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*The Path of Exchange Rates  
in the Polish Economic  
Transformation*

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## **1. Introduction**

Exchange rate policies in transition economies of Central and Eastern Europe have been widely discussed in the economic literature. The scope of the discussion is understandable - a system of exchange rates is important in the determination of the balance of payments position of the national economy with the rest of the world. Exchange rates play a significant role in small, open economies which dependence on external business cycle conditions is considerable. Nevertheless, the economic literature on transition economies tends to exaggerate the importance of exchange rates for the success of economic reform. This is because exchange rates in the economies evolving toward a free market system shall be in principle determined by market forces and free of the governmental interference. This is an inherent logic of transition. From this point of view, the heterodox programs of stabilization in the economies in transition which are based on the exchange rate anchor have a questionable impact on the attainment of the reform goals.

This study examines the path of adjustments of the exchange rate system in the transforming economy of Poland. It emphasizes the relative advantage of flexible exchange rates over the currency peg. It focuses on several aspects of the exchange rate policy that have not been adequately discussed. One of them is the rationale for returning to a currency peg to the leading currencies of the European Union (EU) and, in the future, to the Euro as a part of necessary preparations of the economy of Poland for accession to the Union. A return to a peg means the reversal from the path of the exchange rate system adjustments that has prevailed during the first five years, or in the first stage of the economic transformation. The study evaluates the rationale of applying a currency peg, thus "borrowing" monetary policy credibility from abroad, when the program of disinflation fails and the government loses a chance to stabilize the economy. High inflation that persists over a long time period is usually caused by automatic indexation, and adaptive expectations. Such chronic or inertial inflation continues long after the expiration of corrective inflation, or inflation stemming from price liberalization, cuts in subsidies and trade liberalization.

The course of monetary policy in Poland in the second stage of the economic transformation ought to be based on money supply targeting, positive real interest rate differentials with the EU and the neighboring countries, higher national saving and flexible exchange rates. The expanded flexibility of the exchange rate is feasible until the program of preparations for accession to the EU is adopted. Implementation of this program will require monetary policy to target the exchange rate stability and to gradually move to the peg of the Polish Zloty to the EU currencies.

The theoretical discussion is supported by the empirical testing of the flex-price monetary model of exchange rate fluctuations with the crawling devaluation. The model is developed to evaluate the degree of adherence of the Zloty-per-U.S. Dollar exchange rate to the macroeconomic fundamentals. The conclusions from the empirical examination call for a stable currency strategy for Poland as an integral part of disinflation. Consistently, a more flexible exchange rate formula with a broad band

of permitted fluctuations and without the crawling devaluation is advocated. The currency stability ought to be accomplished primarily through positive real interest rate differentials. Although it may result in a further real appreciation of the Zloty in USD terms, thus in net capital inflows, and in the short-run deterioration of the balance of trade, it is perceived to be favorable for a long-run efficiency and competitiveness of the Polish economy. A stable currency is indispensable in the process of bringing Poland closer to the EU.

Section 2 of this study elaborates on the exchange rate policy choices in the first stage of the economic transformation. The specific policy in Poland is examined by Section 3. The flex-price monetary model of exchange rates and the model estimation for Poland are presented in Section 4. The final Section 5 outlines the exchange rate policy indispensable for preparations for accession of Poland to the EU.

## **2. Exchange Rate Policy Perplexity**

The economic transformation of the former command economies of Central and Eastern Europe signifies a major change in their economic system. With the swiftly applied reform programs in the early 1990s, most of retail and wholesale prices were deregulated and jumped from a low price-ceiling level to the domestic market equilibrium at imperfectly competitive if not monopoly markets. The resulting dramatic one-time corrective inflation was consistent with the erasure of the excess demand for money or the monetary overhang.

Under such circumstances, policy makers actively sought tools leading to a future economic stability and to regressive inflation expectations by economic agents. A currency peg that served a function of a “nominal anchor” was believed to be a key instrument for the future economic stability. It gained a vast support in the theoretical literature that outlined stabilization programs in the transition economies and among policy-makers in the new democratic countries and their advisers, including Bruno (1992), Balcerowicz (1992), Dornbusch (1992), and Sachs (1996). At least three arguments have been advanced in support of the currency peg based on the theoretical debate and on an extensive research on episodes of successful stabilization in other countries [1]. Perhaps the most critical among them was the notion of regressive inflation expectations induced by a currency peg. The administratively set exchange rate enabled economic agents to set prices and wages around a new, low inflation equilibrium. They perceived price stability to be a key task of monetary policy which now became more credible through the link to a low inflation currency. The second important argument favoring the peg was the belief that the fixed exchange rate would enhance the government commitment to stabilization and economic reform. This argument was convincing for the transforming economies of Central and Eastern Europe where in the beginning of the reform program most of the post-communist bureaucracy was still in place and internal anti-reform pressures by those who gained from the command economy system were still strong. Households and small private businesses had reasons to doubt sustainability of the economic reform stemming from many previous failed attempts of partial reform programs. The third reason for the

currency peg was a conviction that it would give households a chance to rebuild real money balances drained by high inflation. With the stable exchange rate the economic agents found incentives to repatriate their offshore capital back home and central banks were committed to convert these capital inflows to the domestic money. Such obligation normally does not take place under flexible exchange rates.

