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Disinflation, Monetary Policy and Fiscal Constraints. Experience of the Economies in Transition

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1. Introduction

Most of economies of the Central and Eastern Europe (CEE) and the former Soviet Union (FSU) experienced a very high inflation or even hyperinflation in the onset of transition process. It was caused by two major factors: (1) price and exchange rate liberalization that unfroze earlier accumulated stock of money (so-called monetary overhang) resulting from extensive price control, and at least temporarily increased velocity of money in circulation; (2) weak current monetary and fiscal control. Fast disinflation became a basic precondition of possible progress in structural reforms [1], and macroeconomic stabilization one of three major pillars of effective transition strategy [2].

Even very superficial look at macroeconomic data of the CEE and FSU countries show very big differences in the size and length of an initial inflation episode, effectiveness of adopted anti-inflationary programs, speed of disinflation process, and remaining inflation problems. For example, Hungary never had 12-months inflation higher than ca. 30%, but until the end of 1997 did not manage to decrease CPI below 18%. Czech Republic and Slovakia experienced relatively limited and short lived inflation jump coming from price liberalization (end of year inflation of 52.0% in the Czech Republic and of 58.3% in Slovakia in 1991). From 1994 12-months inflation rate stabilized at the level 8 –10% in the Czech Republic and on the level of 6 – 7% in Slovakia [IMF, 1998, table 1], without any clear tendency of further progress in this respect. On the other extreme, Georgia suffering hyperinflation in 1993 – 1994 [3] achieved in 1997 inflation level of 7.2% only, and in 1998 level close to zero.

Poland's case can be classified between these two extremes. After many years of rather high and partly suppressed inflation (most of the decade of 1980s), Poland experienced relatively short near-hyperinflation episode in the second half of 1990 connected with food price liberalization. In order to stop hyperinflation danger a radical stabilization program supported by the comprehensive package of institutional, regulatory and structural reforms was introduced from the end of 1989. Generally, these measures gave the expected results and Poland became a respected leader of economic transition among all the post-communist countries. However, continuation of disinflation process from a moderate to low level though followed a continuos trend was not fast and presented a lot of signs of inflationary inertia.

Apart from the earlier mentioned cases one can select group of countries, which had to try to stabilize more than once before they finally succeeded, countries experiencing major disinflation reversals, and finally, countries that never managed to achieve even the level of stable moderate inflation.

Hence, the research project on "Disinflation Process in Poland – Comparison with Experience of other Eastern European and FSU Countries" was intended to give a some comparative picture on the disinflation strategies carried out by transition countries, and their results related mainly to speed and sustainability of disinflation. Particularly, we wanted to answer question why the pace of disinflation in Poland considered as evident reform leader in the all region has been much slower than in some other countries, sometimes less advanced in transition process.

Preliminary research hypothesis assumed that relatively slow disinflation pace in Poland resulted from a relatively weak monetary policy lacking in clear and consequent anti-inflationary strategy. Difficulties in adequate coordination of monetary and fiscal policies, and the weakness of fiscal policy itself also delayed disinflation process [see Dąbrowski et al., 1997]. However, every assessment of any policy has a relative character. Any statement that specific policy is either "weak" or "tough" involves a subjective judgement unless we can find the objective criteria for such a valuation. However, macroeconomic theory does not provide us with any absolute numerical criteria. Short time statistical data series from a transition period, and frequent data incomparability limit the possibility of historical analysis in one country. In addition, limiting research to one country does not allow assessing strategies alternative to those carried out in an analyzed case.

A comparative cross-countries analysis does allow overcoming many of the above-mentioned barriers while creates the new methodological problems. First, countries being subject of comparative analysis started transition in different economic, institutional and political conditions, what

[1] Many authors and studies showed the importance of early and fast disinflation for a good quality of privatization and restructuring processes, creating favorable condition for a new private sector, mitigating cumulated output decline, avoiding massive rent-seeking, social pathologies, and too big differentiation of income and wealth [see e.g. Aslund, 1994, Balcerowicz and Gelb, 1994; de Melo, Denizer and Gelb, 1996; Dąbrowski, 1996; Aslund, Boone and Johnson, 1996].

[2] Apart from liberalization and privatization [see e.g. Fischer and Gelb, 1991].

[3] In September 1994 12-months inflation rate reached 50,654%, the second highest level in the CEE and FSU transition history, after Yugoslavia's hyperinflation in 1993 – 1994 [IMF, 1998, table 2].

could determine rationale of different strategy choices. Therefore, the specific strategy that gave a certain result in one country do not necessarily had to give the same results in other country. This factor was taken into consideration, to extent possible, in our research. Moreover, several countries that started its transition in much less favorable circumstances than Poland did accomplished faster disinflation in comparison with the Polish one. This indirectly means that difficult initial conditions were not obstacle for successful anti-inflationary program. Additionally, attention put on the speed of disinflation and not only on eventual level of inflation allows for decreasing the importance of differences in the initial conditions.

Second, availability of comparative statistical data from transition economies has been limited despite a big effort done by the IMF, World Bank, EBRD, OECD, or Institute of International Finance. This seriously constrained the detail research agenda both in respect to the list of analyzed variables and geographical coverage.

Research team based, in the first instance, on the International Financial Statistics data base, the regular IMF publication. When necessary and relevant we also used other IMF publications, and sometimes other data sources such as OECD, the World Bank and IIF.

The research period basically covered the decade of 1990s (until 1997) with a special attention given, however, to the sub-period of 1993 – 1997. This choice was determined both by availability of comparative data, and by willingness to concentrate our effort on the disinflation process, and not on analyzing high inflation/hyperinflation episodes themselves. Additionally, most of the FSU countries started periods of their fully independent monetary policies from the end of 1993 only what gives analysis of the earlier period very little sense (if comparable data is available at all).

2. Economic Rationale of Disinflation

Before starting the analysis of speed of disinflation process and factors its determining we should answer the question why disinflation is so important for any economy and particularly for an economy in transition, and why fast disinflation is better than a slow one.

Economic and social disadvantages of high and very high inflation [4] are widely known. Generally speaking, it destroys money in its basic functions as a mean of transaction, saving and calculation. High or very high inflation discourages saving and demand for domestic money. In high inflation economies a saving rate is, other things equal, lower than in low inflation ones. One must remember that transition economies are rather generally short of domestic savings for number of historical and structural reasons.

In the high inflation environment economic agents move from domestic currency to foreign currencies or to money substitutes. This seriously limits using seigniorage and inflation tax [5] for financing public expenditure what is the original reason of a high/very high inflation. Number of empirical research shows that there is an "optimal" level of inflation from the point of view of seigniorage/inflation tax maximization [see Budina, 1997], which usually is located in the high or very high inflation zone. This creates initial temptations to resort to this source of deficit financing especially when other sources are not available (and this was the case of the beginning of transition process in most of the post-communist countries). However, the seigniorage/inflation tax maximizing level of inflation is not stable. As economic agents realize that they are subjects of inflation taxation they decrease their demand for domestic money balances narrowing in this way the base for inflation tax. If policymakers respond in this moment with higher rate of inflation tax, economy faces the danger of dramatic acceleration of inflation, leading very often to hyperinflation.

Additionally, high or very high inflation can erode the conventional tax base. It relates, for example, to the so-called Olivera-Tanzi effect, i.e. a real depreciation of part of tax obligations fixed in nominal domestic currency terms (for certain period of time) or due to time lag between the date of tax accrual and its effective payment. Gaidar [1997] also underlines the negative effect of demonetization process for the real tax collection capacity of the government, and demonetization is unavoidable result of each high/very high inflation episode. Thus, from the point of view of fiscal and monetary balances high inflation is a self-fulfilling and self-accelerating process.

High inflation also destroys the information function of prices, and thus, worsens allocation of resources [see

[4] There is no one definition of "high inflation" and "very high inflation". For purpose of this report I consider "high inflation" as exceeding 12 months level of 40% and "very high inflation" as reaching at least three digits annual level. Hyperinflation is a special case of a very high inflation when monthly inflation exceeds the level of 50% during at least 3 subsequent months [see Cagan, 1956].

[5] Differences between seigniorage and inflation tax are extensively discussed by Cukrowski and Janecki [1998].

Dąbrowski, and Rostowski, 1992]. Economic agents have difficulties to find whether the particular price increase reflects an average price increase only or signals a change in relative prices. The very high inflation or hyperinflation distorts the relative prices structure in accidental way, simply because the various frequency and schedule of indexing prices of individual goods according to inflation (so-called Taylor rule).

Any credit in the high inflation environment must have a short term character only, and form an up-front barrier of high nominal interest rates (even if they are negative in real terms). These are additional channels, apart from destruction of savings, of negative influence of high inflation on economic growth.

Finally, we must mention about negative social consequences of high and very high inflation. In most historical cases, high inflation hurt mainly poor people. It increases income and wealth differentiation, and stimulates numerous social pathologies.

The above very brief review of various negative consequences of high/very high inflation shows that it is very difficult to find any good argument against strong disinflation policy when inflation exceeds annual level of 40% – 50%. However, the balance of arguments may change when country enters the zone of moderate or low inflation [6]. Some of the destroying characteristics of high/very high inflation disappear or play significantly weaker role. This relates, for example, to relative price changes argument, danger of self-fulfilling demonetization, destruction of tax base, social pathologies, etc. However, some impediments to growth connected with inflation are still in place: they relate mainly to negative incentives to saving and high nominal costs of credit. This has further negative implications. Inflation differences with low inflation countries together with low saving ratio, and remaining inflationary and devaluation expectations lead to even greater differences in nominal interest rates. When economy becomes at least partly open for international financial flows (what seems to be unavoidable at some stage of transition process) it makes country very vulnerable to short term capital flows and changing investors sentiment. Lower inflation differences and closer convergence of macroeconomic fundamentals with those of developed country decrease the level of macroeconomic risk.

On the other hand, argument of the economic and social costs of disinflation becomes more important when country approaches a low inflation level. The main argument against disinflation or at least against fast disinflation is connected with the existing downward nominal price and wage rigidities. Under lower inflation a room for real price or wage decrease is much limited than under the higher ones. Therefore, a necessary adjustment in this sphere takes more time and costs more in terms of output decline and unemployment [see e.g. Calvo and Coricelli, 1992; Nuti and Portes, 1993]. Thus, according to this argument, slow disinflation is less painful for the economy than a fast one.

The above argument can be, however, challenged on the same ground. Downward price and wage rigidity is, to significant extent, a product of past inflation experience [Leidy and Tockarick, 1998]. Moreover, if inflation has a persistent character, economic agents try to protect themselves against real income decrease through various forms of anti-inflationary indexation. It leads to a phenomenon of inflationary inertia when nominal rigidities become even more serious than before. Attempt to make a real price or wage adjustment needs in such a situation the additional unexpected inflation impulse. This increases bias towards *ex ante* indexation of nominal variables. Moreover, if economic agents do not trust macroeconomic policy and are afraid that they will be cheated by additional unexpected inflation, they try to protect themselves by the additional indexation margin [7]. Thus, moving in this direction one can expect only inflation acceleration, without any serious output and employment gains. On the contrary, nominal rigidities can be limited significantly (and real sector can become much more flexible) as result of credible and sustainable anti-inflationary program though implementation of such a program needs breaking up the existing rigidities and inertia what is connected with certain loses in employment and output.

The same concerns also the so-called money illusion in the original Keynessian model. Additional nominal demand

[6] Again, both moderate and low inflation may be defined in various ways. For example, Dornbusch and Fischer [1993] suggest price increase between 15 and 30% annually as a definition of moderate inflation. For purpose of this report moderate inflation is defined as annual inflation between 10% and 40%, and low inflation as annual inflation below 10%.

[7] One of possible scenarios of such a game can be connected with fiscal gains in the case of unexpected inflation. Nominal revenues and expenditures, including wages, social transfers, and subsidies are planned under assumption of certain projected inflation level. If inflation is higher than expected, budget gets more nominal revenues than it was planned, while most of nominal expenditure remains on the previously planned level. Of course, budget beneficiaries try to protect themselves against such a maneuver by additional indexation. This kind of game was carried out in Poland in 1993 – 1996.

injection can lead to increasing output only if is unexpected and if profit-maximizing economic agents have free and complementary production capacities. This is not certainly the case of transition economies with strong inflation inertia, lack of complementary free production capacities, low saving rate and serious problems with the incentive system on the micro-level. Again, stopping the use money illusion stimulating mechanism is connected with certain costs though is beneficial from the point of view of microeconomic flexibility of a given economy.

Discussing costs and benefits of disinflation policy the real dilemma concerns their time mismatch: costs must be paid immediately (in a short term horizon) when benefits will come later (in medium and long term perspective). This can create political cycle problem [see Alesina and Perotti, 1994] when the given government does not have political time to wait for economic and social gains coming from the disinflation policy [8]. However, slow disinflation strategy does not seem to be a remedy here. Slow disinflation still involves some costs when benefits are very limited and diluted in time. In order to reach certain final low inflation target [9], painful disinflation measures will have to be repeated several times and positive effects will come much later. Additionally, slow disinflation will further support the existing nominal rigidities and inflationary inertia. It will delay the perspective of macroeconomic convergence of a given transition economy with the developed countries what involves, other things being equal, higher risk premium for investment and higher real interest rate for both servicing public debt, and private sector [see Maliszewski, 1998]. Thus, the cumulated economic, social, and political costs of slow disinflation do not need to be lower (than in the case of fast disinflation), while benefits are certainly delayed and somewhat diluted.

The above findings have been supported by results of numerous empirical researches [10]. Generally, lower is inflation level, better are conditions for sustainable economic growth. The modern economy generally rejects a hypothesis on a possible long-run trade-off between inflation and GDP growth (although such a dilemma may take place in the short run) [see Orłowski, 1998]. The modern growth paradigm, known as "the Washington consensus", points out at a low inflation as a factor promoting growth [see e.g. Barro and Lee, 1993].

However, many empirical analyzes show a non-linearity of the relation between inflation and growth. Marginal output gains decrease with lower inflation level. When earlier cross-countries empirical analyzes [see e.g. Bruno and Easterly, 1995] found output losses for inflation above 40%, latest research took this threshold below 10% [see Sarel, 1996; Gosh and Phillips, 1998]. This seems to reflect general disinflation trend of the world economy in the last decade. Ten years ago frequency of low inflation cases was much lower than now, particularly among developing countries.

For countries in transition, Christoffersen and Doyle [1998] estimated the same threshold at the level at around 13%, i.e. a little bit higher than for the wider sample of market economies. However, this result may be influenced by a small number of low inflation cases in the group of transition economies. Probably, as more countries will reach single digit inflation zone for longer period of time, future empirical research may estimate the inflation-growth threshold at a lower level.

There is no empirical evidence, however, that lower inflation, i.e. below the threshold hurts prospects of economic growth. What we can only interpret from the above quoted research results, is the absence of clear negative relation between inflation and growth below the threshold. There is also lack of any evidence that slow disinflation is better for economic growth than a fast one. Thus, both theoretical and empirical literature does not provide serious arguments against rationale of fast disinflation, even if country reach a zone of moderate or low inflation.

3. Different Speed of Disinflation

3. 1. Methodological Remark on Inflation Measuring

Before starting analysis of differences in speed of disinflation in individual countries we must shortly discuss the issue of comparability and quality of inflation statistics. Any deeper analysis of this problem was certainly beyond the project agenda and existing capacities of the research team. However, we must signal some doubts, which we

[8] Central bank independence is considered as the main cure that can help to overcome a political cycle constraint – see chapter 9 of this report.

[9] For the transition countries aiming to become the EU members it will be the level comparable with inflation in the EURO zone.

[10] Results of such research and an overview of earlier research are presented, among others, in Fischer, Sahay and Vegh [1996]; IMF [1998]; Gosh and Phillips [1998]; Christoffersen and Doyle [1998].

discovered on occasions of other research and technical assistance projects carried out by the CASE in some transition countries. The main technical problems in inflation measurement are connected with a construction of consumer basket, weights attached to goods and services composing this basket, and frequency of updating these weights. There are reasons to suspect that statistical agencies of some countries do not update composition of a consumer basket each year what can create downward bias in inflation measurement [see e.g. Jarociński and Jirnyj, 1997 for Georgia]. When inflation is high or very high, and multiple exchange rate regime is in place (examples of Belarus, Turkmenistan or Uzbekistan) possibility of measurement mistakes in price indexes are even greater and may work in both directions, i.e. underestimating or overestimating the inflation rate. Finally, according to Skreb [1998] transition economies may experience the upward biases in inflation measurement due to faster rate of introduction of new products and proliferation of new retail outlets. This argument sounds similar to that raised by the Boskin report for the United States. However, there is very little empirical evidence that its role in transition economies is really significant.

Mentioning all above doubts related to cross-country comparability of inflation statistics, we will omit this factor in the further analyses and assume that inflation data published by the IMF in the International Financial Statistics are good enough to be used for purposes of this project.

3. 2. Comparison of Speed of Disinflation

As it was mentioned in chapter 1, individual countries experienced different size of the initial macroeconomic destabilization in the beginning of transition process. Serbia and Montenegro's hyperinflation of 1992 – 1994 as the second fastest in the world history amounted to 310,000,000% monthly in January 1994 [Rostowski, 1998, p. 87]. Georgia with 50,654% 12-months inflation in September 1994, Armenia with 29,600.9% in May 1994, and Ukraine with 10,155% in December 1993 represent three others hyperinflation cases. On the other extreme, Hungary, Czech Republic, Slovakia, and Slovenia never had three digits 12-months inflation (Hungary always stayed in the zone of moderate inflation).

Antczak [1998] gives an overview of the main stages of disinflation process in 6 CEE countries: Croatia, the Czech Republic, Hungary, Poland, Slovakia, and Slovenia, and six FSU countries: Estonia, Kazakhstan, Latvia, Lithuania, Russia, and Ukraine. Author considers reducing inflation to below 40% a year, around 3% a month, as a "first approach" measure of when stabilization was first achieved [Bruno and Easterly, 1995]. **Charts 3. 1. and 3. 2.** present progress in disinflation in the analyzed twelve countries and show that the CEE countries mostly achieved this first stage of stabilization in 1992, while the FSU countries within the longer period of 1994 – 1996.

The next stage of successful stabilization is when annual inflation lowers to 15 – 30% range [Dornbusch and Fischer, 1993; Antczak (1998)] calls it as the "second approach". The CEE countries mostly achieved this range of inflation in 1993 and the FSU countries in 1995 – 1997.

Finally, a "third approach" is a decline in inflation significantly below 10% or rather closer to 5% annually. From twelve analyzed CEE and FSU countries eleven countries had brought inflation below 15%, but only three countries maintained inflation closer to 5% annually by the end of 1997 (Croatia, Slovakia, and Latvia).

Inflation in the CEE countries was brought under control earlier than in the most FSU countries, albeit from less extreme levels and less rapidly. Starting from 1993, the FSU countries as a group outperformed the CEE ones, as disinflation path of the FSU countries was much more radical than the CEE ones.

Obviously, there are significant differences among individual transition economies. In 1997, four CEE countries (the Czech Republic, Slovenia, Croatia, and Slovakia) registered the end-of-period CPI within a "third approach" (5% – 10% annually). The other two countries (Poland and Hungary) had inflation close or over 15 percent (a "second approach"). Within the FSU countries results were less differentiated – most of them had inflation around 10% in the end of 1997, very close to the level of the best CEE performers. However, lowering inflation to a single-digit number (a "third approach") still remains the difficult problem for most of the transition economies.

IMF comparative analysis of 25 transition countries [IMF, 1998, table 2] gives a similar although much more detail picture. According to classification based on Fisher, Sahay, and Vegh [1996] five CEE countries (Poland, Czech Republic, Slovakia, Slovenia, and Hungary) carried out macroeconomic stabilization relatively early, i.e. before 1993. In nineteen other CEE and FSU countries stabilization was accomplished between 1993 and 1997. Finally, one country (Tajikistan) did not stabilize yet. Stabilization program dates were assumed as the dates of

beginning of the IMF supported programs (usually Stand-by arrangement or Systemic Transformation Facility).

The subsequent disinflation thresholds were set at the levels of 60, 30, 15, and 7.5%. Periods between threshold were defined as the annualized three months inflation rates. The country were classified to have crossed the threshold when first fell below threshold, and remained in the new zone for a year, and if the 12-months inflation rate fell below that level during the following year without rising above it again in that year. The latter rule does not relate to countries that crossed the threshold during 1997.

Crossing down the highest threshold (60%) took 23 months for Kyrgyzstan, 21 months for Lithuania, 18 months for Poland, Ukraine, and Estonia, 17 months for Kazakhstan, 9 months for Russia, Moldova, and Latvia, 6 months for Armenia and Macedonia, 5 months for Albania and Azerbaijan, 4 months for Croatia, and 3 months for Georgia, Czech Republic and Slovakia [11], all from the date of starting the stabilization program.

Reaching the next threshold (30%) took 33 months for Poland, 27 months for Latvia, 26 months for Lithuania, 24 months for Kyrgyzstan, 17 months for Georgia, 13 months for Kazakhstan, 10 months for Armenia, 9 months for Moldova, 8 months for Estonia and Macedonia, 5 months for Russia, 3 months for Slovenia and Albania, and 1 month for the Czech Republic, Slovakia, Azerbaijan, Croatia, and Ukraine (all from the date of reaching the threshold of 60%).

The threshold of 15% was reached during 27 months by Slovenia, 23 months by Albania and Estonia, 21 months by Poland, 14 months by Moldova, 12 months by Latvia, 11 months by Kazakhstan and Ukraine, 7 months by Azerbaijan, 5 months by Macedonia, 2 months by the Czech Republic, Slovakia, Croatia, and Lithuania, 1 month by Georgia.

Finally, the threshold of 7.5% was reached by 6 countries only and it took 46 months for Slovakia, 11 months for Lithuania, 7 months for Azerbaijan, 5 months for Macedonia, 2 months for Albania, and 0 months for Croatia [12].

Another approach to measuring intensity of inflation processes and speed of disinflation is presented by Koen and De Masi [1997] who calculated the cumulative CPI increase during the first five years of transition in each country. The following starting dates were taken for this analysis: December 1989 for Croatia, Hungary, Macedonia, Poland, Slovakia, and Slovenia; October 1990 for Romania; December 1990 for Bulgaria, the Czech Republic, Estonia, and Latvia; January 1991 for Albania and Lithuania; December 1991 for Russia and other FSU countries. The smallest cumulative increase was recorded in the Czech Republic (138%), followed by Slovakia, Hungary, Albania, and Poland (1,341%). The highest figures were recorded by Turkmenistan (over 100,000 times), Georgia (over 86,000 times), Armenia, Ukraine, and Tajikistan. The absolute "leadership" belongs, however, to Serbia and Montenegro where prices increased over 78,000,000,000,000,000,000,000 times during the period from January 1992 to February 1994 (25 months).

In order to make the adequate assessment of differences in speed of disinflation it is also necessary to take into consideration the cases of reversals in this process. Among countries, which achieved low or moderate inflation level major reversals happened in Albania (1996 – 1997), Armenia (1997), Russia and Ukraine (both in the second half of 1998), Hungary (1995), Czech Republic (1997), Slovakia (1997 – 1998), Kyrgyzstan (1996, and again in the end of 1998), and Slovenia (1997 – 1998) recorded some smaller inflation reversals or fluctuations [13]. Reversals were caused by the serious political crises (Albania, Armenia), fiscal policy problems and its inconsistency with the monetary and exchange rate policies (Russia, Ukraine, Kyrgyzstan, Slovakia, and Hungary), balance of payments crisis caused by the weakness of the enterprise sector (Czech Republic).

There is much more reversals and serious fluctuations caused by weak fiscal and monetary policies and slow pace of structural reforms in chronic high inflation countries which only occasionally reached the moderate inflation zone during the investigated period. This relates to Romania, Bulgaria, Belarus, Uzbekistan, Turkmenistan, and Tajikistan [14].

Observing the end of year inflation figures one can conclude that only Poland, Azerbaijan, Estonia, Georgia,

[11] As it was mention earlier (in chapter 1) Czech Republic and Slovakia had the highest inflation levels only a few percents above this threshold when Georgia suffered the second highest hyperinflation among transition countries (after Yugoslavia).

[12] Croatia in its impressive disinflation process passed threshold of 7.5% in the same month (May 1994) as the 15% threshold. In fact, Croatia recorded negative inflation during several months of 1994.

[13] The lowest inflation countries, Croatia and Macedonia, also recorded some fluctuations of their end of year CPIs, but they remained in the range of 2 – 5% of annual inflation in the case of Croatia and from –0.6% (1996) to + 2.7% (1997) in the case of Macedonia.

[14] After many earlier failures Bulgaria started very ambitious stabilization program in April 1997 based on the currency board regime and tight fiscal policy. It allowed to take annual inflation down to 1% in 1998 (from the hyperinflation level in February 1997). IMF statistics also records significant progress in Turkmenistan (21.8% in 1997 from the hyperinflation level in 1994 and 1995), but there is no enough information to assess the sustainability of disinflation trend in this country.

Kazakhstan, Latvia, Lithuania, Moldova, Russia, and Ukraine recorded continuos uninterrupted disinflation trend until the end of 1997 [15] though Russia and Ukraine experienced major reversals of this trend in the second half of 1998.

Summing up, Poland though first started a complex anti-inflationary program and recording continuos trend of decreasing end-of-year inflation index must be classified as slow stabilizer. Especially two first stages of disinflation process, according to the above discussed IMF criteria, i.e. reaching thresholds of 60 and 30% took a lot of time. In the subsequent chapters we will try to find reasons of a limited effectiveness of the anti-inflation policy in Poland comparing its macroeconomic developments with those in other transition countries.

4. Changes in Money Supply, and Factors Determining Money Supply

According to Milton Friedman [Friedman and Schwartz, 1963] *"inflation is always and everywhere a monetary phenomenon"*. Hence, searching for causes of different disinflation performance was started from the comparative analysis of money supply and factors that determine money supply. The analysis [16] covered twelve transition economies which recorded moderate or low inflation, six from the CEE region (Croatia, the Czech Republic, Hungary, Poland, Slovakia, and Slovenia) and six from the FSU (Estonia, Kazakhstan, Latvia, Lithuania, Russia, and Ukraine).

4. 1. Definitions of basic monetary aggregates

The statistics of the balance sheets of the monetary authorities (MAs) [17] provide data on assets and liabilities that after netting out can be summarized by the equation:

$$RM = NFA + NCG + CNPE + CDMB + COFI + CPS + OIN \quad (4.1)$$

Reserve money (RM) [18] is the liability of MAs [19] and includes currency issued (cash in vaults of banks and currency in circulation), plus bank and non-bank deposits with the MAs, excluding the deposits of the government and non-residents which are netted against the claims on the government and foreign assets, respectively. Net foreign assets (NFA) include the domestic currency value of net official international reserves (NIR) and any other foreign assets and liabilities of the monetary authorities. Hence, this definition of NFA is broader than used in many countries, where NFA are equated with the NIR. Net claims on government (NCG) are direct loans and government securities held by the MAs net of the government deposits. Claims on non-financial public enterprises (CNPE) are the monetary authorities' claims on public enterprises. Claims on deposit money banks (CDMB) include all direct credits to deposit money banks (DMBs) [20], as well as bills of exchange for discount from the DMBs accepted by the MAs. These CDMB are not netted out, since deposits of DMBs in the MAs are part of reserve money. Claims on other financial institutions (COFI) and claims on private sector (CPS) together with CNPE are usually insignificant [21]. Other items net (OIN) is a residual category that shows the physical assets, capital, reserves, and profits or losses of the central bank. In addition, it includes valuation adjustment to a net foreign assets position resulting from changes in exchange rate and any other items that have not been classified elsewhere. Valuation adjustment is of a particular importance in countries with high inflation and volatile (nominal) exchange rates. Specifically, changes in stocks over time should be decomposed into changes resulting from transactions and from valuation [22].

Dividing both sides of the equation (4.1) by the lagged value of reserve money (RM_{t-1}) the growth rate of RM can

[15] It does not mean that it was no increases of 12-months inflation index in the course of subsequent years. The recorded statistics concerns end of December figures only.

[16] See Antczak [1998]. Chapter 4 of the summary report is prepared on the basis of this paper. Section 4.3.1. draws also from Rybiński [1998].

[17] Research team based on the IFS IMF monetary statistics.

[18] Reserve money is also called high-powered money or base money.

[19] The central bank represents monetary authorities in most countries, but this term can include agencies of the government (such as the treasury) that perform some of the functions of a central bank. Under the IMF accounting procedures followed in this chapter, the monetary functions of the government are grouped with the accounts of the central bank and presented under one accounting unit.

[20] DMBs are often commercial banks but may also be financial institutions, such as savings banks, whose liabilities include appreciable deposits against which checks can be written to settle obligations [see IMF, 1984].

[21] In a market economy, central banks do not make such loans. However, practice in some transition countries is different.

[22] Monetary accounts are expressed in local currency and all items in foreign currency (e.g., foreign assets and liabilities) are converted into domestic one at the end-of-period exchange rate, because the balance sheet aggregates are stocks. However, this is in sharp contrast to the conversion of flow aggregates, which are converted at an average exchange rate for a period. Adjusting for the effects of exchange rate changes in NFA, implies changes in OIN to ensure that the balance sheet of the MAs remains in balance.

be expressed in terms of the (weighted) contribution of the various asset items.

$$\frac{\Delta RM_t}{RM_{t-1}} = \frac{\Delta NFA_t}{RM_{t-1}} + \frac{\Delta NCG_t}{RM_{t-1}} + \frac{\Delta CNPE_t}{RM_{t-1}} + \frac{\Delta CDMB_t}{RM_{t-1}} + \frac{\Delta CPS_t}{RM_{t-1}} + \frac{\Delta COFI_t}{RM_{t-1}} + \frac{\Delta OIN_t}{RM_{t-1}} \quad (4.2)$$

4. 2. The Role of Net Domestic and Net Foreign Assets in Determining Reserve Money Growth

Simplifying somewhat, one can assume that all credit extended by the MAs to all the sectors other than general government, represents quasi-fiscal financing. This assumption may not be justified in developed economies, but holds with high probability for the initial stage of transition period. Financing general government by the MAs represents monetization of a fiscal deficit, irrespective of the technical side of such financing (printing money or acquiring by central bank Treasury bills on primary or secondary markets) [23]. Adding direct central bank credit to government (*NCG*) to all other sorts of domestic credits extended by a central bank (*CNPE, CDMB, CPS, COFI*), the two main components of RM creation can be identified as changes in net foreign assets and changes in net domestic credit (*NDC*):

$$\frac{\Delta RM_t}{RM_{t-1}} = \frac{\Delta NFA_t}{RM_{t-1}} + \frac{\Delta NDC_t}{RM_{t-1}} + \frac{\Delta OIN_t}{RM_{t-1}} \quad (4.3)$$

Table 4. 1. presents averages and medians of quarterly changes in all main components of RM in 12 analyzed transition economies from the beginning of transformation in every country until the end of 1997 [24]. Two groups of countries can be identified:

- the first group, where changes in RM were almost exclusively related to the changes in NFA (Croatia, the Czech Republic, Slovakia, Slovenia, Latvia, Lithuania, and Estonia);
- the second group (the rest of the analyzed TEs) where both components (NFA and NDC) contributed to RM changes.

Two countries from the first group, Estonia (in 1992) and Lithuania (in 1994), adopted the currency board system where, by definition, only changes in NFA could cause changes in RM level. The picture of exchange rate regimes in rest of the first group is mixed. Croatia [25] and Latvia followed the consequent policy of stabilizing nominal exchange rate in the longer period. Slovenia did initially significant effort in reducing rate of devaluation, but did not avoid perturbations in exchange rate development through the whole period under analysis. The Czech Republic and Slovakia maintained generally stable nominal exchange rates but with single corrective devaluations (Slovakia in July 1993 and Czech Republic in May 1997).

Countries from the second group (Hungary, Poland, Kazakhstan, Russia, and Ukraine) represent rather mixed picture in respect to the exchange rate regime. Hungary and Poland generally experienced frequent fluctuations in exchange rate. Kazakhstan, Russia, and Ukraine after experiencing with the floating exchange rate undertook an effort to stabilize their exchange rates after 1995.

Disaggregation of NDC (equation 4.2) in the second group of countries reveals that changes in NCG constituted the main component of changes (see table 4.1). The analysis of differences between averages and medians of NCG component allows distinguishing two sub-groups:

- countries with significant differences between averages and medians (Kazakhstan, Russia, and Ukraine);
- countries with small differences between averages and medians (Hungary and Poland).

The first sub-group represents countries where MAs massively monetized fiscal deficits in the first period of transition, from 1992 to 1995. Later, in the period of 1995 – 1997, due to the rise in NFA as a result of a stronger foreign capital inflow (after pegging the exchange rate) MAs were decreasing monetization of deficits, but only periodically. When NFA started to go down in the end of 1997 (capital outflow resulting from Asian crisis and realization that fiscal and structural reforms go in the unsatisfactory way) MAs in Ukraine and Russia increased monetization of fiscal deficits again. Saying another way, they did not sterilize capital inflow but sterilized its outflow. Therefore, irrespective of the direction of the

[23] This assumption follows approach proposed by Buiter [1997].

[24] A phenomenon of monetary overhang inherited from a command economy has been taken into account. One or two quarters from the beginning of the data sample, for example, Q2 1990 for Poland or Q4 1992 for most of the FSU countries, were taken away.

[25] Only after October 1993 – after ending the military conflict with Serbia and introduction of stabilization program.

capital flight in these countries, MAs kept financing the government.

In Kazakhstan, the National Bank of Kazakhstan (NBK) halted financing fiscal deficit since Q4 1996, when significant increases in NFA took place and were combined with declines in NDC (both in NCG and CNPE). In the previous quarters (Q4 1995 and Q3 1996), however, Kazakhstan similarly to Russia and Ukraine sterilized the foreign capital outflow. Significant diversions between averages and medians in CDMB indicate large shifts in the NBK policy towards the DMBs. A more careful analysis of quarterly changes reveals periods of a strong refinancing of DMBs by the NBK. Credits to the regions and "strategic" sectors of the economy directed and refinanced by the NBK or clearing off inter-enterprise arrears constituted the main reason of these fluctuations.

The second sub-group of countries experienced a rather steady financing of fiscal deficits by the MAs. It may contradict to general opinion of a tight monetary policy in Poland or Hungary, but the real picture is more ambiguous. In Hungary the strongest monetization of fiscal deficit took place in three periods: from Q4 1990 until Q2 1992, from Q4 1994 until Q2 1995, and during the first two quarters of 1996. In Poland, there were two such periods: from the end of 1990 until Q3 1993 and from Q2 1994 until Q1 1995. The difference between these two sub-groups was only in the "smother" deficit financing in the second sub-group contrary to the first one.

4. 3. The Role of Capital Inflow and its Sterilization

Table 4. 2 gives a more detail outlook of fiscal and external accounts of the analyzed countries. The role of fiscal policy and fiscal deficit will be further discussed in chapter 8. This section will focus on the role of NFA increase and particularly capital inflow in determining money supply.

4. 3. 1. Causes of Capital Inflow

The causes of capital inflow (and NFA increases, *ceteris paribus*) have external and internal character (or a mixture of both). External causes can be connected, for example, with low interest rates in developed countries or positive investor attitude towards the so-called emerging markets (what was the case between mid of 1995 and mid of 1997). Among internal factors one can mention successful stabilization, good prospects of economic growth, high borrowing requirements of domestic enterprises, or high expected yields on Treasury securities very often supported by the stable exchange rate. Hence, domestic causes of inflows derive either from success or from imbalances in macro and micro fundamentals.

A study attempting to address this question was presented by Manzocchi [1997]. He studied ten countries (Bulgaria, Czech Republic, Hungary, Poland, Romania, Slovenia, Slovakia, Estonia, Latvia and Lithuania) over the 1990 – 1995 period. In a series of regressions the behavior of net foreign borrowing over GDP was explained by a set of exogenous variables including growth rate, fiscal balance to GDP ratio, inflation, nominal exchange rate devaluation, exports growth rate, foreign debt to GDP ratio, FDI to GDP and foreign debt to exports ratios. Manzocchi [1997] found that net foreign borrowing in transition CEE economies is positively correlated with GDP growth rate, rate of growth of exports and fiscal deficit. An increase of 1% in the fiscal deficit to GDP is associated with a rise in net foreign borrowing over GDP by 0.7 – 0.8%, while a 10% rise in exports increases net financing from abroad by 0.8% of GDP. The stock of foreign debt has a negative impact on new lending, a rise of 10% in outstanding debt to GDP lowers the borrowing ratio by 1.5%, while a rise of 10% in debt over exports lowers the borrowing ratio by 0.5%.

Manzocchi [1997] results may be summarized in the following manner. A deterioration in the consolidated fiscal balance has a direct positive impact on net foreign borrowing, because it produces a larger domestic saving – investment imbalance [26] that is financed through foreign credit. However, indirectly and with some time lag, larger fiscal deficit leads to higher yields on government liabilities, which further translates into higher debt to GDP ratio; and thus has a negative indirect impact on the capacity to obtain more credit (see chapter 8). Finally, a growth in exports improves the country creditworthiness and increases its ability to attract new funds.

[26] See section 7.1.1. for theoretical arguments on this issue. Looking at the problem of capital inflow more fundamentally, this is exactly the domestic saving-investment imbalance, which provokes a capital inflow [see Rybiński, 1998]. Generally, transition economies present rather low saving rate, additionally depressed by the high/very high inflation episodes (see chapter 2). On the other hand, their investment needs are very high. According to earlier studies made by Collins and Rodrick [1991] and Borensztein and Montiel [1991] in order to maintain the GDP rate of growth in 3 – 7% range and to catch up with productivity levels in Western Europe the investment rates should reach levels of 22 – 30% [see Rybiński, 1998].

It seems plausible to assume that the capital flows in CEE countries are determined mostly by internal factors and thus Manzocchi [1997] study provides a very good insight to the factors explaining the capital flows. It is in contrast to the study by Calvo et al. [1992] who argued that surging capital inflows into Latin American countries in early 1990s were strongly influenced by external factors such as sharp decline in U.S. interest rates, continuing recession and the capital account developments in the United States. Calvo et al. [1992] also argued that strong capital inflows affected the Latin American economies in early 90s in four dimensions, which do seem to be relevant also in the case of capital inflows to CEE countries.

First, they increase capital availability to emerging markets. Due to usual shortage of domestic savings capital inflows provide financing to many net positive value projects and at the same time allow domestic agents to smooth their inter-temporal consumption path.

Second, capital inflows result in appreciation of domestic exchange rate. As shown by Dluhosch et al. [1996] capital inflows increase domestic absorption and the additional demand is targeted at both tradable and non-tradable goods. Therefore the price of non-tradables increases and thus, exchange rate appreciates what bring the economy to the equilibrium, because foreign transfers, by definition, has to be spent entirely on tradable goods and appreciation shifts consumption away from non-tradables (mostly services) towards tradables.

Third, capital inflows pose a challenge to policy makers, which often leads to foreign exchange and money market interventions attempted to prevent appreciation of real exchange rate. It is also of key importance to decision makers to determine whether the capital inflow is sustainable and whether it can be easily reversed, and if so, what could trigger such a reversal.

Fourth, capital inflows send signals to participants of the world financial markets. A surge in inflows may suggest that there are attractive investment opportunities in receiving country. Inflows also boost investments and contribute to higher GDP growth. On the other hand, due to lax fiscal policy yields on government securities may be high what may attract easily reversible speculative capital. Therefore, policymakers and investors need to assess what type of inflows do actually take place what is sometimes a difficult task to perform given the lack of disaggregated data related to capital inflows.

4. 3. 2. Policy Responses to Capital Inflow

When capital inflows (*ceteris paribus*) exceed domestic money demand or add up to domestic reserve money components, they spill over into inflation. In practice, most countries try to sterilize capital inflows. Sterilization can be experienced in a narrow or broad sense. The former comes from offsetting foreign capital inflow by a decrease in net domestic assets of MAs [27]. The latter includes also changes in the rules established by the MAs such as reserve requirements or other regulations increasing operational costs for the DMBs, restricting or increasing costs of capital inflows, and removing restrictions on capital outflow. However, fragility of the banking sector in most of transition countries limits a room of maneuver for sterilization in a broader sense. In fact, fiscal adjustment is the only reliable policy, which can neutralize additional money supply that comes from capital inflows, without reducing country competitiveness [Begg, 1996].

Sterilization always involves explicit or implicit fiscal cost, because central bank must usually offer higher interest rate than that, which it can get on its foreign exchange reserves allocated on international financial markets. Interest rate disparity reflects risk premium connected with lending to transition economies [28].

Sterilization of capital inflow helps to increase the NFA component in the reserve money aggregate and, therefore, decrease a danger of a balance of payments crisis. However, if such a policy goes too far, NFA can exceed reserve money, leading to the structural surplus position of domestic commercial banks in relation to a central bank (i.e. negative size of the central bank NDA). This makes central bank vulnerable to changes in commercial banks' portfolio decisions and creates permanent negative pressure on central bank profit. In order to soften fiscal constraints central bank must resort to higher non-numerated reserve requirements [29].

The response to capital flows was different among countries analyzed by Antczak [1998]. These countries that registered small fiscal deficits (or surpluses) sterilized capital inflows by reducing NDC (mostly NCG). They did not

[27] Section 7. 1. 1. contains a theoretical analysis of macroeconomic consequences of sterilization.

[28] These premiums include inflation premium or exchange rate premium, default risk premium, liquidity premium, and maturity risk premium.

[29] This is exactly Poland's situation (starting from 1995) where the strong structural surplus position was built as result of sterilized financing of the fiscal deficit, and sterilized intervention on the forex market in order to defend undervalued exchange rate. The latter meant indirect export subsidization at the cost of budget and commercial banks.

change money multiplier as sterilization tool, except for the Czech Republic and Slovakia where multipliers decreased from 5 – 6 in 1993 to 2.5 and 4.1 in the end of 1997, respectively. Estonia and Lithuania had limited capabilities to sterilize capital flows because of the currency board regime.

Poland registered increase in money multiplier, what makes sterilization additionally difficult. However, in Poland and Slovenia sterilization of capital inflows reached the biggest scale what is reflected in **Table 4. 1.** (negative sign of almost all-domestic credit components). Such a policy had to meet obvious fiscal constraints (declining central bank profit) [30].

Russia and Ukraine experienced increases in NFA that became significantly important for RM creation only since mid of 1996. Earlier, there were periods of high weight of NFA components, but it could be more related to multinational donors' aid (the IMF and World Bank). Besides, both Russia and Ukraine, if sterilized at all, it was related to capital outflow. The reason was the same as in the other countries with fiscal deficit.

4. 4. Money Multiplier and Broad Money Growth

Money supply process starts with the supply of RM generated by the MAs. The demand for RM comes from the public and the banks. Under the fractional reserve system (multiplier effect), commercial banks create broad money aggregates. Hence, broad money (M2) supply can change either because of a change in money multiplier or a change in RM. The changes in money multiplier reflect decisions of the three types of economic agents: (1) the MAs that set the rules of game – e.g., reserve requirements, (2) the DMBs that decide on stock of excess reserves, and (3) the non-bank public, which determines the composition of a money stock (types of deposits, share of cash).

Irrespective of the monetary policies conducted by the MAs most of the transition economies did not experienced significant changes in money multiplier (see **Table 4. 1**). Looking at the range of changes, we can distinguish three groups of countries that experienced a decline in the multiplier, a growth in it, and did not record any changes. The Czech Republic, Slovakia, and Lithuania constitute the first group; Croatia, Poland, Estonia, Latvia, and Russia belong to the second group; the third group consists of Hungary, Slovenia, Kazakhstan, and Ukraine. The significant changes in the multiplier (over 50 per cent of its value until end – 1997) were experienced only by four countries from the first and the second group: the Czech Republic, Poland, Slovakia, and Estonia. Therefore, only in these four countries both changes in multipliers and RM remain the source of volatility in broad money supply, and in rest of the countries changes in the components of RM contributed to the fluctuations in the broad money.

4. 5. Growth in Money Aggregates and Inflation

Looking at **Table 4. 3** one can notice that changes in inflation followed closely changes in monetary aggregates. Correlation of CPI and lagged changes in broad money reveals an important dependency (see **Table 4. 4**). In most of observed countries, inflation followed growth in broad money with a lag of roughly one quarter [31]. There is a very strong dependency (correlation in the range of 0.6 – 0.9) for highly inflationary countries (Russia, Ukraine, and Kazakhstan) that resorted in first years of transition to monetary financing of fiscal deficits, but also for countries registering low inflation (Slovenia, Lithuania) that implemented restrictive monetary policies. There is also a "medium" group of countries, Hungary, Poland, Slovakia, Estonia, and Latvia, where the correlation is lower (of 0.4 – 0.5). Finally, Croatia and the Czech Republic record a negligible correlation (0.1 – 0.3).

Medium level or low correlation means that changes in money velocity (monetization level) played a significant role in determining inflation in several countries.

5. Factors Determining Changes in Demand for Money

As it was shown in the previous chapter changes in money supply (money aggregates) though important cannot fully explain the inflation level and different speed of disinflation in transition economies. In some countries this relation is rather

[30] For Poland high fiscal costs of sterilization were confirmed by Cukrowski and Janecki [1998].

[31] For Russia, regressions of monthly inflation against current and lagged values of ruble broad money indicate that the bulk of the impact of money growth on prices was felt with a two-to-four month lag [Koen and Marrese, 1995].

weak. Basing on the logic of Fisher equation one must come to the conclusion that changes in money velocity (demand for money) are also responsible for inflation performance.

5. 1. Initial Remarks

As it can be learnt from any economic textbook, money is demanded for transactions, as a store of value and as a means of its transport. Money in a broad sense (Broad Money aggregate reported in a Monetary Survey of a country) consists of cash in circulation and bank deposits in domestic and foreign currencies. Additionally, needs of an economy can be further satisfied by the use of foreign exchange cash, which substitutes the domestic money. Unfortunately, this last component, albeit important in many transition economies, cannot be measured and thus must be skipped in further quantitative analyzes [32].

Monetization of an economy is defined as a ratio of a (broader or narrower) measure of money to an annualized GDP in current prices: the reverse ratio gives money velocity from the Fisher equation. While, in a given moment of time, monetization indicates the result of a money supply and demand interaction, in a dynamic context and in conjunction with price level movements it allows to draw inferences about money demand itself.

Money demand and monetization in transition economies have been, directly or in connection with other economic issues, a subject of (at least) two recent studies: De Broeck et al. [1997] and Ghosh [1997]. Authors of the first paper estimate money demand functions for transition economies. In addition to a significant influence of inflation, they detect a high elasticity of real money balances with respect to real output but they do not establish any clear relationship with exchange rate depreciation. In Central and East European countries, where the financial systems are more developed, domestic interest rates are found to play a role too, decreasing the real money. The results suggest differences between countries in the speed of adjustment of money balances towards estimated equilibrium levels [De Broeck et al., 1997, p. 28 – 31].

