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Lucjan Orłowski

Sacred Heart University, orlowskil@sacredheart.edu

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THE RELEVANCE OF INFLATION AND EXCHANGE RATE RISK FOR MONETARY CONVERGENCE TO THE EUROZONE

Lucjan T. Orlowski

Professor of Economics, Sacred Heart University
5151 Park Avenue, Fairfield, CT 06825
and Senior Fellow, University of Bonn
Center for European Integration Studies (ZEI)

ABSTRACT

This study places a strong emphasis on the ability of Central European countries to lower inflation and exchange rate risk premiums on their path of monetary convergence to the eurozone. A model of the nexus between both risk premiums is presented along with the recent evidence supporting well-coordinated interactions between these risk premiums for Poland, Hungary and the Czech Republic. The analysis implies that monetary policies based on direct inflation targeting are likely to contain these risk premiums in the candidate countries and can be effectively used during the remaining period of their preparations for entering the euro area.

JEL classification: E32, E52, P33.

Key words: inflation risk premium, exchange rate risk premium, common currency area, inflation targeting, transition economies

I. INTRODUCTION

The eastern enlargement of the European Union (EU) and, subsequently, the European Monetary Union (EMU) invokes a number of policy-oriented debates. Among them, considerable attention is devoted to the issue of designing appropriate monetary policies for an effective convergence of the EU/EMU candidate countries to the eurozone. The policy proposals presented in the literature range from calls for a leap to unilateral euroization to more autonomous policy solutions such as direct inflation targeting (DIT) regimes with fully flexible exchange rates. The proponents of early euroization, including Begg, et.al. (2001), Bratkowski and Rostowski (2001), as well as Buitier and Grafe (2001), argue that this approach would infuse monetary stability, which in turn would promote investment and accelerate growth in the candidate countries. Seemingly different modes of monetary policy are endorsed by Bofinger and Wollmershäuser (2001 and 2002), and by Orłowski (2001 and 2002). They favor maintaining more autonomous policies until the candidates are formally eligible for entry to the eurozone, that is no earlier than two years after their EU accession scheduled for May 2004. Specifically, Orłowski argues that effective monetary convergence can be best achieved by adopting a flexible variant of DIT, that is, a policy system which assumes inflation control as a predominant target, supported by exchange rate stability as a conditional target. Bofinger and Wollmershäuser advocate a somewhat less autonomous policy regime by reasoning that the road to price stability leads through currency stability within the framework of flexible exchange rate targeting. In reality, monetary authorities of the Czech Republic, Poland and Hungary have formally repudiated unilateral euroization and enacted official policies for monetary convergence based on DIT.¹

This paper retains the tenets of autonomous monetary policy regimes but suggests strong emphasis on two aspects of financial risk, namely the inflation risk and the exchange rate risk, and the ability of the EMU candidates to lower these risk premiums. Therefore, the key message of this paper pertains to specification of the policy targets within the framework of inflation targeting regimes. Instead of focusing on the pre-determined levels of inflation that are consistent with the convergence criteria specified by the Maastricht Treaty, this study suggests that the countries converging to the eurozone assume and prioritize the targets of lowering the *inflation risk premium* (IRP) and the *exchange rate risk premium* (ERP). For the purpose of this analysis, IRP is defined as a difference between the domestic and the eurozone's average real interest rate in a given period of time. By embracing the IRP target, the policy-makers can demonstrate their commitment to achieving price stability without a sacrifice in the form of reduced income or job opportunities that are brought about by high real interest rates. Undeniably, disinflation is an important task for monetary policy-makers in transition economies but its implementation often entails painful costs in terms of economic slowdown and unemployment.² A monetary policy focus on IRP is likely to counter such embittering effects.

See Orłowski (2002) for a detailed overview of the recent inflation targeting policies in the Czech Republic, Poland and Hungary. Decisive disinflation policies that require application of very high real interest rates have precipitated economic slowdown and reduced painful unemployment effects in the examined economies in recent years. Specifically, the Czech economic recession of 1999 has been largely attributed to tight monetary policy enacted upon the inception of DIT in January 1998 (Brada and Kutan, 2001). Poland's nearly flat real GDP growth in 2002 and unemployment rate of 18 percent at the end of that year can be also viewed as an undesirable outcome of high real interest rates in 2000 and 2001.