The currency peg has found fierce opponents as well. Most notably, Nuti (1996) questions the rationale of the currency anchor claiming that the advocates of such a system neglect the existence of the monetary overhang, repressed demand for foreign assets and the uncertainty about the equilibrium. He is particularly concerned about the level of the peg, and the initial deep devaluation. The initial currency undervaluation does not “buy” credibility in Nuti's opinion. Further to Nuti's concerns, L. Orlowski (1997) presents the argument that the most convincing rationale for the currency peg is the fight with a chronic inflation which has been widely analyzed by Pazos (1972) or Vègh (1992) as the one caused by automatic wage and price indexation and by adaptive inflation expectations. Fixed rates are indispensable when there is a well-established path of chronic inflation. This was certainly the case of the exchange rate-based stabilization programs in Argentina in 1991 or in Brazil in 1995. The currency anchor was a necessity, a last resort to find policy credibility that together with the decisive attack on the budget deficit would help to bring down the chronic inflation. L. Orlowski argues that a low policy credibility was not pervasive in the beginning of the Central European economic reform, since the new, democratic governments were perceived to be superior to the discredited former communist authorities. Moreover, the initial inflation resulted largely from the erasure of the monetary overhang and, therefore, had a short-term character. The fact that the initial inflation shock in Poland evaporated quickly within the period of less than two months following the January 1990 Stabilization Program supports the claim of the social endorsement and optimism about the reform. The initial price shock did not show strong symptoms of chronic inflation thus the ground for introducing the currency peg was not obvious.

It is perhaps paradoxical, that in countries such as Poland or Hungary, which after five years of the reform still have troubles bringing inflation down, some rationale for a currency peg can be advanced now, not before. Their problems with inflation result from the gradually rising role of chronic inflation that is likely to persist as long as the monetary authorities will not show a firm commitment to follow a stable policy course aimed at disinflation and based on predetermined rules.

The final question mark about the rationality of the peg is proven by the experiences of other economies in transition. By the mid-1990s there have been several successful stabilizations without the currency peg (Romania, Kazakhstan, Albania). After the period of contraction, national income in these economies has started to grow and inflation has begun to fall without the application of the currency peg.

The floating exchange rate system is more consistent with the major goals of the economic transformation. At the core of the economic reform of the former command economies is deregulation of businesses and markets. Prices, wages, interest rates and exchange rates shall be ideally determined by competitive, efficient markets. But in order to function effectively and to correctly reflect demand and supply interactions, all commodity, resource and financial markets shall be supported by modern,

competitive institutions. These markets need to be well-developed and diversified. This requirement applies also to foreign exchange markets which closely interact with other financial markets, money, debt and equity markets. Thus based on principles of deregulated markets, exchange rates shall be market-determined, not administratively-regulated, just as prices of the majority of consumer goods, wages or interest rates.

Flexible exchange rates help to improve monetary policy effectiveness. This argument has received a strong theoretical support from the Mundell-Fleming Theorem which is the general equilibrium IS-LM model of a small economy with unemployed resources and a perfectly elastic aggregate supply curve, extended into the balance of payments equilibrium [2]. The model argues that under the pegged exchange rate and perfect capital mobility the effectiveness of monetary policy, or the impact of a rising money supply on national income is minimal, while a fiscal expansion effectively increases income. When there is no capital mobility and a central bank does not sterilize reserves, both fiscal and monetary policies are ineffective. In the case of flexible exchange rates with perfect capital mobility, the effectiveness of monetary policy is maximized, while fiscal policy has no effect on the domestic economy. Moreover, even if the capital mobility is reduced, monetary policy under flexible exchange rates has a stronger impact on the economy than under a currency peg, although its effectiveness falls with tighter capital controls. The effectiveness of fiscal policy increases with higher capital controls and its overall effect on national income can be larger than the effect under a currency peg and complete sterilization. In sum, flexible exchange rates expand the effectiveness of domestic monetary policy on the economy, especially when capital controls are reduced and the currency is convertible for both current and capital account transactions.

Pegged exchange rates were widely applied by small-size economies in the 1980s as a cornerstone of monetary disinflation programs. But their outcome has been mixed and in the 1990s they look less attractive for accomplishing the task of disinflation (Frankel, 1996). More effective monetary policy under flexible rates implies that a departure from a currency peg promotes more efficient domestic credit policy of a central bank. It helps to build more extensive and competitive money and credit markets. This is critical for the economies in transition where the role of bank lending is still relatively low. Specifically, Poland needs to further expand bank lending which ratio to GDP of 33 per cent in 1994 (based on the EBRD 1996 Transition Report data) is well below the Czech Republic (95 per cent), or Germany (140 per cent), or the remaining OECD nations. It is, therefore, imperative that Poland and other economies in transition seek ways to depart from a currency peg for some period of time formulating a proper "exit strategy", until they will have to align their exchange rates again with the EU currencies when they start making adjustments for accession to the Union (L. Orłowski, 1997). In the presence of the active implementation of institutional reforms and, in particular, the construction of modern financial markets, flexible exchange rates are more desirable than a currency peg. A higher degree of currency rate flexibility eventually increases central bank autonomy. It helps to target monetary policy on money supply. A prudent, money-oriented policy targeting is always better than interest rate or exchange rate targets for accomplishing disinflation goals. It improves monetary policy credibility and helps to restore

confidence in domestic money. These are essential conditions for a higher national saving rate and for the development of security markets. They help to expand a time horizon of government securities and deepen the scope of their market.

Flexible rates are advantageous for the development of modern financial markets because they require advancement of forward currency contracts and, ultimately for major international currencies, futures, options and other more complex currency derivative contracts. These instruments are used by investors, exporters and importers for currency risk hedging purposes. They are also a source of speculative gains, especially when instability of underlying spot exchange rates increases. Forward contracts are particularly important for the economies in transition. They can be instituted by banks as soon as domestic competitive money markets and equilibrium interest rates are in place. This is essential for Poland's plans to expand export and to balance the external trade. By mid-1996, several major banks have already established these contracts. Banks generally set forward premiums or discounts for domestic currency in foreign currency terms on the basis of current nominal interest rate differentials. In this way, they establish transmission of market interest rate differentials on equilibrium exchange rates. As the covered interest arbitrage concept implies, forward rates are relatively accurate in predicting the expected trend of spot rates. This is mainly caused by speculative spot purchases of the domestic currency if it shows a forward premium that raise spot rates to the forward trend, and speculative spot sales of the currency if it is at a forward discount. In the latter case, speculators will exercise the forward buying contracts and sell the currency spot as long as the spot rate is above the forward trend [3]. In essence, forward rates and anticipated changes in spot rates are strongly affected by changes in monetary policy and equilibrium market interest rates. Specifically, if a central bank decides to contract money supply and to raise interest rates, the domestic currency is likely to have a higher forward rate that will be followed by the currency appreciation in spot trading as well.