The discussed empirical analysis detects a discrete change in money demand function between the situation of a high inflation and a state after stabilization has been reached. Ghosh [1996] studies directly de-monetization and re-monetization processes in the world countries and his results confirm this finding. There exists an asymmetry in the influence of inflation on monetization: while inflation matters very much in case of de-monetization, its coefficient is insignificant for re-monetization. Statistical analysis reveals only threshold effects on monetization, which are likely to occur when inflation falls below certain, low levels: 10% or 6% annually [Ghosh, 1997, p.12]. Thus, a "ratchet effect" exists and a process of de-monetization is not symmetrically reversed when inflation decreases.

Empirical research conducted by Jarociński [1998] refers to the above findings on several occasions. It confirms the role of inflation in determining monetization. It points to several factors that are likely to contribute to the detected persistence of a low level of monetization, once it is attained. Also, it confirms (if not always explains) the differences in money demand behavior across countries.

5. 2. Beginning of Transition: "Unfreezing" Monetary Overhang

At the outset of transition, the most important factor that sharply reduced monetization was "unfreezing" the existing monetary overhang. Earlier, in the late 1980s, most of the socialist economies had been maintaining big fiscal deficits accompanied by monetary expansion. This created a huge potential for inflation, which could not be realized because of a system of price controls. As a result, forced savings increased, as goods were not available at the existing prices. Additionally, there were regulations, which prevented state owned enterprises from spending their liquid assets [Dąbrowski, 1996]. Thus, the pre-transition level of monetization was artificially high. Price liberalization and deregulation of the economy resulted in a jump of inflation (corrective inflation), which immediately decreased the real money stock.

The existence of a monetary overhang kept currency holding at an artificially high level but it influenced the level of deposits even stronger. Much of the stock of forced savings was kept in the form of bank deposits [33]. The "unfreezing"

[32] The content of this chapter was prepared on the basis of Jarociński [1998].

[33] The high share of bank deposits in the total money stock was determined not only by households' behavior trying to maintain the real value of their savings (interest rate for deposits was rather negative). Some additional administrative measures played a certain role here. For example, part of household savings was connected with housing programs or distribution of some durable goods being in permanent shortage (the example of Poland). On the other hand, state owned enterprises were administratively obliged to make most of their settlements in the form of bank transfers (non-cash transactions). The latter regulation was particularly tough in the former Soviet Union.

of monetary overhang reduced the stock of deposits and, thus, money multipliers in transition economies.

The biggest monetary overhang existed in the FSU countries, but it was serious also in Poland, Romania, Bulgaria and Albania [Dąbrowski, 1996]. In Czechoslovakia and Hungary it is believed to be smaller. Former Yugoslav economies, which had always been more liberalized, were less influenced by this problem.

In most cases, the initial jump of inflation did not return monetization to a new equilibrium level. A number of factors explain, why the corrective inflation was not a one-time phenomenon, but turned into a sustained inflation, that kept reducing the real money stock. First, liberalization was not a single act, but rather a process, with a different speed in different countries. Furthermore, it built up the inflationary expectations [Dąbrowski, 1996]. Patrick Conway [1994b] develops a model, which explains a sustained inflation after price liberalization. Also, under certain assumptions, relative price adjustments can contribute to the persistence of inflation (see chapter 10). Finally, and perhaps most important, monetary policy of many transition countries was expansionary in this phase, reinforcing or even overwhelming the mentioned factors (see chapter 4).

5. 3. Monetization in Transition Economies in Comparison with the Rest of the World

Before we start the detail analysis of differences in level and dynamics of monetization in transition economies it is worth to compare this group of countries with the rest of the world.

5. 3. 1 Broad Money Monetization and *per capita* GDP

Chart 5. 1. illustrates the positive relationship between per capita GDP and monetization. All transition economies belong to low and middle income groups. The lack of high-income countries in this sample is the main reason of the steeper slope of the regression line. Nevertheless, it can be seen that in the sample of transition economies monetization changes with income more, than in the rest of the world sample.

The relationship between broad money monetization and per capita GDP, estimated for the rest of the world countries, can be used to make forecasts of monetization for transition economies [34]. Visual inspection of **Chart 5.1.** (right panel) allows dividing the transition economies into three groups: countries with monetization higher than average for their income level, countries with an average monetization, countries with a low and exceptionally low monetization.

Clearly, there is nothing in the structural characteristics of transition economies what prevents them from having a very high monetization according to world levels. This is the case of Czech Republic and to a lesser extent of Bulgaria, Slovakia and Albania. These countries represent a wide range of characteristics, with income level from almost 10,000 USD per capita (the Czech Republic) to 1,305 USD (Albania).

Monetization of the remaining CEE countries from the examined sample and of two of the Baltic countries is close to the average levels for their per capita GDP. These countries represent average and high-income levels (among transition countries) – from 3,290 to 6,410 USD per capita, and 10,594 USD per capita in the case of Slovenia.

The remaining FSU countries have an exceptionally low monetization in comparison with the 1995 world sample. Kyrgyzstan, Uzbekistan and Moldova can be also classified to this group, although in their cases forecast errors are smaller than the standard deviation of the regression (although they are higher than for the rest of the average monetization group). This can be attributed to the fact that for low-income countries there is "less room" for negative deviations, because their monetization is already too close to zero.

5. 3. 2. Inflation and Monetization

Inclusion of inflation into the regression sheds additional light at the picture. The estimated relationship between monetization and per capita GDP becomes similar to the rest of the world. However, it looses its significance, as inflation proves to be the crucial determinant (and inflation tended to be higher in lower income transition countries). This confirms the observations of De Broeck et al. [1997, p.14 and table 3] and of previous studies quoted by them that monetization reflects *"...the length of the period* (of high inflation – M.D. et al.) *and the cumulative inflation during it"* [De Broeck, et al., 1997, p.14].

Data for the three groups of countries defined earlier confirms the role of inflation as an important determinant of the monetization level. In the group of high monetization countries inflation indicators are among the lowest ones, and vary from a 3-fold price increase (the Czech Republic and Slovakia) to 11-fold (Albania). The case of Bulgaria (66-fold cumulative price increase) is

[34] Wellisz [1995] used the errors of monetization forecasts from a world cross-sectional regression analysis to assess the level of monetization in Poland. The analysis presented in this section applies his reasoning to all transition countries.

somewhat different, because the still high inflation in 1995 (62%) suggests, that high monetization might not be sustainable.

In the second group the cumulative inflation varies widely, from a 4-fold price increase in Hungary to 130-fold in Estonia. Croatia lies somewhere between the second and the third group, with an average monetization level in spite of a very high inflation record.

All the countries from the third group had a period of an extremely high inflation, ranging from an average annual inflation of 441% in Russia, to over 1000% in Turkmenistan.

However, in the rest of the world sample there are also countries with a hyperinflation episode, like Nicaragua, Peru, Brazil and Argentina. Among them, only Argentina with 19% monetization at a relatively high income level (8,310 USD) is far from the average value for its income level, and Peru to a much lesser extent (with a 17% monetization and 3,770 USD income it differs from its fitted value by 18 percentage points). With an exception of Lithuania, the absolute level of monetization of the last group of countries is comparable only with some very poor and typically high inflation African countries.

5. 3. 3. Banking Sector and Broad Money Monetization

Chart 5. 2. presents a plot of broad money multiplier against monetization for the world countries and for transition economies. It illustrates the fairly obvious fact that money creation performed by a banking sector contributes to a higher broad money monetization. In transition economies money multipliers tend to be relatively low. This effect is especially pronounced in low monetization countries.

5. 4. Factors Determining Monetization in Transition Economies

5. 4. 1. Real GDP and Inflation Dynamics

The influence of inflation and the level of real income on monetization have been discussed above. Both these relationships have been confirmed in the cross-sectional analysis and certainly hold as long run tendencies. However, the performance of these relationships in a dynamic context, in explaining year to year monetization changes, is a different issue. The results obtained by De Broeck et al. [1997] suggest that the speed of adjustment of real money to its equilibrium value differs between countries.

Inflation can be expected to have a unanimously detrimental effect on money demand. Real GDP dynamics can influence monetization to the extent that money demand elasticity with respect to real output differs from unity. This effect can complicate the isolation of other influences.

5. 4. 2. Shadow Economy Share

The share of shadow economy in GDP can have a negative influence on demand for domestic currency. There are two reasons why the size of shadow economy matters. First, transactions in this sphere are made in cash dollars (D-Marks) more often than in the case of legal operations. Much of the illegal activity is connected with smuggling, profits are often transferred abroad, so a use of cash dollars (D-Marks) is more convenient. If the shadow sector is big, "network" effects transmit the use of cash foreign currency to other sectors. Second, illegal money more rarely enters the banking system, so it doesn't increase the broad money.

On the other hand, shadow economy growth influences positively measured monetization to the extent that it is not captured by the statistics, because it decreases the GDP figure, which is in the denominator. GDP statistics include official estimates of the unregistered activities, but this data was not available to author. The data from Kaufmann and Kaliberda [1996] are used instead. In the cases where official estimates are much lower then those used, an opposite effect can be expected, so the validity of this aspect of the examination is conditional on the similarity of the data used here to those applied in GDP calculation.

5. 4. 3. Situation in the Banking Sector

Banks in transition countries are prone to problems for a number of reasons [35]. Former state owned banks inherit portfolios of bad loans to state enterprises. Bank staff has insufficient qualifications and no experience in an assessment of creditworthiness. Entry policy for new banks tends to be initially very liberal, which results in the creation of many small banks, which are unable to diversify their loan portfolios sufficiently. Supervision and regulation are not sufficient to prevent banks from engaging in risky operations (e.g. on the currency market). The quality of bank operations is further eroded by corruption.

Individual bank problems and bank runs were widespread among transition countries and, for the reasons

[35] This section draws on EBRD [1997, Box 8.1].

outlined above, are argued to be rooted in the transition process itself [EBRD, 1997]. All such cases decreased, to a certain extent, the trust of population in banks and increased the attractiveness of keeping savings in cash dollars (or other foreign currency). This would have contributed to the lowering of money multipliers.

Policy response to problems of banks differed from country to country. Often, the problem banks were bailed out, which created wrong incentives for the rest of the sector and contributed to fiscal imbalances. In these cases monetization can be influenced in an indirect and gradual way. In cases when open bank crises emerge, the impact on monetization can be immediate: through an outflow of deposits and, possibly, a longer term loss of confidence in banks and a switch of population to saving in foreign currency cash.

Progress in banking sector reform can be an important factor for money demand growth. A healthy banking system increases portfolio demand for (broad) money holding. It should also provide an efficient payment system, which would stimulate a switch from foreign currency to the domestic one, thus decreasing dollarization of the economy, when such is inherited from the high inflation period. On the other hand, remonetization contributes to expansion of the banking sector.

5. 4. 4. Currency Board Arrangements

Behavior of the exchange rate can be expected to have an important influence on money demand (see chapter 6). An introduction of a currency board can have a stronger impact on people's confidence in domestic currency than just maintaining a constant exchange rate without such a strong commitment.

5. 5. Evolution of Broad Money Monetization in High Monetization Transition Economies

This section analyzes money demand in the Czech Republic, Slovakia, Bulgaria, and Albania (see **Table 5. 1**).

The absolute level of monetization and, even more so, the level of monetization relative to per capita GDP place Czech Republic and Slovakia among high monetization countries. In both of these countries monetization has been high and growing in a stable fashion, against similar inflation – moderate and mostly falling. Their experience proves that:

1. **An increase in monetization is possible during a real product fall.** This happened in 1992 in Czech Republic and in 1993 in Slovakia. The insensitivity of monetization to real GDP dynamics suggests a unitary elasticity of money demand.
2. **A rise of inflation does not necessarily prevent a persistent monetization growth**, accompanied by a stable (or even falling) share of foreign currency deposits. This can be seen in both countries in 1993. A surprise increase of money supply often leads to a short-term increase of monetization, followed by a rise of inflation, which subsequently reduces the monetization. However, in the discussed cases the monetization growth was not a short-term, but a persistent one.

Composition of broad money differs in the two countries. In the Czech Republic Reserve Money has a much higher share, while money multipliers are lower than in Slovakia. In both countries money multipliers have been falling what Antczak [1998] ascribes to the policy of sterilization of foreign capital inflows via money multiplier. Czech banking sector had more problems than the Slovak one. On the other hand, EBRD Transition Report [EBRD, 1997] gives to Slovakia a slightly lower note for banking sector reform and interest rate liberalization: 3– (in 1 to 4+ scale) than to Czech Republic: 3.

Bulgaria offers an example of a medium term seigniorage maximizing inflation policy: the inflation rates between 70% and 130% yield a maximum seigniorage according to the estimates of Ghosh [1997, p.8] and Budina [1997]. Regardless of the volatile inflation and real growth performance, monetization has been remarkably high and stable. This may be partly artificial, because Bulgaria is the only country among the high and medium monetization economies where elements of the command system, including price controls, have been quite significant until early 1997 (by 1996 price controls affected more than a half of a consumer basket [EBRD, 1997, p.159]). Also, a closer look at the domestic currency monetization reveals a gloomier picture. The observed steady downward trend in domestic money monetization suggested that the pursued economic policies were not sustainable. In 1996 an acute banking crisis reduced deposits drastically (by 75%) but later, in the first half of 1997, stabilization and introduction of a currency board regime resulted in a rebound of a real money demand [EBRD, 1997, p.160].

Albania, although its monetization is average by world standards, can be treated as a high monetization country taking into account its very low income. Broad money amounted to 56% of GDP in 1996 in spite of a very low level of intermediation (money multiplier, calculated as a ratio of "Money and Quasi Money" to "Money" equaled in

1996 to 1.7 only). The experience of this country shows that even a low income transition economy can have a relatively high money demand and, at the falling inflation rate (and real GDP growth), its monetization can still be increased. It is worth to note, that unlike in Bulgaria, both prices and the exchange system have been extensively liberalized [EBRD, 1997, p.148]. The surprisingly high monetization in Albania is likely to be adversely affected by the consequences of falls of pyramid schemes in 1997 and by the current political instability in the region.

5. 6. Evolution of Broad Money Monetization in Medium Level Monetization Transition Economies

This section analyzes money demand in Hungary, Poland, Slovenia, Romania and the three Baltic countries: Estonia, Latvia and Lithuania (see **Table 5. 2**).

Interesting asymmetries exists between Poland and Hungary. While in Poland relatively high inflation rates did not conflict with an early (although later stopped) monetization growth, in Hungary the period 1990 – 1994 saw much lower rates of inflation and a start of a demonetization process. As a result, the levels of monetization in the two countries seem to converge (as regards the domestic money monetization, they have actually converged). In Poland monetization growth coincided with the rebound in output, while in Hungary monetization was increasing slightly only initially, along with an output fall.

The asymmetries are somewhat difficult to explain. According to EBRD [1997] transition indicators, Hungary is equally or more advanced than Poland in all aspects of transition. Especially, it has a note: 4 for banking sector reform and interest rate liberalization, as the only transition country (Poland has a note of 3). Estimates of unofficial economy are much higher for Hungary than for Poland, where shadow economy share is falling steadily. Maybe this factor determines the differences in monetization tendencies.

In Slovenia the heritage of inflationary past, together with an inflation surge in the beginning of 1990s, brought money demand towards much lower levels than average for this income level. Subsequently, after a successful stabilization, monetization growth has been significant. Similar remarks can be made about Croatia, except that this country went through a war accompanied by a hyperinflation and a much deeper output fall. Surprisingly, with a much lower per capita income level and much tougher experiences behind, 5 years after the splitting of Yugoslavia Croatia has a similar level of broad money monetization as Slovenia. "Dollarization" of deposits is higher in Croatia, but it is very high in both countries regardless of the very low inflation in recent years. Both the high reliance on foreign currencies and low domestic money monetization can probably be connected with the common Yugoslavian heritage. In both countries the level of intermediation is high (money multiplier equaled 3.2 in Croatia and 5.6 in Slovenia in 1996).

In Romania, a money demand increase, following the initial fall, was accompanied by relatively high and unstable inflation rates in conditions of unfinished reforms and continued partial price control until February 1997. Further fall in monetization level is possible after the corrective inflation surge in 1997.

Baltic countries offer exceptional possibilities of analyzing determinants of money demand because the similarity of their inflation experiences and macroeconomic policies makes controlling for these factors unnecessary. Per capita GDP in 1995 at PPP exchange rates ranges from 3,291 USD in Latvia, to 4,138 in Estonia and 4,471 USD in Lithuania. As follows from the regression analysis reported in section 5.1, this implies a difference in monetization between Latvia and Lithuania of only about 3 percentage points of GDP. Inflation peaked in Baltic countries in 1992 and resulted in a significant demonetization. Stabilization was successful and followed by an immediate rebound in monetization.

The currency board, operating in Estonia since 1992 can be argued to have contributed to an early and significant increase in domestic money demand, in spite of the fall in the overall monetization (including foreign currency deposits). On the other hand, Fleming et al. [1996, p.8] link the banking crisis of the late 1992 with the currency board regime (not as the main cause, but as a factor that certainly aggravated the situation).

The banking crisis resulted in a persistent fall of a money multiplier from 2.47 in 1992 Q3 to 1.44 in 1993 Q1 [IFS]. The 1992 size of the multiplier has not yet been reached by 1996. However, Fleming et al. [1996] stresses that relatively few depositors were concerned and that, thanks to the proper handling of the crisis by the authorities, the overall effect was in fact strengthening the banking sector.

Lithuania introduced currency board in the beginning of 1994, while Latvia fixed its exchange rate at the same time, although without an explicit arrangement. Again, according to Fleming at al. [1996], the tight monetary policy in both countries contributed to revealing the unhealthy state of some banks (which could otherwise go unnoticed for a longer time) and the emergence of banking crises.

Monetization fall (or stagnation) in 1995 should be attributed to the banking crises, which troubled all three

Baltic countries. Although some of the banks, perceived as more stable, gained deposits as a result, the overall impact on the deposit base was negative. Fleming et al. [1996, p. 22] associate the withdrawals of deposits in Latvia with a general public confidence outflow and a switch to saving in cash. Lithuania, although its handling of the problem banks was criticized, noted smaller and shorter-term deposit outflows. The fact that Latvia experienced a fall in domestic currency denominated deposits (matched by a growth of foreign currency deposits), which was not observed in Lithuania can be connected with the existence of currency board in the latter and its lack in the former.

The data in **Table 5. 2** can indicate some connection between the share of shadow economy and domestic money demand. Estonia, with the lowest estimated level of illegal activities has the highest monetization, even though it had a slightly higher inflation than Latvia. In spite of a high inflation in Lithuania, its level of monetization caught up with that of Latvia, which has highest estimates of shadow economy.

5. 7. Lowest monetization countries

Tables 5. 3 and **5. 4** contain data related to the most demonetized transition economies. **Table 5. 3** presents countries, which keep progressing (although at a different speed) in an implementation of market reforms, and which have attained some macroeconomic stabilization. These factors allow viewing monetization in these countries as representative in the medium term and interpretable with tools of market economics. The analysis may be partly relevant to countries presented in **Table 5. 4**, too. However, in these countries market reforms have stagnated or even have been reversed and/or their economies are still troubled by macroeconomic instability. Therefore, data on these countries is less credible and future developments less predictable.

All of the lowest monetization countries are the former Soviet republics. Since 1991, they went through a period of a very high inflation, always accompanied by a rapid output fall, problems in the banking sector and a growth of the shadow economy. Because of this coincidence of extreme conditions in most areas, the approach used for high and medium monetization economies is of a limited applicability here. Instead, the discussion will concentrate on several specific issues: additional factors that contributed to demonetization, problems of its measurement, the functioning of a demonetized economy and higher frequency money demand dynamics, especially in the moment of stabilization.

In the FSU countries, an extremely high inflation was accompanied (and preceded) by other government decisions that discouraged money demand. The first serious blow to people's confidence in fiat money happened in January 1991 when the Soviet government withdrew 100- and 50-rubles banknotes from circulation [Dąbrowski, 1995]. Holders were allowed to exchange only a limited amount.

A number of other authorities' decisions were destroying a credibility of the banking systems. Along with the non-equivalent exchange of banknotes, a limit on a maximum withdrawal from a bank account was introduced. This limit was relaxed later [Conway, 1994a]. Conway [1994a] reports a subsequent series of similar decisions throughout most of the FSU countries. They were related to ruble shortages in the period of functioning of the ruble zone. Even in a low inflation environment such acts would be tantamount to an acute bank crisis, as regards the confidence of population. In fact, because they coincided with a period of a very high inflation, they resulted in irreversible losses of savings for ordinary people.

Although without doubts, the analyzed group of countries has been heavily demonetized, an uncertainty concerns the exact level of monetization. The anecdotal evidence shows that the monetization data are least reliable: share of shadow economy is believed to be the highest and GDP statistics – of the worst quality. For example, the official nominal GDP figure was corrected downward in Kyrgyzstan in 1995. This move immediately improved the picture of monetization. Numerous arbitrary adjustments for the informal economy and for the production in breakaway regions (Abkhasia and South Ossetia) render the Georgian GDP figures unreliable [IMF, 1997]. According to Georgian authorities, a correction of nominal GDP level is also considered.

Regardless of developments in the monetary sphere people need to save and a certain number of transactions needs to be made in an economy at a given level of real GDP. Cash hard currency, money surrogates and barter allow an economy to function at the depressed level of domestic monetization.

Because of their liquidity, cash dollars (or D-Marks) become the most attractive savings asset during unstable times, in absence of a reliable banking system. As a result, they are also used for bigger transactions between households. Additionally, corruption is very widespread in the FSU countries and dollars are a traditional means of paying bribes. For the reasons mentioned earlier, the use of dollars is believed to be wide in the shadow economic sphere, which flourishes in the FSU.

Barter has become an increasingly widespread method of exchange in the FSU countries. In Russia, the share of barter in total industrial sales has grown from around 5% in 1992 to at least 40% (according to the highest estimates: 70%) in 1997 [EBRD, 1997, Box 2.2; see also Gaddy and Ickes, 1998]. EBRD [1997] names three motives for using this method of exchange. First, barter allows firms to conceal flows from tax authorities and from creditors. Second, it helps Soviet mentality managers to maintain high levels of production, while concealing its true value [36]. The third reason is connected with a weakness of financial systems and high credit costs in the analyzed group of countries. The enterprises use trade credits collateralized with goods (claims on goods are easiest to enforce) to obtain working capital [37].

Barter is connected with a more general phenomenon referred to as a "non-payment crisis". In the absence of cash, goods are used to regulate payments to public utilities. In public procurement, goods are acquired in return for cancellation of tax arrears [see EBRD, 1997, Box 2. 2]. In relation with the non-payment crisis, barter is supplemented by the use of such money substitutes as securitized non-fulfilled state obligations which are used to pay taxes and even in transactions between enterprises.

In rural areas, small-scale barter is a result of the regress in the living standard and a return to the subsistence agriculture. However, since subsistence agriculture does not contribute much to GDP, the impact of this kind of barter on monetization is rather low.

The discussed phenomena are related to the weak legal framework (poor payment enforcement, inefficient bankruptcy procedures), old style management in privatized enterprises taken over by insiders, structural problems with the whole tax system and to the spreading of poverty among the agricultural population. These phenomena become a part of economic culture and mentality in the FSU countries what strengthens the persistence of low monetization.

5. 8. Summary remarks

As we saw above, the former socialist economies can have both very high, average and extremely low monetization levels in comparison with world averages for their respective per capita income levels. While the crucial role of cumulative recent inflation in determining money demand is beyond any doubts, the strength of a short-term impact in concrete cases can differ. Demonetization can continue under low levels of inflation, or some remonetization can occur in spite of a relatively high inflation, in apparently similar conditions.

Cross-sectional comparisons suggest that a positive relationship exists between income level and monetization. However, in the short run, behavior of real output provides a poor guidance on monetization changes. Although in most cases demonetization coincided with real output falls, several examples of remonetization during output contraction are also noted.

Banking crises have an immediate impact on monetization, through contraction of deposits. However, this influence is a short term one. Progress in banking system reform performs poorly in explaining monetization, although its impact might be easier to track in the longer run. Currency board arrangements influence a composition of deposits giving advantage of the domestic currency ones. Their role in enhancing broad money demand is unclear yet.

There seems to be a negative relationship between estimated sizes of shadow economy and domestic money demand. However, taking into account the inherent inaccuracy of those estimates, this finding should be treated with reserve.

Differences in monetization levels between transition countries are substantial and often, when country characteristics are similar, difficult to explain. In the short time period available for the analysis, there is no evidence of convergence towards average monetization levels for the respective levels of income. A picture of monetization that emerges is that it is a fairly autonomous, country specific feature.

In the lowest monetization transition economies, hyperinflation was accompanied by other policies, which destroyed money demand, such as restrictions on convertibility of bank deposits to cash. Monetization levels, that emerged as a result, are similar: extremely low, but also least credible (because of GDP measurement problems). Barter transactions, the use of cash dollars (or other hard currencies) and other technologies of avoiding the use of domestic money become widespread in these countries.

Theoretical speculations built on De Broeck et al. [1997] suggest that the credibility of stabilization program and inflation inertia can explain some short-term phenomena in money velocity. Factors that increase inflation inertia, such

[36] Making payments in kind to workers allows to postpone restructurization, while supplying an enterprise with a very cheap network of forced dealers.
[37] For analysis of the causes of inter-enterprise debt explosion see also Rostowski [1998].

as indexation mechanisms and the scale and duration of relative prices adjustments, contribute to low monetization shortly after stabilization and possibly (depending on some stronger assumptions) in the medium term. These factors will be discussed partly in the following chapters.

6. The Role of Exchange Rate Anchor in Disinflation Process

The analysis of factors influencing monetization level (demand for money), especially its domestic component, reveals the role of exchange rate policy in achieving price stability. In this chapter we will focus on the role of the exchange rate policy in determining speed of disinflation process, notwithstanding the formal exchange rate regime.

6. 1. Devaluation and Inflation: Transmission of Exchange Rate Changes on the Price Level

Transmission mechanisms of the exchange rate depreciation on prices in open economy can be divided into four channels. The first and the most direct one covers transmission of exchange rate changes on prices of import and export of goods and services in terms of domestic currency. Prices of imported final goods immediately rise with domestic currency depreciation. At the same time, the overall price level is also pushed up due to increase in the cost of imported fuels, raw materials, and semi-finished products to industry. This effect is often called a cost-push inflationary pressure. The same concerns export prices, which also rise due to domestic currency depreciation. Following price increase of importable and exportable goods and services, demand, and consequently, prices of their substitutes will also increase. The overall effect of exchange rate changes on prices will be dependent on the share of foreign trade in GDP, and on the product structure of export and import. Domestic market openness and de-monopolization also plays an important role. The lower the entry cost and the less monopolistic a market, the more pronounced is price effect of exchange rate changes [see Rybiński, 1998].

The second exchange rate-inflation channel operates through wages. Wages in industries affected by exchange rate changes tend to come under pressure. In addition, exchange rate changes affect the cost of living what results in wage claims [see Dornbusch, 1995].

The third channel is connected with negative impact of devaluation on the demand for domestic money. This effect is more intensified in transition economies with poorly developed financial markets, fresh high inflation and devaluation memory, and high degree of dollarization of the economy.

The actual and expected rate of devaluation creates expectations for future changes in the price level, according to the direct transmission mechanism described above. Economic agents, who anticipate that currency will devalue, adjust their inflationary expectations in such a way that expected changes in the price level take into account the most likely impact of the currency devaluation on inflation. Apparently, the expected rate of inflation is considered to be one of determinants of the demand for money function. This means that exchange rate or its likely changes also contribute to money demand. It implies that the overall price level, which is perceived as a result of interaction between demand and supply of money, is also influenced by exchange rate changes. If an economy experiences a considerable degree of dollarization, devaluation will have an even more severe effect on the money velocity and the price level because of the easy opportunities of currency substitution.

Fourth, in the case when foreign currency cash and deposits are used as a mean of transaction, devaluation automatically increases money supply through the higher value of the foreign currency component of the broad money aggregate denominated in domestic currency [38]. In other words, devaluation can be perceived as a monetary expansion, which increases current liquidity of domestic economic agents and creates an excess demand for goods and services, putting an upward pressure on domestic prices.

6. 2. Inflation and Currency Devaluation Rates in the Simple Analytical Framework

The main objective of the empirical analysis carried out by Antczak and Górski [1998] was finding what kind of empirical relationship exists between the exchange rate depreciation and inflation in transition economies [39]. They took into consideration a sample of twelve countries, i.e. Belarus, Croatia, the Czech Republic,

[38] The same concerns foreign currency cash in circulation, which is not included, for obvious technical reasons, into monetary aggregates.
[39] The first version of this statistical research was done by Jirnyj [1997].

Hungary, Kazakhstan, Latvia, Lithuania, Poland, Romania, Russia, Slovenia and Ukraine [40].

The key hypothesis was that, in economy with the stable exchange rate, the rate of inflation is much strongly linked to the exchange rate than in the economy with depreciating or significantly fluctuating exchange rate. This further implies that, for countries in transition stabilizing the price level, inflation decreases faster with the stable exchange rate, as the relationship between the two variables is closer. In other words, convergence of the inflation rate to the rate of depreciation is considerably higher with the stable exchange rate. As a result, the anti-inflationary policy is more effective as far as the exchange rate policy is concerned.

6. 2. 1. Working Definition of Dxchange Rate Stability

For the purpose of the conducted analysis, the past trends of the exchange rate fluctuations rather than formally announced exchange rate regime was taken as a criterion of exchange rate stability. Authors also decided not to set a uniform restriction for the annual rate of devaluation for all countries as a benchmark for identification of the exchange rate stability for the following two reasons. First, all countries under consideration started their stabilization processes with different rates of depreciation, what means that they could not immediately reach a moderate level of annual depreciation even if they pegged the exchange rate. Second, currencies which were a base for pegging local currencies in transition economies (USD or DM) were subject to substantial fluctuations in 1990s. This means that, for currencies pegged to a basket, exchange rate of the specific currency will also contain cross exchange rate fluctuations. Keeping that fact in mind, however, authors focused on single exchange rates, which they considered being sufficient to investigate inflationary effects of domestic currency devaluation.

Taking into consideration the above arguments and the fact that the initial level of annual depreciation was usually considerably high, the definition of the exchange rate stability in this framework was interpreted as a permanent and significant reduction in the rate of annual depreciation with a constantly declining trend. It also implies a constant effort to keep the rate of devaluation below the rate of inflation, which proves stabilization of the price level to be credible as far as the exchange rate policy is concerned.

Looking at rates of exchange rate devaluation in different economies, three patterns of the exchange rate fluctuations can be recognized according to authors' broad definition of stability. The first one represents countries, which followed the consequent policy of nominally stable exchange rates or of lowering the rate of devaluation without any corrective devaluation [41]. If we take under consideration annual rates of devaluation for all twelve countries, there are five, which can be counted as of the stable exchange rate according to our definition. These are Croatia, Kazakhstan, Latvia, Lithuania and Ukraine.

The second set of countries, which did initially a significant effort in reducing rates of devaluation consists of Belarus, Romania, Russia and Slovenia. Apparently, none of those economies was able to avoid perturbations in the exchange rate developments. As a result, all of them experienced periods of increasing annual devaluation rate. Additionally, rates of annual devaluation exceeded rates of inflation for all countries in the second stage of transition.

Third group of countries represented by Czech Republic (and former Czechoslovakia), Hungary and Poland characterize substantial variations in the annual rate of devaluation due to frequent fluctuations in the exchange rate.

6. 2. 2. The Partial Adjustment Model

Although transmission of exchange rate changes on the price level (as discussed before) is complex, authors' econometric exercise focused only on rates of change of both variables (i.e. the exchange rate and the price level) disregarding modeling of indirect effects which are finally observable with lags. As a result, in order to empirically test the proposition concerning the relationship between the rates of devaluation and inflation, they applied a simple partial adjustment model for each of twelve countries. First, they considered the standard inflation formula saying that the rate of inflation (π) depends on its past and expected values (6. 1). Second, the expected rate of inflation (π^e) was assumed to be a function of the exchange rate or to be more precise, of the rate of depreciation (E) (6. 2). Combining the first two equations allowed eliminating the unobservable expected rate of inflation. As a result, they obtained specification, which assumed that the rate of inflation is a function of its past value and the rate of depreciation (6. 3).

[40] Periods of investigation vary among different countries reflecting time differences in implementation and duration of transition processes. In general, however, we cover the period from January 1990 to June 1997.

[41] The only slight fluctuations of the exchange rate can be accepted once a country has reached a low level of inflation.

$$\pi = \alpha_1 + \alpha_2 \pi^e + \alpha_3 \pi_{-1} \quad (6.1)$$

$$\pi^e = \beta_1 + \beta_2 E \quad (6.2)$$

$$\pi = \gamma_1 + \gamma_2 E + \gamma_3 \pi_{-1} \quad (6.3)$$

where π = log(CPI/CPI$_{-12}$), E = log(exrate/exrate$_{-12}$), $\gamma_1 = \alpha_1 + \alpha_2\beta_1$, $\gamma_2 = \alpha_2\beta_2$, $\gamma_3 = \alpha_3$

The proposed specification isolates the effect of exchange rate changes on inflation rate from all other possible influences, which are supposed to be covered by lagged dependent variable. As a result, the model allows the determination of the short-term (γ_2) and the long-term ($\gamma_2/(1-\gamma_3)$) relationships between the exchange rate and inflation.

6. 2. 3. Research Hypotheses

In terms of the presented model specification, it is conceivable to formulate the hypothesis, which will provide an empirical argument to the proposition about the relation between the exchange rate devaluation and inflation. Taking into account selection of countries with respect to stability of the exchange rate, authors claim that the short-run coefficient (γ_2) would obtain statistically significant higher values for countries with a greater degree of the exchange rate stability. It further implies that the disinflation process would be also substantially faster in those countries of the stable exchange rate. They formulated the following hypotheses:

$$H0: \quad M^{(1)}(\gamma_2) = M^{(2)}(\gamma_2)$$

$$H1: \quad M^{(1)}(\gamma_2) > M^{(2)}(\gamma_2)$$

$$H0: \quad M^{(2)}(\gamma_2) = M^{(3)}(\gamma_2)$$

$$H1: \quad M^{(2)}(\gamma_2) > M^{(3)}(\gamma_2)$$

where M stands for mean of sample and numbers in brackets represent a group of countries according to the exchange rate stability.

In general, authors performed a two-sample student's t-test in order to determine whether means of both samples are equal. It could provide statistical evidence of a relationship between an average value of estimated coefficients and the exchange rate stability.

6. 2. 4. Data Used and Results of Estimations

All calculations were done for annual changes using average monthly observations for different periods of time within the time interval from January 1990 to June 1997. From authors' point of view the annual rates of depreciation (or appreciation) and inflation were the most appropriate measures of the exchange rate changes and inflation for the purpose of conducted analysis. The annual rates provide opportunity to analyze overall annual trends in the relation between inflation and depreciation while avoiding noisy and difficult to model monthly fluctuations. Apart from that, this methodology still allows the use of monthly data with sufficient numbers of observations and to eliminate seasonal fluctuations of the price level. As a result, the empirical analysis was based on 12 months rates of change in exchange rates and price levels with monthly frequency of observations.

Samples varied, among different countries, with regard to a number of observations and an estimation period reflecting time differences in implementation and duration of transition processes. The equation (3) was estimated for twelve countries: Belarus, Croatia, Czech Republic, Hungary, Kazakhstan, Latvia, Lithuania, Poland, Romania, Russia, Slovenia and Ukraine.

Results of estimations (see **Table 6. 1**) shows that the relation between the exchange rate and inflation considerably differs among analyzed countries. In general, three groups of countries can be distinguished. The first one, which characterizes the short-term coefficient higher than 0.2, consists of Belarus, Croatia, Kazakhstan, Latvia, and Ukraine. The second group of countries (i.e. Czech Republic, Hungary and Poland) appeared to have a minor short-run relation between inflation and the rate of depreciation (i.e. the coefficient close to 0 or negative in case of Hungary). Finally, the moderate relation was revealed in Lithuania, Romania, Russia and Slovenia, which form the last group with the coefficient slightly higher then 0.1.

Looking at the long-run coefficient, it can be reckoned that not all countries appeared to have a long-run relation between inflation and the exchange rate depreciation close to unity. Belarus, Croatia, Kazakhstan, Poland, Romania and Ukraine are in a range of countries, which can be considered to have a fairly strong long-run transmission of the exchange rate changes on inflation. For the rest of the countries, results reveal either over-sensitivity of the investigated relation or a very low elasticity of the investigated relation. There are also results that are hardly interpretable.

Generally speaking, there exists a positive dependence between the stable exchange rates and declining inflation rates. Results of tests presented in **Table 6. 2.** confirm rejections of both hypotheses about equal means among samples of short-run coefficients for different groups of countries according to their degree of the exchange rate stability. It means that results of estimations for all countries

give the empirical support for the hypothesis that the rate of disinflation is faster with the stable exchange rate.

From a group of countries, which characterize the short-run coefficient higher than 0.2, Croatia, Latvia, Kazakhstan and Ukraine can be taken into account as those of the stable exchange rate according to our definition. Ukraine characterizes the highest value of the estimated coefficient. It reflects a consequent exchange rate policy and determination in disinflation process of the National Bank of Ukraine in 1995 – 1997. Although countries such as Croatia and Latvia reveal some fluctuations of the exchange rate, rates of devaluation did not threaten stability of the price level. These countries obtained values of the coefficient of 0.33 and 0.34 respectively what also shows that there exists a strong relation between the rate of devaluation and inflation. The only country belonging to the first group which obtained a value of the coefficient slightly lower than 0.2, is Lithuania.

Countries of the second group obtained moderate values of the coefficient slightly exceeding 0.1. Russia and Romania put some effort to stabilize the price level. However, they revealed a lack of determination in keeping the stable exchange rate. Romania let the exchange rate to depreciate in 1995, which had inflationary consequences. At the same time, Russia, after initial reduction in 1993, was keeping a relatively high rate of depreciation till the beginning of 1995, what evidently did not help to bring down inflation in this period of time. Slovenia allowed for relatively high persisting level of devaluation, which only lowered the rate of inflation in May 1996. It was the main cause of the law value of the coefficient. Finally, Belarus had initially relatively stable exchange rate and the coefficient of 0.23 reflects that. However, the exchange rate started to depreciate at a higher rate in 1996 what eventually created an inflationary impulse.

Results of the third group of countries are very meaningful. All these countries lunched their stabilization programs in the beginning of transformation in the entire region. Nevertheless, all of them have problems with finishing the process of price stabilization. Czech Republic obtained a slightly positive value while Hungary indicated a negative value of the coefficient in conducted estimations what implies that there is no a clear coherence between inflation and the exchange rate in these countries. Poland showed a small dependence with the short-run coefficient of 0.05 and the lagged dependent variable coefficient of 0.95. Both of them confirm a little success in price stabilization and an existence of inflationary inertia.

6. 3. Conclusions

The simple partial adjustment model provided some evidence of the positive relationship between the stability of the exchange rate and declining trend of inflation. Nevertheless, one has to notice that there are certain limitations of the above approach, which influence robustness of obtained results. First, there are other factors than the exchange rate, which also has an impact on inflation. Therefore, the investigated relation can be more complex and the role of the exchange rate might be significantly reduced. Second, a high value of the coefficient can be an effect of simple interaction between the exchange rate and inflation. As a result, it does not have to necessarily reflect a stabilization effort of economic policy.

Turning from analysis of actual exchange rate stability to formal exchange rate regime, one may conclude that countries such as Hungary, Poland and Russia, which adopted the crawling band regime, experience a persisting inflation while the convergence of inflation to the rate of devaluation is considerably low. Alternatively, countries, which adopted currency board, a target band or a peg, seem to be successful in terms of reducing inflation. However, Lithuania with currency board perform surprisingly poorly reaching a moderate level of inflation only in the second half of 1996, mainly due to the initial exchange rate undervaluation. Nevertheless, Lithuania was able to reduce inflation much faster than economies of crawling bands. Although Latvia did not introduced the currency board, the inflation rate performed similarly to the previous Baltic republic but due to peg to SDR. Croatia with the inflation rate of 4% in 1996 seems to be the most successful among selected countries. After a period of hyperinflation due to a war, Croatia officially introduced a target band, which helped to stabilize the price level very quickly.

The Ukrainian economy is a meaningful example how changes in the exchange rate regime can have an immediate effect of inflation. In the third quarter of 1995, the monetary authority introduced a target exchange rate band vis-à-vis dollar. It allowed reducing inflation from more than 100% in 1995 to about 10% in 1997.

Following our empirical findings and developments of inflation and exchange rates in different transition economies, we can go beyond the conclusion that the exchange rate stability provides favorable conditions for the price level stabilization. Namely, the critical issue is why all countries are not able to conduct the stable exchange rate policy and what conditions are necessary for sustaining the exchange rate anchor without danger of the devaluation crisis.

7. Consequences of Disinflation Process for a Current Account Balance

Active using of the exchange anchor in order to speed up disinflation may lead to an overvaluation of exchange rate and serious balance of payment problems. Recent series of financial crises both in developing and transition countries raised a general question of sustainability of stable exchange rate policies and exchange rate based stabilization programs. It also switched attention in many countries (including Poland) from disinflation to external stability and danger of financial crisis. Radical disinflation started to be seen as competitive to policy aimed in keeping current account balance on the save and sustainable level. Hence, one needs to discuss the question of whether there is indeed a necessity in choosing between low current account deficit and low inflation [42]. Trying to solve this dilemma we will start with review of the main theoretical proposals related to balance of payments equilibrium.

7. 1. Theoretical Models Related to Inflation – Current Account Trade off

Rybiński and Szczurek [1998] analyzed a number of theoretical models related to inflation – current account trade off in macroeconomic policy. They start with the absorption model, which sketches the basic concepts and links between domestic macroeconomy and external balances.

7. 1. 1. Absorption Approach to Current Account

Absorption approach to the current account originates from the following macroeconomic identity.

$$CA \equiv (T - G) + (S - I) \qquad (7.\ 1)$$

and

$$CA + KA + RA \equiv 0 \qquad (7.\ 2)$$

where:

CA – current account of the balance of payments
KA – capital account of the balance of payments
RA – official reserves account [43]
G – government spending
T – government revenues
$T - G$ – consolidated fiscal position
S – private savings
I – private investments

Both identities have to hold subject to statistical discrepancies.

The first identity implies that current account deficit in broad terms reflects the excess of domestic investment over domestic savings if we treat consolidated fiscal deficit as government dissaving.

The second identity states that the current account deficit requires either a capital account surplus or a decline in official reserves (a minus sign means an increase in official foreign exchange reserves). In both cases a country is running down its net foreign wealth. In two extreme cases the large capital inflows have to finance the current account deficit or they have to increase official foreign exchange reserves. The actual impact of capital inflows depends of the exchange rate policy. If central bank chooses not to intervene, then the capital inflows are financing the net imports of goods and services and official reserves do not change ($CA\downarrow + KA\uparrow + RA \equiv 0$). If the authorities decide to intervene, and the effectiveness of these interventions is 100%, then the increase in capital account is reflected by an adequate increase in official foreign exchange reserves ($CA + KA\uparrow + RA\downarrow \equiv 0$). The current account does not change and therefore the gap between national savings and national investment does not widen. In such case, central bank can resort to two types of interventions: sterilized and non-sterilized. Sterilized interventions have been the most common response to rapid capital inflows to Latin America and in the CEE countries.

In order to understand the impact of interventions (sterilized and non-sterilized) the third identity was introduced [see Dornbusch, 1980]:

$$CA \equiv \Delta NFA \qquad (7.\ 3)$$

which states that current account surplus (deficit) is equivalent to the increase (decrease) of country net foreign assets, subject to statistical discrepancies. If we combine identities (7. 2) and (7. 3) we can identify the sources of changes in net foreign assets:

$$\Delta NFA \equiv (T - G) + (S - I) \qquad (7.\ 4)$$

A country runs down its net foreign assets if government budget is in deficit or if private sector invests more than it saves. Net foreign assets is a very broad concept, it encompasses central bank, domestic banking sector and non-bank private sector. Authors take only two subsets of

[42] This chapter is written on the basis of Rybiński and Szczurek [1998], and Rybiński [1998].
[43] Negative number reflects increase in reserves.

ΔNFA: change in net foreign assets of the central bank (ΔNFA^{CB}) and change in net foreign assets of the whole banking system (ΔNFA^{B}).

The former allows formulating the identity based on central bank balance sheet:

$$\Delta NFA^{CB} \equiv \Delta H - \Delta DC \qquad (7.5)$$

which states that an increase in net foreign assets of the central bank is identical to the excess of high powered money (monetary base – H) creation over domestic credit (DC) extended by central bank to government and to commercial banks. Similar identity can be postulated for the whole banking sector:

$$\Delta NFA^{B} \equiv \Delta M_2 - \Delta DC \qquad (7.6)$$

which shows that excess of the M_2 money supply over domestic credit creation has to be equal to the increase in net foreign assets of a domestic banking sector.

If central bank intervenes on the foreign exchange market there will be a change in net foreign asset position. Suppose that domestic currency has a tendency to appreciate. If central bank intervenes to prevent further appreciation, its net foreign assets increase and the high powered money also rises correspondingly. Therefore, foreign exchange intervention automatically increases the stock of high-powered money ($\Delta NFA^{CB}\uparrow \equiv DH\uparrow - \Delta DC$). In the context of the whole banking sector such interventions (purchase of foreign currencies) increase the money supply and the magnitude of such increase depends on the value and stability of money multiplier and (obviously) on the scale of intervention.

Therefore an automatic adjustment process can be observed: in a country which runs current account deficit money supply will contract. This automatic adjustment process may be interrupted by sterilization. Foreign currency purchases by the monetary authority lead to a higher (high powered) money supply which in turn may be absorbed by sales of government or central bank securities or by reverse repo operations. Then domestic credit falls and high-powered money can be held within the target.

Sterilized interventions are costly. Central banks pay interest rate above the market clearing level (one that is consistent with expected future depreciation of domestic currency). Therefore in an extreme case central bank can report losses and may need subsidies form the budget [see Cukrowski and Janecki 1998, on negative seigniorage in the case of Poland]. In such a case domestic taxpayers would enhance the wealth of foreign speculators.

There is a cost of conducting non-sterilized interventions as well. It usually leads to a fall in interest rates and to an increase in monetary base, and thus in broad money supply. Therefore, if growth in money demand does not match this additional supply [44] the likely outcome will be increase in inflation or slower disinflation.

