11-1999

Volatility of Central Europe Exchange Rates: Reaction to Financial Contagion, and Policy Recommendations for European Union Accession

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Russian and East European Finance and Trade, vol. 35, no. 6, 1999, pp. 68–81.

ISSN 1061–2009/2000 $9.50 + 0.00.

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Reaction to Financial Contagion, and Policy Recommendations for European Union Accession

After redirecting their economies away from central planning to open-market systems during the past decade, economic policy makers in the transforming economies of Central Europe (CE) are now preparing for accession to full membership in the European Union. Among other preparatory tasks for integration with the European Union, these economies need to achieve a high degree of economic stability, including stability of their currencies. They further need to develop a strong institutional foundation of their financial markets that would allow them to cushion the impacts of financial disturbances emanating from world financial markets.

The key investigative question of this study is the assessment of sensitivity of Hungarian, Polish and Czech exchange rates in U.S.-dollar terms to fluctuations of the German mark value in U.S. dollars. A close proximity of these exchange rates would imply a tighter link between Central European and EU currencies. Specifically, the study implies a gradually expanding connection of Central Europe's exchange rates to the German mark and, after January 1999, to the euro (EUR).

A closer integration with the EU financial system is indispensable for the development of an effective cushion against the contagion effects of financial crises in emerging market economies. This study shows that the

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Asian financial crisis of 1997 had a more durable destabilizing effect on Central European exchange rates than did the Russian crisis of August and September 1998. Systemic and institutional reforms in Central European financial sectors have played a critical role for developing an effective cushion against disturbances in the Russian economy, and their spillover effects.

Capital account liberalization and a closer integration of Central European financial markets with the European Union may better protect these countries from the contagion effects of future crises in developing countries. The liberalization has almost been completed, by now, in the three examined Central European economies. It has been induced by Organization for Economic Cooperation and Development (OECD) membership obligations and the program of the EU accession. Yet, the Central European countries need to enhance their stabilization policy transparency and improve their bank supervision and monitoring systems, as a vital next step in insulating themselves from the next Asian-like financial crisis.

The second section of this study looks back to the beginning days of the transformation, and describes some of the problems each country faced and the remedies employed. The third section examines the makeup of each country's reference currency basket, and describes the changing relationship between each currency and its principal movers, namely the U.S. dollar and German mark. The impacts of the Asian and Russian financial crises on the currencies of Central European countries are evaluated in the fourth section. The final section summarizes the work to be done by the countries of Central Europe as they move towards a euro peg, and highlights their need to accelerate the development of their financial institutions in terms of sophistication, governance, and regulatory oversight.

The Initial Stage of Transformation: Shock Treatment

One of the first steps taken by Poland, Hungary, and the Czech Republic (Czechoslovakia, at that time) following the collapse of Soviet hegemony was to fix the value of their currencies in specific weighting schemes to the U.S. dollar and the German mark, and, in the case of Poland, to three other currencies as well. Central European policy makers expected that, with the freeing-up of long-standing price controls, fixed reference currency baskets would provide the discipline required to contain and shorten the period of rapid price increases that was inevitable with the opening of their economies to world markets. In choosing fixed pegs, the Central European countries accepted the inevitability of recession, if not depression, accompanied by an indeterminate period of corrective inflation without any guarantees of success.

An inflation threat was lurking in another corner, as well. Poland and the

Czech Republic, especially, began the transformation process with substantial monetary overhangs, the legacy of high income growth and controlled prices during their many years of central planning (Orlowski 1998b). These large savings balances threatened to undermine any long-term policy of inflation control. Thus, a period of debilitating inflation became inevitable, as rapidly rising domestic prices became the catalyst in absorbing these potentially destabilizing savings balances.