The choice between fixed and flexible exchange rates does not mean a selection between stable or unstable exchange rate. Contemporary international financial markets provide a variety of currency derivatives for risk hedging purposes. The fixed rate system means that it is the government which arbitrarily imposes a mandatory stable rate on the economic agents. Under flexible exchange rates supported by currency derivative instruments individual agents can still design a path of permitted currency fluctuations as well by arranging a proper combination of hedging instruments [4]. The extensive use of currency derivatives allows to determine a currency rate stability at the microeconomic level. Moreover, flexible rates still permit to achieve a high degree of currency stability of the nation's central bank and the ministry of finance follow a high degree of policy discipline at the level comparable to other industrial economies. The separation of the problem of currency stability and speculative attacks from the choice between fixed or flexible exchange rates finds a strong support in the recent economic literature as well. Specifically, the so-called "second generation" model of speculative attacks with multiple equilibria advanced by Obstfeld (1996) argues that destabilizing speculation is not only attributable to exchange rate uncertainty under flexible rates. Unwarranted speculative attacks take

place under fixed rates or target zones as well when the economic fundamentals do not support a stable rate.

Flexible rates are sometimes beneficial for restraining excessive speculative capital inflows and reducing their inflationary consequences. This holds true particularly in high inflation economies with a currency peg that leads to a real currency appreciation. The currency appreciation is triggered additionally by speculative expectations of a further appreciation of a currency resulting in large short-term speculative capital inflows. Once the monetary authority decides to allow a higher degree of currency flexibility, expectations of a further real currency appreciation are lowered and the intensity of further speculative capital inflows is subdued or even reversed into net capital outflows. This was an apparent case in Poland in May 1995 when the authorities decided to broaden the band of permitted fluctuations. The action curtailed inflows of speculative capital to Poland.

It is apparent that the countries in transition shall introduce a higher degree of exchange rate flexibility along with developing their financial markets to enable the covered interest rate arbitrage to work and forward contracts to expand. This choice is consistent with the market-oriented path of economic reforms. As Sachs (1996) argues, the most successful stabilization programs have been experienced by countries that have constructed a proper exit strategy from a currency peg. Normally, a fixed rate is followed by an adjustable peg with a narrow band of permitted fluctuations. If domestic inflation persists, monetary authorities are tempted to choose a crawling peg with a narrow band, followed by a crawling band when they opt to broaden the band and allow a higher degree of exchange rate flexibility.

### **3. The Exchange Rate Policy in Poland**

Poland applied a fixed rate as a part of the January 1990 Stabilization Program. The Zloty was pegged to the U.S. Dollar at a level of 9500 following a sharp 30 per cent devaluation. The peg was maintained until May 1991. The policy was aimed at reducing corrective inflation and restoring stability of the economic system. The initial inflation shock (reaching a monthly rate of 79 per cent in January 1991) quickly evaporated within the first two months of the reform. Therefore, it is questionable whether maintaining the peg until May 1991 was desirable. The peg contributed to the real currency appreciation that reached 21 per cent in 1991 in the presence of the prolonged residual inflation.

To avoid pressures on deterioration of the current account and on excessive capital inflows, Polish authorities decided to gradually move toward more flexible exchange rate formulas. The gradual move in the direction of expanded flexibility is viewed generally as a superior solution to a one-step jump to an independent float (Clark, et.al., 1994). The government applied a crawling peg against the five currency basket in October 1991 with a strong weight in the U.S. Dollar (45 per cent of the basket), followed by the German Mark (DM) (35 per cent), British Pound (10 per cent), the French Franc and the Swiss Franc (5 per cent each). The authorities have maintained a pre-announced monthly devaluation, or the crawling element since



October 1991. They lowered the monthly devaluation rate several times from the initial level of 1.8 per cent to the level of 1.0 per cent applied since January 1996. The initial band of permitted fluctuations of plus-minus 2.5 per cent was expanded in May 1995 to 7.0 per cent with the introduction of the crawling band system.

Despite allowing a somewhat greater degree of flexibility and maintaining monthly devaluations at pre-announced rates, the Polish Zloty has considerably appreciated in real terms. For instance, in 1995 with the CPI-based inflation reaching 21 per cent and the nominal depreciation only 1.2 per cent in USD terms, the Zloty substantially appreciated in real terms to the USD. The 1995 real appreciation was affected by the one-time 6 per cent revaluation of the Zloty against the basket by the National Bank of Poland on December 22, 1995. But the reasons for the Zloty real appreciation shall not be attributed to the "insufficient" devaluation not aligned with inflation. Instead, a failure of disinflation shall be identified as a primary cause for the real currency appreciation. Moreover, the maintained crawling devaluation triggers inflation in the "small economy" case of Poland where economic agents are sensitive to exchange rates while formulating their inflation expectations. The crawling devaluation is a serious source of wage and price indexation and adds in this way to the high chronic inflation. The real currency appreciation has contributed to a large extent to net capital inflows. The country's foreign currency reserves increase in 1995 by USD 9 billion (from 6 to 15 bln.), or 7.7 per cent of the nominal GDP.

The analysts are divided over the role played by monthly devaluation in triggering inflation expectations. The prevailing viewpoint is presented by Belka, et.al. (1995), L. Orlowski (1996 and 1997), Nuti (1996), and Rosati (1996) who firmly believe that pre-announced monthly devaluations are a serious source of price and wage indexation. Since the crawling devaluation exacerbates inflation expectations, it shall be removed from the exchange rate formulas applied by Poland (and Hungary) [5]. Poland, as any other country in transition that is trying to stabilize the economy, shall abandon the practice of crawling devaluation. Such action ought to be an inherent part of a comprehensive program of disinflation.