The budget deficit has important implications for inflation, especially in countries with undeveloped financial markets (like CEE economies) in which banking sector holds large chunk of government securities (e.g. in Poland in the past few years the share of banking sector in government financing remained at 50% – 60%). Following Dornbusch [1980] and referring to identities (7. 3 – 7. 6) an increase in total credit to non-financial sector can be divided into net credit to government and net credit to private sector (denoted as ΔDC^{G} and ΔDC^{P} respectively).

$$\Delta DC \equiv \Delta DC^{G} + \Delta DC^{P} \qquad (7.7)$$

Fiscal deficit is financed either by domestic banks (assuming that other sources of domestic deficit financing play a negligible role) or by foreign borrowing what can be expressed as:

$$G - T \equiv \Delta DC^{G} - \Delta NFA^{G} \qquad (7.8)$$

where superscript G denotes government.

Then combining identities 6, 7 and 8 the following identity can be obtained:

$$\Delta NFA^{B} \equiv (T - G - \Delta NFA^{G}) + (\Delta M_2 - \Delta DC^{P}) \qquad (7.9)$$

Identity (7. 9) shows that if net foreign assets of the banking sector decline (country runs a current account deficit) then either a government is running high deficit or it is repaying the external debt or domestic money growth is slower that the extension of credit to the private non-financial sector. In this setting the cure to excessive current account deficit can be in a form of controlling the credit to non-financial sector and to government and by lowering consolidated fiscal deficit.

[44] Which may occur if money demand of residents exhibits low elasticity with respect to interest rates. Because banking sector is typically underdeveloped and transaction costs are high, the transaction money demand theory would suggest that this elasticity is low indeed.

If identity (7. 9) is rewritten in the following form:

$$\Delta M_2 \equiv \Delta NFA^B + (G - T + \Delta NFA^G) + \Delta DC^P \quad (7.\ 10)$$

then it becomes apparent what are the sources of a broad money supply. Thus, the following factors contribute to higher money supply:

- increase in net foreign assets of the banking sector;
- increase in government deficit or in government net foreign assets;
- increase in credit to private non-financial sector.

Moreover, identity (7. 10) shows that the monetary authorities will often face inflation – current account trade-off. Widening of the current account deficit leads to a fall in net foreign assets, which reduces the money supply and thus contributes to faster disinflation.

7. 1. 2. Flow Approach to the Current Account: the Mundell-Fleming Model

The Mundell-Fleming model [Mundell, 1962; Fleming, 1963], is an international extension of the famous *IS/LM* system devised by Hicks [1937]. The determination of equilibrium is made thorough goods market (*IS* curve), money markets (*LM* curve) and balance of payments (*BP* curve).

The long run equilibrium in the system can be described using the following equations:

$$IS: Y = C\left(\overset{+}{Y}\right) + I\left(\overset{-}{r}\right) + G + TB\left(\frac{\overset{-}{Y}, e\overset{+/-}{P^*}}{P}\right) \quad (7.\ 11)$$

$$LM: M_s = M_d\left(\overset{+}{Y}, \overset{-}{r}, \overset{+}{P}\right) \quad (7.\ 12)$$

$$BP: TB\ (Y,e) + KA\ (r - r^*) = 0 \quad (7.\ 13)$$

$$BP: TB\left(\overset{-}{Y}, \frac{\overset{+/-}{e}\ \overset{+}{P^*}}{P}\right) + KA\left(r - \overset{+}{r^*}\right) = 0 \quad (7.\ 14)$$

where Y is domestic income, C, I, and G respectively: consumption, investments, government spending, TB and KA are trade and capital balance respectively. Finally M_s represents money supply, and M_d is the demand for money. P represents price level (which is assumed to be exogenous in the standard version of the model), e is nominal exchange rate and r is nominal interest rate. Sign * denotes foreign level of the variables. Signs of the partial derivatives are above the respective parameters.

The *IS* curve represents goods markets in equilibrium. Goods markets are in equilibrium only when the amount of goods produced is equal to the amount of the goods demanded. *IS* curve has a negative slope. The higher the interest rates, the lower the equilibrium level of demand and output. The reason for this is that the higher interest rates make both consumption and investments more expensive (and thus higher interest rates reduce domestic absorption).

The *LM* curve represents money market in equilibrium, i.e. situation, when money supply is equal to money demand. The Mundell-Fleming model assumes that central bank is able to control money supply. Demand for money, on the other hand, depends on income and interest rates. The higher income, the higher their demand for money balances. On the other hand, when the interest rates are high, it is better to hold less money (defined in a narrow sense as cash plus holdings on checking accounts), and invest it in fixed income instruments. For these reasons the *LM* curve is positively sloped: keeping the other things constant, an increase in total income requires an offsetting increase in interest rates to keep the real money demand equal to money supply.

The *BP* curve represents balance of payment in equilibrium, i.e. zero growth of the official reserves. Balance of payments consists of current account (*CA*), and capital account (*KA*). Their sum equals to change in the official reserves. When *CA* deficit is equal to *KA* surplus, there is equilibrium in the balance of payments. What determines the current and capital accounts? For the sake of simplicity, it can be assumed that *CA* is equal to the trade balance of a given country (export minus import). Higher domestic income usually means more import to the country concerned – people start to buy more goods, and some of them are produced abroad, thus domestic income reduces *CA* surplus. *KA* (inflow minus outflow of capital) on the other hand, depends mostly on domestic and world interest rates and perceived risk of the country concerned. In the absence of sovereign risk or capital controls, owners of capital invest where the interest rates are high, thus higher the interest rate, the higher the *KA*. Generally then, to keep the reserves constant, increased income requires higher interest rates to offset the negative *CA* by positive capital account.

Various macroeconomic developments and policies will have the following consequences for the model:

1. Monetary expansion generally shifts the *LM* curve to the right. Higher money supply requires higher income or lower interest rates to increase money demand and keep the financial markets in equilibrium. Similarly, monetary contraction (tight monetary policy, decrease in money supply) shifts the *LM* curve to the left (see **Graph 7. 1**).

2. Fiscal expansion shifts the *IS* curve to the right. Higher government spending is usually equivalent of higher consumption (at least in the short term) and thus requires higher income, or higher interest rates to keep goods market in equilibrium (see **Graph 7. 2**).
3. Any exogenous shock worsening the current account shifts the *BP* curve upwards. In order to keep balance of payments in equilibrium interest rates have to be higher for each level of income. Examples of such shocks would include real appreciation of the domestic currency, loss of export markets, etc. (see **Graph 7. 3**)
4. Exogenous (not connected with interest rates) shocks worsening the capital account shifts the *BP* curve to the left. For every interest rate, current account must be higher to equilibrate the balance of payments, so income must be lower to reduce imports.

It is important to note that Mundell-Fleming model is essentially short-run. Changes in productivity, effect of cumulating current account deficit on perceived country risk are in fact beyond this model. This makes the application of the model to transition economies very difficult. Exogenous changes in productivity and massive increases in net investments may have dominant effects on both domestic output and interest rate.

Because price level is exogenous in the Mundell-Fleming model, it is not easy to bring inflation to the analysis. There could be two ways in which inflation could develop. First, following the assumption that before the shocks the economy was in a full long term equilibrium, we could infer any increase in *Y* beyond initial state will move the economy beyond its full equilibrium level and induce inflationary pressures. The only problem is that full employment is not very convenient assumption in case of transition economies. Not only it is next to impossible to judge if the economy is in full equilibrium level, but also the potential output changes much faster than in developed countries. If we follow this assumption anyway, it appears that fiscal policy is the way of fighting both inflation and current account deficit. Increased capital inflow, is an example of a pure inflation-current account trade-off. Decrease in current account is directly connected with lower *Y* (because *Y* is equal to absorption plus current account).

Second channel of transmission, which is especially important for highly indexed economies of transition, is a nominal exchange rate. Depreciating exchange rate results in almost automatic increase in the price of tradable goods (see chapter 6). Therefore, improvement of the current account via depreciation results in additional inflationary costs. Monetary loosening, for example, with its ambiguous effect on the current account causes inflation not only through its stimulating effect on domestic absorption, but also through devaluation. Fiscal tightening, on the other hand, could (if the capital mobility is low) appreciate domestic currency, and create additional downward pressure on price level growth.

Mundell-Fleming model is far from being perfect. Its main drawbacks are as follows:

1. Assumption that capital account is driven by yield differential only (with no reference to expected exchange rate movements). In that respect, Mundell-Fleming model is inconsistent with uncovered interest rate parity and rational expectations.
2. Its conclusions regarding insulation from foreign shocks by floating exchange rate do seem unbelievable. The stylized fact is that international business cycles are (at least to some extent) synchronized across industrialized countries.
3. Mundell-Fleming model long-run balance of payments equilibrium may not quite be equilibrium in the longer-run. The model suggests that zero-growth in reserves is an equilibrium state. That in turn means that current accounts deficits could be growing forever, provided that they are financed by capital account surpluses.

7. 1. 3. Inter-temporal Current Account Models

Traditional approach to the current account takes on of the two forms: elasticity approach or absorption approach. The former focuses on terms-of-trade developments and treats current account from trade balance points of view. The latter states that the current account is identical to excess of domestic savings over domestic investments.

The development of inter-temporal current account models was stimulated by Lucas critique [Lucas, 1976]. Instead of estimating the balance of payments model on ad hock basis one should make conclusions based on forward looking expectations. Inter-temporal approach extends the classic absorption approach by arguing that private saving and private investment decisions are based on forward looking calculations related to expected growth of GDP, inflation, interest rates etc. Also the classic absorption approach was appropriate few decades ago, when countries did not have large foreign assets. These assets have been built in recent two decades to very high levels, and therefore current account modeling should take into account interest on net foreign assets and revaluation of net foreign assets.

In a simple version of deterministic inter-temporal current account model [45] the current account is defined (following the absorption approach) as

$$CA_t = A_{t+1} - A = r_t A_t + Y_t - C_t - G_t - I_t \quad (7.15)$$

where

A_t – economy stock of net foreign claims in period t

$r_t A_t$ – interest received on net foreign claims in period t

Y_t – output in period t

C_t – private consumption in period t

G_t – government consumption in period t

I_t – net investment in period t.

Above equation is iterated forward what allows for formulation of inter-temporal budget constraint, which delimits the feasible choices of the economy. It states that the present value of the economy (all today and future) expenditures cannot exceed the initial wealth plus the present value of (today and future) domestic production. In order to find what causes current account imbalances it is worth to specify how private consumption is determined. It is assumed that a representative (and immortal) consumer maximizes inter-temporal utility function:

$$U_t = \sum_{s=t}^{\infty} \beta^{s-t} u(C_s), \qquad \beta \in (0,1),\ u'(C) > 0,\ u''(C) < 0 \quad (7.16)$$

where β shows how future consumption is discounted by consumer (or how much bread today is preferred to bread tomorrow).

As shown in above equation it was assumed an inter-temporal separability of consumption utility function as the aggregation of both in goods and in individuals may cause the inter-temporal dependencies to cancel out.

The next step is the formulation of consumer inter-temporal budget constraint and conducting a constrained maximizing exercise for representative consumer. One of the results is given by standard Euler equation:

$$u'(C_t) = \beta(1+r_t)u'(C_{t+1}) \quad (7.17)$$

which says that the marginal rate of substitution of today for future consumption is equal to the interest rate or the price of future consumption. In other words a representative maximizing consumer will smooth her lifetime consumption path. When interest rates are high he will give up today's consumption in order to consume more in the future.

We also define a "permanent level" of a variable X as:

$$\widetilde{X}_t = \frac{\sum_{s=t}^{\infty} R_s X_s}{\sum_{s=t}^{\infty} R_s} \quad (7.18)$$

where R_s defines discount rate from today to period s.

Then assuming convenient functional form of the consumer utility function it can be stated that:

$$CA_t = \left(r_t - \widetilde{r}_t\right)A_t + \left(Y_t - \widetilde{Y}_t\right) - \left(G_t - \widetilde{G}_t\right) - \left(I_t - \widetilde{I}_t\right) + \left[1 - \frac{1}{\left(\frac{\beta}{R}\right)^{\sigma}}\right]\left(\widetilde{r}_t A_t + \widetilde{Y}_t - \widetilde{G}_t - \widetilde{I}_t\right) \quad (7.19)$$

The following conclusions can be drawn from above equation:

1. If home country is a net foreign claimant on the rest of the world then if current world interest rates are above the permanent level the current account will be in greater surplus as people smooth consumption and do not spend the temporarily high net foreign interest income. If country is a net foreign debtor then the outcome will be opposite and people will not reduce consumption by the full amount of temporarily higher foreign interest payments.
2. If home country output is above its permanent level the current account will be in higher surplus (or lower deficit) due to consumption smoothing. Higher government or investment spending than their permanent levels will contribute to current account deficit as private sector will ensure its consumption levels by foreign borrowing.
3. The last term of the above equation defines so-called tilting effect. If the home country discounts future on average more than the rest of the world (i.e. β is lower than world interest rates r) then the term in square brackets is negative and there will be a tendency to increase the deficit, increase the foreign debt and decrease future consumption (a downward tilt). If the rest of the world prefers today's bread

[45] A more in-depth discussion is presented in Obstfeld et al. [1995].

over tomorrow's much more than home country the consumption path will exhibit upward titling. The tilting effects are proportional to the size of economy permanent resources.

More about the dynamics of current account imbalances can be learned from modeling of output and investment fluctuations. Under assumptions that there is no depreciation (i.e. investment is equal to difference between future and present capital stock) but there is a dead-weight loss equal to a cost of installation of new capital, and that firms are profit-maximizers it can be analyzed the following situations:

1. If initial capital stock is below the permanent level (as in the case of most of the transition economies) the marginal productivity of capital will be larger than the world interest rate. Then capital stock will increase as well as production. However, over time as capital approaches (or eventually tops) its permanent level, investments (increase of capital stock per period) will fall and thus installation costs will top its permanent level. Consequently, output will fall short of its permanent level and will contribute to current account deficit.
2. If a country experiences unanticipated permanent productivity shock (e.g. Poland flooded with unexpectedly large foreign direct investments in 1997-98) then country capital stock suddenly falls below its permanent level. As in the above case country runs current account deficit.
3. If a country experiences unanticipated temporary productivity shock then future investment plans will not change and the only effect will be a temporary increase in output and thus current account surplus will emerge at date t.

So far inter-temporal models shed some light on current account dynamics. Now non-tradable goods, durables and terms of trade will be introduced into the model, which will allow for drawing some conclusions about inflation – current account interactions.

Let assume that consumption basket consists of two goods: tradable and non-tradable. Defining p as a price of non-tradable in terms of tradable and assuming CES consumption function (with ρ denoting inter-temporal substitution elasticity between tradable and non-tradable) it can be shown that the general price level is given by:

$$P=\left[\alpha+(1-\alpha)p^{1-\rho}\right]^{\frac{1}{1-\rho}} \qquad (7.20)$$

where α denotes share of tradable in consumption basket.

In the special case of $\rho = 1$ (Cobb-Douglas preferences) the CPI is given by: $P = p^{1-\alpha}$.

Again maximizing lifetime consumption utility (which now includes both tradable and non-tradable goods) of a representative consumer, subject to inter-temporal budget constraint, leads to the following Euler equation:

$$C_{t+1}=\beta^{\sigma}\left(1+r_{t+1}\right)^{\sigma}\left(\frac{P_t}{P_{t+1}}\right)^{\sigma}C_t \qquad (7.21)$$

where σ denotes consumption elasticity of inter-temporal substitution, i.e. shows how eagerly a representative agent is willing to substitute current consumption for future consumption. The above equation simply states that overall consumption path depends on real interest rate.

Consumption of tradable goods will be given by:

$$C_{T_{t+1}}=\beta^{\sigma}\left(1+r_{t+1}\right)^{\sigma}\left(\frac{P_t}{P_{t+1}}\right)^{\sigma-\rho}C_{T_t} \qquad (7.22)$$

If inflation (P) is rising over time then real interest rate will be below the own interest rate on tradables (or below interest rate if there were only tradables in the model). Therefore the total consumption measured in tradables P^*C will fall over time if consumption elasticity of inter-temporal substitution is greater than one ($\sigma > 1$), and will rise in the opposite case ($\sigma < 1$).

At the same time price changes result in a faster rise of consumption of tradables relative to total consumption with elasticity ρ, so if $\rho > \sigma$ consumption of tradables will grow in time if inflation is rising.

In other words, when inflation is high (sharply rising prices on non-tradables relative to tradables) and when agents are very willing to substitute today's consumption of tradables for future consumption of non-tradables and less willing to give up overall consumption today for larger consumption in the future then consumption of tradables will grow.

Because the current account deficit is a difference between consumption of tradables and production of tradables, then inflation may fuel current account deficit or may help to stabilize it. The direction depends on the relationship between two elasticities described above [46].

[46] Ostry and Reinhart [1992] estimated for a panel of 13 countries that $\sigma = 1.27$ or $\sigma = 1.22$ and $\rho = 0.38$ or $\rho = 0.5$ depending on the method of estimation. Therefore empirical analysis suggests that $\rho < \sigma$ or that there is indeed a current account – inflation trade-off.

7. 1. 4. Meade's Internal – External Balance Synthesis

Orthodox approach to the internal and external balance was provided by Meade [1951]. His findings were popularized by Swan [1960], who introduced the famous Swan diagram shown in **Chart 7. 4**.

The IB curve depicts full employment internal balance of the economy. The curve is downward sloping, because large domestic absorption can (to some extent) be directed abroad by stronger currency, thus relieving domestic economy from the excessive inflationary pressures. Similarly external balance curve (EB) is upward sloping. In order to keep current account in balance, increase in domestic absorption must be accompanied by real depreciation, which improves trade balance and brings external accounts into equilibrium. Meade's point was that in order to control both internal and external balance, one needs to use a mix of expenditure reducing/expanding with expenditure switching policy.

The lesson from Meade analysis is that if policy maker is fighting inflation using only real appreciation of the currency, the economy will certainly end up in a state of payments deficit. Krugman and Taylor [1978] analysis, indicating that real revaluation tends to expand domestic absorption, strengthened this result. If that was the case, not only external balance will be in a worse state as a result of revaluation, but internal balance would also be much harder to achieve. In any case, fiscal tightening must be used in order to break the fatal trade-off between excess demand and current account deficit.

7. 1. 5. Mundell's Assignment Problem

Mundell [1962] provided another insight into internal-external balance problem under capital mobility regime. With capital mobility greater than zero, BP curve is upward sloping in the Mundell-Fleming model. In such case, external and internal balance can be achieved without expenditure switching policies [47]. Internal and external balance curves can now be drawn in monetary-fiscal policy planes (where the origin shows super-loose fiscal and monetary policy mix), as shown in **Chart 7. 5**. Internal balance curve is downward sloping, because reduction of fiscal surplus (T-G) needs tighter monetary policy, and higher interest rates r. The country faces excess demand and inflation below the IB curve, and unemployment above the line.

External balance can also be secured by different mixes of internal and external policies. The EB slope is less negative than IB schedule. While current account remains constant along the internal balance curve (income), interest rates alter the balance of payments. Therefore, as interest rates fall, external balance goes more quickly into deficit than internal balance (points above EB curve indicate balance of payments surplus).

The main problem with this approach is that the equilibrium point E may (as in Mundell-Fleming model) point to an unsustainable level of current account deficit. In the model world, there is perfect current account deficit – inflation colinearity, equilibrium inflation, however, is linked with arbitrary level of the current account deficit. This brings the policy maker back to the need of resorting to expenditure switching policies.

7. 2. Balance of Payment Crisis and Inflation

Current account can impact inflation through unsustainable financing and currency crisis. If a country runs large current account deficit financed by short-term portfolio or speculative inflows (Mexico, Thailand) or by short-term private borrowing (Czech Republic), then the sudden loss of confidence and rapid capital outflow erodes foreign exchange reserves and leads to a forced currency devaluation. This in turn, through large share of consumption goods in imports, usually leads to a hike in inflation. **Table 7. 1** provides the most recent evidence of this process.

The impact of local currency depreciation on inflation depends on the history of inflation in each country as well as on the level of monetization. However, countries with high inflation record tend to have low monetization of the economy. If a country has a long tradition of high inflation then devaluation may lead to a confidence crisis, which may turn into hyperinflation. Russia and Brazil provide the best recent examples of the confidence crisis. If Brazil defended its overvalued currency with high interest rates then country would slip into large recession in any case. Because the hitherto gradual depreciation scheme was not backed by radical fiscal adjustment the resulting lack of confidence led to a full-blown crisis with deleterious implications for the foreign debt rollover and the banking system (the same happened in Russia).

On the contrary, countries with a record of low and stable inflation may suffer only moderate inflation hike as in the case of Czech and Thai crises in 1997 or the ERM crisis in 1992.

[47] But this time external balance is (as in Mundell-Flemming model) equivalent to zero change in reserves.

Current account – inflation causality may also work in the opposite direction. High domestic inflation together with fixed exchange rate regime may lead to currency overvaluation. This makes foreign goods cheaper relative to domestic goods and therefore imports accelerate while exports often fall if domestic producers are not able to reduce costs. Enlarging trade deficit then translates into larger current account deficit.

7. 3. Real Exchange Rate, Current Account and Inflation – Results of Empirical Analyses

Rybiński [1998] carried out the empirical analysis on the interrelations between the real and nominal exchange rates, inflation, capital flows, and current account balance in three CEE countries: the Czech Republic, Hungary, and Poland. Analysis was based on a panel formed from annual data for these countries in the period 1992 – 1997. Real exchange rates were computed on CPI basis.

As shown in **Graph 7. 6** real effective exchange rates appreciated in all three analyzed countries in comparison with their January 1992 levels [48]. Appreciation was most severe in the Czech Republic, which practically followed the fixed nominal exchange rate path. In the case of Hungary and Poland the selection of the starting point (January 1992) seems to affect strongly the outcome. If starting point was set to mid 1992 then the Hungarian forint would seem to have appreciated much less than Polish zloty, while at present setting the zloty real exchange rate based on PPI seems to have remained almost unchanged.

Examining the relation between exchange rates, inflation, capital inflow and current account author came to the following findings:

1. Faster disinflation was associated with depreciation or slower appreciation of both real and nominal effective exchange rates. The relationship, however, was very weak, especially for nominal exchange rates [49]. This outcome would be consistent with the exchange rate policy of sterilized interventions conducted by central banks. The sterilization was not very successful and part of these capital inflows was fuelling domestic consumption and investment rather than reflected a rise in demand for money. This excess in aggregate demand contributed to slower disinflation which translated into appreciation of real exchange rate.
2. Deterioration of the current account position tended to be associated with slower appreciation or depreciation of the real exchange rate. There was no relationship between nominal exchange rates and current account position.
3. No apparent relationships between capital account position and the appreciation of a real exchange rate were found. Nominal exchange rates tended to appreciate more when the net capital inflows were larger what is consistent with intuition but the relationship is very weak. It seems that foreign trade finance related flows affect real exchange rates stronger than portfolio and direct investment flows.
4. Strong positive correlation between current account and real exchange rate appreciation and lack of correlation for the capital account was translated into positive (but weaker than for the current account) correlation between the change in gross official reserves (net of gold) and the appreciation of the real effective exchange rate.

The above evidence suggests that nominal effective exchange rates were not correlated with external position of the economy. In the case of Poland and Hungary nominal exchange rates reflected the adopted crawling peg regimes. In the case of Czech Republic the nominal rate remained almost flat until the Czech crisis in May 1997. However, real effective exchange rates did reflect real external balances. At the same time foreign exchange transactions related to arbitrage, portfolio investments and speculation vastly dominated, in terms of volumes, foreign exchange transactions related to international trade. Therefore, it was rather the asymmetric reaction of central banks to different foreign exchange transactions than the simple supply-demand relation, which caused the above positive relationship between current account and real rate appreciation.

The next step taken by Rybiński [1998] was the study based on purchasing power parity model intended to explain why the exchange rate – inflation correlation was so weak.

The PPP hypothesis relies closely on the assumption that if prices of similar goods changed at differential rates in two countries, commodity trading arbitrage would lead to a depreciation of the currency in the higher inflation country. The simple relative PPP hypothesis says that depreciation (in

[48] Higher values refer to appreciation of real exchange rate. Effective rates were based on the approximate composition of currency baskets.
[49] This conclusion does not stay in conflict with results obtained by Antczak and Górski [1998] discussed in chapter 6.

nominal terms) of the domestic against a foreign currency should be equal to the inflation differential between home and foreign country. In order to apply the model correctly, the same price indices should be used in both countries, which should have the same weights for all goods. In addition, all goods and services used in the indices should be tradable without transaction costs. Because these assumptions are not met in reality, in many cases market rates deviate from the PPP. These disparities are caused by transaction costs, tariffs and other trade barriers and, most important, by changes in relative prices between tradable goods and non-tradable goods and services. Thus, the basic relative PPP model does not give a true picture of the analyzed currencies. Productivity growth differentials also need to be taken into account [50].

In order to capture the productivity growth differential between Poland, the Czech Republic and Hungary and their trading partners, Rybiński [1998] estimated what is called a Scandinavian model of inflation.

This model [51] is related to a small country with a fixed exchange rate and a passive monetary policy in which the prices of traded goods are determined by arbitrage. Therefore, the rate of inflation in traded goods sector is determined by the world rate of inflation. Wages in the tradable goods sector are assumed to be settled each year at the market clearing level with the wage increase equal to tradable goods inflation plus productivity growth. An additional assumption is that wage growth in both the traded and non-traded goods sectors will be the same and that price inflation in the non-traded goods sector will be higher than for traded goods due to lower productivity growth in the non-traded goods (and services) sector. Because the price index used for PPP analysis is based on a basket of both tradable and non-tradable goods, inflation in a faster growing economy will be higher than in more slowly growing economies. Then it can be shown that the logarithmic change in exchange rate is equal to a difference of logs of domestic and foreign inflation minus the difference of logs of domestic and foreign productivity growth. The latter difference is multiplied by the share of non-traded goods in the price index.

In his statistical analysis, Rybiński [1998] used monthly data for the period from January 1992 [52] to December 1997. Currency indices for the analyzed countries consisted of US$ and DM in the following proportions: PLN (50% US$, 50% DM), CZK (35% US$, 65% DM) and HUF (30% US$, 70% DM).

Author used both CPI and PPI but there was no available data on the share of traded goods in these indices. He calculated the import penetration index as a ratio of imports to industrial production and then used the value of one minus this index as a proxy for the share of non-traded goods in both CPI and PPI indices.

The PPP hypothesis holds if deviations of the market rate from the PPP rate are stationary or when the market rate and the PPP rate are cointegrated. Author run regressions of the market rate on a constant and PPP rate and then tested for the stationarity of residuals in these regressions. Results of the testing procedure are presented in **Tables 7. 2. – 7. 4.** The 5% critical value for the Augmented Dickey Fuller (ADF) test is –3.22. Significant values at 5% level were denoted by *** and at 10% level by *.

For the Polish zloty only in the case of the exchange rate index and the productivity adjusted CPI based PPP rate it was possible to reject the hypothesis of non-stationarity of residuals. In all other cases author failed to reject the non-stationarity hypotheses. In respect to Czech koruna no cointegration was found at all. Author found cointegration between HUF/INDEX market rate and unadjusted PPP rate based on CPI and even stronger cointegration between HUF/US$ rate and productivity adjusted PPP rate based on PPI [53].

Labor productivity in the Polish industrial sector increased cumulatively by some 97%, in Czech Republic by 72% and in Hungary by 80% in the analyzed period, compared with 10% growth in the United States and 17% in Germany, where the latter was boosted by the effect of German unification. Thus, one should expect that zloty,

[50] This relates to the so-called Samuelson-Balassa effect [see Balassa, 1964; Samuelson, 1964]: in countries with large productivity growth real exchange rate should appreciate slower than inflation differential.

[51] For a detailed discussion of the model see Williamson and Milner [1991].

[52] The starting date – January 1992 – was selected for three reasons. First, the PPP is a long run phenomenon so it makes sense to start as far back as possible. Second, 1992 was characterized by roughly balanced foreign exchange reserves, Czech Republic experienced some decline while Poland and Hungary enjoyed modest increases, implying that the balance of payments was neutral with respect to the exchange rates in these countries. Third, 1992 was the first year of modest growth (Poland) or smaller decline (Czech Republic, Hungary) after the sharp output decline following the collapse of centrally planned economies.

[53] Unfortunately, analyzed time series exhibited many structural breaks (e.g., changes in exchange rate regimes, changes in currency baskets) which may negatively affect the power of used ADF test.

koruna and forint will depreciate more slowly than a straightforward PPP analysis would suggest in order to maintain competitiveness.

Looking at **Tables 7. 5. – 7. 10** the only reliable reference target for the Polish zloty market rate is provided by the productivity adjusted CPI rate for the INDEX. In the case of Czech koruna no reliable target was found, which may indicate that market rate deviations from fundamentals may be large and long-lasting. For Hungarian forint it was found that its exchange rate against US$ follows productivity adjusted PPI rate, while its exchange rate against INDEX follows productivity unadjusted CPI rate.

The final Rybiński's conclusion was that the Polish zloty remained under – not over-valued relative to productivity – adjusted PPP, by 14% at the end of December 1997. Hungarian forint was found overvalued by 13% against the INDEX, and undervalued by some 25% against US$. Such conflicting results for HUF could be caused by frequent changes in the HUF basket in the past. In the case of CZK no reliable target was found but the koruna seemed to be overvalued between 3% and 46% against the INDEX [54].

Other empirical studies support relevance of the Balassa-Samuelson effect to the economies in transition. This relates in first instance to Halpern and Wyplosz [1995] analysis of six transition economies, and Maliszewska [1998] econometric study on the real exchange rate in Poland and Romania. Jakubiak [1998] found that neither real import nor real export in Poland during the 1992 – 1997 period presented explicit dependence on the real exchange rate, although they both responded actively to domestic and foreign economic activity. It can indirectly support the hypothesis that significant productivity gap between domestic producers and their European partners existed in the beginning of transition what gave a room for substantial real appreciation of the zloty without hurting competitiveness of the Polish industry.

7. 4. Policy conclusions

The above theoretical discussion shows that current account should be discussed in terms of investments-savings imbalance rather than imports-exports imbalance and relative prices of export and import goods. Statistical data collected by Antczak and Górski [1998] for 10 transition economies and related to current account, fiscal deficit, saving-investment balance, devaluation and inflation strongly support the above statement (see **Tables 7. 11** and **7. 12**).

Generally speaking, transition economies are short of savings, comparing to the existing investment needs. This is a crucial factor causing current account deficits in most of the CEE and FSU countries. The fundamental investment – savings imbalance is a typical feature for CEE economies and is consistent with the stages of balance of payments theory. In monetary policy terms domestic saving shortage means insufficient money demand causing inflationary tensions (see chapters 4 and 5).

As the stock of domestic saving is insufficient to finance large investments, transition economies need external financing. This import of foreign savings translates into enlarging current account deficits. As shown by the Czech crisis in 1997 the sustainability of such deficits is extremely important. Therefore, governments and central banks should closely observe the external balance developments. If the structure of capital inflows is dominated by FDI and other long term flows, then even larger current account deficits (of the order of 6 – 7% of GDP) may be perceived as sustainable by international and domestic investors. Sometimes it is very difficult to have a proper assessment of the types of capital inflows due to weakness of the balance of payment statistics. Therefore, it is recommended that authorities should err on the side of underestimating the permanence of capital flows. Indeed, as financial markets become more and more open and sophisticated the capital inflows perceived as long term may be more easily reversed.

Cutting domestic demand should be the proper policy response to excessive current account deficit. This can be done both by monetary and fiscal policy measures. However, the monetary policy alone is not capable to handle properly this challenge. Therefore, fiscal adjustment is highly recommended to diminish investments-savings imbalance as fiscal deficit is equal to negative savings. In most of transition economies fiscal deficit is excessive and unsustainable provoking several episodes of macroeconomic instability [see Dąbrowski, 1998a; Markiewicz, 1998]. Decreasing the size of fiscal deficit or moving towards fiscal surplus gives a number of positive effects, among others:

- improves current account balance;
- gives more macroeconomic room for private capital inflows;
- improves monetary-fiscal policies mix;

[54] Of course, the obtained results are very sensitive to the selection of the starting point.

- decreases public sector borrowing requirements what, other things being equal, helps to curb short term capital inflow and take interest rates down;
- prevents overvaluation of exchange rate through controlling the size of domestic demand and inflation;
- decreases output costs of disinflation process.

The above recommendation is consistent with the absorption approach to the current account (see section 7.1.1.). Contrary to it, attempt to deal with excessive current account deficit through changing the relative prices of export and import only, i.e. through currency devaluation threatens higher inflation, and returning the real exchange rate to its previous level. If devaluation becomes unavoidable (because of adverse external shock or currency overvaluation) it must be connected with fiscal and monetary tightening in order to achieve improvement in current account balance. Otherwise, macroeconomic imbalances will be perpetuated.

Generally, sound fiscal policy seems to be the most important factor responsible for keeping current account balance on sustainable level and for overall successful continuation of the transition process. Fiscal adjustment in transition economies is a very desirable tool in stabilizing not only prices (by supporting the exchange rate anchor), but the whole economy too.

8. The Role of Fiscal Policy in Supporting Disinflation Process

In the previous chapters, on number of occasions, fiscal policy was mentioned as the key factor determining the speed and sustainability of macroeconomic stabilization.

The inflationary impact produced by a fiscal deficit depends on the method of its financing. The governments can finance deficit either by increasing foreign or domestic debt, or by increasing liabilities due to a central bank (monetization of deficit). Each of the above methods of deficit financing may involve macroeconomic disequilibrium: additional money creation immediately stimulates inflation, growth in foreign debt may lead to problems with its service and to narrowing access to credit resources on foreign financial markets, whereas excessive domestic debt may lead to growth in real interest rates, which may involve falling into a trap of increasing cost of debt service, growth of deficit, growth of interest rates etc.

In this chapter we will try to analyze the concrete channels through which fiscal deficit contributes to higher inflation and fiscal adjustment helps in disinflation process.

8. 1. Monetary Financing of a Fiscal Deficit

When fiscal deficit is financed by a central bank credit it results in increasing monetary base (reserve money) and, assuming unchanged money multiplier, in proportional increase in broad money supply. Eventual inflationary effect depends on size of deficit financing, money multiplier, and demand for money (monetization level). Higher is the deficit financed from monetary emission and lower is the monetization level, stronger are the inflationary consequences of fiscal disequilibrium (other things being equal).

In most countries the role of central bank direct credit to government was predominant during first years of transition when other sources of deficit financing, particularly T-bills market were not available yet. In fact, it was the most important factor staying behind initial high inflation/hyperinflation episodes in most of transition countries, apart from the earlier mentioned unfreezing accumulated monetary overhang. This is strongly supported by Antczak [1998] study (see chapter 4).

As the markets of treasury bills developed, the scale of monetary financing of fiscal deficits diminished. For instance, in 1993, the National Bank of Bulgaria credit covered 32% of a fiscal deficit, in 1994 – 26%, in 1995 – zero, but in 1996 – when macroeconomic situation deteriorated – the NBB again financed over 50% of the budget deficit. In Kyrgyzstan in 1992, 100% of budget deficit was financed with a central bank credit. In the subsequent years, the ratio of monetary financing to budget deficit amounted to 40%, 20%, 48%, 34% and 11% in 1997. In Russia in 1994, budget deficit was monetized in 83%, in 1995 in 26% and in 1996 – in 24%. In all the analyzed countries, attempts were made to diminish this kind of deficit financing, but when economic problems or crisis have occurred the ratio of central bank credit to government suddenly increased, thus creating an additional inflationary pressure [Markiewicz, 1998]. Returning to central bank crediting a fiscal deficit could be observed, for example, in Russia and Ukraine in 1998 when market demand for government T-bills failed dramatically as result of credibility crisis (see below).

The above observations have been confirmed by the IMF comparative study [IMF, 1998, table 5]. The role of central bank financing is generally decreasing though there are some striking reversals such as Bulgaria in 1996 when the size of NBB credit to government reached 14.5% of GDP (see **Table 8. 1**).

8. 2. Quasi-Fiscal Operation of the Central Banks

Officially recorded fiscal deficits on the cash basis do not necessarily cover all the cases of fiscal disequilibrium [55]. Apart from the officially recorded fiscal operations there can be also other activities of government, public agencies, central bank or commercial banks involving expenditures of quasi-fiscal (QF) character in present time or in future. This was particularly frequent phenomenon in the beginning of transition when central banks were still heavily dependent on government and parliament, most of banks publicly owned, and fiscal accounting standards did not meet the international norms.

Although a notion of quasi fiscal operations seems to be quite clear, it is not easy to find a good operational definition, which would allow precise measurement of this phenomenon. Generally speaking, QF operations are an equivalent of explicit subsidies and taxes, which are not reflected on the official budget account [Buiter, 1997, p.10]. QF operations are usually carried out by the central bank or by state commercial banks and other financial institutions. The following most frequently observed forms of the QF operations can be distinguished:

- loans granted by the central bank at subsidized interest rates (lower than market rate),
- purchases and sales of foreign currencies under the system of multiple exchange rates (usually at the official exchange rate which is over-appreciated in comparison with a market clearing rate),
- demanding that resources of commercial banks must be deposited with the central bank, as no interest-bearing assets (or the interest rate on which is lower than market rate),
- financial assistance of a central bank to commercial banks or enterprises in the form of recapitalization or guarantees for doubtful liabilities,
- tolerating enterprises tax arrears.

Significant part of the QF activities is conducted by central banks or at least central banks have to pay the bill for such operations (when conducted, for example, by commercial banks). It leads to increased money supply and inflationary consequences [56].

According to Buiter's concept (1997), in transition economy any central bank credit to other sectors than the government sector can be regarded as de facto QF operation. Using this concept Markiewicz [1998] estimated the size of QF transfers defined according to the following formula:

$$\Delta NDCp - \Delta OIN = \Delta RM - \Delta NFA - \Delta NDCg$$

where: *NDCp* – net domestic credit to non-government sector, *NDCg* – net domestic credit for the government, *RM* – reserve money, *NFA* – net foreign assets of the central bank, and *OIN* – other items net. Changes in *OIN* were assumed to give a very rough estimation of the financial result of each central bank.

Table 8. 2 presents result of this estimation. Among analyzed countries (and taking into consideration limited data availability), Hungary represent the biggest and most persistent deficit of QF operations [57]. In the Czech Republic in 1993 and 1995 that indicator was also positive. In Poland large QF deficits of the central bank occurred only in the first year of transition. In the case of Estonia, where the institution of currency board was established, the level of QF deficits may be connected with significant inflow of reserves as well as with domestic currency valuation problems in the central bank balance sheets.

QF operations resulted from delays in structural reforms. With the advance of stabilization programs and other institutional reforms, QF operations were reduced or they were transferred to the budget accounts.

Earlier studies [58] also showed diminishing tendency of the quasi-fiscal operations and their concentration in slow reforming countries. However, there is at least anecdotal evidence that in some countries either delayed with reforms (e.g. Uzbekistan, and Turkmenistan) or trying return to a command system (Belarus) the quasi-fiscal activity of central banks is still maintained.

8. 3. Non-monetary financing of a fiscal deficit

As macroeconomic stabilization and institutional reforms in transition countries progressed other than central bank

[55] Markiewicz [1998] gives the extensive overview of different concepts and definitions of fiscal deficit.

[56] Other forms of QF operations not involving directly or indirectly central bank financing, for example, government guarantees or guarantees of public export crediting agencies, remain beyond the boundaries of the project and this report.

[57] This may stem in part from the fact that a foreign public debt was serviced by the National Bank of Hungary.

[58] See e.g. De Melo, Denizer and Gelb [1996, table 9] for the period of 1992 – 1994.

credit sources of deficit financing have become available. It relates in the first instance to a domestic Treasury bills (T-bills) [59] market, external borrowing from the official creditors and from the private sources. Theoretically, access to the above mentioned sources should stop or at least relax an inflationary pressure coming from fiscal deficits. Here we touch, however, the very fundamental problem of the role of fiscal equilibrium in guaranteeing a sustainability of disinflation process.

Starting from theoretical arguments, in 1994 – 1995 a very interesting polemics between Jeffrey Sachs and the IMF related to strategy of primary macroeconomic stabilization in post-communist countries took place [Sachs, 1994a; Sachs, 1994b; Hernandez-Cata, 1994]. Sachs' point of view was that the IMF had adopted too tough (from the political point of view) fiscal stance in relation to Russia in 1992 – 1993 [60] when stabilization package could rely more on the fixed exchange rate as the main anti-inflationary anchor and on non-inflationary sources of financing the remaining fiscal deficit (i.e. through treasury bills market and external financial assistance). Fixed exchange rate should bring inflationary expectations down relatively quickly and increase demand for domestic currency what would increase the room for maneuver in the monetary policy area. Of course, this kind of stabilization strategy needs a quite substantial external financial aid: both for partial financing the deficit, and for building up the international reserves of a central bank backing the fixed exchange rate.

In fact, these CIS countries which achieved progress in disinflation in 1995 – 1997 have followed Sachs recommendations. In almost all the analyzed cases, a stable exchange rate (*de facto*; *de iure* it has often remained floating) and significant reduction of deficit financing from the money emission (and quasi-fiscal operations of central banks) have been the main factors staying behind price stabilization. However, fiscal deficit has remained on the level of at least 5% of GDP and has been financed either from external sources or through T-bills emission.

International assistance in the form of grants offered by the developed countries and special credit windows of the IMF (ESAF – Enhanced Structural Adjustment Facility), and the World Bank (cheap credits offered by the IDA) has played important role in the low income countries such as Albania, Moldova, Georgia, Armenia, Kyrgyzstan, and Mongolia. Russia, Ukraine, Bulgaria, and Romania have also used external financing but it has been granted predominantly on market conditions. Russia, Ukraine, and Kazakhstan developed domestic market of T-bills and government bonds. The involvement of the foreign portfolio investors into domestic T-bills market and issuing government bonds denominated in foreign currency placed on the international financial markets have become the next stages of easing up the fiscal constraints in CIS countries. Situation which prevailed in the international financial markets in 1996 and in the first half of 1997, i.e. excess of free resources and readiness of financial investors to be engaged into emerging markets, made this form of deficit financing relatively cheap and easy (especially under stable exchange rate).

However, massive domestic and external borrowing can solve fiscal problems and support macroeconomic stability in short run only. Increasing debt overhang (the pace of debt accumulation is particularly fast under continuos decline of GDP) leads to explosion of interest payments and can bring very easy the situation of the debt trap and liquidity crisis of the government finances.

A relatively short history of economic transition can already give a number of striking examples of government liquidity problems and devaluation crises caused by excessive fiscal deficits: Hungary in 1994 – 1995, Kyrgyzstan in 1996, Romania in 1996 – 1997, Bulgaria in the end of 1996, Russia and Ukraine in the second half of 1998 [see Markiewicz, 1998].

Bulgaria's crisis of 1996 – 1997 resulted from slow and inconsequent structural reforms, weak fiscal and monetary policies, and the very high domestic and foreign debt exceeding the level of 100% of GDP. Massive bailing out the loss making enterprises and banks became the substitute of privatization and restructuring based on hard budget constraints. It put a new debt burden on the government finances in addition to the old debt inherited from the communist period bringing the Bulgarian economy to the situation of a real "debt trap".

The lack of financial discipline also led to banking crisis in the beginning of 1996 which overlapped with an overall macroeconomic destabilization. Premature attempts to

[59] For purpose of this report the broad definition of T-bills will be used, including other kinds of government securities and government borrowing on commercial terms.

[60] This critique was not correct as the most of the STF (Systemic Transformation Facilities) programs implemented at that time in CIS countries by the IMF contained rather very loose fiscal deficit target (even up to 10% of GDP when monetization did not exceed 20% of GDP) [see Dąbrowski, 1998b].

decrease interest rate by the NBB in the end of 1995 (in order to relax the interest payments burden of the state budget) became a detonator of the serious crisis and finally bring results completely opposite to the expected ones. Decreasing interest rates provoked chain reaction: decline in demand for leva, capital outflow, foreign exchange market crisis, dramatic collapse of the exchange rate of leva, inflation shock and further decline in demand for leva. NBB effort to stop this spiral by increasing interest rates came too late and was insufficient in scale. However, it brings the dramatic increase of interest payments: in 1996 they reached the level of 20% of GDP(!) while the total tax revenue amounted to 25.5% of GDP. Fiscal deficit amounted to 13.4% of GDP despite the drastic reduction of all expenditure items apart from interest payments.

Russian and Ukrainian developments two years later look very similar to the Bulgarian ones. Series of Asian crises in 1997 and thus growing instability of international financial markets reduced drastically the availability of relatively cheap external financing for emerging markets. Reacting on changing international atmosphere and signs of domestic political and fiscal instability non-resident investors decided to withdraw their holdings from the T-bills markets of both countries. It brought immediately two kinds of problems: liquidity crisis of the government, and pressure for the official foreign exchange reserves. The next step was the speculation of both non-residents and residents against the exchange rate which, as it was mentioned before, constituted the only real stabilization anchor. Attempts to defend exchange rate were very costly in terms of lost foreign reserves and high interest rates but did not stop the speculation and only drastically increased the interest payments. Central banks had to come back to a fiscal deficit financing, mainly through rolling over the existing stock of T-bills. This caused the further erosion of the exchange rate.

Finally, devaluation became unavoidable and it happened in both countries after August 17, 1998. Devaluation led to the new wave of inflation, banking crisis (especially serious in Russia), further explosion of interest payments, shift from domestic currency to foreign currencies, and stimulated continuos capital outflow (despite introduced foreign exchange restrictions). Default of the Russian government on the T-bills market and 90 days moratorium on repayment of Russian commercial bank liabilities finally undermined the country credibility among investors. Ukrainian crisis although a little bit less severe than the Russian one brought very similar consequences [see Dąbrowski et al., 1999].

As result of Russian and Ukrainian crises, other CIS countries experiencing problems with persistent fiscal disequilibrium became in the end of 1998 subjects of speculative attacks of both domestic and foreign investors. This relates, among others, to Belarus, Moldova, Kyrgyzstan, Kazakhstan, Armenia and Georgia. Transition countries having stronger fiscal and macroeconomic fundamentals, i.e. most of Central European and Baltic countries, could avoid adverse contagion effect coming both from Asian and Russian/Ukrainian crises.

The above empirical examples clearly show that non-monetary financing of fiscal deficit can be also inflationary though inflationary consequences usually comes with a certain time lag. This observation led Markiewicz [1998] to the conclusion that the so-called unpleasant monetarist arithmetic does exist in transition economies. It relates to the famous Sargent and Wallace [1981] concept according to which monetary and fiscal policies cannot be separated (at least in longer perspective). They pointed out that debt financing in the long run may be inflationary. The argument is as follows: if government builds up excessive debt burden, that becomes too large to finance by taxes or more borrowing, than the only way for the government to meet the payments is to print money. In that case debt financing only postpones money financing. If rational economic agents perceive the debt burden as excessive, they will assume that today's debt implies a large growth of money stock and inflation in the future. The expectations of inflation will fuel present inflation. Paradoxically, a restrictive monetary policy, but one, that allows for the expectations of future higher interest rates and large costs of debt servicing, can be more inflationary than monetary policy that accommodates fiscal policy.