On a more positive note, fixed exchange rates enhanced the ability of Central European countries to attract much-needed foreign capital, and also provided the means for rebuilding national savings. Offering well-educated, low-cost labor forces, the Central European countries held out the prospect of high returns on foreign investment, with the added inducement of likely real currency appreciations. Success on the foreign investment front also called for a well-defined process for capital account liberalization, and the eventual elimination of all capital controls. It also required a commitment to macroeconomic policies designed to promote growth and control inflation. Without these commitments, the Central European countries ran the risk of scaring off long-term investors, in favor of short-term speculators attracted by high, inflation-driven interest rates. The sudden withdrawal of these speculative funds would place their currencies in jeopardy, possibly resulting in an involuntary abandonment of their fixed pegs.

The selection of an appropriate currency anchors for the pegs was also critical in sustaining disinflationary trends. In choosing the U.S. dollar and German mark as their principal anchors, the Central European countries essentially put themselves in a position of importing the inflation records of the United States and Germany (Mishkin 1999). The U.S.-dollar and German-mark pegs also helped reduce expectations of future inflation in the transition economies—who, in effect, tied their monetary policies to the countries to which their currencies were pegged.

Flexible Exchange Rates and the Adequacy of Currency Baskets

The second stage of the transformation process can be dated to the time when the Central European countries began exploring the possibilities of introducing flexibility into their official exchange-rate regimes. The application of crawling pegs and bands afford policy makers greater discretion in conducting domestic economic policy, compared to the system of fixed currency pegs. This stage of transformation, extending into the current period, emphasizes money-based monetary policies, with an eye on exchange-rate movements (Orlowski 1997). It also includes the application of direct inflation targeting in lieu of interest-rate targeting, giving the Central European countries the best

chance of success in achieving Maastrict convergence criteria on price behavior. The introduction of flexibility into their exchange rates should allow Central European monetary authorities to cushion real currency appreciations, and should help to slow the expansion of current-account deficits. Moreover, exchange-rate flexibility should spur the development of markets and institutions capable of dealing with hedging currency risk (Orlowski 1998b). By increasing the risk of financial loss to speculators, flexible exchange rates should also improve the risk structure, or "pecking order," of capital inflows. There is evidence to suggest that fixed pegs tend to attract short-term capital inflows, while more flexible regimes promote the attraction of long-term portfolio investment and foreign direct investment (Orlowski and Corrigan 1997; Razin, Sadka, and Yuen 1996).

Over the course of their economic transformations, the monetary authorities of the Central European countries have also seen fit to change the structure of their currency reference baskets, although it appears that these adjustments have not kept pace with events. In the early 1990s, their reference baskets were biased towards the U.S. dollar, since most of their external debt was denominated in U.S. dollars, and the servicing of these debts constituted large portions of their foreign exchange transactions. As trade with the European Union expanded, however, the currencies of the European Union took on greater importance. Currently, the reference basket for the Czech koruna is composed of 65 percent German marks and 35 percent U.S. dollars. The Hungarian forint (Hungarian forint) is monitored against a reference basket that is 70 percent German marks and 30 percent U.S. dollars. Through the end of 1998, Poland used a five-currency basket to monitor changes in the Polish zloty (Polish zloty), with the U.S. dollar making up 45 percent, the German mark 35 percent, the British pound 10 percent, the French franc 5 percent, and the Swiss franc 5 percent of the basket. Poland simplified its basket in early 1999 to include only two currencies, assigning a weight of 55 percent to the euro and a weight of 45 percent to the U.S. dollar. In time, these reference baskets will be altered again, with the euro taking a position of prominence in the valuation of the currencies of all three countries.