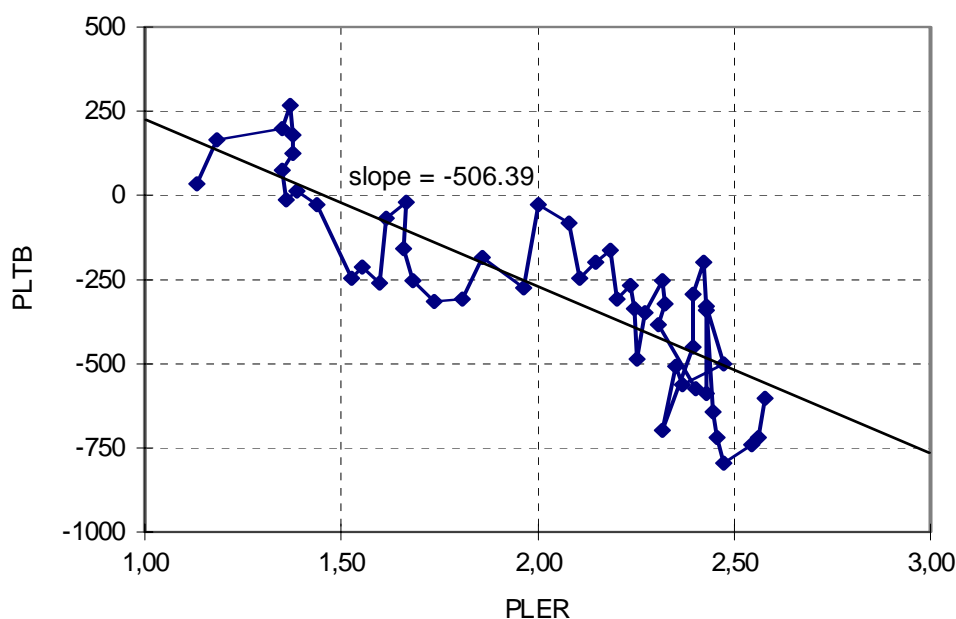
If Poland is not able to reduce inflation to a single digit level, it will risk a prolonged further excessive real currency appreciation and a deterioration of the external trade balance. With the 1990 trade liberalization the country has experienced a dramatic shift of trade from the administratively-determined exchange of goods and services with the former Council for Mutual Economic Assistance (CMEA) countries to the West. By the end of 1995, 75.4 per cent of the country's exports and 75.2 per cent of imports were with western industrial nations. Trade with the West is highly price-elastic and, therefore, sensitive to exchange rate fluctuations. L. Orlowski (1997) has tested sensitivity of Polish exports and imports broken by geographic sub-regions to fluctuations in the Zloty-per-USD exchange rate. This assessment of the exchange rate elasticity of Polish trade shows that both export and import with the West have been highly exchange rate-elastic, or responsive to nominal exchange rate fluctuations. Polish export to Eastern European transition economies has been moderately elastic, while import from these countries has been rather elastic. Trade with less-developed nations is not responsive to changes in the nominal rate of currency exchange. In essence, nominal changes in the Polish exchange rate have a strong impact on the country's external trade balance which has deteriorated at a faster rate than the currency

nominal depreciation in USD terms. Recalling that the rate of inflation has outperformed the currency nominal depreciation, this proves that the trade balance responds inversely to the real appreciation of the currency, at least over the recent three-year period.

It is necessary to emphasize that the deteriorating trade balance as related to the real currency appreciation shall not be attributed to an “insufficient” nominal currency depreciation or devaluation. Instead, it may stem from the other reasons for the real appreciation of the currency which is the excessive inflation. Moreover, it is rather “normal” that Poland as a country experiencing a fast-track GDP growth that has been outperforming the growth of the economies of its major trading partners over the past three years cannot have a trade surplus. The brisk GDP growth creates a strong demand for foreign imports, mostly investment goods and consumer durables, and results in the trade deficit.

*Graph 1*

Poland's Trade Balance (PLTB) in mln current Zł and the Złoty-per-U.S.Dollar end-of-month Nominal Exchange Rate (PLER). Series: Jan. 1992 - Mar. 1996.



Data Source: PlanEcon Reports: No. 11-12, 1995, and No. 17-18, 1996.

The relationship between Poland's trade balance in Zlotys and the nominal Złoty-per-USD exchange rate in recent years is shown by Graph 1. The presented regression function has the slope of -506 meaning that the USD appreciation by one Złoty corresponded with the deterioration of the trade balance by 506 million Zlotys. Therefore, the trade deficit has deepened despite the sizable nominal Złoty depreciation. Again, the nominal depreciation does not help much to improve the trade balance and, in this context, the crawling devaluation remains highly questionable. The rate of depreciation would have to be enormous to generate improvement in the external trade balance and it could only recover it in the short-run. A significant depreciation would add to additional inflation which always worsens trade balances.

At the same time, a slowdown of Poland's real GDP growth rate that has fallen from a 7 per cent in 1995 to approximately 4 per cent projected for 1996, can be expected to have a positive impact (after a several months time lag) on the country's trade balance. Furthermore, in the transforming economy of Poland a fast-track recovery creates a strong demand for "normal" or "superior" consumer goods, which are high-quality goods for which demand increases with a higher level of consumer income. These goods are to a large extent, imported as they are produced by competitive firms in world markets. The structure of consumer demand adds pressures on imports which will continue until the domestic market saturation is high (the share of household ownership of quality consumer durables reaches a higher level). To eliminate the trade deficit in the long-run Poland needs to develop a solid base for export. The currency depreciation will not help to do it. Instead, a stable currency that will improve national savings and investment, along with the modern system of export financing have a chance to upgrade competitiveness of Poland's exports.