Sachs and Larrain [1993] present a different view. They point out that debt financing by itself does not allow the government to escape inflation, but it gives time to adopt other measures, that may enable to avoid it. However, as empirical evidence shows in transition economies this time buffer is rather short.

Basing on empirical experience of transition countries, it would be very difficult to oppose the thesis that monetary policy alone has limited room of maneuver. Recent Russian and Ukrainian experience shows that even relatively conservative and tough central banker must give up in some point when fiscal authorities are unable to prevent default on the T-bills market.

Improper monetary-fiscal policy mix (i.e. too restrictive monetary and too loose fiscal policy) may have other negative consequences even if does not lead to immediate financial crisis. High public sector borrowing requirements crowd out credit for a private sector decreasing rate of economic growth, stimulate short term capital inflow, worsen current account balance.

8. 4. Fiscal sustainability

If fiscal policy plays so important role in guaranteeing effectiveness of disinflation policy what are the criteria of fiscal sustainability in short, medium and long term? Does every fiscal deficit threaten macroeconomic destabilization and financial crisis?

Answer depends on many factors. From the short term perspective the most important determinants are the size and maturity structure of the accumulated debt stock, size of deficit, density of domestic financial market, domestic and external credibility of government policy manifesting itself by the level of yields on government securities. In medium and long term analysis the main role will be played by the stock of accumulated debt, expected rate of economic growth and real interest rates, and possibilities to achieve a required primary fiscal balance.

The density of domestic financial sector depends on the level of monetization and level of financial intermediation. The analysis presented in chapter 5 shows that relatively few transition countries have a really high level of monetization and in the same time a relatively healthy financial sector. In fact, this is only the case of Czech Republic, and Slovakia. Other Central European and Baltic countries also have relatively well functioning financial sector (according to the EBRD rating) but their monetization level is only moderate. All the CIS countries have a low level of monetization and weak or very weak financial sector.

Markiewicz [1998] analyzes the relative size of commercial bank deposit and lending activities in Hungary, Russia, and Ukraine. She generally confirms the very limited potential for domestic deficit financing, especially in Russia and Ukraine. Her analysis also illustrates the crowding out effect of the increasing public debt, i.e. decreasing potential of commercial bank lending to non-government sector.

Assessment of a medium and long term fiscal sustainability usually bases on intertemporal solvency constraint equation [Buiter, 1997]:

$$\Delta b_t = \left(\frac{r_t - g_t}{1+g_t}\right) b_{t-1} - s_t - \delta_t$$

where: b_t – debt/GDP ratio, r – real interest rate, g – the rate of growth of GDP in real terms, s [61] – corrected (interest payments deducted) primary budget surplus to GDP ratio, δ – seigniorage.

If interest rate is higher than the rate of real GDP growth, the ratio of public debt to GDP is going up until the increase in debt ratio has been compensated by the primary budget surplus and *seigniorage* revenues. If interest rates are lower than GDP growth rate, debt may be used to finance sustained growth, unless a sudden increase in fiscal deficit or a sudden fall in income from *seigniorage* has occurred. Solvency can be maintained if real interest rate on public debt is lower than real GDP rate of growth.

It is worth noting that the above equation does not set any upper limit of public debt. If the rate of growth of the public debt exceeds the economic growth, the country will have to achieve primary budget surpluses in future. Formulating more precisely, at the end of the period t its debt will have to equal the amount of discounted future budget surpluses, which does not mean that in each period a primary surplus must be recorded.

This conclusion, stemming from the above equation, seems to be debatable, as market participants may consider the scope of required future fiscal adjustment unrealistic. The expectations of future monetization of debt may induce growth of current interest rates on public debt market, thus raising the level of debt.

Basing on the Buiter [1997] methodological proposal, Maliszewski [1998] made a fiscal sustainability projection for four CEE countries, the Czech Republic, Hungary, Poland, and Romania, for the period until year 2010. Two main assumption were: (1) the public debt-to-GDP ratio cannot exceed the 1997 level for the Czech Republic, Poland and Romania, and level of 60% for Hungary; (2) average rate of economic growth will amount either 5% per year (optimistic variant) or 2% (pessimistic variant). The obtained values of primary fiscal balance looked pretty optimistic for all the analyzed countries apart from Romania. Czech Republic requires primary surpluses in the range of 0.1 – 0.2% of GDP in the low growth scenario and primary deficits between 0.15 and 0.3% of GDP in the high growth scenario. In Hungary the required primary balances amount to (+0.4) – (+1%) and (–0.7) – 1.5% of GDP, respectively (apart from the year 2000 when required fiscal surplus

[61] The ratio of corrected primary budget surplus to GDP is expressed by the equation:

$$s_t = s_t^{\circ} + \left(\frac{1+i_t - (1+i_t^*)(1+\varepsilon_t)}{(1+\pi_t)(1+g_t)}\right) b_{t-1}^*$$

where s° – ratio of primary budget surplus to GDP, i – domestic nominal interest rate, i^* – nominal interest rate abroad, ε – depreciation of nominal exchange rate, b^* – net foreign liabilities to GDP ratio, π – inflation rate.

should amount to 2% of GDP). In Poland it amounts up to +0.5% and (–1.0) – 1.5% of GDP, respectively. In all three cases the obtained results correspond with the recently recorded primary fiscal balances or even set less ambitious targets. Romania's situation is different: in both growth scenarios this country should achieve the primary surplus up to 2.5% of GDP in 1999 and only slowly decreasing in subsequent years (a little bit more quickly in the high growth scenario) when so far this country always recorded a primary fiscal deficit.

However, the above projection involves the implicit assumption that given primary fiscal balance will be obtained equally easy under both growth scenarios what does not necessarily reflect realities of fiscal policy. Hence, in the case of low growth the actual fiscal tensions can be more serious than obtained projection results.

Table 8. 3 presents results of the very similar simulation carried out by the IMF [1998, table 8] for all the transition economies. The sustainable primary balance was defined as the primary balance that would allow stabilizing the public debt-to-GDP ratio on the end of 1996 level. Authors assumed a nominal GDP growth rate of 8 percent, and interest rate differential of 2 percentage points. Obtained results show that in 1997 only 6 countries out of 25 analyzed (Bulgaria, Estonia, Hungary, Latvia, Macedonia and Poland) recorded primary surpluses higher than their sustainable level. In few cases such as Albania, Kyrgyzstan, and Armenia the gap between actual and sustainable level was more than substantial. This indirectly reflects the high future inflation potential in many transition economies.

8. 5. The Dynamics and Structure of Public Debt

Individual countries started the transition with a very different level of public debt. Romania and Czechoslovakia recorded public debt on the minimal or zero level. Bulgaria, Hungary, the former Yugoslavia, and Poland belonged to heavily indebted countries, the former USSR presented a moderate level of indebtedness. After collapse of the USRR all its foreign assets and liabilities were taken over by Russia (the so-called zero option). All other FSU countries started its independent existence with no inherited debt. Contrary to it, the principles of succession of the former Yugoslav debt are not fully agreed yet. Poland and Bulgaria got the official debt reduction.

Hence, individual countries have different room for further expansion of the public debt. Bulgaria presents the most dramatic case, despite 46% debt reduction got from the London Club in July 1994 [62]. Total public debt to GDP ratio exceeded the level of 100% until 1997. Russia's situation is not very much better: apart from significant gross foreign debt inherited from the former USSR the new liabilities connected with the necessity to finance continuos budget deficit have grown at very fast pace [63]. Although Ukraine, Romania, Kyrgyzstan, and Georgia started their transition process from the public debt equal to zero, it has also increased later quite dramatically.

A comparative study prepared by Siwińska [1998] gives a more detail picture of the public debt structure and dynamics in four CEE countries: the Czech Republic, Hungary, Poland and Romania [64].

Chart 8. 1 summarizes the developments of the total public debt in four mentioned countries. During this time the stock and structure of public debt in these four countries has undergone major changes. Hungary and Poland, that entered the transition period with the largest debt burden, managed to substantially lower their debt to GDP ratio.

The improvement in the Hungarian debt ratio can be attributed to the conduct of fiscal policy, that resulted in primary surpluses, as well as to the inflow of non-debt deficit financing, mainly privatization receipts. The fall in the public debt ratio was also due to a high nominal growth rate of GDP that was greater than the interest payments, what resulted in the economy "outgrowing" the debt.

In the case of Poland the debt ratio improvement can be assigned mainly to the external debt reduction, that was the result of the agreements with the Paris and London Clubs. Other important factors were also the fast rate of real GDP growth and the real appreciation of zloty, that resulted in a

[62] Bulgaria received reduction of the commercial debt amounting to 3.8 billion USD, out of 8.1 billion USD of its liabilities to London Club.

[63] In order to have a complete picture one must remember about the former USSR claims to former socialist and many developing countries inherited by Russia in 1992 (ca. 140 billion of US dollars). Additionally, new Russian claims were accumulated in 1992 – 1993 as result of the so-called technical credits granted by the Central Bank of Russia to other central banks of the ruble zone and arrears connected with delivery of energy resources from Russia to CIS countries. However, the opportunity of executing these claims (if any) seem to be very limited in the coming years.

[64] The remaining part of this subsection draws extensively from Siwińska [1998].

phenomenon, that has also occurred in Hungary, namely, that the nominal rate of GDP growth was bigger than the interest payments on the debt, what resulted in lowering of the debt to GDP ratio.

Romania experienced a debt ratio increase, although its indebtedness is still under the 60% of GDP specified by the Maastricht Criteria and lower than the liabilities' ratio of Hungary and Poland. The debt built up has been occurring since 1994, and was especially dynamic in 1996 and 1997. The chief reasons have been the high fiscal deficit and quasi-fiscal imbalances.

The Czech Republic in 1997 also noted a debt ratio increase, although very small in magnitude. It was mainly due the currency crisis and the flood, both of which hit the country in 1997, and resulted in a deterioration of GDP growth.

The structure of the debt of four analyzed countries has also undergone major changes. In the Czech Republic, Hungary and Poland the share of foreign debt has fallen in favor of domestic debt; in Romania, contrary, the share of foreign debt has substantially increased. The shift to market-financing has resulted in growing share of securities in domestic debt financing. On the other hand, progress in the development of public debt market and growing credibility of the governments has allowed to lengthen bonds' maturity.

Although the debt ratios of Hungary and Poland are falling and both countries display primary surpluses, and the debt ratios of Czech Republic and Romania are relatively low, each analyzed country faces hazards that threaten further fiscal sustainability.

The Czech Republic seems to be in the best situation. The debt ratio decline has been halted in 1997, but provided, that the country manages to keep its fiscal deficit in bound and regain economic growth, its financial situation looks quite stable. However, the Czech Republic, contrary to Poland and Hungary, has still not resolved the problem of bad debts in the banking sector, therefore its true indebtedness may be underestimated.

Future fiscal developments in Hungary and Poland can be more vulnerable to negative shocks. Both countries face large interest payments – in Poland they have reached in 1997 almost 4% of GDP and in Hungary 9% of GDP. Those payments are larger than primary surpluses run by the governments of both countries and therefore add to debt cumulating process. Any slowing down GDP growth may cause the interest payments to outweigh the nominal GDP increase what can lead to a snowball effect of growing debt-to-GDP ratio and interest payments, a path that is unsustainable in the longer run and leads strait to an economic crisis. Poland, although has smaller present interest payments, will face an increasing debt service after year 2001 (what is the consequence of a debt reduction schedule).

Thus, it is necessary to make an effort in all three countries to carry out a further fiscal adjustment, especially by curbing government spending and improving their quality. All the advanced transition countries appear to spend more than the long-run revenue generating capacities can sustain and more than efficiency conditions call for [see Dąbrowski, 1998a].

The situation of Romania is the most fragile. The observed dynamics of the debt is unsustainable in the longer run and this country is suffering major economic imbalances that are far from being solved. Although the debt to GDP ratio has still remained low, only over 1996 – 1997 it increased by nearly 16 percentage points. The underlying cause has been a huge fiscal imbalance, augmented by a large quasi-fiscal deficit and off-budgetary transfers. Although the authorities committed themselves to a stabilization program, backed by the IMF and World Bank, in 1998 most criteria agreed with the IMF were missed, including the fiscal deficit target that widened to 6% of GDP in January – June 1998, with a primary deficit of 0.6% of GDP. Those budgetary imbalances were exacerbated by large off-budgetary losses resulting from the failure to close or privatize loss-making state enterprises.

9. Central Bank Independence and Disinflation

9. 1. Theoretical Arguments in Favor of Central Bank Independence

Institutional devises, such as an independent central bank, can impose necessary financial discipline on policymakers and restrict them from short-sighted monetary expansion [65]. Economic theory and empirical evidence give strong support for delegating monetary

[65] Chapter 9 of this report draws extensively from Maliszewski [1997].

policy to the independent central banker. On the other hand, one can put the following question. If fiscal policy plays so crucial role in determining success or failure of disinflation policy, and monetary and fiscal policies cannot be separated in medium and long term (as it as stressed in chapter 8), why the institution of independent central bank has any practical importance?

According to Parkin [1987], inflationary effects of the lack of co-ordination of monetary and fiscal policies can be avoided. If institutional solutions are such that monetary authorities can influence the real size of primary deficit, a consistent restrictive monetary policy may discipline fiscal authorities. The essential institutional solution consists in securing independence of the central bank. In that case, anti-inflationary monetary policy would extort fiscal adjustment.

Economic theory shows that greater central bank independence (CBI) may reduce "inflationary bias", i.e. persistent and higher than socially optimal price growth. To explain possible causes for the bias, Cukierman [1992] demonstrates four motives for monetary expansion: government's concerns about employment, revenues, balance of payments and financial stability.

The employment motive is based on the widely accepted "expectations augmented" Phillips curve, i.e. a relationship between deviations of unemployment from its equilibrium level and unanticipated shocks to inflation [see e.g. Lucas, 1973].

Inflation depreciates the real value of money and allows the government to collect seigniorage revenue. It also cuts down the value of interest bearing debt fixed in nominal terms, reducing government's real expenditures on interest and repayment of principal [Barro and Gordon, 1983]. The government is tempted to use the inflationary tax if other taxes are difficult to collect and when it faces constraints on borrowing from private agents.

The concern about balance of payment may lead to the inflationary policy through nominal devaluation [Cukierman, 1992], which, in the presence of nominal contracts, reduces real wages and increases output. Hence, more resources are available for export or for import substitution and the current account position temporarily improves.

The stability of financial system may be also inconsistent with the low inflation objective [Cukierman, 1990, 1992]. The banking system is vulnerable to surprise increases in interest rate since in the short run it affects costs of (mostly short-term) borrowing more quickly than revenues from (mostly long-term) loans. If central bank cares about the profits of the banking sector, it may avoid raising interest rate when it is needed for suppressing inflationary pressure.

Motives for monetary expansion turn out to be extremely important in the analysis of dynamic inconsistency problem, i.e. when the optimal policy before private agents' contracts are set is different from the optimal policy afterwards. When policymakers are ready to trade off more employment for higher inflation, they have incentive to inflate after the contracts have been set. Kydland and Prescott [1977] showed that, if expectations are rational, the resulting equilibrium is sub-optimal: unemployment is unchanged while inflation is higher. This result, popularized by Barro and Gordon [1983], can be extended to other motives for monetary expansion described above. Rogoff [1985] shows that the time inconsistency problem can be mitigated by delegating monetary policy to the "conservative" central banker, who attaches greater weight to inflation stabilization than the policymakers do. His analysis is based on the assumption that the bank chooses both the goals and instruments of monetary policy. Conservative and independent central bank delivers lower mean and variance of inflation than the government would produce.

The main theoretical determinant of inflationary bias – employment motive for monetary expansion – seems to have only limited influence in transition environment. High or very high inflation rate significantly reduces length of nominal contracts and brings various mechanisms of indexation (see chapter 10). The revenue motive is undoubtedly more important in investigated countries. Inefficient welfare state, loss-making state-owned enterprises and tax base erosion produce substantial pressure on states' budgets. Narrow domestic financial markets and limited access to foreign financing (due to high indebtedness) inevitably lead to the monetary deficit financing. Similarly, a concern about the balance of payment deficit has severe inflationary consequences. A political pressure on "competitive devaluation" remains strong in transition economies. Maintaining stability of the financial system also plays significant role in fuelling inflation [Cukierman, 1996]. Banking systems in transition economies inherited considerable amount of non-performing loans. The newly developed private financial institutions are fragile and unstable. The central banks, usually legally responsible for financial stability, are often forced to bail out insolvent banks in order to avoid financial crisis. The price for the rescue operations is additional monetary expansion.

9. 2. Empirical Research on CBI in Transition Economies

There have been several attempts to explore the question of CBI in post-communist countries. Hinton-Braaten [1994], Hochreiter [1994], and Hochreiter and Riesinger [1995] describe CB laws in transition economies. Sundararajan et al. [1997] discussed central banking reforms in the FSU. Radzyner and Riesinger [1997] presented an extensive review of central bank legal independence in five Central European countries (the Czech Republic, Slovakia, Hungary, Poland and Slovenia), concluding that CB laws in analyzed countries generally meet Maastricht criteria but the actual practice often varies from the rules stipulated by law. Siklos [1994] built the first index of legal independence for Czech Republic, Hungary, Poland and Slovakia. He introduced some additional elements to the index based on the Cukierman's [1992] methodology, accounting for specific features of transition economies [66]. The Czech National Bank was ranked highest in this study while the National Bank of Slovakia was the least independent. The National Bank of Poland was slightly more independent than the National Bank of Hungary. Eijffinger and Van Keulen [1995] presented indices of political independence for eleven countries, including a new legislation of the Czech Republic, Hungary and Poland. Several measures of political independence were investigated, based on Bade and Parkin [1988], Alesina [1989], Grilli, Masciandaro and Tabellini [1991] and Eijffinger and Schaling [1993]. The Czech National Bank was placed on the top of independence ranking according to all indices. In Poland independence was considerably lower and in Hungary the banks' position was the weakest. Loungani and Sheets [1997] examined central bank independence in twelve transition countries. They derived two indices of CBI: the first covers goal, economic and political independence and the second assesses similarity between the analyzed law and the Bundesbank statute. Estonia, the Czech Republic and Bulgaria were placed on the top of independence ranking according to the first index. The Czech Republic, Bulgaria and Albania's central banks were the most independent according to the second index. In the regression analysis, a strong negative correlation between the measures of independence and inflation emerged, even after controlling for fiscal performance and the overall reform progress.

Maliszewski [1997] study extended Loungani and Sheets [1997] analysis by constructing alternative indices of independence and considering recent changes in the CB laws. His sample covered seven FSU countries (Belarus, Georgia, Kyrgyzstan, Latvia, Moldova, Russia and Ukraine), and nine CEE countries (Bulgaria, Croatia, the Czech Republic, Hungary, Macedonia, Poland, Romania, Slovakia and Slovenia). The choice was dictated either by data availability or institutional settings (Estonia and Lithuania adopted currency boards and their ability to conduct independent monetary policy is limited). The information on political and economic independence as stipulated by law is summarized in **Tables 9. 1** and **9. 2** and aggregated into indices similar to those proposed by Grilli, Masciandaro and Tabellini (GMT) [1991].

In GMT [1991] the political independence is influenced by three elements: the relationship between the government and the bank in formulation of monetary policy, the procedure for appointing the board and the formal goal of the bank with respect to monetary policy. These elements are evaluated using eight criteria: appointment procedure for high officials of the bank (the governor and the board), length of their term in office, participation of the government representative in the board, government approval of monetary policy, legal provision strengthening the bank's position against the government in case of conflict and statutory obligations to maintain price stability. Economic independence is affected by legal constraint on the central bank's lending to the government and the location of banking supervision. The bank is assumed to be more economically independent if the direct credit facility is of limited amount, not automatic, temporary and at the market rate. In addition more independent bank sets the discount rate, does not participate in the primary market for public debt and is not engaged in the commercial banks' supervision.

There are few important differences between the GMT [1991] index and the methodology applied by Maliszewski [1997]. Firstly, Maliszewski used different criteria for evaluation of the governor's appointment procedure. The nomination from the president is given two asterisks, from the parliament – one asterisk and from the government none. It takes into account the characteristic feature of less advanced transition economies, namely the populism and the anti-reformatory stance of some parliaments. Maliszewski also assumed that

[66] These are: choice of the exchange rate regime, enterprise arrears, maturity of the financial system, foreign debt burden, absence of the deposit insurance system, structure of the bank's board and degree of monetary overhang.

the bank is more politically independent if the provisions for governor's dismissal, as stated in the law, are non-political only (e.g. loss of ability to perform his duties or sentence for criminal act). Consequently, the new variable is added to the political index. In addition, the parliament or government approval of monetary policy is regarded as a limitation to CBI (instead of government approval only as in GMT). Finally, in the index of economic independence, the government borrowing from CB is assumed to be less "harmful" if all direct credit is securitized. As noticed by Cottarelli [1993], securitization provides the central bank with a stock of government papers, increasing flexibility of the monetary policy.

To avoid arbitrariness, indices of political and economic independence are calculated as a sum of elements in the **Tables 9. 1** and **9. 2**. The Czech Republic, Macedonia, Moldova and Slovenia had the most politically independent central banks, while the banks in Belarus, the Kyrgyzstan and Ukraine were the least independent. The most economically independent banks were in the Czech Republic, Georgia, Macedonia and Slovakia; the least independent were the banks in Belarus, Bulgaria, Croatia, Latvia, Romania, Russia and Ukraine. The measure of an overall independence was obtained by summing two indices. Macedonia received the highest score in this ranking, closely followed by the Czech Republic. The central banks in Georgia, Moldova, Slovakia and Slovenia also enjoy high degree of legal independence.

9. 3. CBI and Stabilization Effort: Causality Issue

Economic theory presented so far explains how central bank independence affects inflation performance. However, it is also possible that the causality arises from inflation to independence. In some countries central bank laws have been changed recently and, given history of the anti-inflationary policy in these countries, we can draw some conclusions about the causality between these two variables.

In most of the countries there were significant amendments to the CB law. Almost all changes were passed after stabilization had been achieved, only in case of Latvia and Russia bank's position was strengthen simultaneously with the stabilization attempt. Thus, the CBI was not an alternative for stabilization programs implemented at the initial stage of transformation. As Cukierman [1996] points out, independence functions well as a preventive but not as a remedial devise. Cukierman [1996] presents historical example of the Reichsbank during hyperinflation in mid-1922. Independence from the government, augmented by increasing the fraction of non-government members in the board, resulted in different distribution of seigniorage revenues but not in lower inflation. Recent experience of transition countries supports this view – Croatia provides an excellent example. The formal CBI did not prevent this country from having very high inflation rate in 1990 – 93. Inflation has been reduced after introduction of the exchange rate stabilization program at the end of 1993. From then on, independence seems to be an efficient device for protecting price stability.

In most of the investigated countries changes in the law were presumably related to high-inflation episodes in the past. Georgia, Kyrgyz Republic, Macedonia, Moldova and Russia, five out of eight countries that have upgraded CBI, experienced annual inflation rate over 1000% in the recent past. High inflation was also recorded in Poland and Latvia before changes have been passed. Recently, the bank's law in Hungary has been amended and the new Polish constitutional law has prohibited monetary deficit financing. Although these two countries managed to stabilize their economies at the start of reform process, they have been facing problem of persistent moderate inflation (see chapter 10). The changes, which were introduced to enforce credibility of their anti-inflationary policy, again support the Cukierman's [1992] idea that the relation between CBI and inflation performance reflects rising aversion to inflation in the society.

Changes to the law were partially enforced by external factors. Less advanced countries, often dependent on foreign aid, have been pushed to strengthen their banks. Georgia, where the new law was designed in co-operation with the IMF, provides an example. Another foreign determinant influences independence in more advanced countries. For Hungary and Poland the new laws are not only helpful in establishing credibility in the international markets but are also necessary for harmonization of the law with European standards.

Cukierman [1996] points out that a width of financial markets significantly affects CBI. Prohibition of the deficit financing by central bank is hardly possible if governments are not able to borrow in the well-organized domestic financial markets (see chapter 8). Difficulties with non-monetary budget deficit financing seem to be the main obstacle in building central bank independence in transition countries and in some countries upgrading independence became possible only recently.

9. 4. CBI and Inflation Performance

Although changes in the CB laws in many cases only followed macroeconomic stabilization, the role of CB in reducing inflationary bias may be still important. To assess how well CBI performs this task, Maliszewski [1997] tested for the relationship between bank's independence and inflation in 1996, i.e. in the year when most of the stabilization shocks have already vanished. He also controlled for an overall reform progress in the regression analysis. Bulgaria, Georgia and Macedonia were dropped from the sample because in these countries changes to the law were introduced in 1996 and it was difficult to assess an impact of these amendments in this year. **Charts 9. 1, 9. 2 and 9. 3** plot the indices of independence against the 1996 inflation rate.

The inverse relation between central bank independence and inflation performance seems to be present in the sample. However, while the relationship between political independence and inflation is quite strong, economic independence is only weakly associated with lower inflation. Although small number of observations limits statistical inference, Maliszewski [1997] attempted to test the relationships controlling for other determinants of inflation, characteristic for transition economies. The effects of macroeconomic disequilibria are stronger and the CB control over inflation is less effective in countries that stabilized their economies later. Moreover, central banks are less independent in these countries due to delayed political and institutional reforms. Thus, advanced reformers tend to have more independent banks and lower inflation and, as pointed out by Loungani and Sheets [1997], the relation between CBI and inflation may be obscured since independence index proxies for an overall transformation progress.

In order to avoid this problem Maliszewski [1997] experimented with two measures of transition progress: time elapsed from the most successful stabilization effort and the cumulative liberalization index (CLI) presented by De Melo, Denizer and Gelb [1996]. He also controlled for a pressure on monetary policy from a fiscal side, running another regression with 1996 fiscal balance and independence index as explanatory variables. Since this fiscal balance may be endogenous with respect to inflation, he also used primary balance as a measure of fiscal performance. **Table 9. 3** enlists all the variables and **Table 9. 4** presents regression results.

The political index (PI) is highly significant in explaining inflation rate in the sample of thirteen transition countries. The law strengthening the central bank position vis-à-vis other authorities seems to be effective in restraining political influence on the bank. The economic index (EI) is not statistically significant, which may suggest that the formal provisions are not binding in practice. One possible explanation of this result is that more politically independent central banks manage to sterilize government's borrowing even if they are not strong enough to enforce full adherence to the law and limit this credit. The overall index of legal independence is statistically significant, reflecting mostly the influence of political independence.

Regressions reported in column (4) to (7) check robustness of the results by controlling for the overall stabilization progress and fiscal performance. The first measure of stabilization progress – time elapsed from the most successful stabilization effort – is only marginally significant and does not affect the size and significance of the independence measure. In regression with the cumulative liberalization index in column (5), the coefficient of independence index is lower and slightly less significant. The result probably reflects high correlation between CBI and the overall transformation progress. In column (6) inflation is regressed on the independence index and fiscal balance in 1996. Both variables are significant and inclusion of the fiscal performance measure does not change the size of independence coefficient. Replacing fiscal balance by primary balance in the last column produces similar results. Concluding, there is a strong, negative relation between inflation rate and adopted measure of CBI, even after controlling for other factors affecting inflation performance.

10. Sources of Inflationary Inertia

Slow disinflation process in several countries, particularly those more advanced in transition process puts the question on the phenomenon of inflationary inertia and its sources. In order to address this problem we will present summary discussion and results of empirical research related to three specific issues: (1) changes in relative prices; (2) wage-price spiral; (3) exchange rate arrangements based on crawling peg/band formula.

10. 1. The Role of Relative Price Changes in Determining Speed of Disinflation

Several authors [e.g. Orłowski L., 1994; Pujol and Griffiths, 1996; Krzak, 1998] stressed the role of relative price adjustment and continuos administrative price changes in perpetuating inflationary inertia in Poland. In

order to verify this hypothesis two empirical analyzes were carried out: one on the role of relative price changes in Poland in the period of 1989 – 1997, and second comparing the size of relative price adjustment and its impact on inflation in the Czech Republic, Hungary and Poland [67].

10. 1. 1. Theoretical Framework of the Analysis

While most economists now acknowledge that relative price variability and inflation move closely together, there seems to be no unanimity as to the direction of causality between the two indicators and the theoretical grounds on which this causality should occur. The different theories linking aggregate price changes to relative price variability fall into three broad categories [see Woźniak, 1997]:

1. Increased relative price variability is a cause for increased inflation.
2. Increased inflation is a cause for increased relative price variability.
3. Inflation and relative price variability are influenced by common factors and therefore move together.

Ball and Mankiw [1994, 1995] models belong to the group of hypotheses which predict that causality runs from relative price variability to aggregate price level. In their 1995 paper authors develop and test a model incorporating costs of price adjustments (*menu costs*) to show the mechanism in which aggregate inflation is influenced by the shape of the distribution of relative supply shocks. Their 1994 model adds a great deal to the discussion by introducing positive trend inflation [68] and identifying other channels through which the association is enforced.

The idea central to Ball and Mankiw's [1995] model is the firms' response to supply (cost) shocks. Authors assume that responding to shocks by changing prices is costly because of various menu costs that have to be incurred. In such a setting firms do not react if shocks are relatively small and respond only to shocks large enough to make paying menu costs worthwhile. With the assumption that the average relative shock is zero, Ball and Mankiw consider different distributions of shocks and look at the consequences that these differences have after the imposition of menu costs. In a symmetric distribution, the range of inaction arising from menu costs covers the same number of positive and negative shocks and the net effect on the price level is zero. However, when a distribution is skewed [69] to the right the upper tail is larger than the lower tail and menu costs imply that firms react more to positive shocks than they do to negative. Finally, if the distribution is skewed to the left the situation is reversed: the mass in the lower tail of the distribution is bigger and more firms experience downward shocks to their prices what results in the fall of the aggregate price level.

The basic implication of this reasoning is that in periods during which the distribution of shocks is skewed to the right, aggregate price level may rise as menu costs imply more price increases than price decreases. The authors formalize these ideas in a one-period theoretical model. They also observe that the analysis refers to the relationship of the distribution of unobserved real sectoral shocks and the rate of inflation. Recognizing that fact, they carry out a numerical analysis that proves that the relationship between the first, second and third moment of the distribution of unobserved shocks carries over to actual price changes under reasonable assumptions. In other words, one can use relative price data as a proxy for unobserved shocks since the two phenomena move monotonically closely together.

While Ball and Mankiw [1995] offer sound justification for including skewness of the distribution of relative price changes as an explanatory variable, their 1994 paper explains the mechanism through which inflation is influenced by the variance of that distribution. The underlying assumption of this paper is the positive trend inflation that all economic agents have to account for. With that assumption authors come much closer to the reality of transition economies, all of which have had to cope with high inflation levels. Introducing steadily growing price level adds a great deal of credibility to the analysis, since intuition strongly suggests that high inflation has a substantial impact on firms' pricing decisions.

The model, as developed by Ball and Mankiw [1994], assumes that in an inflationary environment firms make regular price adjustments to keep up with the growing price level [70] as well as change their prices in response to shocks for which they have to pay the menu cost. In this context, positive shocks trigger greater adjustment than do negative shocks of the same size and asymmetries arise even with a symmetric distribution of shocks. Firms affected by a negative sectoral shock putting

[67] See Woźniak [1997] and Woźniak [1998]. This section draws heavily from these two papers.

[68] Introducing positive trend inflation is crucial in the context of transition economies.

[69] Positive skewness arises when there are few unusually large positive shocks and many small negative ones.

[70] In the model authors assume steady rate of inflation. However, introducing variable (steadily falling) inflation does not change the findings as long as the rate is well-known and anticipated.

downward price pressure have the incentive not to pay the menu costs by simply waiting with unchanged nominal prices until inflation does the desired erosion to the relative price of their product. By contrast, positive shocks call for a prompt and more than offsetting action on the part of the affected firm as the upward price pressure resulting from the shock is magnified by inflation which is continuously widening the gap between the firm's actual and desired relative price. Therefore, authors claim that positive shocks cause firms to adjust quicker and more fully than negative shocks which, if not exceptionally large, are likely to leave firms' prices unchanged.

With the asymmetric price adjustment assumed, distribution of sectoral shocks need not be asymmetric to have a positive influence on the price level. Unlike in the 1995 paper where it was the asymmetry of the distribution of shocks that pushed prices upwards, in the 1994 model it is the greater relative price variability that itself exerts inflationary pressures. In the light of the model a relative shock that raises some firms' desired prices (and lowers the desired prices of others) induces more upward than downward adjustment. It is precisely for that reason that greater relative price variability is likely to be accompanied by higher inflation and lower output [71].

Combining the two models yields a coherent and useful theoretical basis for studying the link between inflation and relative price variability in transition economies. The resultant model would view short run inflation developments in the light of the shape of the distribution of sectoral shocks as proxied by relative price shifts. With positive trend inflation, both variance and skewness of the distribution should add to the inflationary pressures as both downward price rigidity and prevalence of large positive price hikes result in a bigger asymmetry of firms' adjustment.

The most common way of representing relative price changes in the literature is by means of a distribution of individual inflation rates of goods and services comprising the index. In this framework, different pace of price growth across sectors (leading to changing price relations) will be reflected in a wider distribution and disproportionately high price jumps will produce a distribution skewed to the right. In terms of the statistics of the distribution the former phenomenon should be captured by higher values of variance (or standard deviation), whereas the latter by high positive values of the coefficient of skewness.

10. 1. 2. Relative Price Changes in Poland and Inflation

Woźniak [1997] estimated the magnitude of the influence of relative price shifts on the overall price level in Poland in 1989 – 1997 using the above described model based on Ball and Mankiw [1994, 1995] proposals and controlling for nominal and real shocks. Author used individual inflation rates for more than 60 groups of goods and services covering the entire basket of goods and services constituting the basis of the Polish CPI, so that the weights of all categories add up to one for each year. Monthly data were aggregated to quarterly changes in order to eliminate excessive volatility due to high frequency and focus on the shifts in relative prices that are stable over longer periods. For each quarter distribution of unweighted inflation rates and distribution of weighted inflation rates were created. Using those distributions various measures of variance and skewness have been calculated:

- conventional variance and skewness of the unweighted distribution;
- conventional variance and skewness of the weighted distribution;
- theil variance and skewness.

The basic message from this exercise was not surprising: the distribution of individual inflation rates was most heavily skewed and dispersed during initial stages of reform. In the case of all statistics but one, second and third quarter of 1989 turn out to be the periods during which the measures peak. By contrast, later observations (1994 – 1997) tend to be characterized by lowest variance and skewness. To give a better idea of these outlier distributions, **Chart 10. 1** presents histograms of individual price changes for Sep – 89 and Dec – 89 (high positive skewness and variance) as well as Sep – 95 and Sep – 96 (high negative skewness).

In order to empirically verify the presumptions on the link between inflation and relative price variability, Woźniak [1997] used a simple static model for a two-sector (tradables and non-tradables) small open economy proposed by Coorey, Mecagni and Offerdal [1996]. Using this basic set of assumptions authors derive seven structural equations describing market for non-tradable goods, money market equilibrium, real income determination and inflation. The resultant model takes the following form:

$$\pi = \gamma_1 + \gamma_2 m + \gamma_3 w + \gamma_4 \left(\pi_{NT} - \pi_T\right) \gamma_5 V_\pi + seasonals$$

and takes account of:

- nominal money growth – m,

[71] In the absence of monetary accommodation, if firms fail to adjust their prices downward they have to face substantial output cuts.

– nominal wage growth – w,
– real exchange rate based on relative inflation in tradable and non-tradable sector $\pi_{NT} - \pi_T$,
– relative price variability – V_π,
– quarterly seasonality – *seasonals*.

Estimations of the model yielded high explanatory power and statistically significant coefficients on most variance and skewness variables thus giving a strong empirical support to the theoretical relationship. Larger shifts in relative prices accompanying the adjustment process and detected by higher variance in the equation were proven to exert substantial upward pressure on inflation that persists over time. On the other hand, high positive skewness reflecting the domination of the adjustment process by few large increases was confirmed to produce contemporaneous upward impulse that tends to wear off after one quarter but is stronger in magnitude than that coming from higher variance. Including other explanatory variables like real exchange rate, wages and/or money allowed for observing the relative importance of inflationary factors. The analysis revealed that money and wages remain to be the main factors fueling inflation and can jointly account for almost three quarters of quarterly inflation. If their impact is evaluated separately, wages contribute about one half of inflation and domestic credit almost one third. On the other hand, real exchange rate appreciation was confirmed to significantly lower inflation. The measure based on different paces of inflation between tradables and non-tradables has proven to be a substantial dampening factor with an average elasticity of about minus three quarters.

Additionally, a closer look has been cast at the distributions of individual inflation rates of CPI components. High variance and positive skewness have been the typical features of these distributions. This suggests that some profound relative price shifts were taking place (variance) and that a small number of large price increases have led the inflationary process (skewness). Individual inflation rates have also been looked at on a cumulative basis. This analysis revealed that prices in the sector of controlled utilities have experienced the highest relative increases with some services (central heating, hot water supply, and gas) outpacing the aggregate inflation 5 times and more. In general, sectors controlled by the government have registered biggest relative price increases: 8 of them are among 15 sectors with top relative price increases and their average relative price in 1996 has more than doubled since the end of 1988.

It is remarkable, however, that on average most of those dramatic relative price shifts occurred during initial years of reform: 1989 – 1991. Since 1992 relative prices for most goods controlled by the government have remained fairly stable. This suggests that the process of upward adjustments was seriously slowed down or even stopped in recent years and administered price increases just make up for inflation.

Even though the data clearly show that significant increases in some relative prices have indeed taken place, the adjustment process should not be considered complete. Prices in most of the sectors controlled by the government are still substantially undervalued and need further upward adjustments. According to the Cukierman and Leiderman [1984] model, the optimal path of controlled price increases is the one that follows money expansion. The overall relative price variability induced by those administered increases will then be minimized which according to the paper's earlier findings can contribute to lower overall inflation. Therefore, the main policy recommendation for conducting anti-inflationary policy should be frequent increases slightly in excess of overall inflation so that upward adjustments can take place without inducing large price variability. However, when one considers the same issue in the context of political economy, this recommendation may not turn out optimal for policy makers. Less frequent adjustments are clearly more preferred by the government who has to bear the brunt of its unpopular decisions. Therefore, when frequent adjustments are not feasible, sizable increases have to be recommended as they ensure that the existing undervaluation of numerous services will diminish more quickly.

10. 1. 3. Comparison of Relative Price Adjustment in CEE Countries

The comparative analysis of the relative price adjustment in the Czech Republic, Hungary, and Poland done by Woźniak [1998] followed the similar methodology as for Poland (see previous subsection).

Before proceeding with econometric estimation author analyzed behavior of the Theil variance and skewness of the distribution of individual inflation rates in relation to the general rate of inflation in each of the three countries. **Chart 10. 2** presents the two statistics (right scale) indicating the magnitude of relative price changes during the particular quarter along with the quarterly inflation rate (left scale).

Initial inspection of the chart does not give a conclusive answer to the question on the nature of the relationship. While positive correlation between inflation and measures

of relative price variability seems to be visible in Poland, it is not evident in the case of either Hungary or Czech Republic. It should be noted, however, that what should hold one back from drawing definite conclusions at this stage is the incomparability of the series due to different starting points. The unavailability of appropriately disaggregated inflation data in Hungary makes it impossible to calculate Theil statistics for the initial period of Hungarian transformation and hence to evaluate the degree of correlation between relative price shifts and inflation.

In order to verify empirically the presumptions on the link between inflation and relative price variability Woźniak [1998] used the same Coorey, Mecagni and Offerdal [1996] model and the same methodology as in the case of Poland's research (see previous subsection).

Main results of the model estimation were as follows:

1. Money growth appears to be the most significant source of inflationary pressures in the analyzed countries. Strongest (and statistically most significant) impact was detected in the Polish model where as much as 3/4 of the quarterly money growth translates into following quarter's inflation. Czech and Hungarian models suggest that it takes about 6 months for the money effect (of the magnitude of about 1/4) to materialize, although these two results are statistically robust only at the 10% level of significance.
2. Wages prove to be a significant determinant of inflation with an elasticity ranging from 12% in Hungary up to 76% in Poland. Likewise, the length of transmission processes varies across countries. The impact is most immediate in Poland and Czech Republic where wage growth translates contemporaneously into inflation. The process has additional one- and three-quarter-lags in Poland and Hungary with the third lag having negative elasticity thus reflecting some rebound effects of wage growth.
3. Real exchange appreciation has a substantial dampening effect [72] on inflation in all considered economies. The impact seems strongest in Hungary where pooled elasticities reach no less than 100%. Real appreciation of the Czech currency produces a contemporaneous dampening impulse of the magnitude above 50%, while equivalent effects in Poland are relatively weakest and fall into the range of 17% – 30%. The process has the most immediate, contemporaneous effects in the Czech Republic, takes one or two quarters to materialize in Poland and up to three quarters in Hungary.
4. Relative price variability exerts considerable upward pressure on inflation. In all regressions relative price variability was confirmed to raise overall inflation. The fact that the analysis was carried out in the framework controlling for wage/monetary and real exchange rate shocks adds more credibility to the result as the detected correlation is econometrically proven to be an autonomous macroeconomic phenomenon significant even in the absence of exogenous shocks. Coefficients of Theil standard deviation and skewness are significantly positive in all equations except for the Czech one where skewness proved insignificant in money and negative in the wage model. The influence of higher dispersion of relative price changes (higher *Tsd*) is by far the strongest and most immediate in Poland where a one-standard-deviation rise in *Tsd* could historically raise inflation by up to 15% on a quarterly basis! The respective figures for the Czech Republic ranges from 4.2 to 5.2% and for Hungary from 0.8 to 1.1%. The effect occurs within the same quarter in the Czech Republic, but is a gradual process spread over three quarters in other two countries. Larger asymmetry of price changes reflected by higher skewnes (*Tsk*) is again considerably more significant in Poland than in any other country. However, the impact is substantially lower than in the case of *Tsd* and amounts to 1.5 to 2% per one standard deviation. Hungarian models predicts an almost negligibly weak 0.8% impact and Czech data imply no skewness-inflation relationship at all (money model) or a theoretically non-founded negative relationship (wage model).

Econometric analysis revealed that within the framework accounting for monetary, wage or exchange rate shocks, relative price adjustment can contribute to higher inflation. The impact coming from both magnitude and asymmetry of relative price changes is shown to be by far most significant in Poland. Czech inflation seems to be affected more by rapid relative price changes than inflation in Hungary. On the other hand, existence of disproportionately large price hikes exerts more of an inflationary pressure in Hungary than they do in the Czech Republic where the direction of the effect is itself ambiguous. However, the aggregated effect of relative price shifts in those two countries is on average much less important.

[72] Rer was defined as a quarterly change of the ratio of tradable to non-tradable prices. Hence, positive values of rer suggest real depreciation and negative – real appreciation.

In general, substantial relative price shifts have to be considered a very important source of inflationary pressures especially in the initial stages of reform in transition economies. As Coorey, Mecagni and Offerdal [1997, p. 14] conclude, *"significant relative price effect would suggest, other things equal, a worsening of any given trade off between inflation and output growth (at least at moderate inflation levels), compared with a situation without relative price adjustment. For a given relative price adjustment, rapid disinflation would be associated with greater output loss to the extent that economic agents resist the downward adjustment of their prices"*. Authors note that the effect can materialize through an increase in velocity triggered by the price shock and its duration depends in principle on the downward price rigidity and monetary accommodation [73]. Ball and Mankiw [1995] explicitly relate relative price shocks to inflation-output trade-off. They run a series of regressions and conclude that relative price variability and asymmetry can indeed be thought of as a good measure of supply shocks and if included in the Phillips curve equation they come out highly significant as factors worsening the trade-off.

From the above discussion it follows that for those policy makers who target output, necessary adjustments imply higher inflation. Therefore, from the point of view of political economy it might seem worthwhile to resist relative price adjustment in order to eliminate its detrimental effect on inflation. High fiscal costs of maintaining subsidies are often not as apparent and immediate as political costs that policy makers have to incur when they decide on administrative increases.

Estimating relative price variability on the basis of differences in individual inflation rates of groups of commodities comprising the price index need not indicate whether any actual relative price shifts take place in the economy. It is possible that even during periods of persisting relative price variability, relative prices measured at the end of the sample period did not change and the variability as detected by variance and skewness resulted from different paths of catching up with inflation across sectors. Therefore it is necessary to examine relative price changes on a cumulative basis, particularly in the case of transition economies.

Citrin and Lahiri [1995] argue that administered price increases have been the main factors fueling inflation in the FSU countries. While this may be true for Poland, Hungary and Czech Republic as well, it is important to look at those increases on a cumulative basis. Administered increases can only be considered a fundamental determinant of inflation if their purpose is to establish new and higher relative prices of controlled goods. Pujol and Griffiths [1996] employ simple regression technique to show that in Poland there has been strong correlation between a long lasting improvement in a particular sector's relative price and the number of times its price increases were distribution outliers.

To give more inside into outlier price increases **Table 10. 1** presents a detailed list of all categories of the countries' CPI baskets whose price rose more than 3 standard deviations of the unweighted distribution of individual inflation for a particular quarter.

The most striking pattern that emerges from **Table 10. 1** is that of high seasonality. In Poland after the initial outburst of corrective price increases in staple foods, pharmaceuticals and fuels, on average, initial quarters seemed to be highly dominated by increases of controlled prices such as energy, gas or water supply. Sometimes these administered increases were extended into the second quarter as well (1991 and 1992). Seasonal foods increases accounted for biggest hikes in the fourth and second quarter as the reduced supply of fruits and vegetables combined with protectionist agricultural policies drove prices up. Third quarter emerges as the period with relatively small price increases with no clear pattern (with the exception of eggs) and no increases exceeding 3 standard deviations in 1995, 1996 and 1997 [74]. This is certainly the result of food price decreases brought about by positive seasonal supply shocks.

Czech Republic emerges as the country with relatively few outlier price jumps. After corrective increases in fuels, dairy products and some services, the list from 1994 contains almost exclusively seasonal increases in prices of vegetables and potatoes. Third quarter of 1989, 1995, 1996 and 1997 as well as second quarter of 1992, 1993 and first quarter of 1995 registered no price changes bigger than 3 standard deviations of the unweighted distribution.