The goal of minimizing the domestic IRP relative to the eurozone needs to be supplemented by a conditional target of exchange rate stability. It is because excessive volatility of the candidates' exchange rates increases the risk of missing the equilibrium exchange rate upon setting the fixed exchange rate for the purpose of euro entry. The exchange rate stability is understood in the sense of cushioning shocks to nominal exchange rates and is prescribed in this paper in terms of lowering ERP. Technically, ERP is defined as a difference between the actual nominal exchange rate, i.e. the amount of the domestic currency per one euro, and the trend-fitted exchange rate.

The argument to associate monetary convergence with the ability to lower IRP and ERP suggests that a candidate country can be declared 'ripe' for eurozone accession if these two risk premiums become close to zero. In other words, the eurozone entry becomes feasible when the candidates IRP converges to the eurozone level and the ERP is minimized to a sustainable level.

Section II of the paper introduces a graphical model of interactions between IRP and ERP within the analytical framework of uncovered real interest rate parity. The empirical record of recent interactions between relative IRP and ERP in Poland, Czech Republic and Hungary is presented and discussed in Section III, followed by policy conclusions in Section IV.

II. IRP-ERP TRADEOFF

The analytical model of monetary convergence prescribed in this study is based on the following three assumptions.

1. A successful monetary convergence requires lowering both IRP and ERP.
2. A simultaneous lowering of both risk premiums is seemingly difficult; it entails a tradeoff between IRP and ERP. For instance, if squeezing ERP becomes the primary policy objective, a hard peg may be put in place. To sustain the peg, policy-makers are required to maintain high interest rates, which in turn will result in rising relative IRP.
3. The sequencing of monetary policy aimed at facilitating a successful convergence to a common currency system (the eurozone) may give priority to lowering IRP. This is implied by the urgent need to dampen inflation that is attributable to transition-related factors (catching-up effects, Harrod-Balassa-Samuelson effects, corrective inflation, etc.). If such an approach is successful and, consequently improves the policy credibility, the relative IRP will fall as disinflation can be now accomplished with lower interest rates. Subsequently, policy-makers will focus their efforts on lowering ERP.

Since the subject of this analysis is an open transition economy pursuing monetary convergence to a common currency area (CCA), the concept of IRP needs to be based on a differential between domestic and CCA real interest rates. Thus the *relative* IRP, denoted as Φ_t , is stated as

$$i_t^d - i_t^* - \bar{\pi}_t^d + \bar{\pi}_t^* = \Phi_t \quad (1)$$

Superscript d denotes domestic variables and the asterisk denotes foreign (CCA) variables; i_t is a market (short-term) nominal interest rate and π_t is a trend-fitted headline inflation rate in a given time period. Correspondingly, ERP, labeled as Ψ_t , is defined as a difference between the (log) current nominal exchange rate e_t in terms of domestic currency values of one euro, and the (log) trend-fitted nominal exchange rate \bar{e}_t .