The long-run external trade strategy of Poland requires the environment of a stable nominal exchange rate of the Polish Zloty in USD or DM terms. At the same time, the real currency appreciation ought to be prevented by lowering inflation from the current level (in mid-1996) of around 20 per cent to a single digit target. Monetary authorities shall pursue a stable, or "hard" currency strategy (Hochreiter, 1995) which is the only feasible choice in preparations for accession to the EU (L. Orlowski, 1996). A stable currency approach ought to be backed by positive real interest rate differentials that will lead in the long-run to a higher national saving. Such environment is essential for expanding investment and it will result in a growing demand for skilled labor. It will eventually promote investment in the most efficient economic sectors and areas of production contributing to productivity improvements and, consequently, to a higher standard of living of members of the society. Since the conditions of stable currency and higher national saving create demand for a skilled and productive labor, the government shall promote investment in human capital through direct funding or tax breaks to alleviate the problem of the extensive structural unemployment among unskilled workers. Needless to say, a long-run stable currency strategy will help to concentrate investment on the areas most consistent with the country's comparative advantage and make the Polish economy competitive and well-prepared for inclusion into the EU economic system.

Nonetheless, a stable currency strategy managed through positive real interest rate differentials without exchange rate regulation or fixidity may pose a danger of excessive net capital inflows. If the NBP believed that the continued, large capital inflows were inflationary, it could either allow the currency to appreciate, neutralize it through sterilization, or raise mandatory reserve requirements for banks that would curb the growth of domestic credit. These measures, along with a possible tax on capital inflows, are generally ineffective, and they could have only a short-run impact (Rosati, 1996). It remains highly debatable whether positive real interest rate differentials and the subsequent net capital inflows would have a strong inflationary impact in Poland because of the low level of monetization still lagging behind the industrial, or other OECD nations. Specifically, the ratio of M2 money to the nominal GDP reached in Poland 37.3 per cent in 1994, while it exceeded 50 per cent for OECD countries (55 per cent for the United States). In this context, the call for low interest

rates advanced by Nuti (1996) that would presumably stem capital inflows and reduce the cost of their sterilization is questionable. Low interest rates do not contribute to the improvement of monetary credibility which is essential for Poland and for other countries in transition (perhaps with the sole exception of the Czech Republic) that are experiencing problems with inflation. Low or negative real interest rates are not desirable for curbing chronic inflation and they may promote lax monetary policy. They are not consistent with monetary policy adjustments essential for preparation for accession of Poland to the EU (L. Orłowski, 1995). More reasonable monetary policy approaches in the second stage of transformation would be to maintain positive real interest rate differentials by either directly targeting interest rates, as suggested by Rosati (1996), or targeting the growth of money balances to the degree that would still yield positive real interest rate differentials, as suggested by L. Orłowski (1995). Such positive differentials are crucial as long as the problem with the chronic inflation persists.

It will be necessary to free exchange rates in Poland from excessive regulation by expanding their flexibility and, certainly, by eliminating the crawling devaluation. Money supply targeting is a better monetary policy solution to exchange rate targeting when the economy undergoes structural adjustments and privatization. If the growth of money supply is modest and predictable, it allows to provide a sufficient domestic credit for implementation of these programs without inflationary consequences. Moreover, relaxation of the administrative interference with exchange rates will permit a closer link between currency rate fluctuations and changes the macroeconomic fundamentals. The Polish exchange rate system has not been well aligned with differentials in inflation, interest rates, or income due to the insufficient flexibility of the Polish Zloty.

#### **4. Flex-Price Monetary Model of Exchange Rates: the Evidence for Poland**

Before assessing the adherence of exchange rates to macroeconomic fundamentals in the transforming economy of Poland it is helpful to derive a comprehensive model of exchange rate fluctuations that includes standard monetary and income independent variables (inflation, income, and interest rate differentials) modified by the currency crawling devaluation. The standard flex-price monetary model of exchange rates with the crawling devaluation is chosen for this purpose, since it is a basic asset-related model particularly useful for evaluation of exchange rate volatility. The model holds well in the environment of flexible rates which are strongly related to macroeconomic fundamentals.

The origin of the flex-price model is the standard Cagan money demand function:

$$M/P = kY - hi \quad (1)$$

where  $M$  is nominal money,  $P$  is price level,  $Y$  is the level of income, and  $i$  is nominal interest rate.

The presented real money demand function can be transposed into the logarithmic form:

$$m - p = \alpha y - \beta i \quad (2)$$

where  $\alpha, \beta > 0$ .

The basic version of the monetary approach to exchange rates is derived from the purchasing power parity (PPP) theorem. It is a two-country model where domestic and foreign goods are perfect substitutes and they are exchanged under free trade conditions, without impediments to trade. These are necessary conditions for the PPP theory and for the “law of one price” to hold continuously. In the logarithmic version the PPP exchange rate is:

$$s_t = p_t - p^*_t \quad (3)$$

where  $s_t$ ,  $p_t$  and  $p^*_t$  are logarithmic values of exchange rates, domestic prices and foreign prices.

By entering the price equation derived from (2) into the PPP exchange rate formula (3) we obtain:

$$s_t = m_t - \alpha_1 y_t + \beta_1 i_t - m^*_t + \alpha_2 y^*_t - \beta_2 i^*_t \quad (4)$$

where all foreign variables are denoted with the asterisk (\*).

This expression can be further regrouped into:

$$s_t = m_t - m^*_t - \gamma_1 (y - y^*)_t + \gamma_2 (i - i^*)_t \quad (5)$$

given  $\gamma_1 = \alpha_1 - \alpha_2$ , and  $\gamma_2 = \beta_1 - \beta_2$ .