In Hungary, similarly to Poland, first quarters of the year were clearly dominated by administered increases, mainly of water and sewage disposal charges, pharmaceuticals and gas. On the other hand, fourth (and sometimes also third) quarter was marked by seasonal changes in food prices: prices of vegetables, eggs and animal fats tended to rise disproportionately.

[73] Coorey, Mecagni and Offerdal [1997] identify money expansion through foreign exchange inflows as the potentially substantial accommodating factor in transition economies.

[74] This finding can be linked to negative skewness of third quarters for 1995, 1996 and 1997 as well as for most other years (see Chart 10.2). The same is true for Hungary and Czech Republic.

In general, categories of the Polish CPI seem to register outlier price relatively more often than do their Czech or Hungarian counterparts. However, this is not clear anymore from 1994. While the Czech Republic has fewest outlier price increases throughout the entire sample [75], Hungary seems to match or even overtake Poland in some more recent quarters. High seasonality is visible for all three countries. Koen and De Masi [1997] point to two different factors causing seasonal variation of inflation in transition economies: "natural" (weather induced) and "artificial" (administered-price-related). This is strongly confirmed by **Table 10. 1** in which the vast majority of entries (if not all of them) fall into one of the two categories. Koen and De Masi [1997] argue that administrative adjustments have become so systematic and regular that they give rise to potentially misleading fluctuation around "core" disinflation. While this is certainly true for the studied countries, Woźniak [1998] analysis discussed above allows to extend the argument one step further. Administrative increases do not only temporarily throw inflation off the disinflation trend, but can also contribute to slowing down this trend in the short run or, if money-accommodated, permanently.

In order to examine how much seasonal is inflation in the studied countries Woźniak [1998, table 6] regressed quarterly CPI on seasonals, a constant, and its lagged value. Regressions reveal the following facts:

1. In the initial years of reform in Poland trend was a dominant inflation-shaping factor. Seasonality became significant later on as the trend's contribution weakened threefold (from -0.6% down to -0.2% quarterly) and inflation inertia set in. In the later years, inflation in the first quarter, compared to the fourth's quarter, was on average some 1% higher, in the second quarter – some 1% lower and in the third quarter –2.7% lower.
2. Inflation in Hungary didn't follow any particular seasonal pattern during initial years of reform. Neither trend nor inertia was significant and the only seasonal factor present during the period was that of the first quarter raising quarterly inflation by 3% on average. Later on, both inertia (higher than in Poland!) and trend became significant along with a number of seasonal variables. First quarter inflation appeared on average 4% higher and third quarter inflation 2.2% lower than that of the fourth quarter.
3. Inflation in the Czech Republic seems the least prone to seasonal factors. Throughout the entire sample, it exhibits neither inertia nor trend. During initial years of reform administrative increases were responsible for seasonal inflation peak in the first quarter, but this effect disappeared afterwards.

Although the above results strongly confirm the existence of seasonal factors, intuition suggests that both natural and artificial seasonality may be best captured in monthly rather than quarterly data. Indeed, monthly regressions carried out by Woźniak [1998, table 7] offer a better picture of seasonality. In each analyzed country January is the month of extraordinarily high inflation. However, the size of the impact seems to be declining over time. Furthermore, it is remarkable that Poland is the only country whose CPI index falls significantly during summer months due to positive food supply shock. On the contrary, in the Hungarian and Czech samples, July appears to be a higher-inflation month most likely as a result of the second round of administered increases.

Evaluating the extent of changes in the relative price structure on the basis of frequency and magnitude of individual price increases has one major weakness. Big price increases need not cause a significant shift in a sector's relative prices (food serves as the best example) unless they are repeated frequently. Establishing higher relative prices requires continuos increases well in excess of inflation rates. To trace those continuos relative price shifts Woźniak [1998] calculated the relative price index RP_i, which was defined as a ratio of the price index for a particular CPI category to the general CPI index. In the calculations t = 0 (88Q4) was set to be the base period so that $P_0^i = CPI_0 = RP_0^i = 1$ for all i.

If in any sample period, RP of a category drops below 1 this means that the upward adjustments in its nominal price have fallen short of overall inflation and that the relative price of this good has deteriorated. By contrast, RP bigger than 1 indicates relative improvement in the category's price.

Charts 10. 3 and **10. 4** present comparisons of the relative price of services (excluding fuel and electricity), food (excluding tobacco and alcohol), non-food goods, fuel and electricity [76], alcohol and tobacco as well as alcohol alone cumulated over the period of 9 years. Both charts show that Poland has gone the furthest way in adjusting the prices of services (1.71 comparing with 1.04 in Hungary and 1.19 in

[75] However, this conclusion has to be viewed with caution as it may follow from the fact that the disaggregation of the CPI basket is not as fine as that for Poland and Hungary.

[76] Due to unavailability of data, the Czech series prior to 1993:Q3 reflects only changes in relative price of fuels.

the Czech Republic). Nonetheless, it is remarkable that in Poland after an incredible upward shift that occurred between the 4th quarter of 1989 and 2nd quarter of 1992, relative prices of services have remained fairly stable to date. This suggests that the process of adjustments came to a halt in 1992 and subsequent increases (for the most part administrative) just make up for inflation. On the other hand, relative prices of Czech services have been increasing slowly but continuously and consistently since the beginning of 1991. Hungary presents a yet another case: prices of services have on average matched inflation pretty closely leaving aggregate relations roughly at the pre-transition level.

After an upward correction in 1989, prices of food have begun to fall in all countries. The initial spike was particularly big in Poland – over 3 times bigger than both in Hungary and the Czech Republic. Falling trend is very clear in Poland and the Czech Republic, but not evident in Hungary where the relative price line resembles some sort of a sine-line getting close to unity towards the end of 1997.

The category "Goods less food", closest to the definition of tradables, contains all CPI items with the exception of those graphed separately, i.e. food, services, fuel, electricity, tobacco and alcohol. On average, prices of non-food items have increased much less than the general price level in Poland and Hungary. The falling trend is particularly visible in Hungary where it has been in place since the beginning of 1991. In Poland relative prices in the non-food category have been fairly stable after the initial drop in 1989. Czech Republic is the evident outlier here: the index of tradable prices has been on average above the general CPI index to return to its initial pre-reform level in 1996 and remain there since then. One of the possible explanations of those differences comes from the real exchange rate behavior. Czech koruna turn out to be the only currency which didn't experience significant real appreciation on a cumulative basis: the end-97 value of the Czech CPI deflated index equals 0.97 while that of Poland and Hungary – respectively 0.54 and 0.74.

With the assumption of a relatively equal openness to foreign trade in the three countries under consideration, the extent of real appreciation may have indeed influenced the pace of relative price changes. The periods of rapid real appreciation tend to coincide with significant deterioration of non-food prices. Forces of international arbitrage that work through cheaper imports ensure that prices of tradables converge more rapidly towards those prevailing in world markets [Koen and De Masi, 1997, p.9]. Accordingly, periods of relative real exchange stabilization or even depreciation (Poland since 1992, Czech Republic since 1995) entail stabilization or a slight increase in the relative price of tradables.

Fuel and electricity have experienced by far the biggest relative price increase out of all considered aggregates. The most radical upward adjustments were made in all countries in early 1991 what was connected with collapse of the CMEA. Prices of fuel and electricity have, until present, continued to rise well above inflation in the Czech Republic and particularly in Hungary while in Poland adjustments seem to be falling short of inflation since 1994 resulting in a gradual erosion of the category's relative price.

Prices of alcohol and tobacco as well as alcohol alone fell relative to the general inflation, albeit the latter drop was significantly bigger in the case of all countries. Prices of alcohol grew, on average, at half of the pace of inflation in the Czech Republic and at 3/4 in Hungary.

In general, **Charts 10. 3** and **10. 4** revealed significant differences in both the extent of relative price shifts within the CPI in individual countries as well as the degree of relative rise or fall of that same category across countries. Hence, the crucial issue to be looked is the degree of undervaluation of prices of specific categories of goods and services. Koen and De Masi [1997] quote the European Comparison Program (ECP) data on price levels of selected goods and services in all transition economies compared to their Austrian counterparts. **Table 10. 2** presents this comparison for some major aggregates as well as individual items of special interest. Figures in first three rows are individual price levels in terms of respective Austrian indices. To show the extent of undervaluation relative to the undervaluation of the overall price level, the value of the "All Goods and Services" index (first column of the table) has been subtracted from the individual values and can be seen in subsequent rows.

Main messages that emerge from **Table 10. 2** can be briefly summarized as follows:

1. Consumer prices in Hungary have come closer to standard European levels than their Polish and Czech counterparts. The latter amounted to, on average, just 1/4 of Austrian prices.
2. Convergence towards world prices was much faster in the case of tradables for all countries, with some high-tech goods reaching prices well in excess of world levels (TV sets in Poland and the Czech Republic).
3. Services, in line with the general notion, remained the most undervalued CPI category, albeit significant differences between countries existed. Czech prices were evident outliers: the cost of electricity, railway tickets or a haircut was 1 – 3 times lower than in Poland or Hungary.

4. Rents and haircuts were some of the most undervalued services in all countries.

While the low value of the overall price index (26% – 44%) points to significant undervaluation of domestic currencies in 1993 according to PPP rule, the desired real appreciation, even if it takes place will not eliminate existing disparities within the index. Therefore, only continuos corrective adjustments in services (which seem to be the most undervalued) along with liberal foreign trade policies and allowing for real appreciation will ensure that price structures in the analyzed countries will converge fully towards the world patterns.

Tables 10. 3, 10. 4 and **10. 5** present evolution of relative prices for the Czech Republic, Poland, and Hungary. Tables list those CPI categories whose relative price rose or fell more than 10% during the period of 4 years between 1993 and 1997 [77]. Additionally, the table presents values of indices for some categories of services which didn't register significant relative price change during that period but were up to some point or still are subject to administrative controls. To give more insight into cumulative changes over longer periods, indices were re-calculated using the earliest possible base period [78] and are presented in the last columns.

Tables confirm that all countries have made significant progress in adjusting their administrative prices. To show the scale of the processes more clearly, Woźniak [1998] identified those individual categories for which the government (national or local) can be considered a price setter or was one up till recently (they were marked with the shaded background) [79]. For Poland and Hungary he calculated the weighted average of relative price indices of the regulated CPI categories (shaded areas in **Tables 10. 4** and **10. 5**). Figures used for calculations were the indices as of end-1997 calculated with the end-1993 base period. The Czech index is the index of regulated prices calculated by the Czech National Bank. Two sets of indices (both including and excluding alcohol and tobacco) are shown in **Graph 10. 5**.

In spite of obvious deficiencies of the index, it points clearly to differences in the pace of administrative adjustments across countries during the analyzed period. Hungary seems to have made the biggest progress in adjusting its regulated prices since 1993 (1.19 excluding tobacco and alcohol). Second comes the Czech Republic with the value of the index 1.13. Poland was relatively slowest in the recent years. Since 1993 regulated prices were on average adjusted at the pace exceeding general inflation by just 6% (the index equals 1.06).

These indices combined with the pre-1994 price data as well as **Charts 10. 3** and **10. 4** suggest that while the scale of overall administrative adjustments since the beginning of transition was bigger in Poland than anywhere else, the bulk of them was registered prior to 1993. Since 1994, prices of most controlled goods and services are subject to inflationary indexation rather than corrective upward adjustments. By contrast, administrative prices in Hungary and Czech Republic were on average adjusted respectively 19% and 13 % faster than inflation. However, the scale of the overall adjustments cumulated from the early 1990s seems to be much less radical.

Summing up, the evidence suggests that during 1993 – 1997 inflationary pressures coming from administrative adjustments were relatively high in all considered countries. However, they have been biggest in Hungary, lower in the Czech Republic and relatively lowest in Poland, although significant differences among individual items exist and the notion does not apply with equal strength across the entire aggregate. The undervaluation of certain administratively controlled services, although reduced between 1993 and 1997, is still high relative to the general price level. Therefore the adjustment processes should not yet be considered complete.

10. 2. Wage-Price Spiral

The relation between wages and inflation has been one of central problems in economic discussions for many years. It has been analyzed among many others by Robert Gordon [1988], Olivier Blanchard [1986], and more recently D.A. Brauer [1997]. The relationship between wage and price inflation in post-communist countries has also been already analyzed by Blangiewicz and Bolt [1992],

[77] Because price data published by Czech, Polish and Hungarian statistical offices are based on different classifications of goods and services each, the level of disaggregation varies and the comparability of some results remains an open question.

[78] According to data availability base periods are as follows: 1988Q4 for Poland and 1991Q1 for Hungary. Due to change of the classification used, 1993Q4 is the earliest available base period for the Czech Republic with very few exceptions for which the series started in 1989Q2.

[79] Due to insufficient disaggregation, the list contains broad composite categories which are either subject to controls as a whole (like rents or central heating) or include some items regulated by the government along with those with free market prices (like trains and private busses, respectively, in the category: public transportation).

Welfe [1994], Golinelli and Orsi [1994] and Totev and Tzanov [1994].

However, all these papers either presented only the theory (Blanchard) or analyzed the single case of one country and in most cases tried to answer whether wage-price spiral phenomena existed or not during the examined period in a given country. Walewski [1998] compared the wage-price relationship of 10 transition countries (the Czech Republic, Lithuania, Latvia, Kazakhstan, Poland, Romania, Russia, Croatia, Slovenia, and Slovakia) in order to find whether existence of price-wage spiral could hamper disinflation process in examined countries.

10. 2. 1. What is a Wage-Price Spiral?

One of the best characterics of the wage-price spiral has been given by Blanchard [1986]: *"An increase in aggregate demand, it was argued, would increase output and employment, leading firms to desire higher prices and workers higher wages; this would start a wage-price spiral, which would end only if and when this "demand pull" inflation decreased real money balances sufficiently to return economy into steady state. Or the spiral could start from a desire by workers to increase their real wages, or from firms to increase their profit margins, or from attempts of both sides to maintain the same wage and price in the face of adverse supply shock. These would also start a wage price spiral, lead to "cost push" inflation and through the effect of inflation on real money balances, lead to recession".*

This characteristic shows two possible sources of wage-price spiral. The first one is the positive demand shock caused, for instance, by real increase in government spending. The second one is the negative supply shock caused, for example, by growth in energy or commodity prices or deep structural break which was experienced by post-communist economies in the beginning of 1990s.

Spiral finishes as soon as real money balances decrease enough. It means that duration of spiral depends on monetary policy stance. As long as a central bank accommodates price shocks rising money supply sufficiently, the spiral can develop. On the contrary, tight monetary policy does not create a friendly environment for price-wage spiral to develop. After the initial increase in both price and wage inflation, decrease in real money balances will reduce aggregate demand leading to growth of unemployment what stops the spiral.

Independently what is the origin of wage-price spiral its consequences remain very similar, if not the same. Definitely, inflation accelerates, and afterward, without any additional shock, it will stay on the higher level then before. This fact puts some doubts on the possibility of existence of this economic phenomena in situation in which inflation is decreasing, i.e. in the situation existing in all the countries analyzed in this paper. It is obvious that in this case one cannot speak about wage-price spiral in its most often used classical meaning. It is possible to answer only the question whether interdependence of wages and prices caused inflation to decrease slower, or as in the case of Romania, caused inflation to come back to its very high values after the period of moderate inflation.

The second consequence of wage inflation spiral whatever is its reason should be rising unemployment. In the case of classical demand pull inflation, it follows the initial decrease in unemployment below the actual Not Accelerating Inflation Rate of Unemployment (NAIRU). If inflation is cost-pushed, i.e. it is caused by a negative supply shock, NAIRU itself rises and unemployment has to rise to achieve the new equilibrium level. In the case of decreasing inflation, the interesting question is whether a wage increase is strictly related to price increase in the former period. If wage increase is constantly too high it means that real wages are constantly over the equilibrium level inducing rise of unemployment and disturbing the disinflation process.

10. 2. 2. Construction of Analytical Model

Walewski [1998] built a simple analytical model describing price and wage setting processes. In his proposal prices are set as mark up over expected wages. This mark up tends to rise as the level of economic activity increases, i.e. as unemployment decreases. This can be illustrated with the following simple equation:

$$p - w^e = \beta_0 - \beta_1 u + \beta_2 z \qquad (10.1)$$

where p equals nominal price level, w^e expected nominal wages and u unemployment rate. The variable z presents the vector of other variables influencing prices such as: money supply, import prices or productivity (see **Graph 10. 6**). The line "price setting" presents the maximum real wage that price setters are willing to concede (given z).

Wage setters set wages as the mark-up over the expected level of prices. The bigger is employment, the lower is unemployment level, and the bigger is mark up, hence:

$$w - p^e = \alpha_0 - \alpha_1 u + \alpha_2 z \qquad (10.2)$$

This is shown in **Graph 10. 6** as the "wage setting" line which presents the target (minimum) real wage intended by wage setters given the level of other variables.

If actual wages and prices are equal to their expected values ($p = p^e$ and $w = w^e$), adding both equations the

formula for the equilibrium level of unemployment will be obtained:

$$u^* = \frac{\beta_0 + \alpha_0}{\beta_1 + \alpha_1} \qquad (10.\ 3)$$

If expected values of wages and prices are not realized the equation is as follows:

$$u = u^* - \frac{\left(p - p^e\right) + \left(w - w^e\right)}{\beta_1 + \alpha_1} \qquad (10.\ 4)$$

Under assumption that surprises on wages and prices are similar, the following equation is obtained:

$$u - u^* = -\frac{1}{\lambda}\left(p - p^e\right) \qquad (10.\ 5)$$

where

$$\lambda = \frac{\beta_1 + \alpha_1}{2}$$

With static inflation expectations price surprise will be equal to change in inflation. It means that in the bracket on the right hand side of equation (10. 5) $p - p^e$ we will replaced by $\Delta p - \Delta p^e$:

$$\Delta p_t - \Delta p_{t-1} = -\lambda(u - u^*) \qquad (10.\ 5')$$

what is the classical Phillips Curve relationship. As shown in **Graph 10. 6.**, when level of economic activity is higher then equilibrium and unemployment is lower then u^* inflation is rising and vice-versa. Thus, u^* can be thought as non-accelerating inflation level of unemployment, already mentioned NAIRU.

But even more interesting is the mechanics of rising inflation, i.e. the price-wage spiral. It can also be presented by the wage-price equation model. Rewriting equations (10. 1) and (10. 2), applying the same changes as in equation (10. 5') the following equations will be obtained:

$$\Delta p_t = \beta_0 - \beta_1 u + \Delta w_{t-1} + \beta_2 z_t \qquad (10\ 1')$$

$$\Delta w_t = \alpha_0 - \alpha_1 u + \Delta p_{t-1} + \alpha_2 z_t \qquad (10.\ 2')$$

Although the above model has been originally invented to investigate unemployment performance in developed countries, it can be used for an analysis of relationships between wages and inflation in transition economies. First, it gives the straight theoretical relationship between wages and inflation. Furthermore, it is quite simple what makes it especially useful for two reasons: it does not assume any particular shape of institutional arrangements on the labor market, and it is easy testable for countries with a short history of market economy.

In the case when wage and price inflation are interdependent, i.e. price changes are set in relation to wage changes, and vice versa, disinflation process itself can be seriously hampered. This interrelation of wages and prices can be less harmful if both wage and price setting decisions are sensitive to unemployment. Both wage push and, to lesser extent, price margins should be lower as unemployment rises. It means that if the coefficient on unemployment in equation (10. 1') but especially in (10. 2') is significant, inflation should decrease faster then in opposite case (other things being equal). The second point is the strength of relationship between wage and price inflation in examined countries. The stronger is this relationship, the harder disinflation process should be.

10. 2. 3. Results of Graphical and Econometric Cross-Country Analysis

Using model described in the previous subsection and various statistical and econometric techniques Walewski [1998] carried out the comparative analysis of wage-price relationship in 10 earlier mentioned transition countries. Period of investigation varied between countries depending on data availability. He distinguished in the analyzed sample periods of high inflation [80] and moderate inflation. High inflation period was experienced by six countries from the sample: Croatia, Kazakhstan, Latvia, Poland, Romania, and Russia.

The analysis of a high inflation period in two countries where it was possible (Romania and Russia), indicates the existence of a wage-inflation spiral. Furthermore, a significant negative relationship between rise of unemployment and wage inflation acceleration was found only in Russia. **Graph 10. 7** presenting wage and inflation developments during high inflation periods in these countries shows that inflation in Romania, although never so high as in Russia, decreased much slower. It could suggest that the presence of a significant relationship between unemployment and wage dynamics helped Russia to keep

[80] Defined as a period when four quarters overlapping rate of change of CPI was higher then one hundred percent.

inflation on stable decreasing trend, while in Romania this process was much more distorted.

The analysis of moderate inflation period shows that in hardly any of the examined countries (with the exception of the Czech Republic) unemployment is taken into account by wage setters. However, the Czech Republic belongs to the group of countries with relatively low and stable inflation, thus it is very hard to answer whether this would facilitate disinflation process.

Czech Republic and Slovakia are also the only two countries with no level relationship between wage inflation and price inflation. In rest of the countries wage inflation and price inflation seem to be correlated but results of tests for stationarity, results of dynamic equations and visual inspection of **Graph 10. 7** suggest that this correlation is rather a result of a "common trend" then a real interdependence. Slovenia is the only country for whom results of the dynamic analysis suggest a presence of some kind of a wage inflation spiral. The problem is that this relationship seems to be contemporaneous in both directions. Author's interpretation is that in this case only one of the variables is exogenous. Comparison of sizes of coefficients in restricted lagged dynamic equations implies that causality here goes from price inflation to wage inflation. A relationship of this kind can be, for example, a result of the earlier decided level of wage indexation and author does not think that it indicates presence of a wage-price spiral, especially that rise in wages does not seem to have a lagged effect on price inflation.

Summing up, first findings of Walewski [1998] study seemed to suggest the existence of a wage-price spiral. Both statistical and econometric analyzes have shown that in most of countries wage changes are not related to unemployment, the rise of which should stop the spiral (according to theory.) Moreover, results of the analysis of level data demonstrated that wages and prices move together in almost all countries. However, for most cases neither wage inflation nor price inflation data have been stationary what together with very low values of Durbin Watson statistics, indicates a possibility of spurious results. The dynamic analysis of differentiated data has also been applied. It has shown that wage-price spiral existed in none of the examined countries, at least at a moderate inflation period. These results show that prices and wages "move together", which should come as no surprise in countries where inflation is of a two-digit number. It seems that both wage and price changes are determined by the same or similar variables but they are not interrelated.

Situation looks differently in periods of very high or high inflation. Analysis of the Romanian and Russian data proved presence of wage inflation spiral in these countries during a high inflation period (see above). However, a wage-price spiral is a result of high inflation rather then its cause.

10. 3. Exchange Rate Arrangements Stimulating Inflationary Inertia

10. 3 .1. Origins of Crawling Peg/Band Arrangements and their Weaknesses

The influence of exchange rate changes on inflation was discussed in chapter 6. Exchange rate mechanism can serve as a good anti-inflationary device (see chapter 11) anchoring domestic prices to the international level and taking down the inflationary expectation. However, the exchange rate arrangements can also work in the opposite direction inducing an inflationary inertia if they are subordinated to other target than disinflation. It concerns particularly a crawling peg devaluation. Invented originally in developing countries with chronic high inflation as a mechanism smoothing unavoidable currency depreciation and calming inflationary and devaluation expectations it becomes autonomous factor building an inflationary inertia. Additionally, similarly to any other indexation mechanism, political economy factors start to work making politically difficult abandoning this device under new circumstances (for example, much lower inflation). Usually exporters' lobby tries to defend crawling peg as long as possible, raising all possible arguments about competitiveness, role of export led growth, danger of balance of payment crisis, etc.

Continuing crawling peg in moderate inflation environment means perpetuating this phenomenon and subordinating monetary policy to the balance of payments or growth targets instead of disinflation targets (see chapter 11). In fact, most of defenders of the crawling peg/band arrangement [see e.g. Sachs, 1996; Gomułka, 1998] explicitly or implicitly accept priority of balance of payment targets over the disinflation targets. However, this can mean in practice that monetary policy should accommodate weakness of fiscal policy and structural reform, what in turn will not stimulate progress in these spheres.

Hence, the crawling peg/band regime is rather inconsistent with the consequent anti-inflationary orientation of the central bank. Apart from inducing inflationary expectation it can create a lot of problems with controlling money supply (see chapter 11). Converting a crawling peg into a crawling band (what happened, for example, in Poland in May 1995) gives more room for a current monetary management but does not eliminate inflationary inertia on the micro level.

Rybiński [1998] stresses that in countries which adopted the crawling peg mechanism the expected exchange rate depreciation impact on inflation can be observed on a very micro level. Resident companies undertake the budgeting task one to three years ahead planning price increases, expansion of the workforce, development of real wages. For that purpose, companies often need to forecast the exchange rate path one to three years ahead. They perform this exercise themselves or, which is very common, approach local banks, which handle their accounts to provide such service. If the central bank is pursuing a preannounced crawling peg/band regime, then often the best forecast (random walk with drift forecast) of the future exchange rate is often given by the present exchange rate depreciated by expected crawling peg. Thus, expected depreciation of the central parity enters into inflation equation. Products and wages pricing with respect to expected depreciation is very common for companies with foreign capital shareholding.

The effectiveness of crawling peg/band or any other types of controlled devaluation regimes for export promotion and its inflationary consequences remain the open question. In industrialized countries depreciation of the currency can sometimes improve competitiveness in short and medium run without strong negative impact on domestic inflation. This may occur when fiscal policy is tightened and unemployment remains high, as it was the case with UK in the post-1992 period. However, in developing or transition countries undergoing substantial restructuring, the outcome maybe quite different, as Latin American experience clearly indicates. Fiscal authorities in these countries lack credibility, or simply do not posses enough record to have established one, while in the economy there is a large degree of indexation. In such cases imposing a crawling peg regime may result in a return of inflation without any sustainable competitiveness improvement.

10. 3. 2. Crawling Peg Regime and the Case of Persistent Moderate Inflation in Poland and Hungary

Preannounced crawling peg/band arrangements have been formally adopted in Poland (from 1991), Hungary (from 1995) and Russia (1995 – 1998) but less formally they also existed in some other countries such as Slovenia and Kazakhstan. However, Poland and Hungary as countries having the longest experience with this mechanism give the best evidence on its negative inflationary consequences.

Poland and Hungary are often considered as belonging to the group of most advanced transition countries. They have succeeded in implementing many market-oriented institutional reforms and they returned to economic growth. However, their disinflation record is not impressing. Until very recently, both countries remained within the so-called moderate inflation range (i.e. between 10 and 40% see **Chart 10. 8**). Only in 1998 Poland managed to reach a single digit inflation level. Hungary stayed through many years with inflation level between 20 and 30% and only recently started to move very slowly towards low inflation zone. The persistence of this kind of inflation results from an inflationary inertia, which means that inflation reacts only slowly to changes in macroeconomic policy [Krzak, 1998].

The sources of persistent moderate inflation in Poland and Hungary seems to be similar: monetary policies tended to accommodate aggregate demand, entrenched inflationary expectations existed, indexation of labor and debt contracts was widespread, exchange rate regimes incorporated mechanisms of automatic devaluation in order to compensate exporters for inflation differentials [Antczak and Górski, 1998].

There were several reasons for entrenched inflationary expectations in Poland and Hungary. Inflation has persisted for many years, so it was expected to continue. This implies that inflationary expectations were highly adaptive. It was rational to expect inflation, as the governments did so, and they tried to avoid radical changes in their macroeconomic policies. Polish government formally committed itself to a strategy of gradual disinflation, which was announced in 1994 in the document named "Strategy for Poland", and later repeated and updated in several subsequent mutations (usually with upward correction of the previous inflation targets). However, until 1996 the announced inflation targets were always missed. This fact seriously undermined the credibility of monetary policy. Another factor upholding inflationary inertia in Poland and Hungary is a backward looking indexation of pensions and wages in the so-called budgetary sphere.

Looking at inflation performance presented at **Chart 10. 8**, it becomes clear that though crawling devaluation did not increase inflation, but certainly it slowed down the disinflation process in Poland and Hungary. The authorities in Poland and Hungary have taken care more of domestic exporters' interests than disinflationary record. However, their current account balances have been determined rather by saving-investment imbalance and size of fiscal deficit than by the pace of nominal exchange rate depreciation (see **Chapter 7**, **Tables 7. 11** and **7. 12**).

11. Assessment of Disinflation Strategies

11. 1. Stabilization Strategies in the First Stage of Transition

In the very beginning of transition, macroeconomic policy in most of CEE and FSU countries had to concentrate on stopping high or very high inflation. This was the absolute priority and precondition of a progress in other fields of economic reforms. Looking at the historical experience of fighting high inflation or hyperinflation, particularly in developing countries one can distinguish three basic types of stabilization strategies based on different policy mixes [see e.g. Kiguel and Liviatan, 1992; Ades, Kiguel and Liviatan, 1995; Tomczyńska, 1998]:

- money based orthodox programs (MBOP),
- exchange rate based orthodox programs (ERBOP),
- heterodox programs (HP).

Generally, orthodox programs consist of monetary and fiscal policy measures only while heterodox programs additionally use income policy measures (wage control) or sometimes also price control. The difference between two variants of orthodox programs relates to nominal anchor: money aggregates in the case of MBOP, and exchange rate peg in ERBOP.

Most of transition countries used *de facto* an exchange rate anchor even if only few of them declared it formally [see Fisher, Sahay and Vegh, 1996; IMF, 1998]. Only few CEE countries (Poland, Hungary, and former Czechoslovakia) resorted in the first years to income policy instruments as additional anti-inflationary measure. However, taking into consideration slow pace of disinflation in these countries and strong inflationary inertia effectiveness of the heterodox approach can be seriously disputed. The idea of price control was completely irrelevant to the transition realities. Price liberalization and removing price distortion were one of the preconditions of an initial fiscal adjustment (and thus success of stabilization program) and starting any structural and microeconomic reforms [Dąbrowski, 1996]. Hence, countries that delayed price liberalization or trying to come back to price control (for example, Belarus, Uzbekistan, Turkmenistan, Ukraine, and Bulgaria) recorded failures of stabilization programs or their serious delays. In fact, a successful orthodox program needs a widespread liberalization of all markets [Rostowski, 1998].

Informal pegging of exchange rate has an advantage of not risking central bank reputation and sometimes gives also central bank more real autonomy (formal pegging usually needs join decision with government). However, it does not allow to exploit all opportunities of fighting ex ante inflationary expectations what is connected with a formal and credible pegging.

Popularity of an exchange rate anchor should not be surprising. If we analyze 20th century history of fighting high inflation or hyperinflation, most of successful episodes involved this kind of anchoring. However, the actual advantages of ERBOP for most of CEE and FSU countries in the initial stage of transition were different from those for developing countries. Classical arguments in favor of ERBOP are connected with lower output costs of stabilization, fighting high inflationary expectations, currency substitution, etc. This was not a serious problems in most of transition countries in the beginning of 1990s. Apart from Poland Hungary, and former Yugoslavia, peoples and enterprises in other former communist countries were not familiar with an open inflation and therefore, not prepared to protect themselves against inflation tax. Additionally, dollarization was no so widespread as in many developing countries. Only after few years of transition economic agents learned classical behavior from high inflation economy. Thus, these countries, which either delay stabilization, or failed its first attempts had to resort to exchange rate anchor in order to gain at least minimal credibility.

On the other hand, MBSP were technically very difficult for implementation. Radical price and financial liberalization, unfreezing monetary overhang, and high inflation environment changed dramatically money demand function, which were very difficult to estimate. Central banks had very few monetary policy instruments in their hands, money and foreign exchange market only started to work, two tiers banking system only began to be established. Most of economic agents did not understand basic macroeconomic categories, including monetary aggregates. Exchange rate target was easy to understand for everybody and easy to operate for monetary authorities. It also had a potentially disciplining effect both for monetary and fiscal policy.

The above advantages of ERBOP were confirmed by transition experience. Even very superficial analysis shows that countries, which took down inflation quickly to single digit level (for example, Croatia, Macedonia, all three Baltic countries, Slovakia, Moldova, Georgia, Azerbaijan) used formally or informally anti-inflationary exchange rate anchor. On the other hand, countries that subordinated exchange rate policy (and indirectly all the monetary policy) to balance of payments or export promotion targets (Hungary and Poland) recorded slow disinflation progress. Most of

empirical research [e.g. Fischer, Sahay and Vegh, 1996; Cottarelli, Grifiths and Moghadam, 1998; Antczak and Górski, 1998] shows the importance of exchange rate policy for a speed of disinflation process.

11. 2. Controversies around Exchange Rate Targeting in Moderate and Low Inflation Environment

While using an exchange rate anchor for stopping high inflation or hyperinflation and in the initial stage of transition is supported by many authors [see e.g. Sachs, 1996, Rostowski, 1998; Rosati, 1996], continuation of this regime in the phase of moderate or low inflation meets much more resistance. Stable exchange rate arrangements have become more frequently criticized after series of financial crises in emerging markets in 1995 – 1998 (Mexico, Thailand, Malaysia, Korea, Philippines, Indonesia, Russia, Ukraine, and Brazil) [81]. Although discussing a responsibility of pegging exchange rate regimes for financial crises is certainly beyond the scope of this report it is worth to remind the crucial role of a fiscal policy in maintaining a sustainable disinflation and sustainable current account balance (see chapters 7 and 8). This is probably the crucial and absolutely necessary condition of a success of any disinflation strategy [82].

On the other hand, tight fiscal policy though necessary is not sufficient to guarantee a low inflation. This is confirmed by the experience of Slovenia and Poland where fiscal deficit close to zero (Slovenia) or remaining on the stable and rather low level (Poland) did not bring fast disinflation because of accommodating character of monetary and exchange rate policies.

Summing up, an exchange rate anchor is one of possible monetary strategies for any market economy, including transition ones. It has both certain advantages and disadvantages and final choice should depend on the concrete situation of each country [83]. Two other possible monetary strategies focus on: (1) targeting monetary aggregates; (2) direct inflation targeting (DIT).

DIT gets more and more popularity during last twenty years in developed countries. Two transition countries, the Czech Republic from the beginning of 1998, and Poland from the end of 1998 declared this kind of strategy during the period remaining before the EU membership.

11. 3. Weaknesses of Monetary Policy Strategies in Poland, Hungary and the Czech Republic

Orlowski L. [1998] criticizes the hitherto monetary policy strategies and instruments of three CEE countries – Poland, Hungary and the Czech Republic [84]. Basing on the annual reports and the policy guidelines published by the central banks and on Krzak and Schubert [1997] study he came to conclusion the analyzed banks are uniform in their declared ultimate goals (price stability) but differ substantially in their intermediate and operating targets. The National Bank of Hungary (NBH) pays relatively more attention to the "external currency stability" than the National Bank of Poland (NBP) and the Czech National Bank (CNB). As a supplementary ultimate goal, both the CNB and the NBP state the obligation to support economic policies of their governments. This is a vague policy statement that shall be interpreted with a caution.

All three countries have designed and implemented various strategies of departing from a strict exchange rate targeting applied in the beginning of the 1990s Poland abolished the fixed zloty-to-dollar peg in May 1991 after holding it for sixteen months. At first, the NBP replaced it with an adjustable peg, and later with a crawling peg and crawling band which was introduced in May 1995, after widening the band of permitted fluctuations of the zloty against a five-currency basket (the dollar, the German mark, the British pound, the French frank and the Swiss frank). The Czech Republic maintained a peg of the koruna to a basket of two currencies (the German mark and the dollar) until the end of February 1996, when it enacted an adjustable band. After speculative attacks on the koruna in May 1997, the CNB switched to a managed float. Hungary pursued an adjustable peg with a narrow band between January 1990 and March 1995 when the forint was devalued and the crawling peg was introduced. As of May 1998, the regime maintained monthly crawling devaluation.

As mentioned above, despite the similarities between ultimate monetary policy goals, their intermediate and

[81] Sachs [1998] paper can serve as one of examples of the fundamental critique of a pegged exchange rate regime.

[82] For example, any money based stabilization program will not succeed when fiscal policy will be weak.

[83] For more detail discussion of advantages and disadvantages of fixed and flexible exchange rate arrangements – see WEO [1997], and Tomczyńska [1998].

[84] This and the next two sections of chapter 11 are prepared on the basis of Orlowski L. [1998].

operating targets varied significantly. Through most of 1998 the NBP claimed controlling broad money and an exchange rate within the wide plus-minus 12% band (without publishing internal target zones) as intermediate targets. In the 1998 monetary policy directives and operating procedures the NBP lists stability of the spread between a one-month Warsaw Interbank Offer Rate (WIBOR) and the Lombard rate as the operating target, thus introducing the policy instrument as a targeting device. There has been a considerable degree of inconsistency in the choice of monetary policy in recent years. Specifically, the NBP targeted short-term interest rates in the first half of 1996 and domestic credit expansion in the second half of 1996 when the GDP growth rate accelerated and the current account deficit deteriorated. In 1997, it announced targeting the monetary base and in 1998 it switched again to targeting interest rates.

The NBH assumes both monitoring of an exchange rate within a relatively narrow 2.25% band on either side of the parity, and monitoring of a M2 growth rate as the intermediate targets. The NBH has consequently pursued the interest rate differential vis-a-vis European financial markets as the operating target. This approach permits the NBH to monitor effectively the net capital inflows.

At the end of February 1996 and until the end of 1997, the CNB assumed controlling the growth of M2 balances as an intermediate target, after the expansion of the band of permitted currency fluctuations to plus-minus 7.5 percent. The corresponding operating target was the one-month Prague Interbank Offer Rate (PRIBOR) [Krzak and Schubert, 1997]. Since the beginning of 1998, the CNB has applied new solution – a core inflation targeting system (see section 11. 5).

In sum, interest rate targeting has been a dominant practice among the three examined CEE economies. Until the end of 1997, all three central banks utilized a discretionary rather then a rule-based approach to monetary policy. The main reason for applying interest rate targeting, as stated by the NBP, was a need to contain a rapid expansion of credit induced by sharp economic recovery. The actual growth rates of credit in Poland have shown a high degree of instability which encourages the NBP to apply a discretionary, frequent resetting of the interest rate target.

The Hungarian and the Polish systems of interest rate targeting have further flaws. They neutralize the monetarist link between money supply and inflation, thus making inflation more difficult to forecast. Interest rate targeting contributes to the instability of the income elasticity of demand for money in these countries, because in the environment of high targeted interest rates growth of a M2 is highly unpredictable and uncontrollable. The unstable income elasticity of demand for money inhibits an accurate determination of a desirable range of M2 growth and it may induce large deviations of actual M2 money balances from the target range. Consequently, highly unpredictable growth rates of money balances may present a risk factor to indexation of wages and prices, contributing further to inflationary pressures.

As shown by Poole [1970], the targeting of interest rates proves to be a better policy choice only when the money market shocks (LM shocks) are more significant than shocks in aggregate demand (IS shocks). Adversely, if the aggregate demand shocks prevail, a money growth target is a better policy, since it has a less destabilizing impact on income. It is difficult to determine what type of shocks prevails at the present stage of the economic transformation in Central Europe. However, considering a fast expansion of aggregate demand accelerated by large inflows of foreign direct investment, the real economy shocks seem to prevail over the money market shocks. Under such conditions, the Poole [1970] model would suggest setting money targets rather than interest rate targets.

Frequent resetting of interest rate targets contributes to poor transparency of monetary policy in Poland and in Hungary and inhibits monetary policy credibility. While these small, open economies are becoming increasingly dependent on conditions of world financial markets. As a result, their exogenous domestic interest rates require frequent reactions to changes in international interest rates. The high dependency of domestic monetary policy on world financial markets proves that the policy is neither fully autonomous nor highly credible.

The interest rate targeting approach prompts central banks to change monetary policy in a discretionary manner by reacting to the most recently observed levels of market interest rates and to other monetary variables. Interest rate targeting assumes a very short decision lag meaning that central banks are usually pressed to decide on corrective actions without having enough time to observe a real nature and to estimate duration of market disturbances.

According to Orlowski L. [1998] a system of money supply targeting would be a better choice at the present stage of the economic transformation in Central Europe as a more forward-looking policy. It has a more stabilizing impact on income in the presence of large shocks in aggregate demand, as proven by Poole [1970]. More importantly, this policy allows to expand recognition and decision lags. These lags become longer if the tolerance band of the actual money supply growth around the target

level is wider thus allowing more time for money balances to reach the upper or the lower bound of the pre-determined band. Money supply targets require, however, a close monitoring of velocity of monetary aggregates and money expansion multipliers.

Money targeting systems usually yield a low income elasticity of demand for money because the permitted percentage growth rate of money balances is restricted by the official target. Thus the coefficient of income elasticity of demand for money or the ratio of the percentage change in money balances to the percentage change in income is relatively low comparing to its higher level under interest rate targeting. More stable and predictable coefficients of income elasticity of both M1 and M2 money allow monetary authorities to estimate more precisely the money growth targets and the tolerance bands. This, in turn, may have a smoothing effect on inflation.

11. 4. Perspectives of direct inflation targeting in CEE countries

Orlowski L. [1998] suggests that central banks in CEE counties would be better off abandoning the current practice of interest rate targeting and considering a system of direct inflation targeting. Less discretionary forward-looking policies focused consequently on disinflation are more desirable in the context of expected accession to the EU and the EMU.

Several strategies can be suggested to CEE central banks in their efforts to rationalize monetary policy in order to make it more compatible with policies of the EU members. Establishing a proven, solid record of policy credibility should remain to be their primary objective. At the minimum, credibility can be achieved through a successful disinflation and through the stability of interest rates and market exchange rates, thus ultimately through the stability of financial markets. Disinflation is required for reducing the scope of real appreciation of Central European currencies and, subsequently, for diminishing the danger of excessive current account deficits along with the risk of large short-term capital inflows. Central banks credibility will be enhanced further by making monetary policies more predictable to the economic agents. In order to accomplish a higher degree of policy predictability, central banks in our region need to develop a forward-looking policy based on pre-announced rules.

Such a policy will improve transparency of central bank actions. It can best be accomplished by developing and publishing a set of feedback rules and policy guidelines thus by allowing for optimal recognition lags and decision lags. These lags indicate a sufficient time for recognizing economic disturbances, for judging whether they are temporary or permanent, and for making the appropriate decisions about policy responses. Experienced, credible central bankers always exercise patience in policy reactions to observed disturbances. They do not react immediately to price shocks and other disturbances in monetary variables, because such disturbances may likely be self-correcting, presenting no permanent dangers to economic stability. Pre-determined recognition and decision lags are also necessary in order to account for delayed responses between prices, interest rates, exchange rates and money balances. Central banks need to explain all of these lags to the public and to other branches of government. A patient, less discretionary approach to monetary policy involves lower economic costs to government and to a private sector.

Forward-looking policies are also favorable for incorporating various impact lags of changes in money supply on inflation. Their length varies among different monetary transmission channels [Svensson, 1997b]. The aggregate demand channel has a long adjustment period. Specifically, monetary tightening results in higher interest rates which in turn reduce investment and consumption causing a downward pressure on prices in a relatively long period of time. The channel of rational inflation expectations has a shorter impact lag. A monetary contraction diminishes inflation expectations and, if the policy is credible, it results in a downward pressure on wages and prices. The effect of lower wages may not occur if the policy credibility is low. The exchange rate channel has the shortest impact lag. Monetary tightening leads to real appreciation of domestic currency and to lower import prices, which relatively quickly contribute to lower domestic inflation. While pursuing a forward-looking monetary policy, central bankers need to identify which one of the three transmission channels prevails, in order to estimate when the targeted level of low inflation is likely to be reached.

More transparent monetary policies in Central European economies are likely to alleviate the problem of asymmetric information between central banks and financial institutions. Under a discretionary monetary policy, central banks tend to act without pre-announcements. They do not fully disclose information about the current state of monetary policy and their possible responses to changes in monetary variables.

Finally, CEE central banks need to augment their accountability for policy decisions. This can be accomplished

by more extensive disclosure of information about the current state of monetary variables and about conditions in financial markets as perceived by central banks. Such disclosure, coupled with the increased responsibility of policy-makers for their actions to the public, may play an important role in educating households and small businesses, not having much experience with understanding problems of macroeconomic stability and modern financial markets.

In the recent literature on monetary policy targeting, DIT has received a strong support and intellectual endorsement [Spaventa, 1996; Wyplosz, 1997; Krzak and Schubert, 1997; Fischer, 1997; Mishkin, 1997; Bernanke and Mishkin, 1997; Mishkin and Posen, 1997; Svensson, 1996, 1997a and 1997b]. Most of the authors arrive at a general conclusion that DIT, as a less discretionary, rules-based policy, emphasizes central bank commitment to disinflation. This policy is believed to be effective for gaining credibility by central banks. As a forward-looking policy, it is likely to have a stabilizing impact on financial markets. The theoretical literature is supported by generally successful experiences with lowering inflation by the monetary authorities that have practiced some forms of DIT, namely, the central banks of New Zealand, Australia, Canada, Sweden, Denmark, Finland and the United Kingdom [Mishkin and Posen, 1997; Svensson, 1997b; Frowen and Karakitos, 1997; Nadal de Simone, 1998].

There are two extreme forms of DIT. On the one extreme, a central bank may apply strict inflation targeting (SIT) with a narrow tolerance band of deviation of actual inflation from the midpoint target. A narrow band implies that the policy decision lag is short and monetary policy is subject to frequent corrections and resetting. This would be a discretionary policy that also restraints flexibility of exchange rates. The policy utilizes mainly the exchange rate channel because of its short impact lag. Therefore, it is often implemented by adjusting market exchange rates through active interventions in foreign exchange market. This policy implementation can be alternatively accomplished by adjusting a rate of crawling devaluation or by changing the spread between the rates of required reserves on domestic and foreign currency deposits. Because of the shorter decision lag and the active interference with market exchange rates, SIT may lead to an instability of money market variables, preventing exchange rates from corresponding to interest rate differentials. SIT is seldom applied in practice because it does not generate attractive features of expanded monetary flexibility.

Flexible inflation targeting (FIT) is the other extreme form of DIT. It is based on a wide band of tolerance, which allows more time for a policy decision lag, necessary for a proper judgment whether the observed inflationary shock is temporary, that is, self-correcting or more permanent. Wider bands restrain discretionary policy reactions and reduce the frequency of target resetting, thus making the policy more predictable and transparent. They also allow central banks to expand the time horizon of intermediate targets and to focus on long-term goals of disinflation. In essence, by applying wider bands, the policy becomes forward-looking. This may contribute to lower inflation expectations and to a weakening indexation of wages and prices. A wider tolerance band corresponds directly to more flexible exchange rates. For instance, the broader margin of the permitted currency depreciation is consistent with a larger departure of actual inflation from the target level. Therefore, the application of FIT requires expanded flexibility of exchange rates. In order to be effective, the system requires well-defined policy rules and guidelines based on more complex models of inflation.

