. The *de jure* rate needs to correspond with the long-run dynamic equilibrium exchange rate in order to guide effectively the euro-convergence process. The *de jure* rate set at suboptimal level, i.e. different than that implied by market perceptions, would bring a number of unpleasant policy consequences. In general terms, it would effectively narrow the tolerance band prompting the central bank to conduct frequent and asymmetric foreign exchange market interventions. If a central bank decided to stick firmly to the suboptimal rate and refrain from its official resetting, the *de jure* rate would function as a magnet pulling the actual exchange rates in a wrong direction (Schadler, 2004). This in turn would infuse some inflationary pressures in the case of an excessively weak domestic currency, or contribute to real currency appreciation if the *de jure* rate were too strong. Moreover, a strong rate would have to be defended with suboptimally high interest rates or alternatively supported with frequent foreign exchange market interventions, while a weak rate would trigger market expectations about interest rate cuts by the central bank. It is therefore imperative that the official reference rate is not hastily chosen, but properly determined and introduced at an appropriate time in order to avoid potentially damaging consequences of a wide gap between the *de jure* and *de facto* equilibrium exchange rate perceived by financial market participants.

An additional difficulty with arriving at the appropriate reference rate stems from prevalence of risk premia that are built into the equilibrium exchanger rate. Uncertainties about fiscal discipline and political stability may bring down the perceived market rate and require a tighter monetary policy stance, i.e., higher interest rates encapsulating such exogenous risk premia. Furthermore, a suboptimal rate is likely to exacerbate exchange rate volatility, thus increase the exchange rate risk premium due to uncertainty about foreign exchange market interventions. In contrast, volatility of exchange rates around a correctly chosen reference rate is likely to be curtailed.

Selecting correct procedures and formulas for a robust determination of the reference exchange rate for ERM II poses a major challenge for policy-makers in NMS as evidence on comparable endeavours in the world economy is seemingly scant. By all means, monetary convergence of the NMS to the eurozone is a pioneering effort.

7. A Synthesis - Some Stylized Facts

It is debatable whether monetary policies in NMS aspiring to join the euro by the end of the present decade will come full circle, i.e. whether after starting from the initial hard currency peg, replaced by DIT with floating exchange rates they will go back to exchange-rate-based policy based on the euro-peg. As argued in this study, the final bend of the perceived 'circle' is not imperative, as they may opt for flexible DIT instead. The proposed RIFT framework, as a special case of flexible DIT, is believed to support the monetary convergence more effectively than a retreat to a hard peg.

The key precepts underlying this study can be synthesized as follows:

1. An autonomous strict DIT framework is not conducive to the euro-convergence. Monetary authorities of the euro-candidates face a task of incorporating an exchange rate stability objective into their DIT strategies in order to ensure a proper balance between the two key objectives of monetary convergence, i.e. price convergence and exchange rate stabilization.
2. In an attempt to alleviate possible conflicts between disinflation and exchange rate stabilization in a dual target-one instrument framework, this study advocates assigning the highest priority to the inflation target, thus enacting a forward-looking policy based on relative inflation forecast targeting originally outlined in Orlowski (2005b).
3. Consistently, a difference between the domestic and the eurozone inflation forecasts is proposed as the main policy operating target, while exchange rate stabilization is viewed as an important indicator variable.
4. Implementation of RIFT combines interest rate adjustments and foreign exchange market intervention. Thus in essence, RIFT has to be accompanied by managed float. The central bank will adjust interest rates in response to more permanent changes in the relative inflation forecast, while foreign exchange market intervention will be used to correct shocks to nominal exchange rates. The central bank may consider an interest rate response only when exchange rate shocks become highly persistent, and thus jeopardizing the realization of the inflation target.
5. The policy constraints engendered by ERM II are unlikely to hinder an effective implementation of RIFT if, however, the exchange rate reference rate is properly determined. A suboptimal reference rate implies a narrower *de facto* than the *de jure* permitted tolerance band of currency fluctuations. It may exacerbate exchange rate volatility in response to the market expectations of the reference rate resetting. It may further incite more frequent, costly and asymmetric foreign exchange market interventions. Ideally, the reference rate should be fully aligned with the long-run equilibrium exchange rate that is credible for financial markets.