The central analytical problem examined in this section is whether the currency exchange rates of the Central European countries already are experiencing a high degree of sensitivity to changes in the value of the euro. We also want to know if the Central European countries have reached a stage of economic transformation consistent with tying their currencies exclusively to the euro. These questions are assessed by examining the elasticity of the U.S. dollar exchange rate for each Central European currency, with respect to German mark/U.S. dollar movements. The examined exponential model is:

$$E(\text{CEC/USD})_t = \alpha \bullet [E(\text{DEM/USD})_t]^{\beta} \bullet \varepsilon_t \qquad (1)$$

In this analytical framework, the b coefficient measures the elasticity of the value of the U.S. dollar in Central European currency terms—denoted by E(CEC/USD)—to changes in the value of the U.S. dollar, in German mark terms—E(DEM/USD). The model is tested through a double-logarithmic transposition:

$$\log[E(\text{CEC/USD})_t] = a + b \cdot \log[E(\text{DEM/USD})_t] \quad (2)$$

The estimated elasticity coefficient b reflects the percentage change in the value of the Central European/U.S. dollar exchange rate in response to a given percentage change in the value of the German mark/U.S. dollar exchange rate. A positive value of b implies that for a given nominal depreciation (or appreciation) of the German mark, there is a corresponding nominal depreciation (or appreciation) of a Central European currency. If b is larger than 1, the Central European currency exchange rate is elastic, relative to the German mark. Alternatively, a negative b suggests a higher sensitivity of a Central European currency to U.S. dollar movements.

The results of the regression estimation of the elasticity of co-movements of exchange rates are presented in Table 1. The empirical test involved 142 observations of weekly averages of average daily exchange rates for the period from January 1, 1996 to October 31, 1998.

The empirical results show that in all three cases the national currencies are elastic, with respect to the German mark. The Hungarian forint exhibits the highest degree of sensitivity to changes in the German mark, as implied by the highest value of coefficient b. Sensitivity of the Czech koruna to the German mark is the lowest among the three examined currencies. The table also reports the coefficient of variation v of Central European/U.S. dollar exchange rates. The average weekly variation of the Polish zloty was the highest, while the average variation of both the Czech koruna and the Hungarian forint was substantially lower. These differences reflect differences in each country's currency basket. Poland's broader basket, through 1998, contributed to larger variations in the Polish zloty/U.S. dollar rate, and also made it more difficult for the authorities to align Polish zloty movements with the U.S. dollar and other currencies in the basket. In addition, nominal shocks may have contributed to the differences in variability of Polish, versus Hungarian and Czech, exchange rates. Dibooglu and Kutan (1998) reported, based on a series of VAR tests, that nominal shocks had a greater impact on the Polish zloty than on the Hungarian forint.

The reported increasingly close co-movements of the Central European currencies with the German mark imply a growing importance for the German mark in the various currency baskets—and, from January 1, 1999, the euro in foreign exchange market transactions involving Central European

Table 1

Regression Results of the Double-Log Function of Central European Currencies per U.S.-Dollar (USD) Exchange Rates, with Respect to Changes in the German Mark (DEM) per USD Rates (January 1996–October 1998, weekly series)

Currency	*a*	*b*	R^2	v
Polish zloty	0.4187 (23.34)	1.4097 (40.34)	0.92	0.106
Czech koruna	2.8243 (153.8)	1.1581 (32.31)	0.88	0.029
Hungarian forint	4.2809 (176.59)	1.7836 (37.10)	0.91	0.029

Key
a = Constant term
b = Elasticity coefficient of Central European currency to the DEM
R^2 = Coefficient of determination
v = Coefficient of variation
t = Statistics in parentheses

Source: Authors' calculations using OANDA, Inc., currency tables.

currencies. In April 1996, the U.S. dollar still played a dominant role in foreign exchange turnovers in Poland and in Hungary. According to the Bank for International Settlements (1998), average daily foreign exchange turnover in April 1996 reached the equivalent of US$1.2 billion in Poland, with the U.S. dollar involved in 73.5 percent of the transactions and the German mark in 23.0 percent. Total foreign exchange turnover in Hungary was US$600 million, with the U.S. dollar involved in 53.4 percent of the activity and the German mark in 16.8 percent. By contrast, the Czech foreign exchange market was dominated by the German mark, which accounted for 57.4 percent of the average daily turnover of US$2.5 billion. Transactions involving the U.S. dollar constituted only 40.5 percent. Since early 1996, both the Polish and Hungarian foreign exchange markets have seen the importance of the German mark increase, largely in response to an easing in external U.S. dollar debt-service payments, increased inflows of direct foreign investment from Germany and other EU countries, and a sharp expansion in trade with Germany. These developments have made their currencies more sensitive to the German mark, as indicated by their high elasticity coefficients in Table 1.