Central banks interested in implementing a DIT approach have to solve a number of technical and instrumental problems. They relate, among others, to:

- the choice of width of inflation target band (see below),
- inflation indexes which will be chosen as target variables,
- determination of maximum permitted duration of non-action, that is the lack of policy responses to shocks that are believed to be only temporary; credibility of a central bank may be significantly hurt if it delays responding to inflation overshooting the band for an excessive period of time,
- develop complex, non-monetarist models of inflation,
- monitoring of adherence to inflation targets which should be conducted by independent economic research institutions, in addition to central banks; such approach helps to strengthen monetary discipline and improve public accountability of a central bank.

Another key issue that needs to be resolved prior to the introduction of DIT is whether the responsibility for setting the inflation target will lie with a central bank, a ministry of finance or an economic council of the government. Normally, a central bank autonomy is better protected when the bank is granted the exclusive right to make such decision. This approach, however, may not be desirable in small, open economies where the responsibility for price stability ought to be equally shared by fiscal authorities. Therefore, it is advisable that ministries of finance and central banks jointly determine official inflation targets.

According to Orlowski L. [1998] monetary policy adjustment in CEE countries should be divided into three stages. Stage one would focus on active disinflation from a moderate level towards a low single digit level. The initial tolerance band at this stage would be reasonably narrow, in order to reaffirm commitment of a central bank to disinflation. At the same time the band width would be sufficient for generating an appropriate decision lag. The narrow band at this stage is also desirable to alleviate the problem of "instrument instability", that is, to reduce fluctuations of relatively flexible exchange rates and market interest rates. The optimal inflation tolerance band at this stage seems to be plus-minus 1.0 percentage point. When the lower bound of the tolerance band reaches a pre-determined inflation level, the scope of permitted deviations from the midpoint target may be expanded (stage two). This would allow monetary authorities to take advantage of the benefits of FIT. Targeted inflation may be viewed as a desirable level of inflation upon the actual accession to the EU. By announcing the estimate period of getting to stage two in advance, the banks would demonstrate their firm commitment to both monetary discipline and disinflation. It is imperative that fiscal authorities will equally engage in setting the inflation target to ensure that fiscal discipline will be maintained.

The final, third stage of monetary policy adjustment will be connected with the EU and ERM-II membership and will focus on preparations for the entry to the EMU. In this period, the monetary policy targeting would have to change from DIT to the EURO-peg. The inflation tolerance band will be gradually narrowed to ensure a smooth convergence to the irrevocable peg to the EURO in the end.

11. 5 The Czech Core Inflation Targeting: Basic Assumptions and Preliminary Results

The main reason for the introduction of DIT by the Czech National Bank (CNB) in January 1998 was a need to discipline a monetary policy (as admitted by the CNB in the Monthly Bulletin of January 1998). Earlier monetary policy in the Czech Republic was kept under control by the nominal anchor in the form of the fixed exchange rate and, after February 1996, in the form of an adjustable band. With the introduction of the managed float in May 1997, the policy disciplinary element was forgone. The CNB applied a money stock targeting rather unsuccessfully until the end of 1997. The rate of growth of monetary aggregates exceeded the targeted range. Under such circumstances, the CNB decided to introduce DIT as a policy disciplinary tool.

The new strategy assumed for the period 1998 – 2000 calls for a 4.5% net annual inflation target at the end of the year 2000 with the tolerance band of plus-minus 1.0 percentage points. The 1998 net inflation target is set at 6.0% with a narrower tolerance band of plus-minus 0.5 percentage points. The CNB has chosen to target only the part of inflation that is believed to be effectively influenced by monetary policy, that is, a net inflation. Net inflation excludes from the consumer price index basket regulated price items which currently account for 18% (136 items) of all 754 items in the Czech CPI basket. Therefore, net inflation represents the movement of the remaining prices in the CPI basket. Excluded are prices of those items that are directly set by the central and local governments (rents, electricity, gas, railway transportation, etc.), items with imposed price limits (education services, housing, heating, bus transportation) and items with administratively set fees.

Although the intention of targeting unregulated prices, which movements depend on monetary policy conditions may seem correct, the approach is questionable, because regulated prices strongly influence costs of production. Consequently, they have an indirect, strong impact on unregulated prices, with a relatively short time lag. In fact, the CNB reports the net inflation running high in January and February 1998 due to indirect effects of increases in administratively regulated prices and in indirect taxes applied in the beginning of the year.

In its February 1998 Monthly Bulletin, the CNB claims shifting the target emphasis on core inflation rather than the net inflation. Core inflation is a seasonally adjusted share of net inflation in overall inflation. It has been monitored and reported by the Czech Statistical Office on a month-to-month basis only. The main technical difference between net and core inflation, in addition to the factor of seasonal adjustment, is that the calculations of core inflation assign zero weights in the CPI basket for regulated price items, while calculations of net inflation exclude these items from the basket.

As of mid-1998, it was still unclear whether the Czech DIT is effectively fulfilling the policy disciplinary function. The policy has been applied at the start of high CPI inflation, exceeding the annual rate of 13.0% in the first quarter of 1998. Because this surge in inflation has been induced by significant adjustments in administrative prices, indirect taxes and fees, the introduction of DIT has cast doubts. Some financial analysts proclaimed the new policy to be premature and financial markets exerted some

pressures on the koruna nominal depreciation in the first quarter of 1998.

The narrow width of the tolerance band may also be questioned. It is rather a SIT system that favors calls for discretionary policy reactions to observed departures of actual inflation from the target band, not warranting a sufficient decision lag. On a positive side, a one-year time horizon for the intermediate target seems to be justifiable because it guarantees that the target will not be frequently reset and that disinflation is consistently pursued.

12. Reasons of Slow Disinflation in Poland and Perspectives of its Continuation in the Coming Years

12. 1. Factors Responsible for Slow Disinflation in Poland

The comparative analysis of disinflation process and disinflation strategies presented in the previous chapters shows that Poland's disinflation path though continuous and sustainable was not especially impressing in terms of speed and consequence. During the critical period of transition (1991 – 1992) high fiscal deficit financed predominantly from the NBP credit constituted the main factor pushing up money supply. Since 1993, the general government balance has improved as result of output recovery, the completion of comprehensive tax reform, and limited expenditure cuts [Dąbrowski et al., 1997]. However, the adjustment process was stopped in 1995 and 1996 and even slightly reversed, despite fast GDP growth and improved tax collection. Only 1997 and 1998 bring the new phase of fiscal adjustment.

Although far from desired pattern and missing some historical opportunities during a high growth period fiscal policy cannot be blamed alone for slow pace of disinflation. Comparing to other transition economies Poland's fiscal balance was not so bad. The second part of this story is connected with unstable, inconsequent and accommodative monetary policy.

First, up to 1997, the NBP was directly involved in direct financing a part of fiscal deficit (see chapter 4). It was an effect of weak political position of the NBP in relation to the parliament and government, despite some legal guarantees of its independence.

Second, the NBP had huge problems with absorption and sterilization of capital inflow (see chapter 4). However, the actual orientation on balance of payments targeting and export promotion (see section 10. 3) did not help in effective control of this part of money supply.

Third, maintaining a crawling peg/band mechanism created a strong inflationary inertia, probably much stronger than consequences of relative price adjustment (the role of this factor significantly diminished after 1992), and in fact non-existing wage-price spiral (see chapter 10).

Fourth, during most of the transition period interest rates were relatively low, frequently negative in real terms (it concerns mainly deposits). This stopped in fact remonetization process: broad money velocity remained stable from 1991 until 1996 (see chapter 5). Only 1997 and 1998 bring an increasing trend in demand for money, particularly for its zloty component. It was possible due to radical change in interest rate policy: they reach their maximum nominal and real level in the end of 1997.

Fifth, coexistence of many mutually inconsistent targets, part of them officially declared but not really implemented, other ones non-declared but in fact followed by the NBP, and their frequent changes damaged transparency and credibility of monetary policy (see chapter 11).

Sixth, credibility of monetary and, more generally, all macroeconomic policy, was additionally undermined by regular failures in inflation forecasting, and public conflicts between the Ministry of Finance and National Bank of Poland.

Orłowski W. [1998] analyzed the role of the three nominal anchors – exchange rate, wages, and the money supply – in fighting inflation in Poland during the 1990s. **Graphs 12. 1., 12. 2.** and **12. 3** show the 12-month CPI inflation, and 12-month changes in the exchange rate, nominal wage, and M2. The periods of the use of a tool as a nominal anchor was defined by comparison of the rates of change: rate of change much slower than inflation means, that the tool was active in pushing inflation down.

The graphs suggest the following remarks:

- CPI inflation was gradually falling in Poland during the 1990; that, however, was mainly due to the fact that in the whole period inflation was pushed down by the active use of at least one nominal anchor,
- the most important role was played by the exchange rate anchor, active (with some short interruptions) almost during the entire period of the 1990s,
- the role played by the wage as a nominal anchor seems to have been important only during the first phase of the transition, when the mechanism of taxing excess wage increases was in place, and in the period of an unexpectedly high productivity increase in the years 1993 – 94,
- money supply played a role of a strong nominal anchor itially, until autumn 1990; fortunately, the fast growth of M2

was accompanied by the gradual increase of demand for money, due to increase of GDP and fall in money velocity.

According to Orłowski W. [1998], disinflation in Poland during the 1990s were possible mainly by using the macroeconomic policy tools, first of all the exchange rate anchor [85]. The growth of credibility of a macroeconomic policy played a very limited role in a disinflation process (with the possible exception in the first phase of disinflation).

12. 2. Perspectives of Disinflation Process in Poland

New constitutional and legal arrangements related to monetary and fiscal policies adopted in 1997 and entered into force from January 1, 1998 strengthened an independence of the NBP and clarified its policy targets. This created institutional conditions for a more effective monetary policy and better coordination of the monetary and fiscal policies. Decision of the Monetary Policy Council of the NBP of September 1998 to move towards the DIT strategy creates additional chances to accelerate disinflation process and make it less painful. However, it is too early to forecasts how these new opportunities will be exploited in day-today practice of monetary policy.

Orłowski W. [1998] stresses that in assessing the prospects of disinflationary policy in Poland one can not omit the European integration dimension [86]. On the one hand, Poland must join the EMU at some point, if wants to be the EU member and this perspective determines macroeconomic policy targets for the next couple of years. On the other hand, the strategy of disinflation and joining the EMU can be seen as a condition for a successful economic integration with Europe, and achieving long-term sustainable growth. Assuming that no unexpected dramatic changes happen in the international environment, Poland will have to converge its inflation level to the European one during next few years. That means a need for breaking the inflationary inertia, i.e. dismantling, open or hidden, indexation mechanisms in the economy.

The structural factors, namely changes in relative prices, pushing towards price increase may complicate a disinflationary policy (see section 10.1). Orłowski W. [1998] tried to analyze the potential role of these factors in the coming years. His conclusions are following:

First, the period of big "revolutionary" changes in relative prices is over. In Poland it lasted until 1992 [Woźniak, 1997].

Second, phasing out of the administrative control of some prices has also been almost over. It is very unlikely that government administrative price decision can bring any new dramatic inflationary impulses.

Third, one must take into account a strong tendency of an increase of the relative prices in the non-tradable sector [EBRD, 1996]. Despite the fact that the tradable sector has already achieved the world price level (corrected for some differences in the quality of goods, not well measured by the research on the purchasing power parities), prices in the non-tradable sector in Poland are still well below the level in the majority of the OECD countries (see section 10.1). The fast growing demand for non-tradables (due to the growing income), confronted with the slower adjustment of their supply will lead to the continuous pressure for the relative price structure [87].

Table 12. 1 shows the level of prices of various components of GDP (domestic absorption) in Poland and in some EU countries in 1994. Until today, the structure of the relative prices in Poland moved somehow closer to the structure observed in the developed market economies, but probably differences are still significant [88].

Therefore, the coming years will bring continuous pressure for the change in the relative prices, and particularly faster than the average inflation growth of prices of non-tradables. However, the same phenomenon was also observed in the poorer EU economies (particularly in Portugal). Nevertheless, this pressure did not stop the nominal convergence, elimination of inflation, and joining the EMU. Obviously, if such a pressure is not very high, and spread over time, macroeconomic policy can deal with it.

Fourth, what concerns food prices, it is well known, that they are supported in the EU on the level by ca. 60% higher than the world price level. In Poland, the supported price level is, on the average, only ca. 30% above world prices. That does not mean, however, that joining the EU and the Common Agricultural Policy (CAP) necessarily means an

[85] Witold Orłowski's finding does not need to oppose earlier conclusion about pro-inertial role of the crawling devaluation.

[86] The remaining part of this chapter is prepared on the basis of Orłowski W. [1998].

[87] The phenomenon can be also explained by the Balassa-Samuelson effect, linking the differences in price dynamics with differences in the productivity growth in both sectors.

[88] The new data for 1996 will be available soon. Preliminary data confirm a hypothesis about persistence of significant differences in the relative price structure in Poland, and other OECD countries.

increase in the Polish food prices. Several factors will work in the opposite direction: (1) gradual liberalization of the CAP, leading to the lower level of price support in the EU; (2) real appreciation of the zloty leading to increase of the Polish food prices expressed in EURO, even before joining the EU; and (3) the fact that basic agricultural products represent only a certain share in the costs of production of the processed food bought by the households, and therefore the total increase of food prices will be smaller [89].

Despite a common view, Polish agriculture has already achieved the price level close to the West European one (if some quality differences are taken into account) [see EU, 1998]. Obviously, the structure of support is different. Nevertheless, the changes connected with the EU membership should not lead to drastic changes in the relative prices of food, and therefore should not strengthen the structural factors obstructing the path of disinflation. The food prices expressed in EURO should not increase significantly and, with the relatively stable exchange rate, the zloty prices should not increase significantly neither.

Altogether, the structural factors connected with changes in the relative prices will have a certain impact on the inflationary pressure in Poland in the coming years. However, the impact should not be strong enough to create a major obstacle for the disinflation, and the corrective inflation, spread over time, should not reduce the efficiency of the macroeconomic policy. This policy should concentrate on fighting the inflationary inertia, by breaking the indexation mechanisms existing in the Polish economy. The most important ones are:

- exchange rate indexation mechanism, existing due to a gradual, steady depreciation of the domestic currency vis-à-vis the foreign currencies,
- wage indexation mechanism, of an informal character, but existing in the Polish enterprises,
- an indexation mechanism built in the policy of increasing the controlled prices (this mechanism is going to lose its importance soon).

Breaking the indexation mechanisms in the economy is a pre-condition of eliminating inflation. However, if a disinflationary policy is based solely on the monetary policy tools, and the indexation mechanisms are still in place, the effort to push down inflation leads to a strong recessionary cost (only the recession and a drastic deterioration of the financial situation of firms forces the employees to accept non-indexed nominal wages, that initially means the fall of real wages) [90]. Although almost everybody agrees with Milton Friedman's statement on the monetary character of the inflation, particularly in the longer run, the short-term possibilities of disinflation based only on the use of monetary tools are limited by the political economy (willingness of the policy makers to accept the recession).

The alternative solution is a policy based on the exchange rate stability, available for small, open economies with the inflation rate significantly higher than the inflation in the major trading partners. Such a solution allows – with a relatively low pain for the domestic agents – for breaking the indexation mechanisms. The success of such a policy depends crucially on the ability of the country to avoid a devaluation crisis that may ruin all the achievements. Hence, macroeconomic policy under the fixed exchange rate regime must base on the logic of a monetarist approach to a balance of payments [Grabowski, 1997]. The experience of various countries shows, however, that due to some political economy consideration it is extremely difficult for policy makers to follow this approach, and cool down the economic growth when the current account deficit, fuelled by the appreciating currency, grows to the dangerous levels.

Fiscal policy remains the main corrective instrument and the ability to keep a proper fiscal balance usually determines the success or failure of exchange rate-based disinflation policies.

According to Orlowski W. [1998], the EU accession process itself may be accompanied by the rapid fall of inflationary expectations. It can help both above mentioned variants of a disinflationary policy. If that was the case, the monetary policy could be much less restrictive, as an increase in the monetary aggregates would be accompanied by a fall in money velocity. Exchange rate policy, on the other hand, could be also freed from the inelastic fixed exchange rate regime, if the belief in the long-term stabilization of the exchange rate enhanced, despite a wide fluctuation band allowed by the central bank. Finally, the growing confidence in a macroeconomic policy could lead to the gradual dismantling of the wage indexation mechanism, reducing the costs of disinflation. In such a case, a coherent

[89] The input-output matrix for Poland shows that this share is ca. 20 – 25%.

[90] In the US, success of the policy of pushing down annual inflation from 10% to 2 – 3%, performed in the early 1980s mainly with the monetary policy tools, was initially connected with the serious recession. Unemployment rate increased from 5.8% in 1979 to 9.5% in 1982, and the GDP contracted.

macroeconomic policy could lead to the fast disinflation, and finally to elimination of inflation, with a low recessionary cost, or no cost at all.

Thus, increasing the confidence in macroeconomic policy is probably possible under the condition that disinflation will become a part of general strategy of Poland's integration with the EU. The most obvious proof for the society of the government's determination to join the EMU would be the consolidation of public finances, and further reduction of the fiscal deficit (zero deficit target). The reduction of fiscal deficit would also enhance efficiency of the monetary policy, and will greatly reduce risk connected with the stable exchange rate. This is very important because exchange rate has been until now the only factor that influenced in a significant way the inflationary expectations [Czyżewski, Orłowski and Zienkowski, 1996] .

12. 3. The experience of the EU countries

Is the above mentioned disinflationary strategy, combining the coherent (but not excessively restrictive) use of the macroeconomic policy tools with the rapidly growing confidence a feasible scenario? The historical experience is mixed. One may quote numerous examples of well prepared, consequently implemented disinflation programs that were unable to achieve the goals due to the low confidence in government's determination to fight inflation and control the fiscal deficit (e.g. several disinflation programs in Latin America during the 1980s). The confidence granted by the public to the institutions responsible for the macroeconomic policy must be built over a long period of time, and once the confidence is shaken, it is not an easy task to restore it.

Some interesting suggestions about how to increase the confidence in macroeconomic policy may be drawn from the experience of the relatively poor Mediterranean countries (EU members). In the case of these countries the confidence of the public was also shaken by long years of the inefficient policy, unable to fight inflation and to push it down to the levels observed at the richer EU neighbors. The possibility to "import" the confidence from abroad in the process of joining the EMU changed radically the picture. The role of the EMU should be seen in two horizons:

1. In a longer horizon, the prospects of the membership in the EMU meant a full confidence in the future price stability, resulting from exchanging a weaker domestic currency into a stronger EURO. For the more stable economies the problem was if the EURO would be as strong a currency, as for example D-Mark was. For the Mediterranean countries no such worry existed: for them, joining the EURO zone meant that if only were they able to qualify, the problem of the inflation is going to disappear.
2. In the short and medium-term horizon, the disinflationary policy dilemma was limited to one problem: will country be able to qualify for the EMU membership? One can claim that although general level of confidence in the domestic institutions and economic policies was rather low, the societies had little doubt about the political will of the governments to join the "hard core" of the EU integration.

As a consequence, the problem of determination of the domestic institutions in the long-term disinflationary policies – that was difficult to believe for the public – was replaced by a short-term problem of the political determination to qualify for the EMU, easy to measure (due to the precise conditions set by the Maastricht Treaty), and connected with the emotional rather than economic motivations (the national pride).

Graph 12. 4 shows a simple aggregated index of the restrictiveness of the macroeconomic policy in the Mediterranean countries during the 1990s, defined as a sum of the real interest rate, reduction of the budget deficit in percentage points of GDP, and real appreciation of the domestic currency in% points, plotted against the inflation rate in these countries. The graph covers both Spain and Portugal that managed to qualify for the EMU, and Greece that was unable to meet the criteria (the public sector deficit amounted to 18% of GDP in 1990, and no effort was enough to put it down to below 3% in 7 years) but now frantically fights for qualifying to EMU around the year 2000 – 2001 (before the Eastern enlargement).

As it was mentioned above, the decisive factor in enhancing the confidence of the public was the political determination of the government to reduce fiscal deficit (the Maastricht criterion generally judged as the most difficult to fulfil). Spain reduced the deficit from more than 6% of GDP in 1993 – 94, and Portugal from 7%, to below 3% of GDP in 1997 (partly due to the good external environment). Greece managed to push it down from 14% in 1994 to 7% in 1997, with the plans of further reduction to 3%. However, as **Graph 10. 4** shows, the radical fall of

inflation rate observed in all the Mediterranean countries was not a result of a general tightening of the macroeconomic policy. Just the opposite, the rapidly falling real interest rates (particularly in the years 1996 – 97) led to some relaxation of the macroeconomic policy (fall of the aggregate index of restrictiveness).

Indeed, it seems that the clear prospect of joining the EURO zone, and a proof of the government's determination to make the country to be qualified to the EMU, was enough for a radical disinflation, despite a stable – or even diminishing – overall restrictiveness of the macroeconomic policy. For example, in the case of Greece the rate of inflation diminished from 20% to 5% in 6 years, despite the yearly average increase of M2 fluctuating around 12%). The real explanation of this phenomenon is that the coherent (but not very restrictive) macroeconomic policy was accompanied by a rapid increase of the public confidence (for example, the velocity of money diminished in Greece from 2.3 in 1993 to below 2 in 1997). Moreover, the radical success of disinflation was accompanied by a good growth performance. Therefore, sometimes the politics can help economics.

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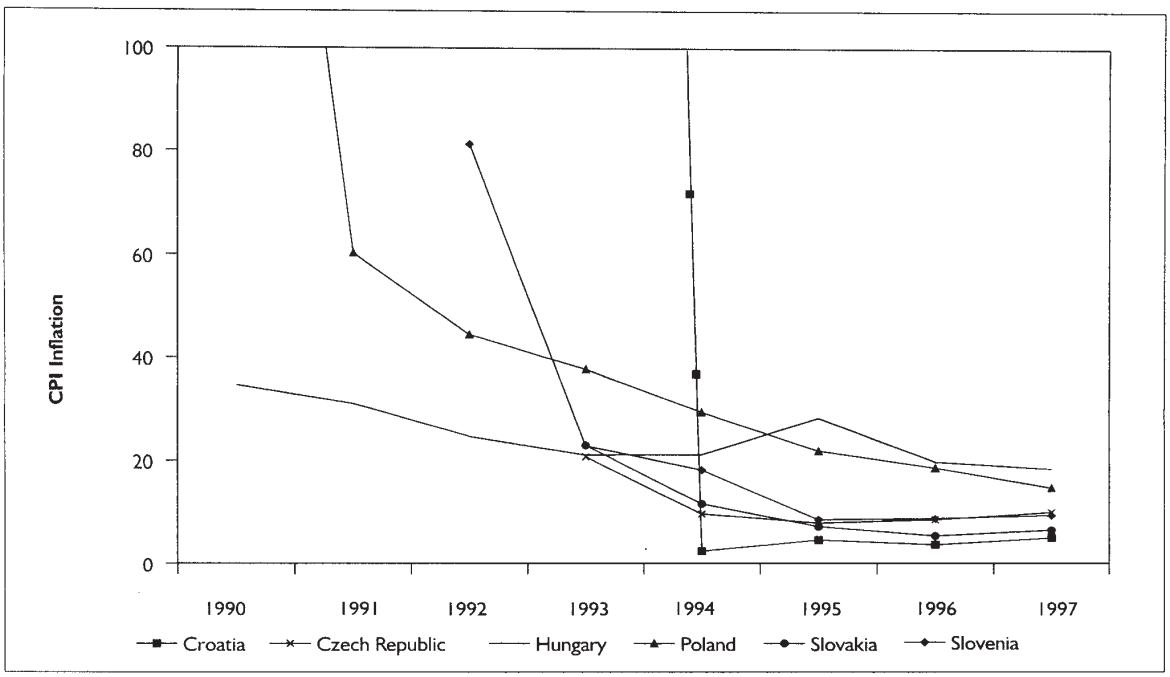
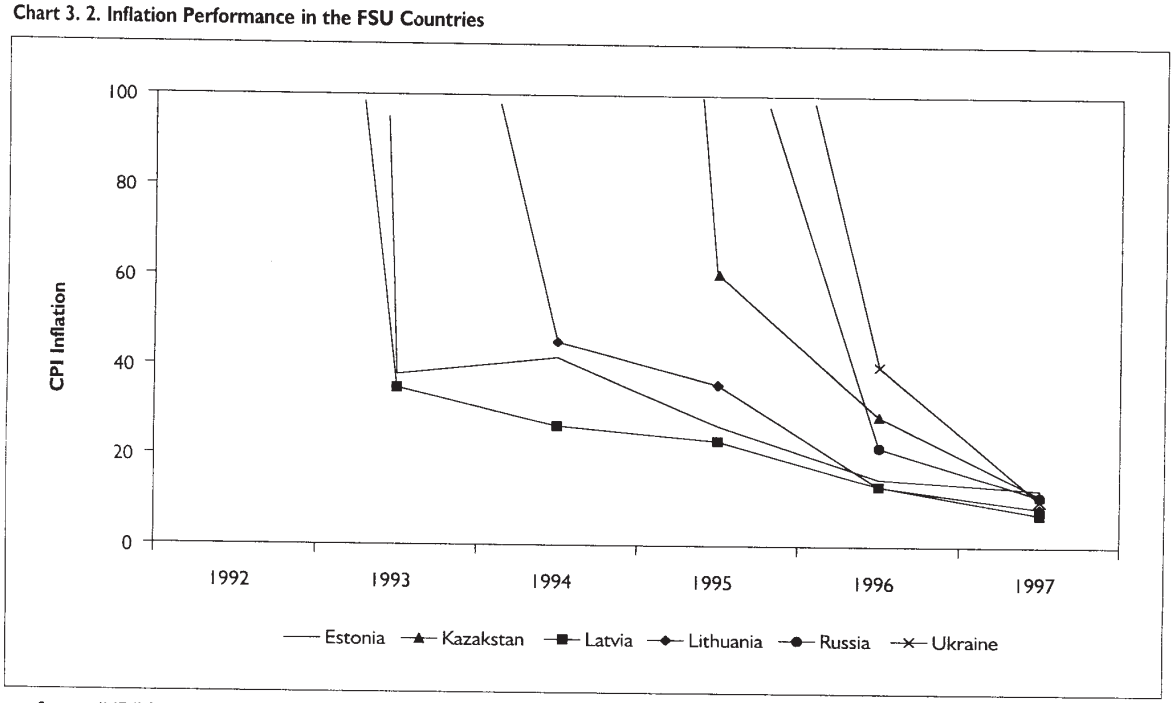
Tables and Graphs

Chart 3. 1. Inflation Performance in the CEE countries



Source: IMF IFS, August 1998

Chart 3. 2. Inflation Performance in the FSU Countries



Source: IMF IFS, August 1998

Table 4. 1. Components of RM Creation, Broad Money, and Multiplier

Country	ΔRM	ΔNFA	ΔNDC	ΔNCG	ΔCDMB	ΔOIN	ΔM2	m (M2)
Croatia								
Average	0.308	0.376	0.101	0.054	0.047	-0.169	0.100	4.14
Median	0.158	0.148	0.008	0.023	0.001	-0.038	0.099	4.11
Czech Republic								
Average	0.080	0.079	-0.002	-0.025	0.023	0.003	0.022	3.55
Median	0.073	0.104	-0.007	-0.013	0.006	-0.003	0.036	3.61
Hungary								
Average	0.058	-0.017	0.021	0.014	0.004	0.057	0.051	1.62
Median	0.046	-0.006	0.014	0.015	0.004	0.053	0.050	1.63
Poland								
Average	0.074	0.090	0.030	0.039	-0.009	-0.045	0.090	3.22
Median	0.072	0.091	0.035	0.040	0.007	-0.040	0.087	3.40
Slovakia								
Average	0.067	0.099	-0.021	-0.015	-0.007	-0.010	0.040	5.02
Median	0.047	0.065	-0.007	-0.013	0.003	0.007	0.029	5.06
Slovenia								
Average	0.105	0.366	-0.220	-0.247	0.028	-0.042	0.104	8.42
Median	0.068	0.255	-0.151	-0.193	0.027	-0.041	0.087	8.43
Estonia								
Average	0.095	0.112	-0.004	-0.004	-0.001	-0.013	0.090	1.99
Median	0.090	0.074	-0.002	0.000	-0.002	-0.008	0.080	1.97
Latvia								
Average	0.053	0.043	0.004	0.006	-0.002	0.006	0.066	2.34
Median	0.042	0.053	0.007	0.033	-0.003	0.008	0.087	2.46
Lithuania								
Average	0.125	0.111	-0.017	-0.014	-0.003	0.030	0.091	2.32
Median	0.110	0.116	0.000	-0.007	-0.004	0.014	0.074	2.25
Russia								
Average	0.156	0.025	0.180	0.165	0.015	-0.050	0.170	2.09
Median	0.114	0.026	0.158	0.113	-0.001	-0.018	0.119	2.13
Ukraine								
Average	0.399	0.003	0.409	0.243	0.164	-0.013	0.425	1.75
Median	0.170	0.014	0.280	0.189	0.046	-0.019	0.215	1.78

Country	ΔRM	ΔNFA	ΔNDC	ΔNCG	ΔCNPE	ΔCDMB	ΔOIN	ΔM2	m (M2)
Kazakhstan									
Average	0.164	0.334	0.076	-0.001	0.008	0.068	-0.245	0.084	1.89
Median	0.101	0.184	0.027	0.006	0.000	0.002	-0.086	0.080	1.78

Note: Multiplying by 100 the quarterly changes in the components of RM we obtain weighted percent changes with respect to the previous quarter
Source: IMF IFS, August 1998

Table 4. 2. Fiscal and External Balances

Country	Deficit/surplus		ΔNCG	ΔNFA
	% GDP	n.c. units	n.c. units	
Croatia		**million**	**million**	
1993	-1.5	-618	482	3,379
1994	0.6	544	-1,078	3,711
1995	-0.8	-715	538	1,480
1996	-0.1	-134	-333	2,624
1997	...	-1,160	-694	2,963
Czech Republic		**billion**	**billion**	
1993	2.7	12.6	-18.0	47.6
1994	0.8	1.1	-27.1	90.5
1995	0.4	10.4	-12.4	195.8
1996	0.2	7.2	-14.6	-23.9
1997	-1.0	-1.8	-25.4	-26.9
Hungary		**billion**	**billion**	
1991	0.7	16.7	43.3	-92.9
1992	-3.2	-95.2	128.9	111.9
1993	-6.8	-214.6	304.7	-295.3
1994	-8.2	-202.9	215.0	-420.2
1995	-6.5	-310.8	-240.7	108.6
1996	-3.5	-355.5	442.7	140.0
Poland		**million**	**million**	
1990	3.7	2,080	-1,217	2,054
1991	-6.7	-5,392	4,024	414
1992	-6.7	-7,660	7,629	1,433
1993	-2.8	-3,588	2,572	1,993
1994	-3.4	-4,812	3,300	3,582
1995	-2.8	-5,762	-8,663	25,501
1996	-3.6	-7,841	-1,460	14,374
1997	-3.1	...	5,873	19,680
Slovakia		**million**	**million**	
1993	-6.3	-23,304	4,189	118
1994	-4.1	-18,093	-5,288	29,966
1995	0.8	4,144	-25,139	53,553
1996	-1.9	-11,058	2,417	9,290
1997	...	...	14,210	582
Slovenia		**billion**	**billion**	
1992	0.3	2.6	-44.7	52.5
1993	0.3	5.4	0.1	30.9
1994	-0.2	-5.1	-73.9	97.1
1995	-0.1	-6.5	-47.4	48.2
1996	0.3	1.6	-26.3	82.9
1997	-1.0	-43.2	-187.2	227.6
Estonia		**million**	**million**	
1992	...	163.3	-2.3	2,656
1993	-0.7	-458.5	40.4	1,433
1994	1.3	421.1	-40.3	561
1995	-1.2	18.2	3.2	844
1996	-1.5	-96.6	0.0	1,332
1997	...	...	-354.6	3,520

Table 4. 2. Fiscal and External Balances

Country	Deficit/surplus		ΔNCG	ΔNFA
	% GDP	n.c. units	n.c. units	
Kazakhstan		**million**	**million**	
1994	...	-30,382	12,219	41,838
1995	...	-25,181	12,927	25,244
1996	...	-59,564	531	46,774
1997	...	...	-44,841	44,989
Latvia		**million**	**million**	
1993	0.6	...	...	...
1994	-4.1	...	-0.4	6.3
1995	-3.5	...	40.6	-26.4
1996	-1.4	-44.1	-48.5	110.8
1997	...	23.3	61.7	63.1
Lithuania		**million**	**million**	
1993	-3.1	-943	...	...
1994	-4.2	-857	47.4	303.6
1995	-3.3	-1,275	-46.9	510.5
1996	-3.6	-1,137	26.6	9.2
1997	...	...	-203.3	928.7
Russia		**billion**	**billion**	
1992	-18.9	-3,592	...	...
1993	-7.6	-13,035	...	...
1994	-9.7	-59,242	57,603	958
1995	-6.0	-69,508	46,279	34,136
1996	-8.8	-147,607	58,622	-18,278
1997	-8.2	-150,415	32,431	11,886
Ukraine		**million**	**million**	
1992	-12.2	...	...	...
1993	-6.5	-96	95	2.4
1994	-10.5	-1,264	1,131	159.6
1995	-7.9	-4,307	3,051	-874.6
1996	-4.6	-3,704	1,700	189.2
1997	-7.1	-6,566	1,101	322.6

Note: ΔNCG – changes in claims on general government, net; ΔNFA – changes in net foreign assets; n.c. units – national currency units expressed in million or billion for each country

Source: IMF IFS, August 1998

Table 4. 3. Inflation and Monetary Aggregates (annual percentage changes)

Country	Inflation	M2	M1
Croatia			
1993	1,121.0	...	...
1994	2.4	72.6	111.9
1995	4.6	41.3	24.6
1996	3.7	49.4	37.9
1997	5.0	37.7	20.9
the Czech Republic			
1993	20.8	-17.0	-37.5
1994	9.7	20.4	50.2
1995	7.9	29.3	6.7
1996	8.6	6.4	4.7
1997	10.0	1.7	-7.3
Hungary			
1990	34.6	121.8	...
1991	31.0	29.4	18.2
1992	24.7	27.3	32.1
1993	21.1	16.8	11.7
1994	21.2	13.0	8.0
1995	28.3	18.4	5.8
1996	19.8	...	...
1997	18.5	...	...
Poland			
1990	225.9	160.1	401.1
1991	60.3	37.0	14.4
1992	44.4	57.5	38.8
1993	37.7	36.0	31.3
1994	29.4	38.2	39.7
1995	21.9	35.0	36.4
1996	18.7	29.3	31.8
1997	14.8	30.7	32.4
Slovakia			
1993	23.0	24.1	...
1994	11.7	17.4	6.2
1995	7.2	18.4	20.9
1996	5.4	16.2	15.8
1997	6.5	2.9	-8.1
Slovenia			
1992	81.2	123.6	133.7
1993	22.9	62.0	41.5
1994	18.3	43.9	35.1
1995	8.6	29.3	24.8
1996	8.8	21.3	18.4
1997	9.4	11.7	18.1
Estonia			
1992	942.2	71.1	291.5
1993	37.9	54.4	85.3
1994	41.6	30.0	20.6
1995	26.5	30.0	29.1
1996	14.8	36.4	30.9
1997	12.5	37.8	22.6

Table 4. 3. Inflation and Monetary Aggregates (annual percentage changes)

Country	Inflation	M2	M1
Kazakhstan			
1992	2,961.0	...	...
1993	2,165.0	...	...
1994	1,158.0	576.0	...
1995	60.3	108.2	...
1996	28.7	20.9	...
1997	11.2	...	...
Latvia			
1992	331.1	...	...
1993	34.9	...	...
1994	26.3	50.3	31.1
1995	23.1	-21.4	0.8
1996	13.2	18.6	18.8
1997	7.0	71.1	34.7
Lithuania			
1992	1,163.0	...	...
1993	188.6	88.8	...
1994	45.1	62.9	41.7
1995	35.7	27.9	40.8
1996	13.1	-3.0	3.5
1997	8.4	34.1	41.0
Russia			
1992	2,526.0	783.3	...
1993	840.0	272.6	...
1994	215.0	216.5	187.0
1995	131.0	112.6	120.7
1996	21.8	29.6	27.2
1997	11.0	29.5	40.6
Ukraine			
1992	1,210.0	1,333.0	1,077.0
1993	10,155.0	1,810.0	1,552.0
1994	401.1	568.0	444.0
1995	181.7	115.0	151.7
1996	39.9	35.4	39.9
1997	10.1	33.9	49.0

Note: Inflation is changes in December-to-December CPI; M1 consists of currency in circulation and demand deposits; M2 combines M1 and saving deposits in domestic and foreign currencies

Source: IMF IFS, August 1998

Table 4. 4. Inflation and Broad Money Correlation Coefficients

Country	Correlation	Fisher test
CEE countries		
Croatia	0.165	0.166
Czech Republic	0.085	0.085
Hungary	0.348	0.364
Poland	0.405	0.429
Slovak Republic	0.326	0.338
Slovenia	0.678	0.826
FSU countries		
Estonia	0.461	0.499
Kazakhstan	0.597	0.688
Latvia	0.315	0.326
Lithuania	0.810	1.128
Russia	0.776	1.036
Ukraine	0.911	1.536

Source:IMF IFS , August 1998

Table 5. 1. Monetization, inflation and real GDP dynamics in high level monetization countries

Country	1990	1991	1992	1993	1994	1995	1996	1997
Czech Republic								
Monetization (%)	...	**67**	**77**	**77**	**83**	**83**	**83**	...
_ excl. foreign currency deposits	...	**63**	**67**	**71**	**77**	**77**	**77**	...
End year CPI inflation (%)	18	52	13	18	10	8	9	9
GDP at const. prices (% change)	-1.2	-11.5	-3.3	0.6	2.7	5.9	4.1	1.0
Slovakia								
Monetization (%)	...	**63**	**63**	**67**	**67**	**67**	**71**	...
_ excl. foreign currency deposits	...	**63**	**59**	**63**	**59**	**63**	**63**	...
End year CPI inflation (%)	18	58	9	25	12	7	5	7
GDP at const. prices (% change)	-2.5	-14.6	-6.5	-3.7	4.9	6.8	6.9	4.5
Bulgaria								
Monetization (%)	...	**77**	**77**	**77**	**77**	**67**	**77**	...
_ excl. foreign currency deposits	...	**50**	**59**	**63**	**53**	**50**	**38**	...
End year CPI inflation (%)	73	339	79	64	122	33	311	592
GDP at const. prices (% change)	-9.1	11.7	-7.3	-2.4	1.8	2.1	-10.9	-7.0
Albania								
Monetization (%)	...	**71**	**53**	**40**	**45**	**48**	**56**	...
_ excl. foreign currency deposits	...	**67**	**42**	**32**	**38**	**38**	**45**	...
End year CPI inflation (%)	0	104	237	31	16	6	17	42
GDP at const. prices (% change)	-10.0	-27.7	-7.2	9.6	9.4	8.9	8.2	-15.0

Data for 1997 are EBRD [1997] projections

Sources: Monetization: Jarociński [1998] calculations from De Broeck et al. [1997], Table 1 and 2; end year CPI inflation and change of GDP in constant prices [EBRD, 1997]

Table 5. 2. Monetization, inflation, real GDP dynamics and shadow economy share in medium level monetization countries

Country	1990	1991	1992	1993	1994	1995	1996	1997
Hungary								
Monetization (%)	...	**48**	**50**	**50**	**45**	**43**	**43**	...
_ excl. foreign currency deposits	...	**40**	**43**	**40**	**36**	**31**	**32**	...
End year CPI inflation (%)	33	32	22	21	21	28	20	17
GDP at const. prices (% change)	-4	-12	-3	-1	3	2	1	3
Shadow economy (% of GDP)	28.0	32.9	30.6	28.5	27.7	29.0	...	...
Poland								
Monetization (%)	...	**32**	**36**	**36**	**37**	**37**	**37**	...
_ excl. foreign currency deposits	...	**24**	**27**	**26**	**26**	**29**	**31**	...
End year CPI inflation (%)	249	60	44	38	29	22	19	15
GDP at const. prices (% change)	-12	-7	3	4	5	7	6	6
Shadow economy (% of GDP)	196.0	23.5	19.7	18.5	15.2	12.6	...	...
Slovenia								
Monetization (%)	...	**34**	**26**	**30**	**33**	**36**	**38**	...
_ excl. foreign currency deposits	...	**18**	**14**	**16**	**21**	**22**	**24**	...
End year CPI inflation (%)*	*105*	*247*	46	15	14	6	6	...
GDP at const. prices (% change)	-5	-9	-6	3	5	4	3	4
Croatia								
Monetization (%)	...	**37**	**38**	**24**	**20**	**26**	**36**	...
_ excl. foreign currency deposits	...	**23**	**25**	**10**	**10**	**11**	**14**	...
End year CPI inflation (%)*	*136*	204	11449	1398	3	5	4	...
GDP at const. prices (% change)	-7	-20	-11	-1	1	2	4	5
Romania								
Monetization (%)	...	**48**	**30**	**22**	**21**	**25**	**27**	...
_ excl. foreign currency deposits	...	**45**	**25**	**16**	**17**	**19**	**21**	...
End year CPI inflation (%)	38	223	199	296	62	28	57	116
GDP at const. prices (% change)	-6	-13	-9	2	4	7	4	-2
Estonia								
Monetization (%)	...	**100**	**26**	**21**	**23**	**22**	**32**	...
_ excl. foreign currency deposits	...	**42**	**15**	**20**	**21**	**20**	**29**	...
End year CPI inflation (%)	***23***	304	954	36	42	29	15	12
GDP at const. prices (% change)	-8	-8	-14	-9	-2	4	4	7
Shadow economy (% of GDP)	...	26.2	25.4	24.1	25.1	11.8	...	...
Latvia								
Monetization (%)	...	...	**18**	**24**	**29**	**26**	**26**	...
_ excl. foreign currency deposits	...	...	**13**	**17**	**21**	**19**	**14**	...
End year CPI inflation (%)	***11***	262	959	35	26	23	13	8
GDP at const. prices (% change)	3	-10	-35	-15	1	-1	3	3
Shadow economy (% of GDP)	...	19.0	34.3	31.0	34.2	35.3	...	...
Lithuania								
Monetization (%)	...	...	...	**15**	**16**	**16**	**27**	...
_ excl. foreign currency deposits	...	...	...	**9**	**12**	**12**	**20**	...
End year CPI inflation (%)	***8***	345	1161	189	45	36	13	10
GDP at const. prices (% change)	-5	-13	-38	-24	1	3	4	5
Shadow economy (% of GDP)	...	21.8	39.2	31.7	28.7	21.6	...	...