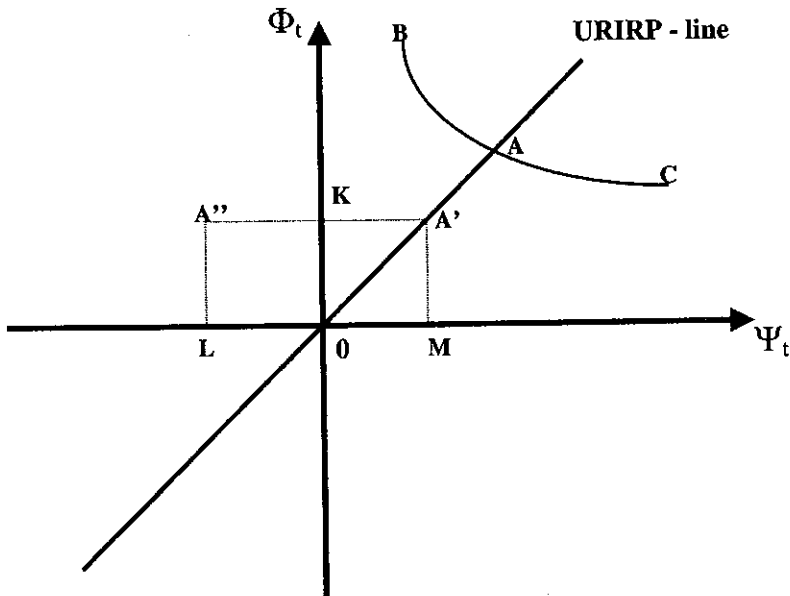
$$e_t - \bar{e}_t = \Psi_t \quad (2)$$

A high, positive value of Ψ_t implies the prevailing tendencies toward domestic currency nominal depreciation, while its negative value denotes pressures toward currency appreciation.

Changing monetary regimes as well as policy directions are believed to induce negative correlation of shocks to Φ_t and Ψ_t . Moving from a hard peg to a flexible exchange rate regime will increase Ψ_t , while it may lower Φ_t . Specifically, a hard currency peg is likely to result in Ψ_t being close to zero, while it may require a very high Φ_t . In contrast, under autonomous monetary policy with flexible exchange rates, a tight policy course will result in a combination of high Φ_t and low, or negative, Ψ_t . Adversely, a monetary policy easing will result in lower Φ_t , while contributing to stronger currency depreciation (rising Ψ_t).

FIGURE 1

Interactions Between Relative Inflation Risk Φ_t and Exchange Rate Risk Ψ_t Premiums: The Uncovered Real Interest Rate Parity



Interactions between Φ , and Ψ , are shown in Figure 1. In this scenario, the monetary convergence process begins at any point on the locus BAC, which reflects a situation of high risk premiums and low policy credibility. The ultimate goal of monetary convergence is to reach a combination of IRP and ERP located as close as possible to the origin, reflecting the highest degree of policy credibility. Point B combines high IRP and low ERP and is indicative of an excessively tight, yet autonomous monetary policy, which results in high domestic real interest rates relative to CCA and in low ERP, while point C denotes opposite effects emanating from an excessively easy monetary policy stance. Point A rectifies a well-balanced monetary policy that results in moderate IRP and ERP effects that do not distort the balance of payments. It is located on the *uncovered real interest rate parity line*, which in itself neutralizes incentives for large capital inflows or outflows. Departures from this line are associated with destabilizing balance of payments effects. Specifically, points above it, such as point B, imply a strong advantage of domestic investment, thus provide incentives for large capital inflows, while points below it, such as point C, result in capital outflows. In essence, point C implies an excessive domestic currency depreciation, which in turn may exacerbate inflation expectations and lower the anticipated levels of IRP.

As indicated above, monetary convergence to CCA requires a movement from BAC toward the origin. However, a candidate country might be declared ready for CCA accession if it reaches at minimum point A', which reflects absolute minimum benchmark for improvements in IRP and ERP. It corresponds with the level K that implies the target or the "ceiling" for IRP relative to the eurozone, and also with the level M reflecting the exchange rate stability target (specified in terms of a maximum permitted nominal depreciation of domestic currency).

If the candidate country decides to enter an exchange rate stability band arrangement (such as the European Exchange Rate Mechanism (ERM) II) prior to a formal accession to the CCA, the target range for permitted currency fluctuations will be set between the lower (currency depreciation) boundary M and the upper (currency appreciation) boundary L. Consequently, the criterion of eligibility for the CCA entry can be prescribed by the rectangle LA'A'M. In practical terms, it is also possible that the candidate country will reach a negative level of IRP during the course of preparations for the CCA accession. However, this ought to be viewed as a suboptimal policy, since a negative domestic IRP relative to that in CCA implies prevalence of strong domestic inflation expectations that might stem, for instance, from a lax fiscal discipline. Thus the rectangle reflecting the boundaries of the IRP and ERP targets for accession to CCA cannot be expanded below the horizontal axis.