A further in-depth analysis of monetary policy issues pertaining to the optimal euro-convergence and ERM II strategies continues to be an urgent task for policy-makers and academicians. The behavioural aspects of the proposed policy solutions ought to be supported with advanced policy modelling efforts and a thorough econometric analysis. Completion of these tasks is now critical since not much time remains until the formal euro adoption that is scheduled by the NMS authorities to take place at the end of the present decade.

References

- Ball, L., 1999. Policy rules for open economies, in: Taylor, J. (Ed.) *Monetary Policy Rules*, University of Chicago Press, Chicago, Illinois, pp. 127-156.
- Begg, D., Eichengreen B., Halpern L., von Hagen J., Wyplosz C., 2003. Sustainable regimes of capital movements in accession countries. London: Center for European Policy Research Policy Paper No. 10.
- Bofinger, P., Wollmershäuser, T., 2001. Is there a third way to EMU for the EU accession countries?. *Economic Systems* 25 (3), 253-274.
- Bofinger, P., Wollmershäuser, T., 2002. Exchange rate policies for the transition to EMU, in: Sepp, U., Randveer, M., (eds.), *Alternative Monetary Regimes in Entry to EMU*. Bank of Estonia, Tallinn, Estonia, pp. 95-132.
- Brada, J.C., Kutan, A.M., 1999. The persistence of moderate inflation in the Czech Republic and the koruna crisis of May 1997, *Post-Soviet Geography and Economics* 40 (2), 121-134.
- Bratkowski, A., Rostowski, J., 2001. Unilateral adoption of the euro by EU applicant countries: the macroeconomic aspects. In: Orlowski, L.T. (ed.) *Transition and growth in post-communist countries – the ten-year experience*. Edward Elgar Publishing Ltd., Cheltenham, U.K., pp.125-147.
- Buiter, W., Grafe, C., 2002. Patching up the Pact – Some suggestions for enhancing fiscal sustainability and macroeconomic stability in an enlarged European Union. Center for Economic Policy Research *Discussion Paper* no. 3496. London.
- Christoffersen, P., Wescott, R., 1999. Is Poland ready for inflation targeting ? International Monetary Fund: Working Paper No. WP/99/41.
- DeGrauwe, P., Schnabl, G. G., 2004. Nominal versus real convergence with respect to EMU accession: How to cope with the Balassa-Samuelson dilemma. *Paper to the International Atlantic Economic Society convention*, Lisbon, March 11-14.
- Detragiache, E., Mody, A., Okada, E., 2005. Exits from heavily managed exchange rates. . International Monetary Fund: Working Paper No. WP/05/39.
- Dibooglu, S., Kutan, A. M., 2005. Sources of inflation and output movements in Poland and Hungary: Policy implications for accession to the economic and monetary union. *Journal of Monetary Economics* 27 (2) 107-131.
- Domaç, I., Mendoza, A., 2004. Is there room for foreign exchange market interventions under inflation targeting framework?: Evidence from Mexico and Turkey. World Bank Policy Research Working Paper No. 3288.
- Eichengreen, B. L., 2005. Can emerging markets float?: Should they inflation target? In: Driver, Rebecca L., Peter J. N. Sinclair and Christoph Thoenissen (eds.) *Exchange rates, capital flows and policy*. Routledge Publ. Co., London, pp. 10-38.
- Égert, B., Drine, I., Lommatzsch, K., Rault, C., 2003. The Balassa-Samuelson effect in Central and Eastern Europe: Myth or reality?. *Journal of Comparative Economics* 31(3), 552-572.
- European Central Bank, 2004. 2004 Convergence Report. ECB: Frankfurt, Germany.
- Golinelli, R., Rovelli, R. R., 2005. Monetary policy transmission, interest rate rules and inflation targeting in three transition countries. *Journal of Banking and Finance* 29 (1), 183-201.
- Holtemöller, O., 2003. Uncovered interest rate parity and analysis of monetary convergence of potential EMU accession countries. Humboldt University Berlin – Discussion Paper of Interdisciplinary Research Project No. 373.
- Jonas, J., 2004. Euro adoption and Maastricht criteria: Rules or discretion?. University of Bonn-Center for European Integration Studies (ZEI): *Working Paper B14/2004*.