* Figures in bold italics mean that, because of unavailability of data on end-year inflation, average inflation is reported instead. Figures in italics mean that "retail prices" changes [EBRD, 1997] (apparently not equivalent to CPI) are reported instead, because of the availability of data

Data for 1997 are EBRD [1997] projections

Sources: Monetization: Jarociński [1998] calculations from De Broeck et al. [1997], Tables 1 and 2; end year CPI inflation and change of GDP in constant prices: [EBRD, 1997] (Poland, Hungary, Romania, Estonia, Latvia, and Lithuania), [IFS] (Slovenia and Croatia), shadow economy: Kaufmann and Kaliberda [1996]

Table 5. 3. Low monetization transition economies, which attained stabilization: monetization (excluding foreign currency deposits), inflation and real GDP dynamics

Countries	1990*	1991	1992	1993	1994	1995	1996	1997
Moldova								
Monetization (%)	...	50	24	11	10	13	20	...
End year CPI inflation (%)	*4*	151	2198	837	116	24	15	11
GDP at const. prices (% change)	-2	-18	-29	-1	-31	-3	-8	-2
Kyrgyzstan								
Monetization (%)	...	...	18	11	10	14	14	...
End year CPI inflation (%)	...	170	1259	1363	96	32	35	24
GDP at const. prices (% change)	3	-5	-19	-16	-20	1.3	6	6
Russia								
Monetization (%)	...	77	23	20	14	11	10	...
End year CPI inflation (%)	6	144	2501	837	217	132	22	14
GDP at const. prices (% change)	...	-5	-15	-9	-13	-4	-5	1
Ukraine								
Monetization (%)	...	67	19	20	18	13	10	...
End year CPI inflation (%)	*4*	161	2730	10155	401	182	40	15
GDP at const. prices (% change)	-3	-12	-14	-14	-23	-12	-10	-3
Azerbaijan								
Monetization (%)	...	...	22	27	18	11	9	...
End year CPI inflation (%)	*8*	126	1395	1294	1788	85	7	7
GDP at const. prices (% change)	-12	-1	-23	-23	-18	-11	1	5
Kazakhstan								
Monetization (%)	...	...	20	20	11	9	9	...
End year CPI inflation (%)	105	137	2984	2169	1160	60	29	12
GDP at const. prices (% change)	0	-13	-3	-10	-18	-9	1	2
Armenia								
Monetization (%)	...	...	33	23	11	6	7	...
End year CPI inflation (%)	*10*	25	1341	10896	1885	32	6	19
GDP at const. prices (% change)	-7	-17	-53	-15	5	7	6	6
Georgia								
Monetization (%)	...	111	34	7	4	2	4	...
End year CPI inflation (%)	5	131	1177	7488	6473	57	14	7
GDP at const. prices (% change)	-12	-14	-45	-25	-11	2	11	11

* Inflation figures in italics mean that, because of unavailability of end-year inflation, average inflation is reported instead

Data for 1997 are EBRD projections

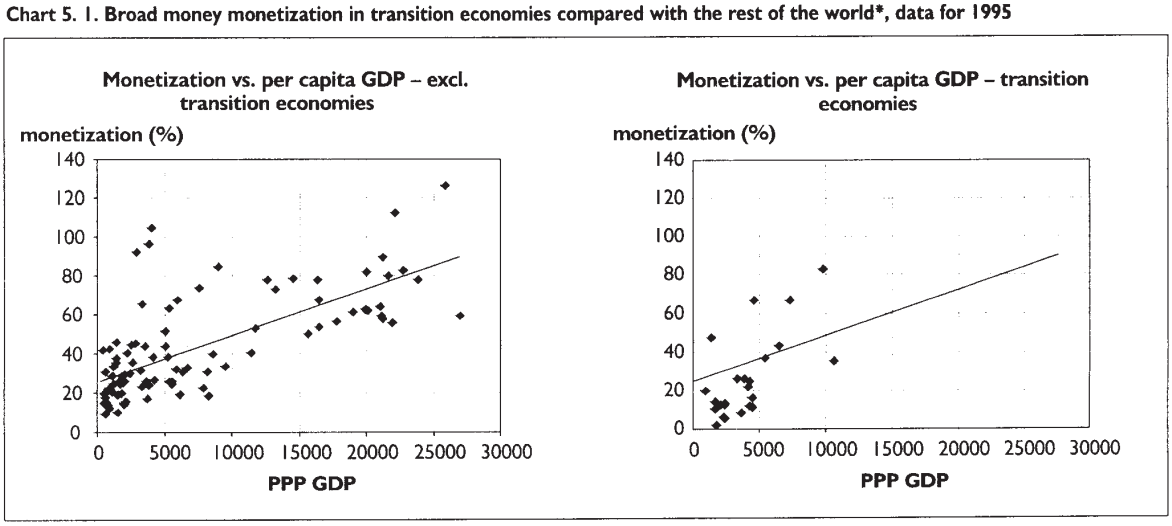
Sources: monetization: Jarociński [1998] calculations from De Broeck et al. [1997], Table 2; end year CPI inflation and change of GDP in constant prices: [EBRD, 1997]

Table 5. 4 Low monetization transition economies, which are still unstable and not liberalized: monetization (excluding foreign currency deposits), inflation and real GDP dynamics

Country	1990*	1991	1992	1993	1994	1995	1996	1997
Uzbekistan								
Monetization (%)	...	...	...	29	20	14	14	...
End year CPI inflation (%)	*3*	169	910	885	1281	117	64	40
GDP at const. prices (% change)	2	-1	-11	-2	4	-1	2	1
Tajikistan								
Monetization (%)	...	...	29	42	32	20	7	...
End year CPI inflation (%)	*4*	204	1364	7344	1	2132	41	105
GDP at const. prices (% change)	-2	-7	-29	-11	-22	-13	-7	-3
Turkmenistan								
Monetization (%)	...	...	18	13	5	6	6	
End year CPI inflation (%)	*4.6*	155	644	9750	1328	1262	446	44
GDP at const. prices (% change)	2	-5	-5	-10	-19	-8	-3	-15
Belarus								
Monetization (%)	...	59	20	20	16	12	13	...
End year CPI inflation (%)	...	93	1558	1994	1990	243	40	99
GDP at const. prices (% change)	-3	-1	-10	-8	-13	-10	3	3

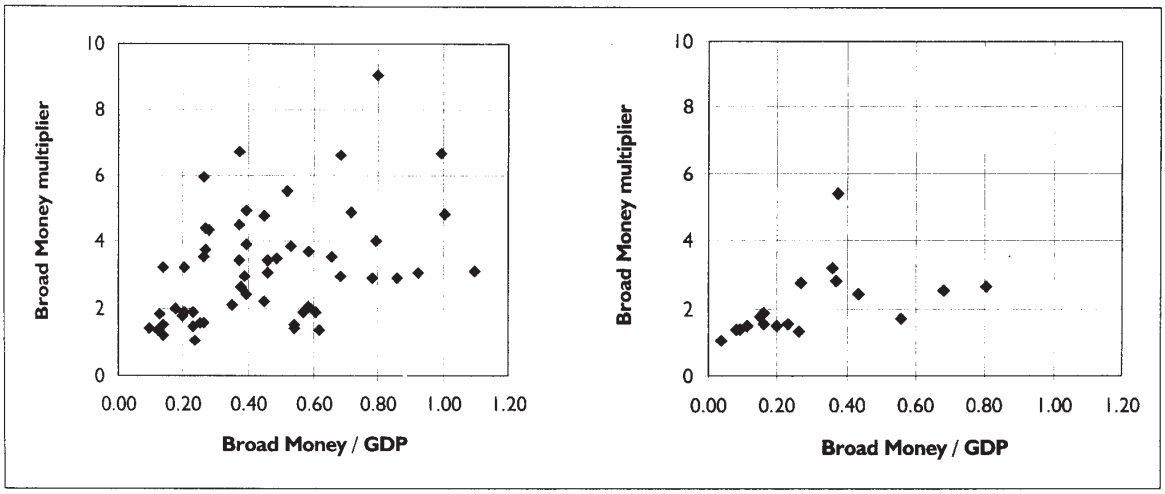
* Inflation figures in italics mean that, because of unavailability of end-year inflation, average inflation is reported instead.
Data for 1997 are EBRD projections.
Sources: monetization: Jarociński [1998] calculations from De Broeck et al. [1997, table 2]; end year CPI inflation and change of GDP in constant prices: [EBRD, 1997].

Chart 5. 1. Broad money monetization in transition economies compared with the rest of the world*, data for 1995



* Straight line has been fitted for the sample excluding transition economies
Sources: Monetization in transition countries: De Broeck et al. [1997], Table 2; per capita GDP at PPP exchange rates in transition economies [TR]; monetization and per capita GDP at PPP exchange rates in the remaining countries [WDR]

Chart 5. 2. Broad money multiplier and monetization in the world countries (left panel) and in transition economies (right panel) in 1996



Sources: Money multiplier, calculated as a ratio of "Money and Quasi Money" to "Money" [IFS], monetization (Broad Money/nominal GDP) [IFS], for transition economies: De Broeck et al. [1997], Table 2

Table 6. 1. Results of estimations

	Country	short-term coefficient (γ_2)	γ_3	γ_1	long-term coefficient $\gamma_2/(1-\gamma_3)$
1	Belarus	0.23	0.81		1.22
2	the Czech Republic	0.01	0.89	0.01	0.08
3	Croatia	0.33	0.62	0.02	0.86
4	Hungary	-0.04	0.96	0.01	-1.20
5	Kazakhstan	0.23	0.70	0.06	0.77
6	Latvia	0.34	0.87	-0.02	2.68
7	Lithuania	0.19	0.89	0.02	1.80
8	Poland	0.05	0.95		0.95
9	Romania	0.11	0.84		0.72
10	Russia	0.14	0.92	-0.05	1.72
11	Slovenia	0.13	0.75	0.04	0.52
12	Ukraine	0.41	0.64	0.07	1.13

Source: Antczak and Górski [1998]

Table 6. 2. Results of hypotheses testing

Item	Test 1		Test 2	
	$(\gamma_2)^{(1)}$	$(\gamma_2)^{(2)}$	$(\gamma_2)^{(2)}$	$(\gamma_2)^{(3)}$
Mean	0.298562	0.154179	0.154179	0.004803
Variance	0.007558	0.002874	0.002874	0.002181
T Stat	**3.057321**		**3.929009**	
P(T<=t) one-tail	0.009196		0.005541	
T Critical one-tail	1.894578		2.015049	

Source: Antczak and Górski [1998]

Table 7. 1. Basic macroeconomic indicators of countries experienced current account problems

Country	Year	Real GDP (%YoY)	Current account (%GDP)	CPI (% YoY)	US$/ loc.cur. (year end)
Mexico	1993	0.6	-5.8	9.8	3.1
	1994	4.5	-7.0	7.0	5.3
	1995	-6.2	-0.6	35.0	7.6
Czech Republic	1996	3.9	-7.6	8.8	27.3
	1997	1.0	-6.1	8.4	34.6
	1998	-1.5	-2.5	11.1	31.7
Thailand	1996	6.6	-7.8	5.8	25.6
	1997	-0.4	-1.9	5.6	47.3
	1998	-8.5	10.5	8.7	41.8
Russia	1996	-6.0	1.7	22.0	5.6
	1997	0.8	0.0	11.0	6.0
	1998	-5.0	-4.0	130.0	24.0
Brazil	1997	3.2	-4.2	6.4	1.1
	1998	0.7	-4.0	1.9	1.2
	1999	-3.0	-2.7	2.3	1.4

1998 and 1999 figures are forecasts
Source: ING Barings, Global Economics Fourth Quarter 1998

Table 7. 2. ADF test results for Polish zloty

PLN versus	PPP based on	Productivity unadjusted	Productivity adjusted
USD	CPI	-1.44	-1.66
USD	PPI	-1.03	-1.13
DEM	CPI	-1.73	-1.9
DEM	PPI	-2.12	-2.34
BASKET	CPI	-3.21*	-4.63***
BASKET	PPI	-2.45	-2.84

Source: ING Barings

Table 7. 3. ADF test results for Czech koruna

CZK versus	PPP based on	Productivity unadjusted	Productivity adjusted
USD	CPI	-0.89	-0.58
USD	PPI	-0.87	-0.71
DEM	CPI	-1.91	-1.67
DEM	PPI	-1.89	-1.58
BASKET	CPI	-1.63	-1.33
BASKET	PPI	-1.38	-1.26

Source: ING Barings

Table 7. 4. ADF test results for Hungarian forint

HUF versus	PPP based on	Productivity unadjusted	Productivity adjusted
USD	CPI	-1.82	-2.39
USD	PPI	-2.68	-3.99***
DEM	CPI	-1.69	-2.5
DEM	PPI	-0.86	-1.83
BASKET	CPI	-3.24***	-2.9
BASKET	PPI	-2.09	-1.99

Source: ING Barings

Table 7. 5. Polish zloty market and PPP rates, Dec'97

Indicator	US$	DM	INDEX
MARKET	3.542	1.964	2.927
CPI	3.845	2.451	3.403
PPI	3.402	2.215	3.042
CPI-PROD	2.800	1.842	2.518
PPI-PROD	2.477	1.665	2.251

Source: ING Barings

Table 7. 6. Polish zloty over(+)/undervaluation(–), Dec'97

Indicator	US$	DM	INDEX
CPI	9%	25%	16%
PPI	-4%	13%	4%
CPI-PROD	-21%	-6%	**-14%**
PPI-PROD	-30%	-15%	-23%

Source: ING Barings

Table 7. 7. Czech koruna market and PPP rates, Dec'97

Indicator	US$	DM	INDEX
MARKET	34.640	19.203	1.120
CPI	46.210	29.459	1.639
PPI	40.540	26.398	1.459
CPI-PROD	35.794	23.587	1.299
PPI-PROD	31.402	21.137	1.157

Source: ING Barings

Table 7. 8. Czech koruna over(+)/undervaluation(–), Dec'97

Indicator	US$	DM	INDEX
CPI	33%	53%	46%
PPI	17%	37%	30%
CPI-PROD	3%	23%	16%
PPI-PROD	-9%	10%	3%

Source: ING Barings

Table 7 .9. Hungarian forint market and PPP rates, Dec'97

Indicator	US$	DM	INDEX
MARKET	203.500	112.810	2.437
CPI	211.422	134.781	2.757
PPI	197.124	128.360	2.606
CPI-PROD	164.370	107.933	2.186
PPI-PROD	153.255	102.790	2.066

Source: ING Barings

Table 7. 10. Hungarian forint over(+)/undervaluation(–), Dec'97

Indicator	US$	DM	INDEX
CPI	4%	19%	**13%**
PPI	-3%	14%	7%
CPI-PROD	-19%	-4%	-10%
PPI-PROD	**-25%**	-9%	-15%

Source: ING Barings

Table 7. 11. Nominal currency devaluation, inflation, openness of the economy, balance of payments, current account, budget deficit, savings and investment-to-GDP ratios in Poland, Hungary, Czech Republic, Slovakia, and Russia in 1993 – 1997

Country /year	Devaluation in USD Terms*	Inflation %**	Balance of Payments	Current Account	Budget Deficit	Import + Export	Gross National Investment	Gross National Saving
Poland					as a % of GDP			
1993	32.9	36.9	-5.1	-9.1	-2.8	52	14.8	19.6
1994	25.4	33.3	-12.0	1.4	-3.4	56	14.9	24.6
1995	6.7	28.1	11.0	1.0	-2.8	60	16.9	25.7
1996	11.2	19.8	3.4	-3.1	-3.6	58	16.8	22.6
1997	22.4	15.1			-3.1			
Hungary								
1993	16.4	22.5	8.0	-13.4	-6.8	67	20.6	13.0
1994	14.4	18.9	-1.4	-12.0	-8.2	75	23.0	15.0
1995	19.5	28.3	15.6	-7.3	-6.5	80	23.8	19.9
1996	21.5	23.5	-3.4	-4.6	-3.5	78	24.5	20.5
1997	23.8	18.4			-5.0			
Czech Republic								
1993	5.9	18.3	10.1	1.7	2.7	88	16.4	18.4
1994	-6.4	10.1	9.4	-2.1	0.8	81	20.5	21.1
1995	-5.2	9.1	15.8	-2.9	0.4	102	26.4	22.1
1996	2.7	8.8	-1.6	-8.3	-0.2	107	34.5	26.9
1997	16.0	8.4			-1.0			
Slovakia								
1993	8.7	12.5	0.1	-4.8	-6.3	101	27.6	22.1
1994	4.1	13.4	8.8	5.2	-4.1	097	22.2	27.7
1995	-7.3	9.9	10.3	2.2	0.8	103	27.5	30.8
1996	3.2	5.8	2.0	-11.0	-1.9	107	36.2	25.4
Russia								
1993	141.1	874.6		3.4	-7.2	45	27.0	34.7
1994	120.9	307.4	-7.8	3.3	-10.4	43	25.5	30.1
1995	108.1	197.4	-3.1	2.3	-5.5	40	23.2	26.3
1996	12.3	47.6	-5.1	2.7	-8.3	35	21.6	27.8
1997	13.0	14.6			-8.0			

* – Annual rate of nominal currency devaluation (+) based on year average exchange rate (domestic currency to USD)

** – Average CPI percentage changes

Sources: International Financial Statistics, IMF [May 1998]. Comparative Statistics for Emerging Market Economies Institute of International Finance, Inc. [December 1997]; Antczak and Górski [1998]

Table 7. 12. Nominal currency devaluation, inflation, openness of the economy, balance of payments, current account, budget deficit-to-GDP ratios in Estonia, Latvia, Lithuania, Slovenia, and Ukraine in 1993 – 1997

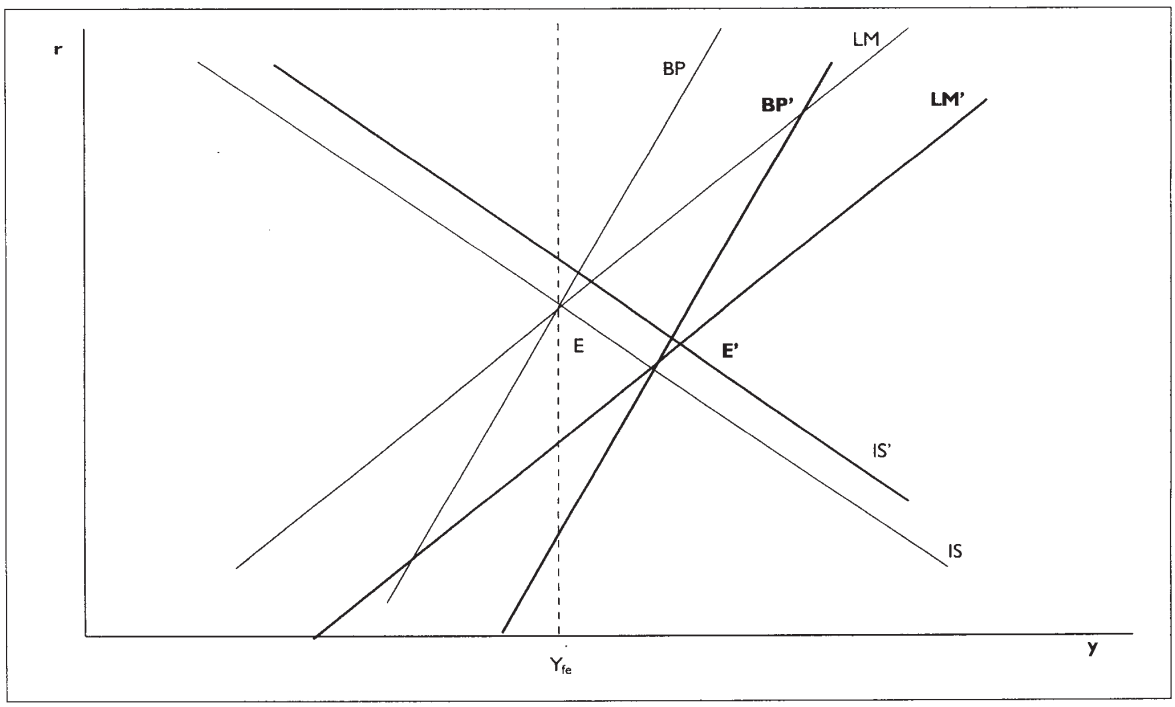
Country/year	Devaluation in USD Terms*	Inflation %**	Balance of Payments	Current Account	Budget Deficit	Import + Export
Estonia			as a % of GDP			
1993	2.4	89.8	9.9	2.2	-0.7	102
1994	-1.8	47.7	0.8	0.9	1.3	127
1995	-11.8	28.8	2.3	-4.6	-1.2	121
1996	5.0	23.1	2.4	-3.8	-1.5	120
1997	15.4	11.2				
Latvia						
1993	-8.3	108.8	13.7	19.2	0.6	84
1994	-17.1	35.9	1.5	5.5	-4.1	61
1995	-5.7	25.0	-0.7	-0.4	-3.5	69
1996	4.4	17.6	4.2	-8.3	-1.4	74
Lithuania						
1993	145.0	410.2	8.2	-3.4	-3.1	168
1994	-8.4	72.2	2.6	-2.2	-4.2	103
1995	0.6	39.7	2.8	-10.3	-3.3	107
1996	0.0	24.6	-0.1	-9.2	-3.6	99
Slovenia						
1993	39.3	31.9	1.0	1.5	-0.3	99
1994	13.7	19.8	4.5	4.2	-0.2	98
1995	-8.0	12.6	1.3	-0.1	0.0	95
1996	14.2	9.7	3.1	0.2	0.3	94
1997	18.0	9.1			-1.0	
Ukraine						
1993	610.4	4734.9			-16.2	53
1994	622.6	891.2	-3.3	-3.2	-7.8	57
1995	349.8	376.7	-4.4	-3.1	-4.8	79
1996	24.2	80.3	-1.4	-2.7	-4.9	74
1997	1.8	15.9			-3.2	

* – Annual rate of nominal currency devaluation (+) based on year average exchange rate (domestic currency to USD)

** – Average CPI percentage changes

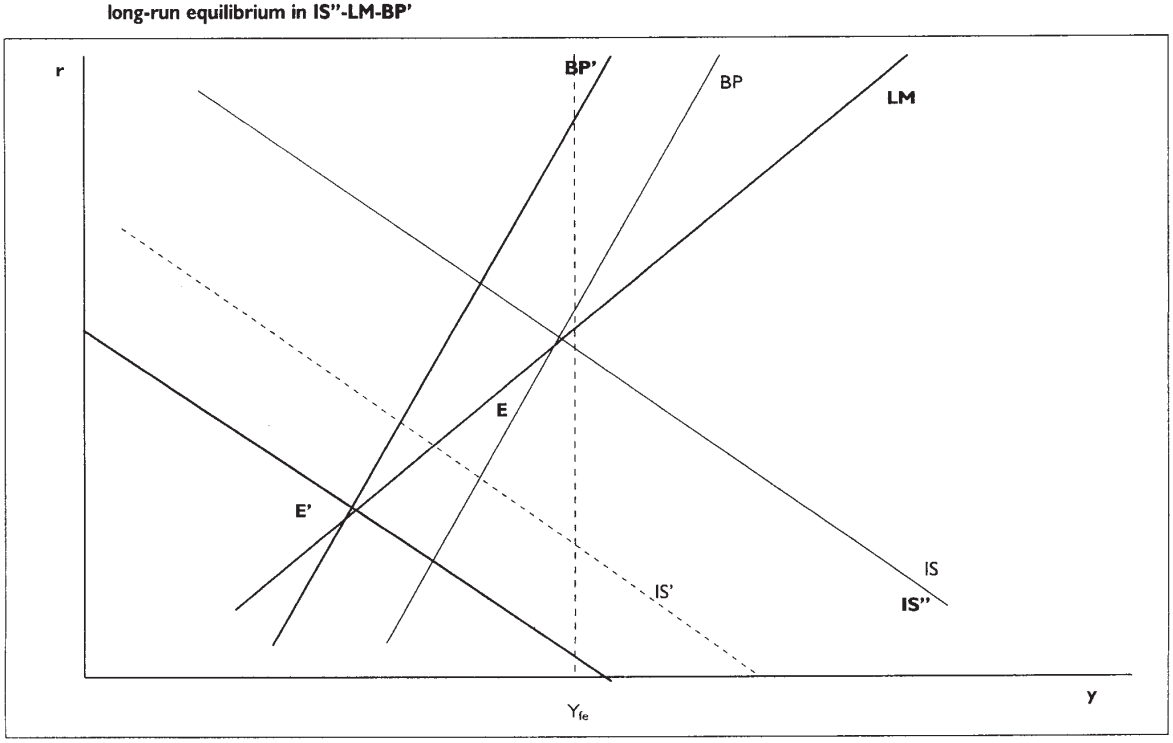
Sources: International Financial Statistics, IMF [May 1998]. Comparative Statistics for Emerging Market Economies Institute of International Finance, Inc. [December 1997]; Antczak and Górski [1998]

Chart 7. 1. Monetary expansion in M-F model (initial equilibrium in IS-LM-BP, short-run in E, long run in E')



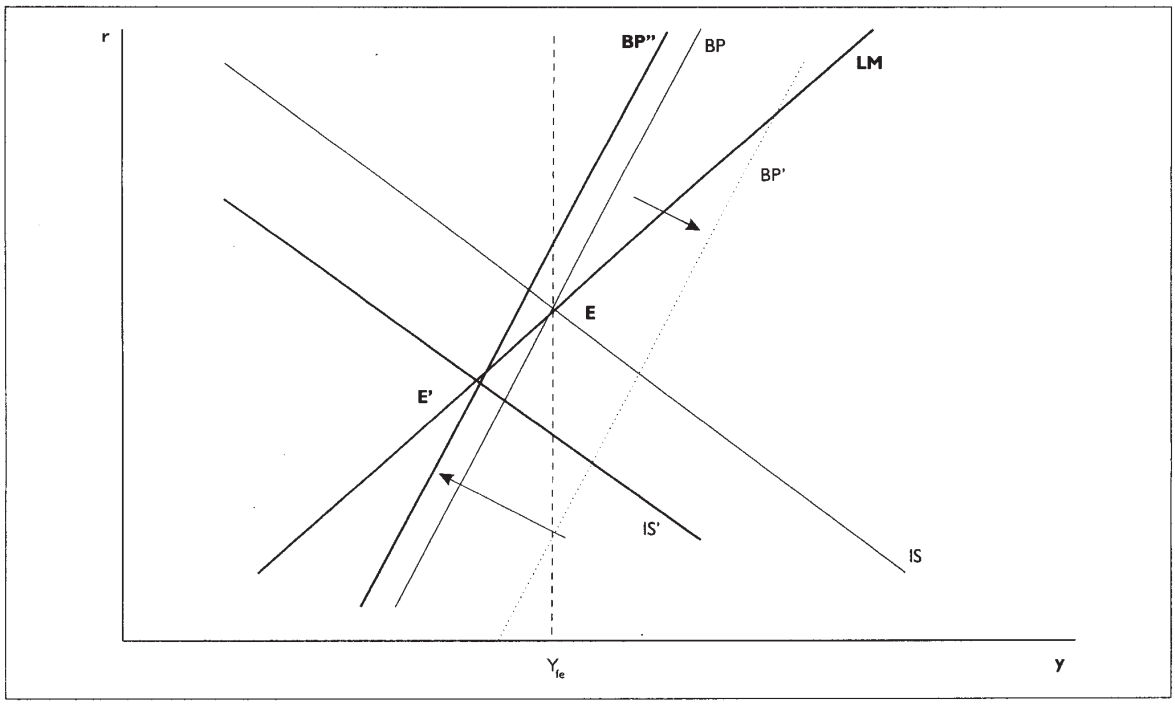
Source: Rybiński and Szczurek [1998]

Chart 7. 2. Fiscal contraction in M-F model, (low capital mobility case). Initial state in IS-LM-BP, short run equilibrium at IS'-LM, long-run equilibrium in IS"-LM-BP'



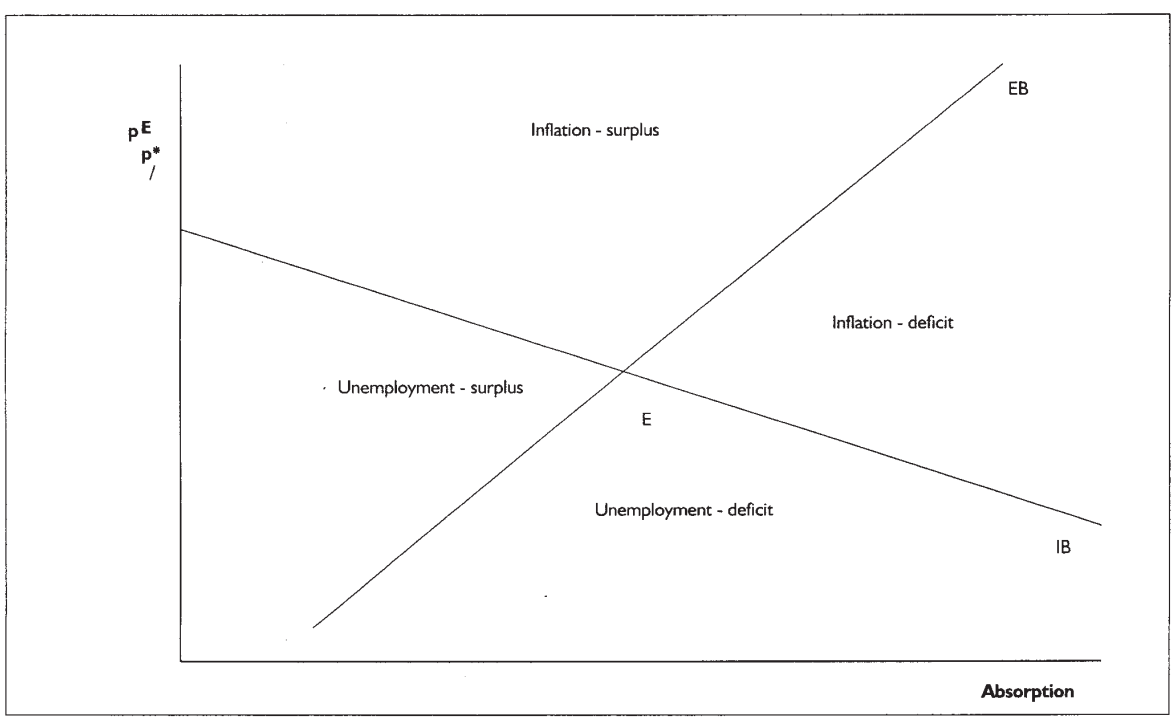
Source: Rybiński and Szczurek [1998]

Chart 7. 3. Effets of exogenous increase in capital account



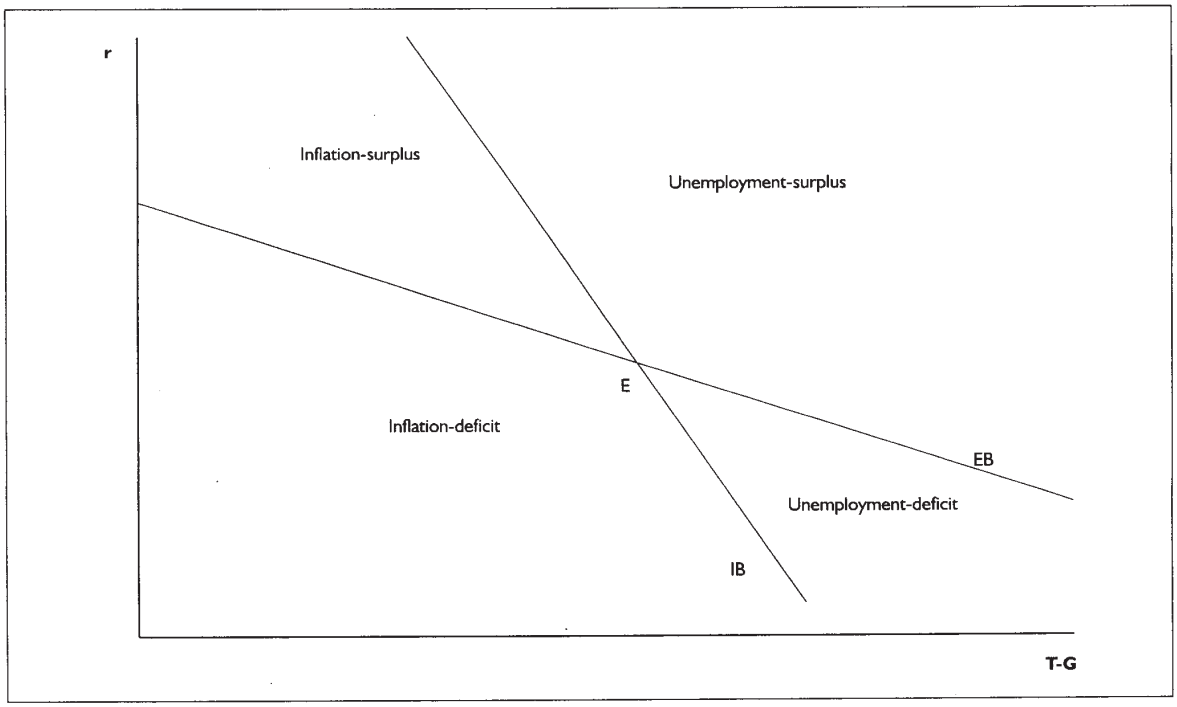
Source: Rybiński and Szczurek [1998]

Chart 7. 4. Swan diagram. P shows Polish macroeconomic situation in early 1998



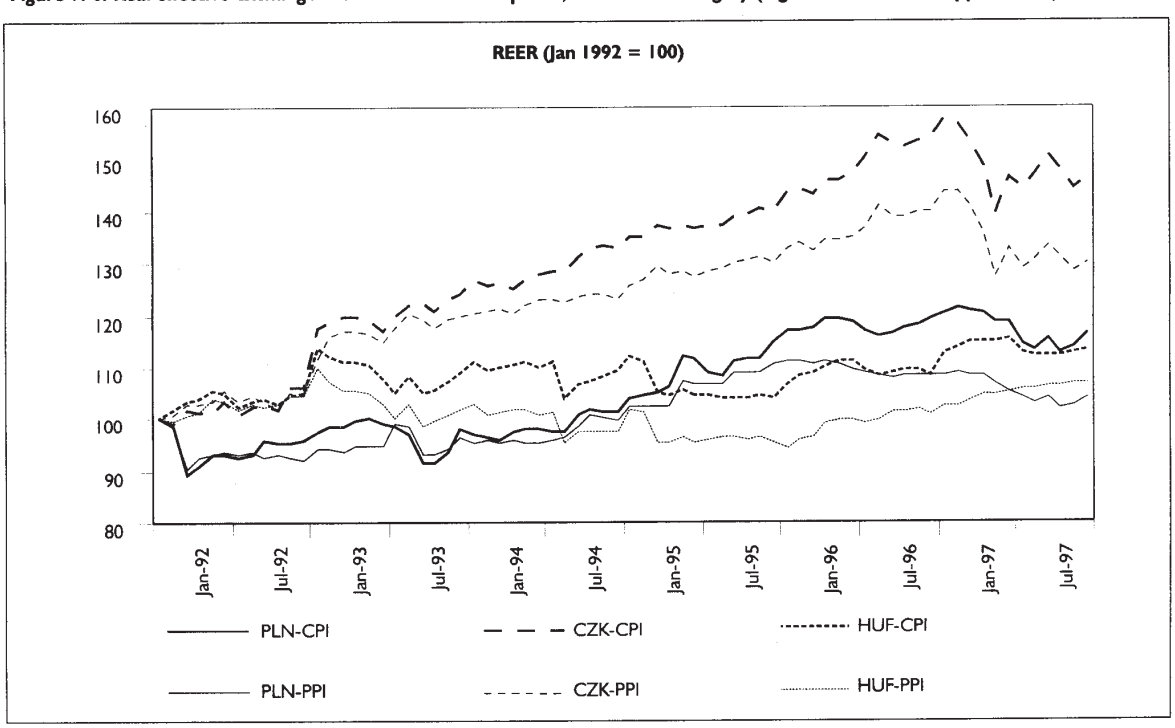
Source: Rybiński and Szczurek [1998]

Chart 7. 5. Internal and external balance and fiscal – monetary mix



Source: Rybiński and Szczurek [1998]

Figure 7. 6. Real effective exchange rates in the Czech Republic, Poland and Hungary (higher values reflect appreciation)



Source: ING Barings

Table 8. 1. Overall General Government Balance, and Central Bank Financing to the Government, 1992 – 1997 (in % of GDP)

Country	Overall Balance						Central Bank Financing					
	1992	1993	1994	1995	1996	1997	1992	1993	1994	1995	1996	1997
CEE countries												
Albania	-21.8	-15.4	-13.0	-10.4	-12.6	-13.1	20.0	9.1.	6.6	2.0	1.0	6.0
Bulgaria	-5.2	-10.9	-5.8	-6.3.	-13.3	-2.6	6.0	11.0	5.5	4.9	14.5	-0.1
Croatia	-3.8	-0.8	1.5	-1.0	-0.4	-1.3	...	...	-0.7	0.5	-0.1	0.0
the Czech Republic	...	...	-1.2	-1.8	-1.2	-2.1	...	-2.1	-2.4	-1.0	-0.8	0.7
Hungary	-6.9	-8.5	-8.3	-7.1	-3.1	-4.6	16.5	13.2	11.2	7.5	7.3	1.7
Macedonia	...	-13.8	-2.9	-1.2	-0.4	0.4	...	...	1.3	0.1	0.1	0.4
Poland	-7.5	-4.0	-2.0	-2.7	-2.5	-2.3	5.2	1.5	1.5	0.1	0.1	0.5
Romania	-4.6	-0.4	-1.9	-2.6	-4.0	-3.5	...	...	...	...	...	...
Slovakia	-11.9	-7.0	-1.3	0.2	-1.3	-5.1	...	...	...	...	...	1.5
Slovenia	0.2	0.3	-0.2	0.0	0.3	-1.5	0.0	0.0	0.0	0.0	0.0	0.0
FSU countries												
Armenia	-37.3	-54.3	-10.1	-11.1	-9.3	-6.7	...	...	3.5	0.4	1.4	-1.4
Azerbaijan	-27.9	...	-11.4	-4.3	-2.6	-1.3	0.0	11.4	8.2	-2.7	1.4	-0.6
Belarus	0.0	-1.9	-2.5	-1.9	-1.6	-1.2	...	...	0.8	2.6	1.4	0.4
Estonia	-0.3	-0.6	1.3	-1.2	-1.5	2.0	...	0.0	0.0	0.0	0.0	0.0
Georgia	-62.3	-26.1	-16.5	-4.5	-4.4	-3.7	...	...	2.0	1.8	2.7	2.2
Kazakhstan	-7.3	-1.2	-7.2	-2.0	-2.5	-3.6	...	...	3.2	1.7	-0.1	-0.3
Kyrgyzstan	-14.8	-14.4	-11.6	-17.3	-9.5	-9.4	...	0.7	1.3	7.8	1.9	0.4
Latvia	-0.8	0.6	-4.0	-3.3	-1.3	1.3	0.0	0.0	0.0	0.0	0.0	0.0
Lithuania	0.0	-5.5	-4.8	-4.5	-4.6	-1.4	0.0	0.0	0.0	0.0	0.0	0.0
Moldova	-23.9	-7.4	-9.1	-5.8	-6.6	-6.8	26.1	5.0	1.9	1.5	-0.7	1.4
Russia	-18.2	-7.3	-10.4	-5.8	-8.1	-7.5	9.2	5.9	8.1	1.6	2.1	...
Tajikistan	-30.5	-23.4	-5.1	-11.2	-5.8	-3.3	30.6	24.8	9.6	13.1	2.3	1.5
Turkmenistan	13.3	-0.5	-1.4	-1.6	-0.8	-0.4	9.9	6.0	1.6	1.8	-0.2	0.4
Ukraine	-23.2	-9.7	-8.2	-5.0	-3.2	-5.1	23.8	14.1	8.9	5.6	2.1	1.4
Uzbekistan	-18.4	-10.4	-6.1	-4.1	-7.3	-2.3	...	...	4.8	1.4	6.8	1.3

Source: IMF [1998, table 5]

Table 8. 2. The size of quasi-fiscal operations – as percentage of GDP (positive values mean that the Central bank carries out QF operations)

Country	1990	1991	1992	1993	1994	1995	1996
Czech Rep.	n.a.	n.a.	n.a.	1.3	-0.4	1.2	-1.3
Hungary	9.0	15.5	-0.4	10.9	6.5	7.1	n.a.
Poland	7.9	-2.5	-5.2	-2.0	-1.6	-2.7	-2.2
Russia	n.a.	n.a.	n.a.	n.a.	-4.1	-0.5	-0.2
Estonia	n.a.	n.a.	-3.3	2.1	0.8	-0.2	-0.6
Latvia	n.a.	n.a.	n.a.	n.a.	1.5	-0.4	0.1
Slovenia	n.a.	n.a.	n.a.	-2.0	-2.9	-1.8	n.a.
Slovakia	n.a.	n.a.	n.a.	n.a.	-7.2	0.4	-1.1
Ukraine	n.a.	n.a.	n.a.	12.5	-1.7	n.a.	n.a.

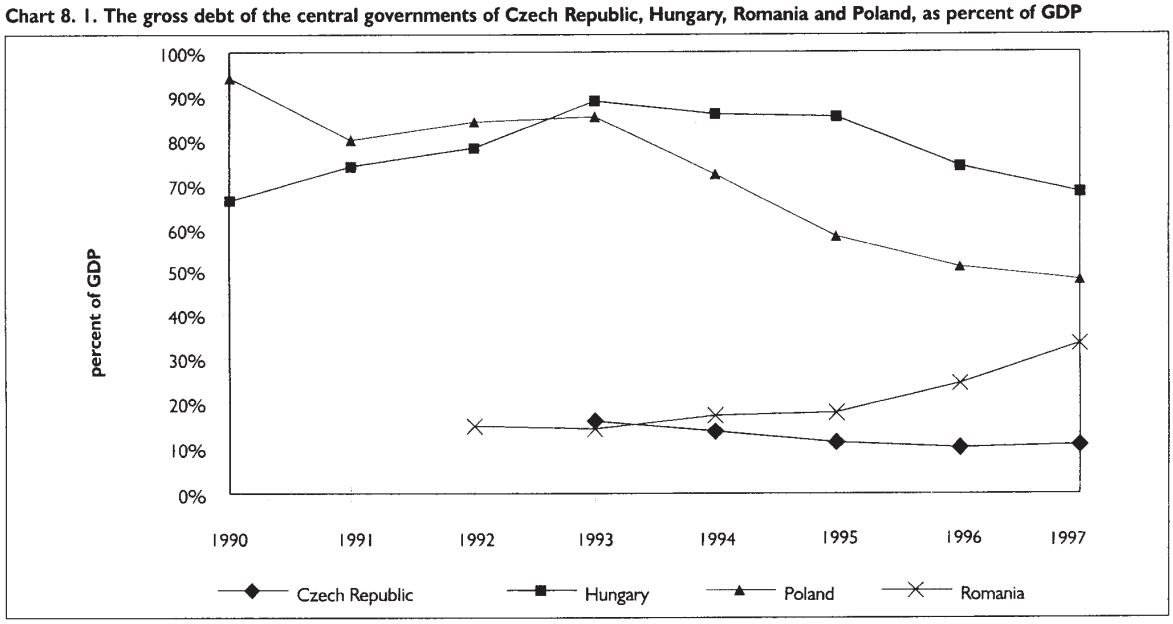
Source: Markiewicz [1998] based on IMF data – IFS basis

Table 8. 3. Actual and Sustainable Primary Fiscal Balances (in percent of GDP)

Country	1997 (Actual)	Sustainable
CEE countries		
Albania	-7.4	1.1
Bulgaria	6.0	2.1
Croatia	0.2	0.6
Czech Republic	-0.9	0.2
Hungary	3.5	1.3
Macedonia	1.0	0.8
Poland	1.2	0.9
Romania	-0.2	0.4
Slovakia	-3.0	0.5
Slovenia	-2.6	0.4
FSU countries		
Armenia	-4.1	0.8
Azerbaijan	-1.2	0.3
Belarus	-0.7	0.2
Estonia	2.3	0.1
Georgia	-2.4	0.6
Kazakhstan	-2.9	0.3
Kyrgyzstan	-7.7	0.8
Latvia	2.2	0.3
Lithuania	-0.5	0.2
Moldova	-3.1	0.8
Russia	-3.1	0.4
Tajikistan	-2.5	1.6
Turkmenistan	-0.2	0.6
Ukraine	-3.2	0.4
Uzbekistan	-2.3	0.3

Note: Shaded rows indicate countries where actual 1997 primary fiscal position is better than sustaineble
Source: IMF [1998, table 8]

Chart 8. 1. The gross debt of the central governments of Czech Republic, Hungary, Romania and Poland, as percent of GDP



Source: IMF, Czech – Statistical Appendix (1998), IMF, Hungary – Statistical Appendix (1997), Polish Ministry of Finance (1998) and IBCA, Sovereign Report – Republic of Romania (1997)

Table 9. 1. Index of political independence (PI) in 1996

Country	G1	G2	G3	B4	B5	R6	R7	C8	C9	PI
Belarus	*	*		*		*				4
Bulgaria	*			*		*	*	*		5
Croatia	*	*		*	*	*	*	*		7
the Czech Republic	**	*	*	*	*	*	*	*		9
Georgia	**	*		*	*	*		*		7
Hungary		*	*			*	*	*		5
Kyrgystan	**		*					*		4
Latvia	*	*		*	*		*	*	*	7
Macedonia	**	*	*	*	*	*	*	*		9
Moldova	*	*	*	*	*	*	*	*		8
Poland	**	*	*	*		*		*		7
Romania		*			*	*	*	*		5
Russia	**		*	*		*		*	*	7
Slovakia		*	*		*	*	*	*		6
Slovenia	**	*		*	*	*	*	*		8
Ukraine	*			*		*				3

Notes:
G1: Governor not appointed by the government (*) and not appointed by the parliament (**)
G2: Governor appointed for more than 5 years
G3: Provisions for governor's dismissal non-political only
B4: None of the board appointed by the government
B5: Board appointed for more than 5 years
R6: No mandatory government representative in the board
R7: Government/parliament approval of monetary policy is not required
C8: Statutory responsibility to pursue monetary stability
C9: Presence of legal provision supporting bank in conflicts with the government
Source: National legislation

Table 9. 2. Indices of economic (EI) and legal independence (PI+EI) in 1996

Country	D1	D2	D3	D4	D5	M6	M7	EI	PI + EI
Belarus	*		*			*		3	7
Bulgaria	*					*		2	7
Croatia	*					*		2	9
the Czech Republic	*		*	*	*	*		5	14
Georgia	*	*	*	*		*		5	12
Hungary	*			*		*	*	4	9
Kyrgyzstan	*		*	*		*		4	8
Latvia	*					*		2	9
Macedonia	*	*	*	*	*	*		6	15
Moldova	*	*			*	*		4	12
Poland	*			*	*	*		4	11
Romania	*		*			*		3	8
Russia	*			*		*		3	10
Slovakia	*		*	*	*	*	*	6	12
Slovenia	*		*	*		*		4	12
Ukraine	*					*		2	5

Notes:
D1: Direct credit facility is not automatic
D2: Direct credit facility is at the market interest rate
D3: Direct credit facility is temporary
D4: Direct credit facility is of limited amount
D5: All direct credit is securitized
M6: Discount rate is set by the central bank
M7: Supervision of commercial banks is not entrusted to the central bank (**) or not entrusted to the central bank alone (*)
Source: National legislation

Table 9.3. Inflation, transition progress indicators and fiscal balances in 1996

Country	Inflation	Cumulative liberalisation index (CLI)	Time elapsed from stabilisation	Fiscal balance (% of GDP)	Primary fiscal balance (% of GDP)
Belarus	39.3	2.03	2.0	-1.6	-0.9
Croatia	3.7	5.68	3.0	-0.4	0.7
the Czech Republic	8.6	5.47	5.0	-1.2	-0.2
Hungary	19.8	5.91	6.0	-3.1	4.3
Kyrgyz Republic	35.0	3.49	3.0	-9.5	-8.3
Latvia	13.2	4.11	4.0	-1.3	0.0
Moldova	15.1	3.05	3.0	-6.6	-3.9
Poland	18.7	5.92	6.0	-2.5	1.2
Romania	56.9	3.72	3.0	-4.0	-2.3
Russia	21.8	3.49	1.0	-8.1	-2.5
Slovakia	5.4	5.19	5.0	-1.3	0.9
Slovenia	8.8	5.88	4.0	0.3	-0.3
Ukraine	39.9	1.9	2.0	-3.2	-1.6

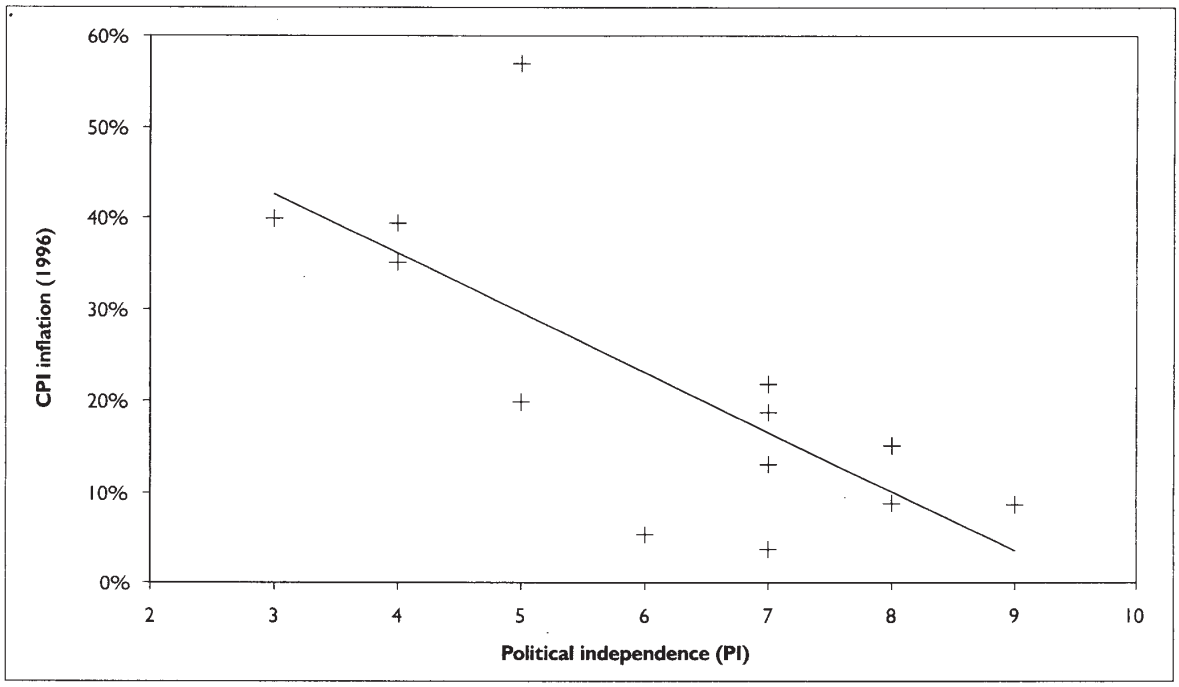
Sources: IMF, IMF IFS, De Melo, Denizer and Gelb [1996], Fisher, Sahay and Vegh [1996]