In conclusion, the presented model suggests that the simultaneously declining inflation and exchange rate risks imply gains in monetary policy credibility. Thus in essence, monetary convergence to CCA calls for efforts toward curbing both risk premiums in the candidate countries that ultimately strengthen policy credibility. When the appropriate level of IRP that is compatible with that prevailing in CCA is reached and ERP is effectively minimized, the candidate country may be considered ready for the CCA accession.

III. EMPIRICAL EVIDENCE FOR POLAND, HUNGARY AND THE CZECH REPUBLIC

The theoretical model presented above can be empirically tested for the Czech Republic, Poland and Hungary, the three largest economies among the 10 contestants for the EU enlargement expected to take place in May 2004. Their entry to the eurozone is officially declared plausible no earlier than two years after the official EU accession. Table 1 shows the resulting fundamental aspects of their preparedness for the eurozone entry.

TABLE 1
Average Inflation Levels and Instability of Inflation Risk Remiums Φ_t and Exchange Rate Risk Premiums Ψ_t in Central Europe (January 1995-March 2002 sample period)

	$\bar{\pi}_t$	$\pi_{December\ 2002}$	$\bar{\Phi}_t$	St.dev. of Φ_t	St.dev. of Ψ_t
Poland	13.6	0.8	4.436	4.339	0.032
Czech Rep.	6.7	0.6	0.070	2.349	0.026
Hungary	15.9	4.8	-0.054	1.539	0.030

Notes: $\bar{\pi}_t$ = average monthly CPI-based inflation on year-on-year basis

$\pi_{December\ 2002}$ = actual inflation at the end of 2002

$\bar{\Phi}_t$ = average IRP vis-a-vis Germany computed on the basis of equation (1)

Ψ_t = ERP computed on the basis of equation (2)

Trend inflation rates and exchange rates are computed by applying the Hodrick-Prescott filter

Source: Own calculation based on IMF: *International Financial Statistics*.

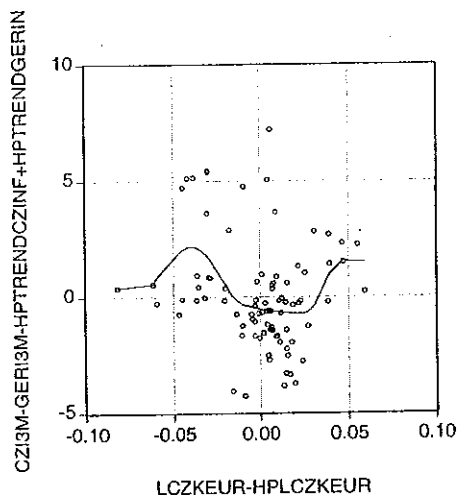
The data implies that the Czech Republic has already established solid foundations of monetary stability that make it fully eligible for accession to the eurozone. Its average inflation rate during the sample period was the lowest among the three examined countries; it was roughly half of that of Poland. At the end of 2002, both Poland and the Czech Republic reached a low level of annualized inflation not exceeding one percent, which even outperforms the outcome of price stability within the current eurozone. Hungary's average inflation was the highest in this group although its most recent annual level of 4.8 percent may suggest that the country is on the right track to reaching low sustainable inflation.

The average level of IRP reveals more specific information pertaining to the "burden" of disinflation. Poland's average IRP was by far the highest, implying that its real interest rates relative to Germany contained the strongest risk premium that had been unquestionably detrimental to the output growth and employment. At the same time, the

Polish IRP displayed the highest degree of volatility (as demonstrated by the highest standard deviation of Φ). In contrast, Hungary's average IRP relative to Germany was even negative, which proves prevalence of easy monetary policy during the sample period. The Czech average IRP was essentially in line with that of Germany; however, it displayed a moderate degree of volatility. By comparison, the average monthly volatility of ERP was roughly the same in all three countries.

More specific information about the nexus between IRP and ERP in these countries is detected from the graphical display of these interactions. Figure 2 shows the interplay between both risk premiums in the Czech Republic.