- Jonas, J., Mishkin F.S., 2003. Inflation targeting in transition economies: Experience and prospects. NBER Working Paper, No. 9667.
- Kenen, P., Meade, E.E., 2003. EU accession and euro: Close together or far apart?. Institute for International Economics: International Policy Briefs No. PB03-9.
- Kocenda, E., Kutan, A. M., Yigit, T.M., 2005. Pilgrims to eurozone: how far, how fast. William Davidson Institute Working Paper, University of Michigan School of Business, forthcoming.
- Kutan, A. M., Yigit, T.M., 2002. Nominal and real stochastic convergence within the transition economies and to the European Union: evidence from panel data. University of Bonn-Center for European Integration Studies (ZEI): Working Paper B21/2002.
- Mihaljek, D., Klau, M., 2004. The Balassa-Samuelson effect in Central Europe: A disaggregated analysis. Comparative Economic Studies 46(1), 63-94.
- Natalucci, F. M, Ravenna, F., 2002. The road to adopting the euro: monetary policy and exchange rate regimes in EU candidate countries, Board of Governors of the U.S. Federal Reserve System, International Finance Discussion Papers: 741.
- Nuti, D.M., 2002. Costs and benefits of unilateral euroization in Central Eastern Europe. Economics of Transition 10 (3), 419-444.
- Orlowski, L.T., 2001. Central European economies in the aftermath of the Russian payment crisis. In: Orlowski, Lucjan T. (ed.) *Transition and growth in post-communist countries: the ten-year experience*. E. Elgar Publ. Co., Cheltenham, U.K., pp. 148-165.
- Orlowski, L.T., 2003. Monetary convergence and risk premiums in the EU accession countries. Open Economies Review 14 (3), 251-267.
- Orlowski, L.T., 2004. Money rules for the eurozone candidate countries. Journal of Policy Modeling, 26 (7), 817-837.
- Orlowski, L.T., 2005a. Monetary convergence of the EU accession countries to the eurozone: A theoretical framework and policy implications. Journal of Banking and Finance 29 (1), 203-225.
- Orlowski, L.T., 2005b. Targeting relative inflation forecast as monetary policy framework for adopting the euro. William Davidson Institute Working Paper No. 754, University of Michigan School of Business.
- Reinhart, C. N., Rogoff, K. S., 2004. The modern history of exchange rates: A reinterpretation. Quarterly Journal of Economics 119 (1), 1-48.
- Rogoff, K. S., Husain, A. M., Mody, A., Brooks, R., Oomes, N., 2003. Evolution and performance of exchange rate regimes. International Monetary Fund: Working Paper No. WP/03/243.
- Schadler, S., 2004. European macroeconomic challenges and EU enlargement. Paper to the 17 Symposium Moneda y Credito, Madrid, November 18-19.
- Svensson, L. E.O., 1999. Inflation targeting as a monetary policy rule. Journal of Monetary Economics 43 (3), 607-654.
- Svensson, L.E.O., 2000. Open-economy inflation targeting. Journal of International Economics 50 (2), 155-183.
- Szapáry, G., 2000. Maastricht and the choice of exchange rate regime in transition countries during the run-up to EMU. National Bank of Hungary: Working Paper 2000/7, October.
- Taylor, J. B., 2000. Inflation targeting and monetary policy rules: Experience and research. Paper to the 12th Meeting of Latin American Network of Central Banks and Finance Ministers – Inter-American Development Bank, May 12.