These findings imply that the composition of the Polish currency basket, through 1998, did not accurately reflect Poland's relationships with the United

States and Germany. Changes in the basket initiated in January 1999 represented an attempt to correct this imbalance. To underscore this point further, common practice in the Polish foreign exchange market in 1998 was to hedge 50/50 percent U.S. dollar/German mark, as reported by ING/Barings Poland (1999), even though the official basket was more heavily weighted towards the U.S. dollar. In other words, the markets were ahead of the authorities in assessing the rising importance of the German mark in Polish economic and financial affairs.

The dynamics of the elasticity of Central European/U.S. dollar exchange rates, with respect to changes in the German mark/U.S. dollar rate, are shown in Figures 1–3, which present cumulative sum (CUSUM) tests of the regressions in equation 2. The positive trend of the CUSUM of residuals in the double-log function reflects an increasing sensitivity of Central European countries currency movements to the German mark. Between the end of May 1996 and the end of February 1997, the Czech koruna experienced a declining sensitivity to the German mark. Since early 1997, however, the Czech koruna has become increasingly sensitive to movements in the German mark. The Polish and Hungarian currencies show a steady pattern of increasing sensitivity to the German mark over the entire investigated time period.

A noteworthy observation is the sharp increase in the elasticities of the Polish zloty (see Figure 1) and the Hungarian forint (see Figure 2), relative to the German mark, between the last week of August and the end of October 1998, at the height of the 1998 Russian financial crisis (Orlowski 1999). This episode reinforces the conclusion that the German mark has supplanted the U.S. dollar as the main driver behind Central European currency movements. The observation also may be linked to some outflows of U.S. dollar-denominated capital from Polish and Hungarian markets at the time of the Russian crisis, combined with strong inflows of the European-based direct foreign investment and long-term portfolio capital into these emerging markets.[1]

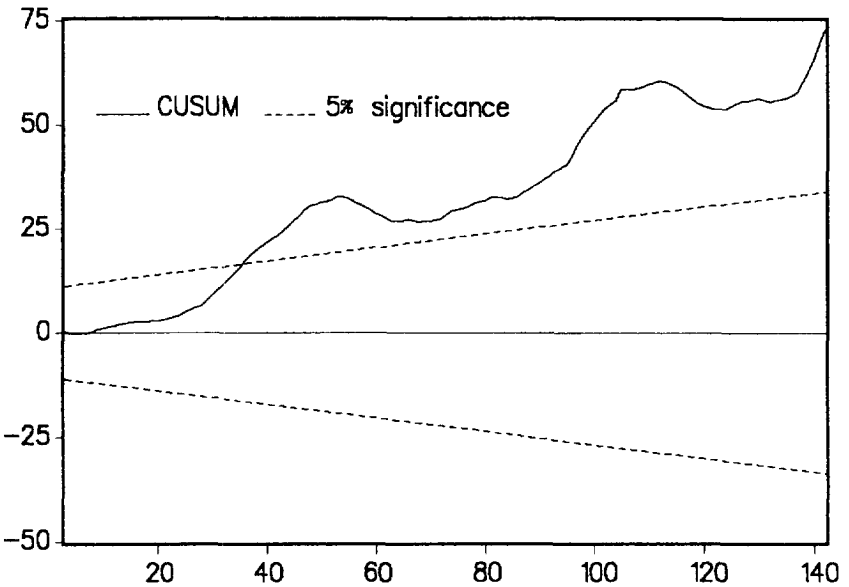
Spillover Effects of the Asian and Russian Crises on Central European Exchange Rates

As indicated above, exchange-rate data show a sharp increase in the elasticity of Polish zloty and Hungarian forint co-movements to the German mark at the time of the August–September 1998 Russian financial crisis. However, while steep, the impact of the Russian crisis on Central European currencies was relatively short lived. By contrast, the impact of the 1997 Asian financial crisis on Central European currencies went on for many weeks, ending only when the worst of the Asian crisis seemed to have passed.