FIGURE 2
Interplay Between Relative Inflation Risk Premiums vis-à-vis Germany and Exchange Rate Risk Premiums for the Czech Republic (January 1995-March 2002 data)



Note: Vertical axis: relative inflation risk premiums vis-à-vis Germany; horizontal axis: log of Czech Koruna values of the Euro (DMx1.9853 before 1999) minus log of Hodrick-Prescott trend of the Czech Koruna per Euro. The solid line represents Nadaraya-Watson regression with Kernel Fit: Epanechnikov, $h=0.0211$.

Source: Own estimation based on the IMF:IFS and national data

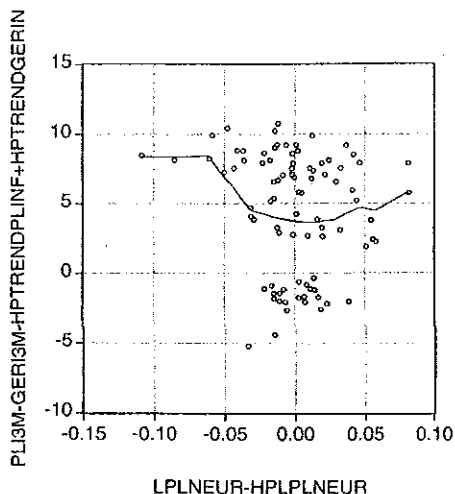
In almost all cases during the sample period, the Czech relative IRP is close to zero. At the same time, deviations of nominal exchange rate (in logs) from the trend-fitted rate do not exceed 0.05 in absolute terms. This shows a satisfactory degree of stability of both risk premiums. In the number of cases, the Czech IRP actually falls below Germany's level (as implied by negative values of Φ). Moreover, these favorable developments prevail at the later stage of the sample period, which proves that the Czech DIT regime has been seemingly successful in containing the country's IRP. Nevertheless, there are also several strong, positive shocks to IRP, most of which coincide with the financial crisis of May-August 1997 when the Czech National Bank was forced to abandon a hard peg and allow the koruna to float freely (Brada and Kutan, 2001; Matoušek, 2001).

The Czech ERP oscillates around its trend in a well-balanced manner, which underpins success of DIT in terms currency stability. Evidently, in spite of the floating exchange rate regime, the koruna has been remarkably resilient to speculative attacks and contagion effects of international financial crises episodes, including the effects of the Russian financial crisis of August/September 1998.

A somewhat different story is demonstrated for Poland (Figure 3). The regression line combining interactions between IRP and ERP does not fall below the horizontal axis, which proves persistence of high positive real interest rates. On a more encouraging note, there are some scattered episodes of negative values of relative IRP that occur mainly in the most recent period (since June 2001). Apparently, the tight stance of Poland's monetary policy has been recently relaxed, as price stability appears to be under control. Deviations of actual exchange rate from its trend do not show any destabilizing currency shocks. There are, however, several episodes of strong appreciation of the zloty against the euro. Again, these tendencies are more prevalent at the later stage of the sample period.

FIGURE 3

Interplay Between Relative Inflation Risk Premiums vis-à-vis Germany and Exchange Rate Risk Premiums for Poland (January 1995-March 2002 data)



Note: Vertical axis: relative inflation risk premiums vis-à-vis Germany; horizontal axis: log of Polish Zloty values of the Euro (DMxl.9853 before 1999) minus log of Hodrick-Prescott trend of the Polish Zloty per Euro. The solid line represents Nadaraya-Watson regression with Kernel Fit: Epanechnikov, $b=0.0285$.

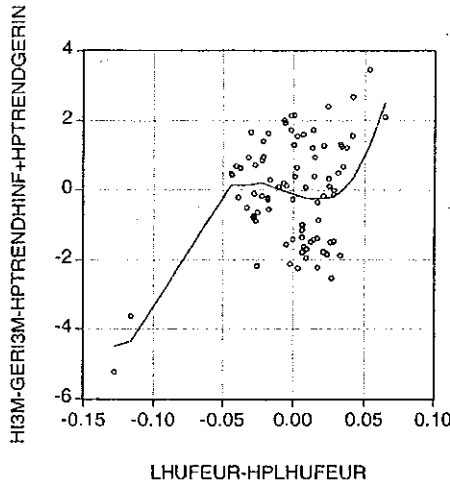
Source: Own estimation based on the IMF:IFS and national data

In sum, disinflation posed a real challenge to Polish monetary authorities, although recent developments are quite encouraging. The DIT regime employed by the National Bank of Poland since January 1999 has been generally successful in lowering IRP as proven by its ubiquitous near-zero or even negative values that are observed since the DIT inception.