Formula (5) is a portrayal of the flex-price monetary approach to exchange rates [6]. The expression can be further modified by replacing the nominal interest rate differential with the international Fischer parity (IFP) condition:  $i = r + \Delta p^e_{t+1}$  that views the nominal interest rate as a sum of the real rate of interest and inflation expectations for future periods. To reflect a dynamic character of the model, a regressive expectations component  $\Phi$  is introduced in the form first advance by Dornbusch (1976). His sticky-price model with regressive expectations views the PPP equilibrium exchange rate as a long-run phenomenon. In the short-run the PPP fails to hold, the equilibrium exchange rate does not follow the price differential between the domestic and the foreign economy being distorted by uneven inflation expectations. But the spot rate eventually settles at the PPP equilibrium in the long-run as affected by the regressive expectations mechanism  $0 < \Phi < 1$ . The model becomes applicable to the economy with an apparent disinflation program and a credible monetary policy. The model expanded by the IFP and regressive expectations can be presented in the form:

$$s_t = m_t - m^*_t - \gamma_1 (y - y^*)_t + \gamma_2 (\Delta p^e - \Delta p^{*e})_{t+1} + (1/\Phi) [(i_t - \Delta p^e_{t+1}) - (i^*_t - \Delta p^{*e}_{t+1})] \quad (6)$$

For the purpose of the econometric estimation, a reduced form of the model shall be used. Frankel (1979) first proposed a reduced form of the expanded flex-price monetary model, stemming directly from formula (5), in the empirical investigation of the DM-per-USD exchange rate series in the period 1974-1978. His model is commonly referred to as hybrid monetary model (HMM) of exchange rates. In order to adjust the analysis to the experience of Poland, the model is modified by the crawling devaluation level  $D_t$ . The reduced form of the model combining these elements is:

$$s_t = \tau_0(m - m^*)_t + \tau_1(y - y^*)_t + \tau_2(\Delta p^e - \Delta p^{*e})_{t+1} + \tau_3(r - r^*)_t + \tau_4 D_t + \mu_t \quad (7)$$

where  $\mu_t$  is the error term, and  $r$  is the real interest rate.

When  $s_t$  is stated as a domestic currency value of a unit of foreign currency, the expected values of slope coefficients can be predicted as follows:

- $\tau_0 = 1$ , to reflect a parallel impact of the relative changes in money balances on exchange rates as stated by the flex-price monetary approach,
- $\tau_1 > 0$ , if one believes in the demand-side explanation applied to external trade, when the faster rate of the domestic income growth relative to foreign income will accelerate demand for foreign currency and lead to the foreign currency appreciation,
- $\tau_1 < 0$ , if the faster growing domestic economy will attract foreign capital inflows and increase demand for the domestic currency,
- $\tau_2 > 0$ , the accelerating domestic inflation contributes to the foreign currency appreciation,
- $\tau_3 < 0$ , since the higher real interest rate differential will contribute to the foreign currency depreciation,
- $\tau_4 > 0$ , to reflect an impact of the expanded crawling devaluation on the foreign currency appreciation.

For the purpose of the empirical investigation of the Polish experience with exchange rates the estimated function (8) is used:

$$\check{s}_t = a + b(m - m^*)_t + c(y - y^*)_t + d(p - p^*)_{t+1} + e(r - r^*)_t + f D_t \quad (8)$$

This model is estimated for the monthly series of the Zloty-per-USD exchange rate in the period January 1993 - March 1996. Poland's monetary variables are related to the corresponding U.S. data [7]. The empirical double-log estimation yields:

$$\check{s}_t = 0.154 + 0.295(m - m^*)_t - 0.027(y - y^*)_t - 0.008(p - p^*)_{t+1} - 0.011(r - r^*)_t - 3.726 D_t \quad (9)$$

(0.71)	(0.16)	(0.01)	(0.01)	(0.01)	(9.15)
(0.21)	(1.85)	(-5.08)	(-1.05)	(-1.90)	(-0.41)

with standard errors given in upper and t-statistics in lower parentheses.

$R^2 = 0.905$  and  $F$ -statistics = 62.88

The estimated function is highly deterministic as implied by the high coefficient of determination  $R^2$  and the high value of  $F$ -statistics. The score is comparable in terms of the same value of the coefficient of determination to the result obtained by Frankel (1979) in his estimation of the DM-per-USD series. However, the individual

variables and slope coefficients are not all robust and have various degrees of statistical significance. The slope coefficient for the relative money supply is remote from unity indicating that a transmission of the growth of money balances on the exchange rate is relatively weak, although it has a positive sign implying that the domestic M2 money expansion relative to the U.S. contributes to the USD appreciation in the Polish Zloty terms. The coefficient for the relative income is negative and has a strong statistical significance. This combination confirms the impact of net capital inflows in the fast growing Polish economy on the exchange rate. Adversely, the relative CPI-based inflation and the relative short-term market interest rate have not played a significant role in the determination of the Polish exchange rate in the examined period of time, which is understandable considering the high degree of fixidity of the exchange rate. This administrative interference neutralizes the impact of monetary variables on exchange rates. The weakness of this relationship is expected to change once the exchange rate flexibility is expanded and the financial markets start playing a more active role in the determination of exchange rates. Finally, the coefficient of the monthly crawling devaluation not only is statistically insignificant, but it has a negative sign, contrary to the presumed hypothesis. This suggests that the expanded Zloty devaluation coincided with the USD appreciation. In spite of the limited number of adjustments in the rate of the crawling devaluation and the coincident monthly variables build into the model, this implies that the crawl has no effect on the market exchange rate. This justifies the calls for the elimination of the crawling devaluation.