This view of the impact of the Asian crisis on Central European currencies is confirmed by an examination of the residuals between actual Central Euro-

Figure 1

Double-Log Function of the Polish Zloty (PLN) per U.S. Dollar (USD) Against the German Mark (DEM) per USD (CUSUM test)



January 1, 1996–October 31, 1998 weekly averages of average daily exchange rates

pean/U.S. dollar values, and time trend-fitted values developed through the estimated linear trend function:

$$E(\text{CEC/USD})_t = a + b \bullet t \qquad (3)$$

where t is consecutive weeks between the beginning of January 1996 ($t = 0$) and the end of October 1998 ($t = 141$).

The estimated linear trend functions for the Polish zloty, Hungarian forint, and Czech koruna are, respectively:

$$E(\text{PLN/USD})_t = 2.524 + 0.0085 \bullet t$$

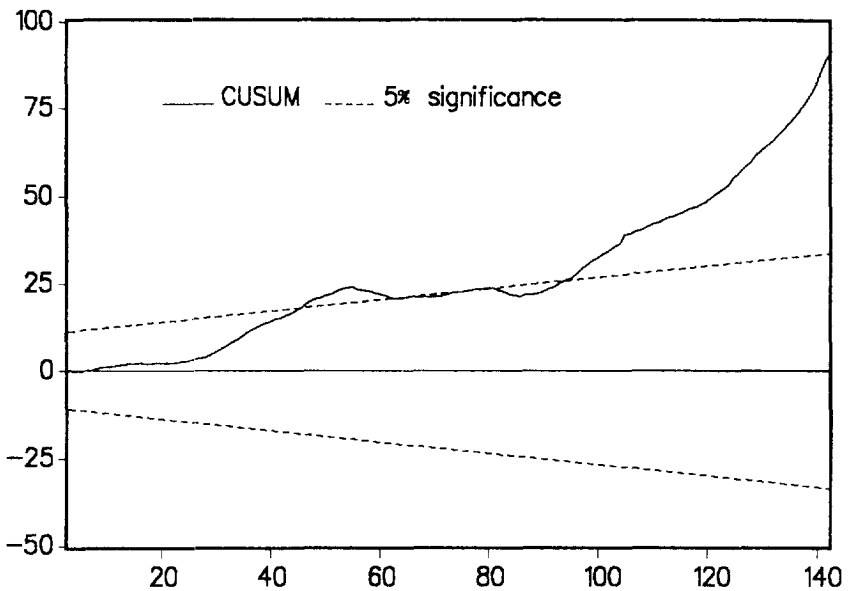
$$E(\text{HUF/USD})_t = 134.44 + 0.6507 \bullet t$$

$$E(\text{CKR/USD})_t = 26.087 + 0.0615 \bullet t$$

The percentage deviations of residuals from the fitted values are reported in Table 2.

Figure 2

Double-Log Function of the Hungarian Forint (HUF) per U.S. Dollar (USD) Against the German Mark (DEM) per USD (CUSUM test)