The scattergram of interactions between and for Hungary (Figure 4) proves the country's remarkable success in coordinating both risk premiums. It shall be noted that there are only two extreme observations departing from the overall pattern. They reflect combination of a strong nominal over-valuation of the forint and a negative IRP in the period preceding the enactment of a comprehensive economic stabilization plan in March 1995 that introduced the crawling devaluation regime. Otherwise, the crawling devaluation appears to be fully synchronized with interest rate adjustments during the sample period, as implied by a well-balanced coordination between IRP and ERP. The crawling devaluation regime that was maintained until October 2001 enabled the National Bank of Hungary to avert excessive nominal appreciation of the forint against key international currencies. However, considering the fact that Hungary's inflation was the highest among the three examined countries, it cannot be argued that this system was successful in reducing the scope of real currency appreciation. Furthermore, in spite of the well-balanced IRP-ERP interactions, the high level of inflation (as shown in Table 1) does not signify that the country's monetary convergence to the eurozone is close to an end.

FIGURE 4

Interplay Between Relative Inflation Risk Premiums vis-à-vis Germany and Exchange Rate Risk Premiums for Hungary (January 1995-March 2002 data)



Note: Vertical axis: relative inflation risk premiums vis-à-vis Germany; horizontal axis: log of Hungarian Forint values of the Euro (DMxl.9853 before 1999) minus log of Hodrick-Prescott trend of the Hungarian Forint per Euro. The solid line represents Nadaraya-Watson regression with Kernel Fit: Epanechnikov, $b=0.0288$.

Source: Own estimation based on the IMF:IFS and national data

In general terms, Figures 2-4 show that the three examined countries have been seemingly successful in containing both IRP and ERP in a balanced way. Moreover, convergence of both risk premiums appears to be coordinated much better at the most recent stage of the sample period, which suggests that DIT policies work favorably toward establishing solid foundations of monetary stability that is essential for a smooth entry to the eurozone.

IV. SUMMARY AND POLICY CONCLUSIONS

This paper argues that inflation and exchange rate risk deserve a special monetary policy emphasis because of their implications for a successful monetary convergence process. Perhaps the ability of the candidates to CCA to lower IRP and ERP should be adopted as a critical criterion of their monetary convergence. In the light of presented empirical evidence and the theoretical underpinnings, the lowering of IRP should precede ERP in the sequencing of monetary convergence policy. Thus Central European candidates are advised to reduce IRP as a necessary prerequisite for joining the eurozone. After establishing solid foundations of price stability, they may wish to focus their policy efforts on minimizing ERP. These tasks can be accomplished within the DIT framework.

The candidate countries will be well-advised to follow the monetary policy framework of DIT until their intended timing of the eurozone accession (Masson, 1999; Orłowski, 2001 and 2002), particularly in the light of their recent accomplishments in terms of price and exchange rate stability. As they approach the formal EMU entry, the monetary policymakers may wish to emphasize targeting exchange rate stability.

Although, based on the presented evidence, Poland, Czech Republic and Hungary have already achieved a fair degree of price stability as well as exchange rate stability, the question remains whether these conditions are sustainable. There are two venues through which the stability can be sustained—fiscal discipline and the resilience of these countries financial systems against any possible future external financial crises—this analysis however goes beyond the boundaries of this paper.

If monetary policies of the candidates continue to be effective and credible, their currency volatility shall not exceed the boundaries prescribed by the ERM II, which they are expected to join formally upon their official EU accession.

Against this background, the calls for a leap to unilateral euroization seem to have little merit.

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