If the relative variables do not play a significant role in the determination of the Zloty-per-USD exchange rate, one may suspect that both the NBP and the economic agents in Poland would have a more “inward-looking” attitude relating changes in the rate of exchange to domestic variables only. To prove this assertion the series of changes in the Zloty-per-USD exchange rate can be regressed against absolute values of only domestic monetary and income variables replacing the relative variables used in the regression (9). Among the tested combinations, the most robust result is provided by the log-lin function (10) where the logarithm of the Zloty-per-USD exchange rate is regressed against absolute levels of money M2 ( $M_t$ ), real GDP ( $Y_t$ ), CPI inflation ( $P_t$ ), real money market interest rate ( $R_t$ ), and the level of the crawling devaluation ( $D_t$ ):

$$\begin{aligned} \check{s}_t = & 2.475 - 0.008 M_t + 0.038 Y_t - 0.045 P_t - 0.040 R_t - 26.81 D_t & (10) \\ & (0.73) \quad (0.01) \quad (0.02) \quad (0.01) \quad (0.01) \quad (14.27) \\ & (3.40) \quad (-2.24) \quad (1.67) \quad (-4.14) \quad (-4.45) \quad (-1.87) \end{aligned}$$

$R^2 = 0.85$ , F-statistics = 36.68

The model is again highly deterministic. This time all monetary variables (price, money M2, real interest rates) have a stronger statistical significance as implied by high absolute values of t-statistics (in lower parentheses) and by low standard errors (in upper parentheses). The important difference are adverse signs of slope coefficients of income and broad money balances comparing to (9). This time, the negative slope of  $M_t$  indicates the domestic broad money expansion combined with the slowdown of the USD appreciation and the positive slope of  $Y_t$  denotes the faster Polish GDP

growth corresponding with the USD appreciation. Both results underline the significance of capital inflows on the exchange rate. The fast growing Polish economy attracts more capital inflows and contributes to the growth of the broad money balances that result in the slowdown of the USD appreciation in the Polish Zloty terms. As in the previous case, the crawling devaluation has a very limited impact on fluctuations of the exchange rate.

In order to obtain more useful and conclusive monetary policy guidelines derived from the flex-price model, a higher degree of exchange rate flexibility is desirable. More flexible exchange rate formulas would increase sensitivity of Zloty exchange rates to differentials in monetary variables between Poland and the leading industrial nations. At the same time, it would sanction a higher NBP policy autonomy allowing the central bank to effectively target domestic money balances, or as Rosati (1996) suggests, interest rate differentials. Maintaining relatively stable money balances, inflation and interest rate differentials the NBP will be able to stabilize the exchange rate and to reduce speculative capital flows.

## **5. Exchange Rate Policy in Preparation for Accession to the European Union**

A future exchange rate policy in Poland will have to be included in the program of preparations for accession to the EU. The NBP will have to carefully examine the experiences of monetary policies in other countries that have already entered the Union, particularly Spain, Portugal, Greece, Austria, Sweden, and Finland. While bringing the Polish economy structurally closer to the EU and, at a later time, preparing the monetary system for a possible inclusion in the EMU, the monetary policy of the NBP will have to be more outward-looking. The NBP will have to take into consideration not only changes in the domestic but also in foreign monetary and income variables. The autonomy of the NBP will be consequently reduced once the country gets closer to the admission to the Union. Therefore, it is imperative that the central bank will successfully build up monetary policy credibility in the short period ahead when the expanded policy autonomy is still feasible. In order to advance the policy autonomy the NBP shall expand the exchange rate flexibility and concentrate monetary policy on domestic targets, mainly on controlling the growth of broad money. This target is exhaustively explained in the economic literature as less inflationary than the interest rate target. Thus a control over money supply will be an important tool in the strategy of disinflation (L. Orłowski, 1995).

Active preparations for accession to the EU and, at a later date, to the EMU will eventually require changing the monetary targeting onto exchange rate stability. The future change of policy targeting from broad money to exchange rates will entail a very different mode of the policy implementation. The Polish Zloty will have to be pegged again, but this time to the DM and, in the future, to the Euro. This means a reversal of the exchange rate policy which still needs to be thoroughly investigated in terms of not too many comparable episodes experienced by other countries and carefully designed. A gradual move toward a currency peg is a preferred solution to a one-time leap, so that financial markets and instruments will get better prepared for the



new system. The currency peg will be managed more effectively after Poland accumulates large foreign currency reserves and banks increase their capital. Poland needs also to gain a broader access to international bond markets after opening its domestic markets to foreign investors. In order to accomplish these tasks, the country needs to reduce inflation to a single digit level and to stabilize the exchange rate. A gradual move toward a currency peg will very likely prevent speculative attacks on the currency.

The path of monetary policy adjustments aimed at aligning the Polish Zloty with the leading EU currencies ought to be initiated by the elimination of the crawling devaluation followed by the change in the composition of the currency basket. The DM and/or the ECU will have to be assigned higher weights than the USD. A consideration for Poland might be recent changes in the composition of the Czech or Hungarian baskets emphasizing the Euro over the USD. However, since the bulk of the Polish external debt and the large part of Poland's import, primarily purchases of Russian oil, are still accounted and paid in USD, Poland shall maintain the USD in the currency basket. This will be additionally beneficial if the USD depreciates further in the long-run in terms of other leading international currencies. It will somewhat diminish the Zloty excessive real appreciation in the DM and other EU currency terms. The band can be expanded further at this time to increase the NBP autonomy. The expansion is feasible as long as the European central banks maintain a wide 15 per cent band of permitted fluctuations of their individual currencies within the EU Exchange rate mechanism. In the future, Poland will eventually have to narrow the band along with the policy requirements still debated by the European Monetary Institute, particularly the guidelines for the foreign exchange policy with countries and currencies of the EU member states and associated countries that will not initially join the EMU.

The monetary policy change into exchange rate targeting is promising and helpful for the program of disinflation. Historical experiences of Spain (L. Orlowski, 1994) and other EU countries have proven that such policy targeting is an effective tool of curbing inflation [8]. It is inevitable that Poland will have to maintain a positive margin of real interest rates over the corresponding interest rates in Germany and in the united European capital market in the future in order to reach the currency stability task. This margin is a direct function of monetary credibility. If disinflation is successful, thus credibility of monetary policy improved, this interest rate margin will be minimized. But the failure of disinflation will force Poland to keep very high interest rates if Poland is still willing to pursue integration with the EU at all.