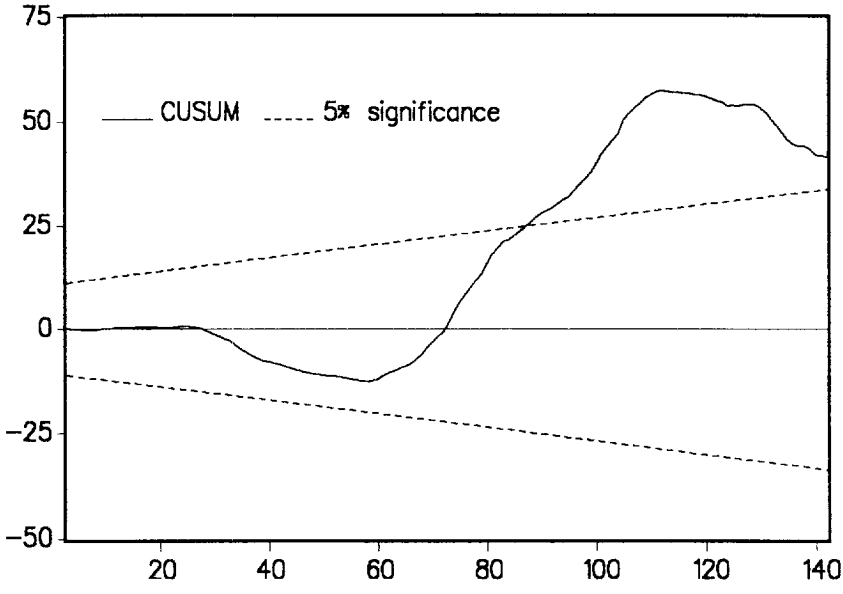


January 1, 1996–October 31, 1998 weekly averages of average daily exchange rates

The period July 11–September 5, 1997 represents the peak of the financial crisis in Asia, while the period August 22–September 5, 1998 coincides with the Russian moratorium on foreign debt repayments and the suspension of ruble convertibility. As shown in Table 2, the Czech koruna was the most severely affected by the Asian crisis, followed by the Polish zloty. The average weekly depreciation of the Czech koruna in U.S. dollar terms, relative to the assessed trend, reached 9.5 percent. By comparison, the Polish zloty's weekly fall was limited to 7.1 percent. The Hungarian forint weathered the Asian contagion relatively well: Its average weekly depreciation in U.S. dollar terms, relative to the trend, was only 4.1 percent. The relatively sharp decline in the Czech koruna in response to the Asian crisis was conditioned by the high degree of convertibility of the Czech currency for capital transactions, compared to Poland and Hungary, and a sustained period of real appreciation of the Czech koruna, through the suspension of the currency peg in May 1997. In effect, the large stock of liquid external capital accumulated by the Czech Republic, through its over-valued currency, deserted the Czech financial system during the Asian crisis. Significantly, the impact of the Russian financial

Figure 3

Double-Log Function of the Czech Koruna (CKR) per U.S. Dollar (USD) Against the German Mark (DEM) per USD (CUSUM test)



January 1, 1996–October 31, 1998 weekly averages of average daily exchange rates

crisis on the Central European currencies was evident only in the week of August 29, 1998. The Hungarian forint was virtually untouched by the event. There was a one-time sharp fall of the Czech koruna, followed by an equally sharp rebound. The Polish zloty also weathered the storm without too much damage.

Perhaps the most pronounced finding, in examining the effects of the Asian and Russian financial crises, is that the most critical factor for the transmission of financial contagion into transition economies is systemic similarities. The Czech currency and financial markets were most severely affected by the Asian crisis because of the real over-valuation of the Czech koruna, stemming from its prolonged fixed peg in combination with capital account convertibility. Just as importantly, the country developed problems in the spring of 1997 in its financial sector, not unlike those experienced by several Asia economies. Specifically, there were widespread failures of banks and insurance companies, due to inadequate corporate governance and lax bank supervision and monitoring practices.

The sequencing and scope of capital account liberalization are equally

Table 2

Percentage Deviations of Residuals Between Actual and Fitted Values of the U.S. Dollar (USD) in Terms of the Central European Currencies
(January 1996–October 1998 series)

Reported week	PLN/USD trend Residuals/Fitted %	HUF/USD trend Residuals/Fitted %	CKR/USD trend Residuals/Fitted %
July 11, 1997	3.3	2.9	9.6
July 18, 1997	8.2	3.8	10.9
July 25, 1997	7.5	4.9	10.7
August 1, 1997	8.0	6.0	11.7
August 8, 1997	7.9	5.2	9.2
August 15, 1997	7.8	4.4	9.1
August 22, 1997	7.0	3.4	7.7
August 29, 1997	7.1	3.4	8.0
September 5, 1997	7.2	2.9	8.5
July 11–September 5 average	7.1	4.1	9.5
August 22, 1998	–2.8	0.1	–4.2
August 29, 1998	1.7	0.8	8.2
September 5, 1998	–0.1	–0.5	–8.8

Source: Authors' calculations using OANDA, Inc., currency tables.

important variables influencing a country's vulnerability to financial contagion. Again, Czech openness, in the presence of insufficient institutional governance and oversight, made the country vulnerable to contagion effects from Asia.