The NBP shall avoid discretionary changes in monetary policy, or reactions on any reported disturbances in business cycle and monetary conditions. Instead, it should follow feedback rules allowing policy changes stemming only from predetermined formulas (L. Orlowski, 1995). The majority of economic disturbances in the economies in transition have a temporary, self-correcting character and they do not have to be counteracted by monetary policy tightening or expansion, including sterilization of capital inflows. These disturbances include: corrective inflation shocks, seasonal changes in prices or aggregate demand conditions, temporary downfalls in trade deficit, irregular net capital inflows including those from cross-border trading, price shocks related to VAT changes, and many others. The NBP ought to react only if

the disturbances assume a secular trend and may have a permanent damaging impact on the economy. Discretionary policy reactions are extremely dangerous for a perceived stability of the economic system. They enhance uncertainty about future actions of the central bank and add to inflation expectations and to higher interest rates aimed at covering this uncertainty. They eventually undermine credibility of the central bank.

The advise of exchange rate targeting supported by positive real interest rate differentials is not comfortable to those who fear dangers of excessive capital inflows, particularly to M. Nuti (1996). Such concerns in the case of Poland seem to be exaggerated for at least two reasons. First, the country still has a low degree of monetization as indicated in this study before. Second, the Zloty is undervalued in USD terms based on the measure of the ratio of the official to the PPP exchange rate. The ratio was maintained in the first quarter of 1996 at a stable 1.5 level. It would have to be considerable lowered before large net capital inflows backfired by triggering inflation. However, at this point the NBP has to monitor the growth of foreign currency reserves. By the end of 1995 the ratio of foreign currency reserves to the nominal GDP reached 12.8 per cent, after expanding by 7.7 per cent over a one-year period.

The future exchange rate policy in Poland will have to be an integral part of a disinflation program. A policy of disinflation is strongly emphasized as a critical task for the EU member nations, as stated by the working documents for the Union intergovernmental conference (European Parliament, 1996).

It becomes apparent that the NBP will have very little choice in the determination of the future monetary policy. It has to pursue a stable currency strategy as a policy fully consistent with the objectives of accession of Poland to the EU. This is the only strategy that will promote the development of a competitive and efficient Polish economy. A strong currency will provide incentives to increase national saving that is essential for stimulating investment in the most efficient areas consistent with the country's comparative advantage. As a result of application of high efficiency requirements for the national economy, Poland's economic system will be better prepared for inclusion into the competitive markets of the EU. High efficiency requirements based on positive real interest rate differentials and on a stable currency are favorable for the improvement of the competitiveness of the Polish export in the long-run. At the present time, most of Polish exported goods are "inferior" products for which demand may not grow when the EU economic growth accelerates.

The exchange rate stability supported by positive real interest rate differentials may lead to a short-run further deterioration of the trade balance, especially when inflation insufficiently decelerates. The Polish Government shall avoid using exchange rate as a remedy for the short-run trade deficit. Even if the deficit persists, the government ought to seek tools of export promotion other than the currency devaluation. It ought to expand the system of export insurance, foster more aggressive marketing of the national economy, and extensively use tax credits to support exporters.

These solutions along with the policy of disinflation, positive real interest rates and stable exchange rates will be likely included among formal requirements for accession of Poland to the European Union.

## Endnotes

- [1] See for instance Sachs (1996, p. 149) for a comprehensive examination of these factors.
- [2] An extensive discussion on the impact of exchange rates systems on the effectiveness of fiscal and monetary policy under different levels of capital mobility can be found in Kenen (1995, pp. 384-393).
- [3] These adjustments are by no means perfectly smooth. For example Frankel (1993) proves that there is a strong bias in forward currency trading. Forward markets are not strongly efficient. Currency traders engage frequently in destabilizing speculation in the short-run by applying extrapolative expectations. Moreover, short positions are often taken by “noise traders” or short-horizon technical analysts causing destabilizing attacks on currencies.
- [4] For instance, by arranging a *strangle*, or call and put options on the same currency with the same maturity date but at different strike prices, a currency risk manager individually designs the path of permitted fluctuations resembling an official peg with a band. Flexible rates and currency derivatives allow the manager to customize the band of future currency fluctuations on the micro-level.
- [5] It is very difficult to evaluate the exact impact of the crawling devaluation on inflation due to a small number of changes in the devaluation rate and the complexity of factors influencing price and wage indexation. Nevertheless, a simplified test of the series of CPI monthly inflation rates  $p_{mt}$  as a function of the monthly crawling devaluation  $D_t$  in Poland yields interesting results. In the period January 1993 - March 1996, the formula shows a positive slope coefficient of  $D_t$  equal to 135.4 (t-stat. = 1.61,  $R^2 = 0.07$ , F-stat. = 2.59). Despite the low deterministic value this series indicates some impact of the crawling devaluation on inflation. Furthermore, the Granger Causality Test shows that the strongest impact on inflation of the monthly devaluation has a 6 months lag (F-stat. = 1.37), the highest among all possible lag operators. Yet, more observations and more complex and deterministic models are needed to investigate this relationship.
- [6] The presented flex-price model is derived on the basis of the analysis by Hallwood and MacDonald (1994, pp. 158-179).
- [7] PlanEcon Reports (numbers 11-12, May 19, 1995; and 17-18, June 6, 1996) and the IMF: International Financial Statistics are used as a data base for Poland. U.S. observations are taken from The Federal Reserve Bank of St. Louis: Monetary Trends and National Economic Conditions (various monthly editions).
- [8] To support this argument, W. Orlowski (1996) examines the case of Greece in contrast to the experiences of Spain and Portugal with their accession to the EU. Only when the speed of the Greek Drachma devaluation was lowered below the rate of inflation, the country experienced a declining rate of inflation from double-digit levels.

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