The mild impact of the Russian crisis on Central European exchange rates shows that geographic proximity does not matter in the transmission of financial contagion. Nor does the Central Europe's historical affiliation with the Council for Mutual Economic Assistance (CMEA) trading bloc, and the labeling of these Central European transition economies as post-Soviet countries. Conversely, systemic and institutional reforms of financial markets play a critical role in developing an effective cushion against the contagion effects of financial crisis in emerging market economies. Such desirable systemic reforms of Central European financial markets are indispensable to

these countries' effective preparations for accession to the European Union and, at a later stage, for entering the European Monetary Union (EMU).

Conclusion

By far, the single most important step the Central European countries can now take to smooth their path to EU membership is to implement, and adhere to, economic policies that promote their competitiveness in world markets and, at the same time, contain inflation. In effect, this means that they should adopt Maastrict guidelines on fiscal and monetary convergence targets, and should formulate credible plans to meet those targets within a reasonable time span.

The three EU-candidate nations are also encouraged to align their currencies more toward the euro, by de-emphasizing the U.S. dollar in their currency baskets. This only makes sense, given their growing trade with the European Union, and the eventual fixing of their currencies solely to the euro, upon entry to the EMU. Later after EU accession and upon the initiation of preparations for entering the EMU, Poland, Hungary, and the Czech Republic will need to narrow their exchange-rate tolerance bands gradually, in order to insure an orderly transition to the currency peg to the euro.

The lesson of the Asian crisis is that the Central European countries still have a long way to go before they are institutionally prepared for either the ERM-II or the EMU. The data suggest that while the Central European countries have been successful in breaking away from the old Soviet model of central planning, they are still viewed as being outside of European economic and financial circles. The contagion effects of the Asian crisis also suggest that investors view the Central European economies as emerging markets, rather than western markets.

Clearly, the Central European countries need to break this association. They are advised to continue to develop their capacity to absorb foreign capital, by strengthening and deepening their financial markets and institutions (Fink, Haiss, Orlowski, and Salvatore 1998). Just as important, they need to strengthen their regulatory and governance systems in order to build confidence among both domestic and foreign investors.

Beyond all of these considerations, one might question whether a return to a fixed peg will ever be an appropriate exchange-rate policy for the Central European candidate countries. Aside from being a requirement for membership to the EMU, Poland, Hungary and the Czech Republic appear to meet (or can be expected to meet) the strict requirements of Williamson (1999), who foresaw fixed pegs as being appropriate for countries that are small, do the bulk of their trade with the countries to which their currencies are pegged, follow economic policies that promote low inflation, and are subject to the dictates of a currency board (the ECB, in this case).

Although it is unclear as to exactly when either Poland, Hungary or the Czech Republic will be ready for EU membership, strategic plans for further reforms of monetary systems need to be developed and implemented soon, in order to strengthen transparency and consistency of macroeconomic policies in these countries. Such formal plans would contribute to a higher degree of stability of Central European exchange rates and financial markets.

Note

1. The strong transmission of the German mark volatility, in U.S.-dollar terms, into the German mark value of the Polish zloty following the financial instability related to both the Asian and the Russian crisis has been documented by Rybinski (1999). His research shows considerably stronger generalized autoregressive conditional heteroscedasticity (GARCH) effects of these two exchange rates in the period between May 5, 1997 and July 21, 1998, compared to the period from May 16, 1995 to April 30, 1997.

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