Table 9. 4. Relationship between 1996 inflation and CB independence (OLS)

Indicator	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	66.13 (12.22)	61.79 (8.94)	66.92 (11.57)	67.47 (12.11)	69.30 (11.68)	58.91 (13.17)	61.94 (11.19)
PI	-6.08 (1.48)	-6.45 (1.13)					
EI	-1.88 (3.37)						
PI+EI			-4.63 (0.96)	-4.27 (0.97)	-3.20 (1.38)	-4.29 (1.05)	-4.27 (0.92)
Time elapsed from stabilisation (1996)				-1.12 (0.94)			
CLI					-3.78 (2.09)		
Fiscal balance (1996)						-1.45 (0.74)	
Primary fiscal balance (1996)							-1.55 (0.68)
R^2	0.55	0.53	0.50	0.51	0.57	0.57	0.58

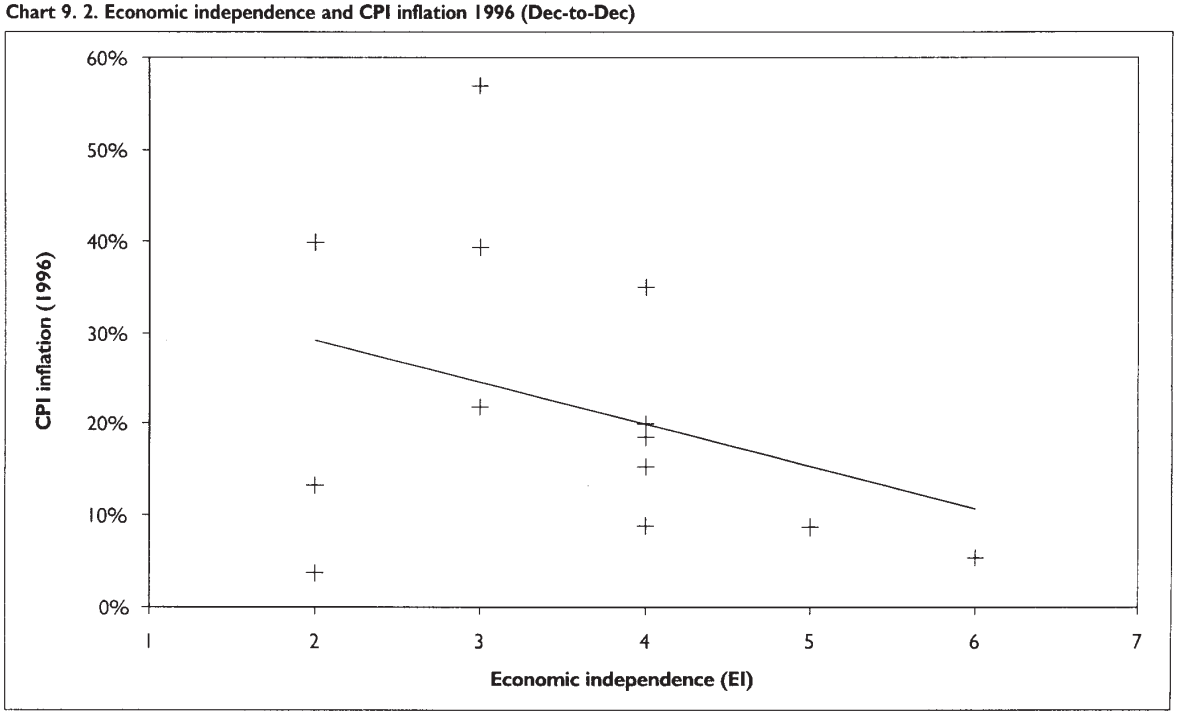
Note: White's heteroscedasticity consistent standard errors reported in parentheses

Chart 9. 1. Political independence and CPI inflation 1996 (Dec-to-Dec)



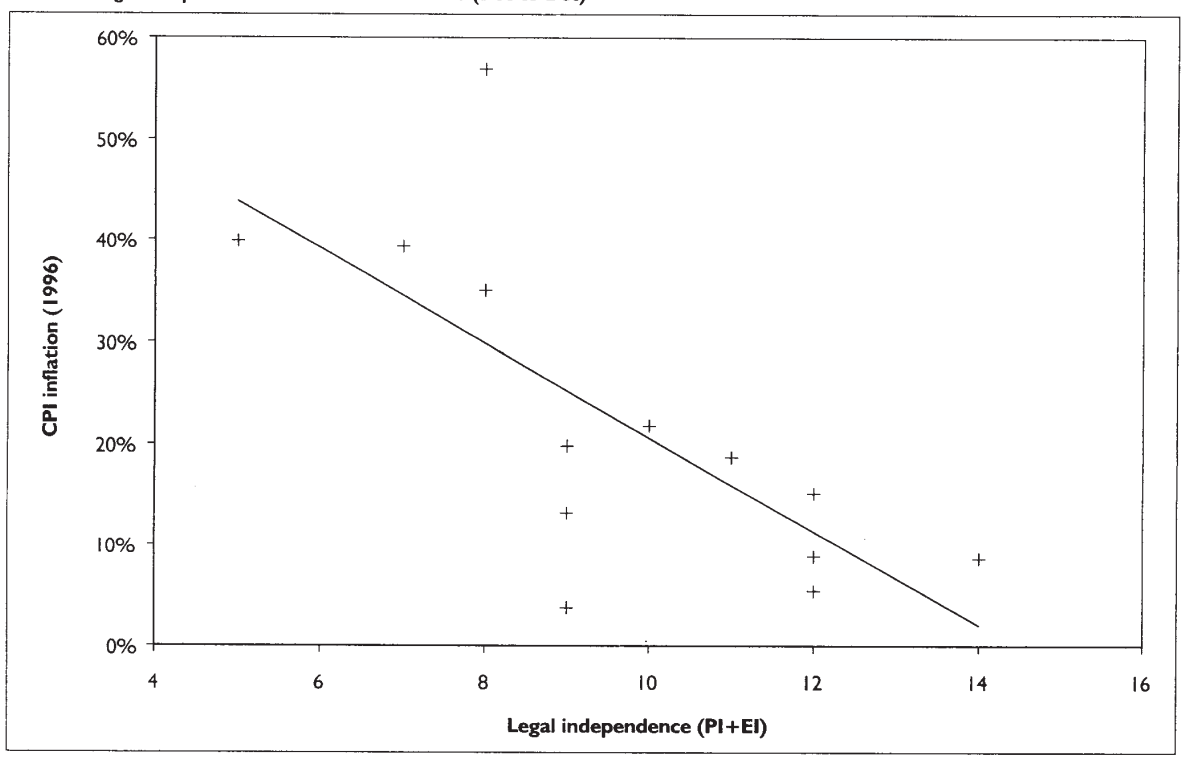
Sources: IMF IFS and national legislation

Chart 9. 2. Economic independence and CPI inflation 1996 (Dec-to-Dec)



Sources: IMF IFS and national legislation

Chart 9.3. Legal independence and CPI inflation 1996 (Dec-to-Dec)



Sources: IMF IFS and national legislation

Table 10. 1. Outlier Price Increases in Poland, Czech Republic and Hungary

Quarter	Poland (sample starts 1989:Q1)	3sd	Czech Republic (sample starts 1989:Q2)	3sd	Hungary (sample starts 1991:Q1)	3sd
1989:Q1	pharmaceuticals 413%	156				
1989:Q2	fuels & lubricants 64%; vegetables 54%; furniture 54%; rents 46%; edible fats 46%; tea and coffee 45%; fish 43%	42	footwear and leather goods 5%	4		
1989: Q3	meat 660%; meat products I 567%; butter 429%; meat products II 421%	377	—*			
1989:Q4	sugar 329%; wine 279%; transport 256% bread 232%; grain and pasta products 221%; publications 196%; confectionery 189%; furniture 181%; vehicle maintenance and repairs 173%	166	fuels 9%	6		
1990:Q1	pharmaceuticals 452%; furnace fuel 405%; central heating & hot water 398%; electricity 369%; gas 338%; detergents 333% jewelry 328%	295	culture articles 20%	16		
1990:Q2	postal and telecom services 71% potatoes, fruits & products 64% toys 54%; national transport 54%	53	tobacco and related products 8%	7		
1990:Q3	central heating & hot water 100% electricity 79% gas 58%	56	milk and dairy products 48% potatoes and potato products 43%	42		
1990:Q4	butter 103%; vegetables 90%; eggs 77%	60	potatoes and potato products 28%	20		
1991:Q1	central heating & hot water 100%; gas 78%; vegetables 66%; postal and telecom services 64%; rents 60% furnace fuel 59%	59	building materials 151% health-care and toilet products 99%	90		
1991: Q2	gas 163% electricity 129%	85	fuels 154%	91	coke 159%	68
1991: Q3	postal and telecom services 82% central heating & hot water 61%	51	potatoes and potato products 35%	21	heating 72% natural and manufactured gas 53%	42
1991:Q4	vegetables 50%; eggs 50%; butter 36%; potatoes, fruits & products 33%	31	eggs and egg products 27%	22	eggs 101%	40
1992:Q1	central heating & hot water 100% gas 70%	48	notary, justice, insurance & local fees 16%	14	water 50% vegetables 46% sewage disposal 45% pharmaceutical products 40%	34
1992:Q2	rents 38% pharmaceuticals 29%	22	—		potatoes 86%	33
1992:Q3	eggs 49%; sugar 44%; cookies and pastries 38% bread 33%	31	potatoes and potato products 45%	27	eggs 40%	28
1992:Q4	vegetables 39% potatoes, fruits & products 27% furnace fuel 26% national transport 24%	20	transport and telecommunications 17% eggs and egg products 17%	14	animal fats 69% propane-butane gas 32% bacon 31%	29
1993:Q1	vegetables 38% central heating & hot water 26% local transport 18%	17	recreation, health-care, social facilities 29%	23	vegetables 63% sewage disposal 44% water 32%	31
1993:Q2	national transport 25% potatoes, fruits & products 25%	18	—		—	

Table 10. 1. Outlier Price Increases in Poland, Czech Republic and Hungary

Quarter	Poland (sample starts 1989:Q1)	3sd	Czech Republic (sample starts 1989:Q2)	3sd	Hungary (sample starts 1991:Q1)	3sd
1993:Q3	eggs 55%	34	potatoes and potato products 21%	14	eggs 61% gambling, membership fees 52% pork 29%	28
1993:Q4	edible fats 63%; eggs 56% potatoes, fruits &products 51% vegetables 44%	37	eggs and egg products 22% notary, justice, insurance and local fees 20%	19	vegetables 35% animal fats 17%	14
1994:Q1	vegetables 18%	18	housing rents and municipal services 17%	14	pharmaceutical products 43% vegetables 36% culture, education &entertainment 22%	22
1994:Q2	potatoes, fruits &products 49%	22	potatoes and potato products 20%	13	potatoes 58% domestic and tropical fruits 36%	24
1994:Q3	tea and coffee 47%; sugar 30% eggs 25%; butter 23%	22	potatoes and potato products 112%	60	coffee 51% pork 33%	30
1994:Q4	vegetables 32% butter 25% central heating & hot water 20% tea and coffee 17%	17	eggs and egg products 21%	15	potatoes 41% vegetables 41% animal fats 32% eggs 31% edible oil 31%	26
1995:Q1	rents 30% vegetables 22% potatoes, fruits &products 22%	20	—		potatoes 83% electricity 64% natural and manufactured gas 56%	44
1995:Q2	vegetables 15% potatoes, fruits &products 15% tobacco 15%	11	potatoes and potato products 48%	26	fuel oil 132% domestic and tropical fruits 50%	48
1995:Q3	—		—		—	
1995:Q4	vegetables 31% potatoes, fruits &products 31% eggs 27%	18	vegetables 20%	10	eggs 24% flour 23% animal fats 22% edible oil 20% vegetables 19% bacon 17%	16
1996:Q1	vegetables 20% potatoes, fruits &products 20% bread 16% gas 13% culture and arts 13%	13	education 29% vegetables 27%	20	vegetables 57% local transport excl. taxi 35% telecom 27%	26
1996:Q2	tobacco 16% bread 16%	15	potatoes and potato products 31%	17	potatoes 31% pharmaceutical products 29% natural and manufactured gas 25%	25
1996:Q3	—		—		eggs 44%	29
1996:Q4	potatoes, fruits &products 42% vegetables 20%	18	vegetables 20%	14	vegetables 28% propane-butane gas 22%	16
1997:Q1	electricity 17% rents 13% vegetables 13% culture and arts 12% gas 12%	12	vegetables 17%	9	vegetables 39% local transport excl. taxi 31% commuting 23%	21
1997:Q2	potatoes, fruits &products 53%	22	potatoes and potato products 135%	65	potatoes 153%	55
1997:Q3	—		—		—	
1997:Q4	vegetables39% eggs36%	20	vegetables14%	8	animal fats60% eggs35% vegetables 32%	25

* – indicates that there was no outlier price changes

Source: Polish, Czech and Hungarian statistical offices; Woźniak [1998]

Table 10. 2. Comparison of price levels in 1993 (Austrian indices=100)

Country	All Goods and Services	Food incl. Alcohol and Tobacco	Clothing and Footwear	Gasoline	Color TV Set	Residential Electricity	Railway Fare	Haircut	Rents	Utilities
in percent of price level in Austria										
Poland	37	47	47	60	106	32	32	23	14	38
Hungary	44	52	52	98	90	34	47	15	28	37
the Czech Republic	26	36	36	80	114	19	17	5	10	25
individual price levels relative to the domestic price level of all goods and services (CPI)										
Poland		10	10	23	69	-5	-5	-14	-23	1
Hungary		8	8	54	46	-10	3	-29	-16	-7
the Czech Republic		10	10	54	88	-7	-9	-21	-16	-1

Source: European Comparison Program database [1993] quoted after Koen and De Masi [1997]; Woźniak [1998]

Table 10. 3. Evolution of the price structure in the Czech Republic

CPI category	1995	1996	1997:12	
	93:Q4=1			89Q1=1
Education	1.14	1.44	1.46	
Rent	1.06	1.12	1.36	1.49*
Utilities	1.13	1.17	1.19	1.49*
Accommodation services	1.04	1.11	1.14	
Public transport	1.02	1.06	1.11	
Recreational and cultural services	0.98	0.97	1.02	
Cigarettes and tobacco	0.98	1.02	0.98	1.12
Household maintenance and services	0.92	0.88	0.88	
Household textiles	0.92	0.90	0.88	
Household equipment	0.94	0.90	0.87	
Alcoholic beverages	0.93	0.91	0.86	0.53
Furniture and home furnishings	0.95	0.91	0.86	
Health service	0.91	0.86	0.82	
Home appliances	0.91	0.86	0.82	
Potatoes and potato products	1.79	1.20	0.82	1.55
Personal means of transport	0.95	0.89	0.82	
Vegetables	0.93	0.88	0.80	0.93
Equipment for sports and culture	0.92	0.86	0.80	
Non-alcoholic beverages	0.90	0.85	0.80	0.61

* For the period 1989–1993 the broader category "rents and municipal services"
Source: Czech Statistical Office; Woźniak [1998]

Table 10. 4. Evolution of the price structure in Poland

CPI category	1995	1996	1997:12	
	93Q4=1			89Q4=1
Rents	1.24	1.33	*1.49*	1.92
Tobacco	1.15	1.37	*1.44*	1.45
Tea and coffee	1.59	1.44	*1.41*	0.64
Butter	1.28	1.20	*1.26*	0.87
Central heating & hot water	1.16	1.14	*1.20*	5.72
Local transport	1.05	1.12	*1.19*	2.30
Pharmaceuticals	1.14	1.16	*1.17*	3.18
Spirits	1.11	1.19	*1.14*	0.61
Condiments other than tea and coffee	1.14	1.14	*1.13*	1.32
Publications	1.09	1.11	*1.13*	1.59
Bread	0.96	1.13	*1.10*	2.62
Culture and arts services	1.02	1.02	*1.04*	1.18
Electricity	1.02	0.99	*0.98*	2.25
Gas	0.99	0.99	*0.96*	4.82
National transport	1.01	0.98	*0.93*	1.82
Beer	0.88	0.85	*0.86*	1.10
Vehicles	0.92	0.90	*0.86*	0.78
Jewelry	0.97	0.90	*0.85*	0.59
Fuels and lubricants	0.83	0.81	*0.83*	1.07
Meat products	0.84	0.77	*0.83*	0.96
Raw meat and poultry	0.85	0.84	*0.82*	1.38
Wine	0.88	0.84	*0.80*	0.68
Edible fats other than butter	0.84	0.77	*0.74*	0.65
Electronics	0.88	0.79	*0.70*	0.24
Postal and telecom services	0.78	0.70	*0.66*	0.91
Eggs	0.46	0.47	*0.49*	0.56

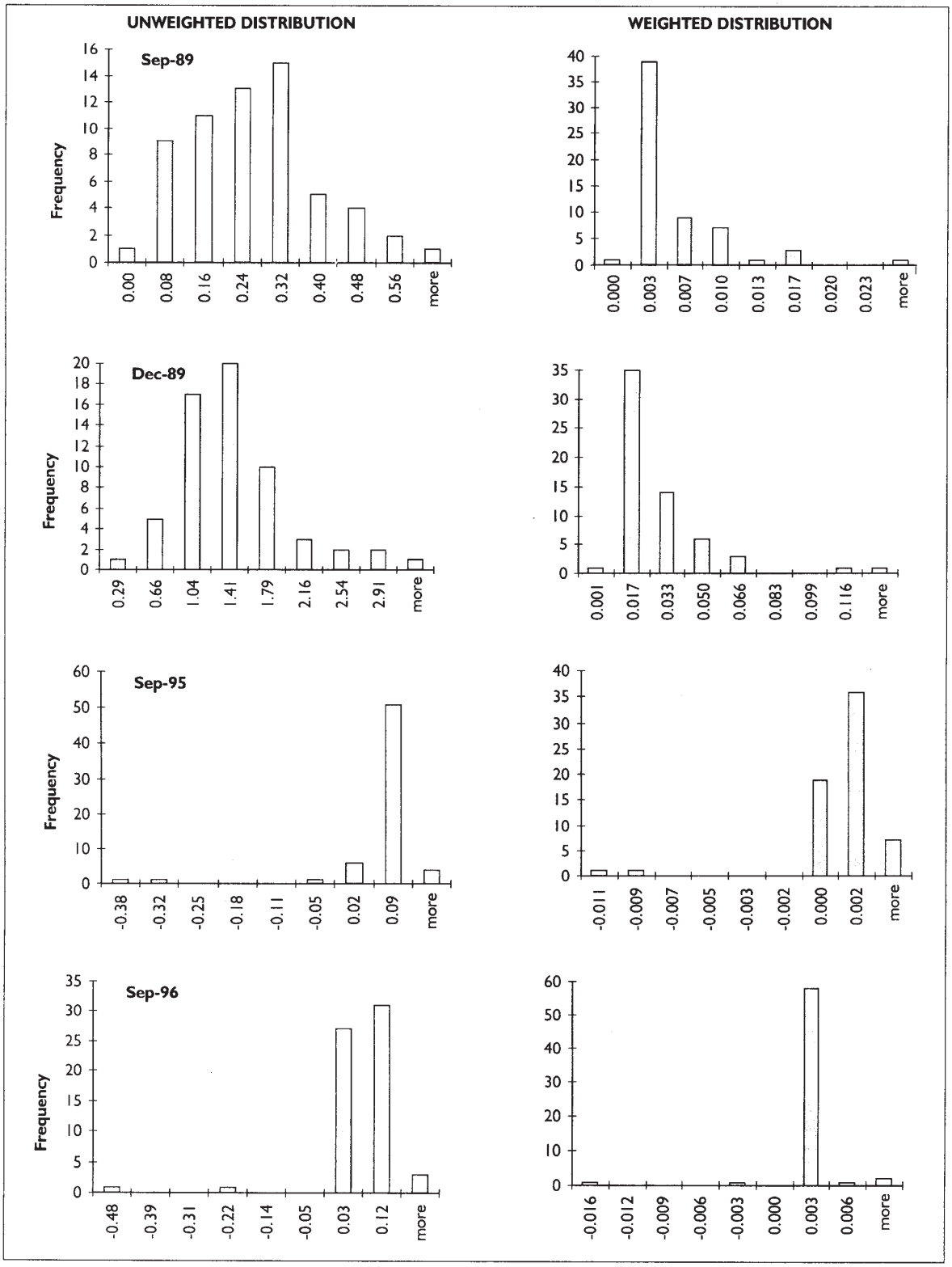
Source: Polish Central Statistical Office; Woźniak [1998]

Table 10. 5. Evolution of the price structure in Hungary

CPI category	1995	1996	1997:12	
	1993:12 = 1			1991:3 = 1
Fuel oil	1.96	2.41	2.47	2.15
Pharmaceutical products	1.60	1.77	1.64	3.69
Propane-butane gas	1.14	1.34	1.56	1.58
Animal fats	1.12	0.99	1.54	2.31
Fish	1.05	1.08	1.47	1.45
Bacon	1.27	1.27	1.43	1.75
Electricity	1.19	1.19	1.41	1.77
Natural and manufactured gas	1.09	1.15	1.36	1.55
Coffee	1.49	1.33	1.30	1.09
Rents	1.13	1.24	1.23	0.82
Vegetables	1.11	1.11	1.21	0.77
Local transport excl. Taxi	0.95	1.04	1.20	1.23
Repairs and maintenance of vehicles	1.07	1.10	1.16	1.45
Domestic and tropical fruits	1.46	1.34	1.16	0.73
Sewage disposal	1.06	1.12	1.15	1.51
Maintenance cost at private houses	1.10	1.15	1.14	1.53
Edible oil	1.17	1.18	1.13	0.86
Books, newspaper, school and stationary supplies	1.10	1.11	1.13	1.47
Rice and other cereals	1.13	1.24	1.12	0.92
Pork	1.08	0.93	1.11	1.20
Personal care and health services	1.02	1.09	1.11	1.18
Telecom	1.12	1.17	1.02	0.85
Water	0.99	1.01	1.00	1.21
Spirits	0.99	1.01	0.98	0.84
Tobacco	0.88	0.93	0.97	1.01
Culture, education and entertainment	1.02	1.03	0.96	1.01
Heating	0.98	0.96	0.94	1.71
Gasoline and motor oils	0.92	0.93	0.92	0.78
Other transport	0.91	0.89	0.90	0.80
Commuting	0.92	0.90	0.90	0.84
Household repairs and maintenance goods	0.96	0.94	0.89	0.70
Household goods	0.95	0.94	0.89	0.86
Tires, parts and accessories for vehicles	0.95	0.94	0.88	0.89
Beer	0.89	0.90	0.88	0.79
Chocolate, cocoa	0.93	0.95	0.88	0.77
Gambling, membership fees	0.86	0.88	0.86	0.90
Fruit and vegetable juice	0.94	0.92	0.86	0.73
Cleaning and washing	0.94	0.91	0.86	0.92
Firewood	0.96	0.93	0.85	0.83
Bread	0.86	0.89	0.84	0.95
Durable household goods	0.88	0.87	0.83	0.75
Vehicles	0.98	0.92	0.81	0.62
Flowers, goods	0.91	0.88	0.79	0.76
Flour	0.71	0.89	0.75	0.80
Goods for entertainment and recreation	0.90	0.84	0.73	0.50
Sugar	0.76	0.73	0.67	0.65
Potatoes	1.64	0.80	0.43	0.29

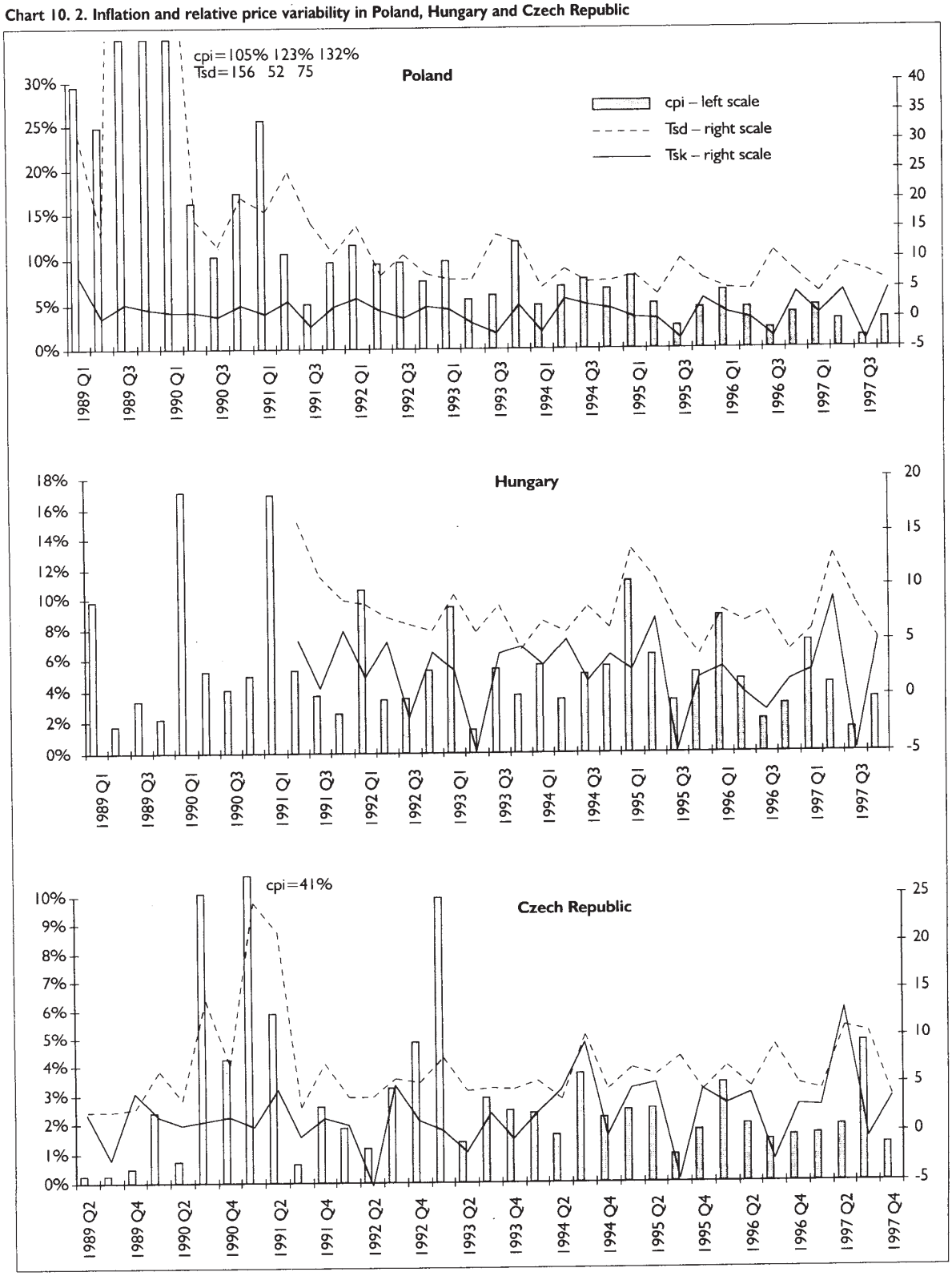
Source: Hungarian Statistical Office; Woźniak [1998]

Chart 10 .1. Histograms for individual price changes in Poland for selected quarters



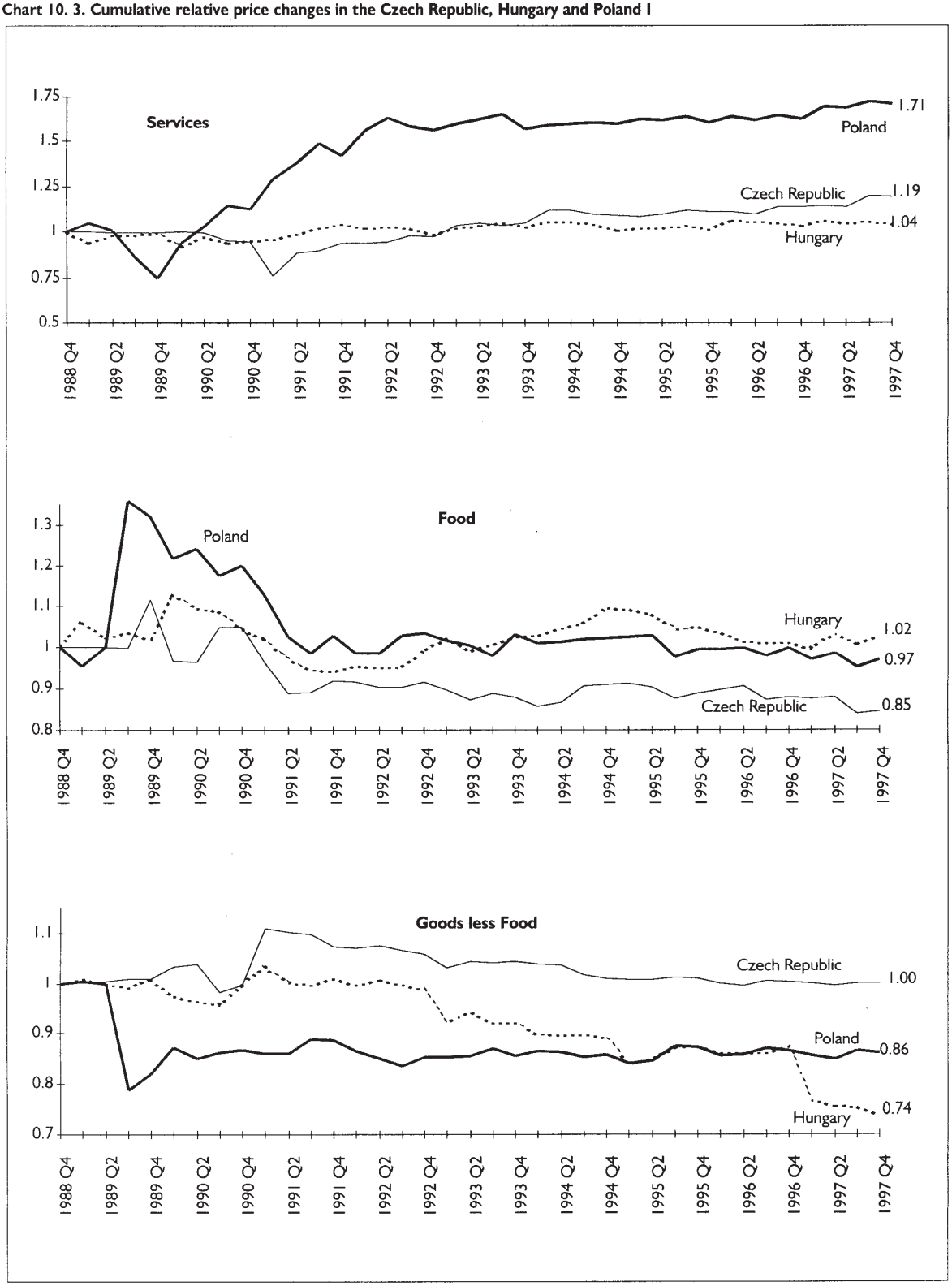
Source: Woźniak [1997] using GUS data

Chart 10. 2. Inflation and relative price variability in Poland, Hungary and Czech Republic



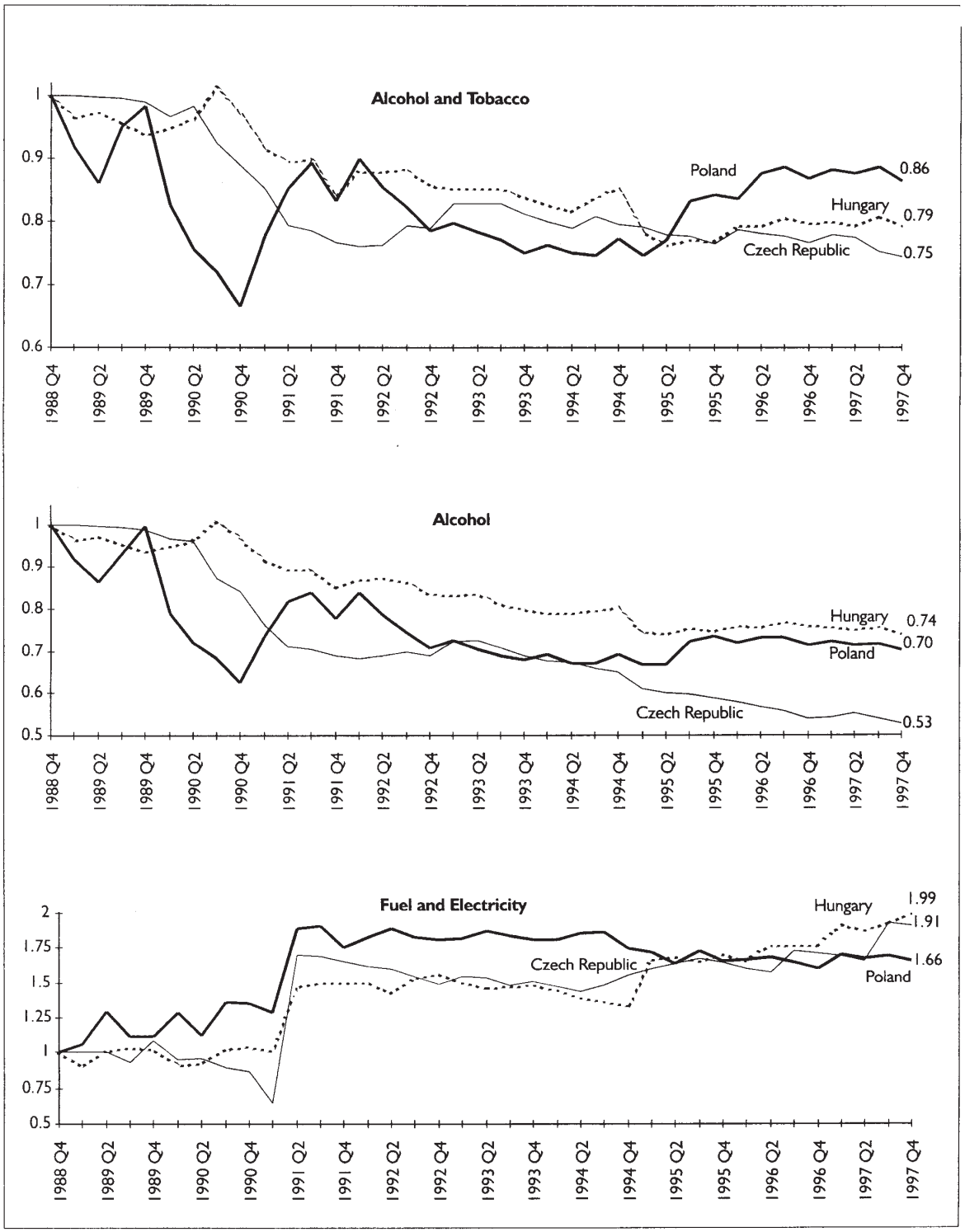
Source: Polish, Czech, and Hungarian statistical offices; Woźniak [1998]

Chart 10. 3. Cumulative relative price changes in the Czech Republic, Hungary and Poland I



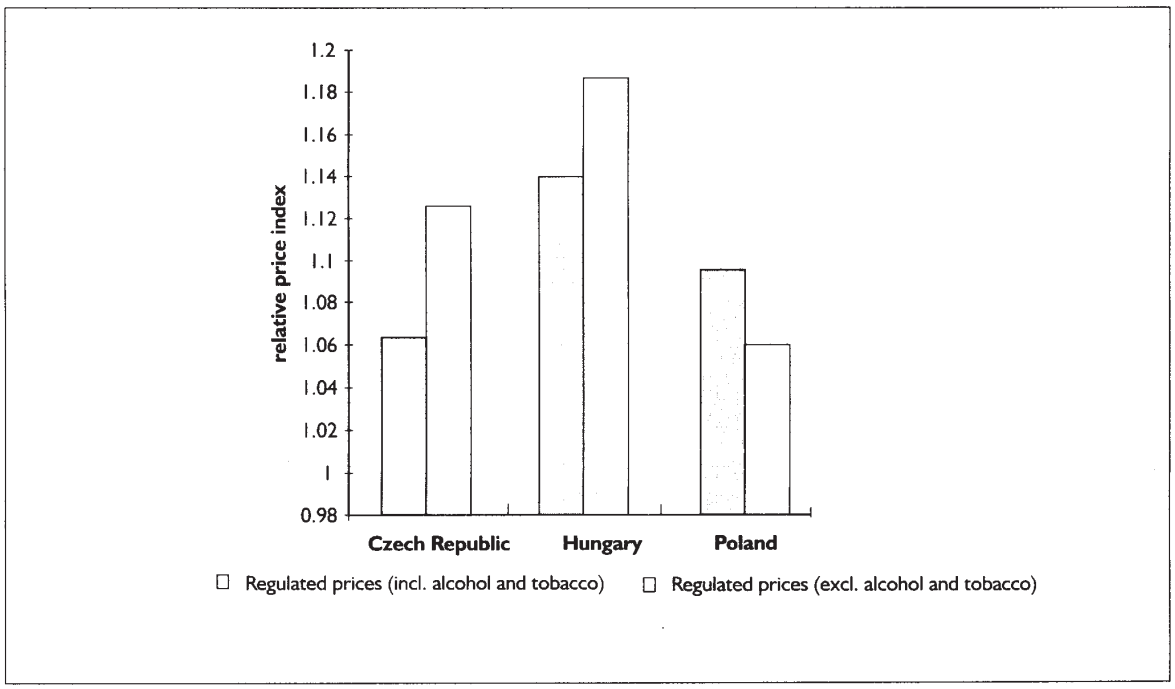
Source: Polish, Czech and Hungarian statistical offices; OECD Short Term Economic Indicators and Main Economic Indicators; Woźniak [1998]

Table 10. 4. Cumulative relative price changes in the Czech Republic, Hungary, and Poland II



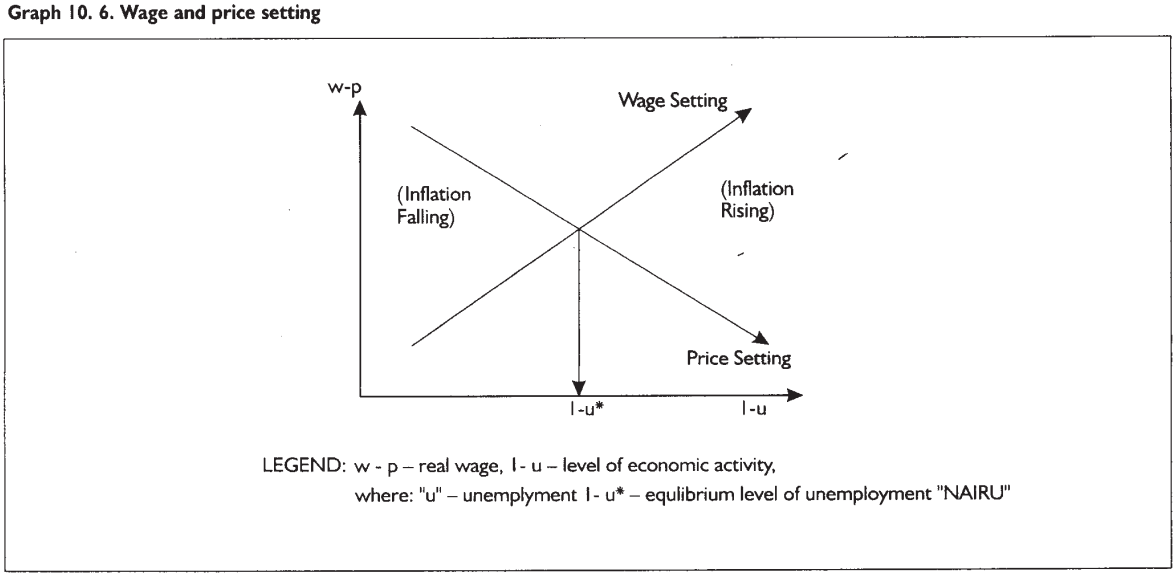
Source: Polish, Czech and Hungarian statistical offices; OECD Short Term Economic Indicators and Main Economic Indicators; Woźniak [1998]

Graph 10. 5. Index of regulated prices in the end 1997 (1993:12 = 1)



Source: Czech National Bank [1998], Hungarian, Czech and Polish Statistical Office; Woźniak [1998]

Graph 10. 6. Wage and price setting

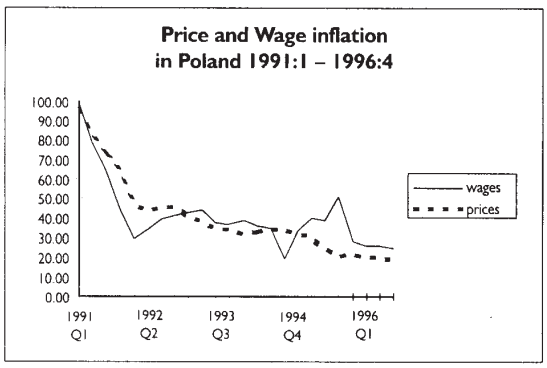


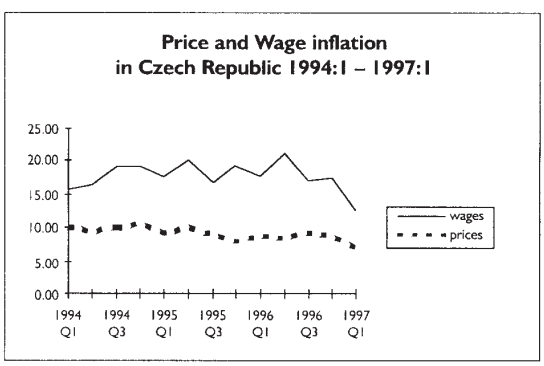
LEGEND: w - p – real wage, 1- u – level of economic activity,
where: "u" – unemplyment 1- u* – equlibrium level of unemployment "NAIRU"

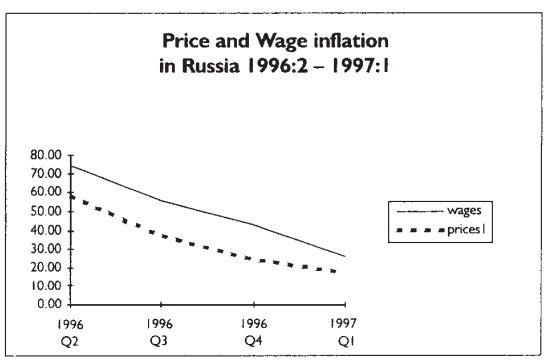
Source: Layard, Nickell, Jacman [1992]

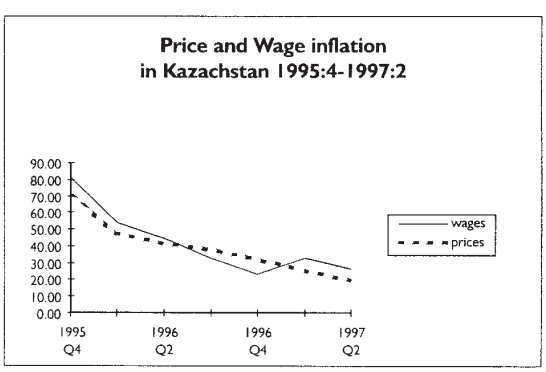
Chart 10. 7 Price and Wage inflation

(A) Moderate inflation period









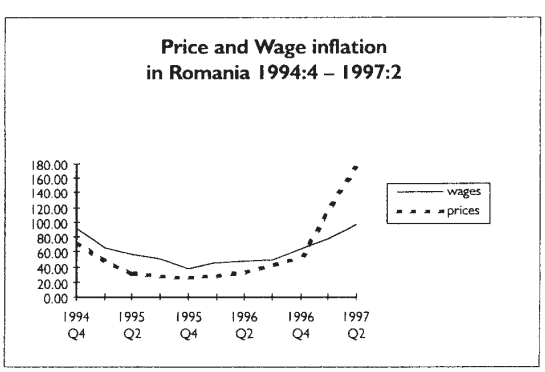
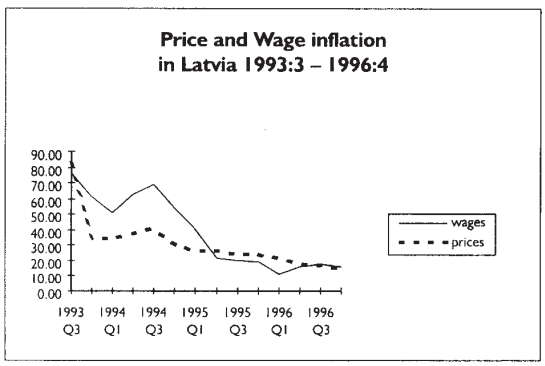
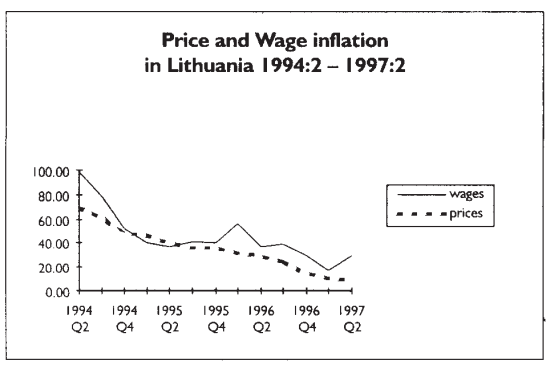
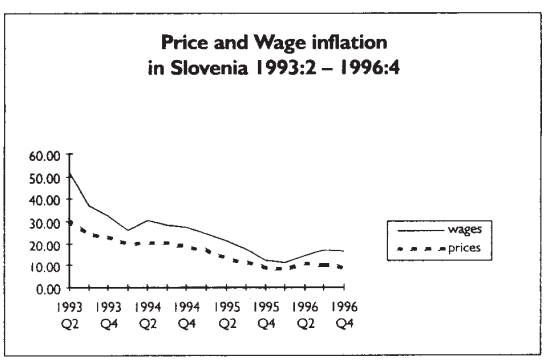


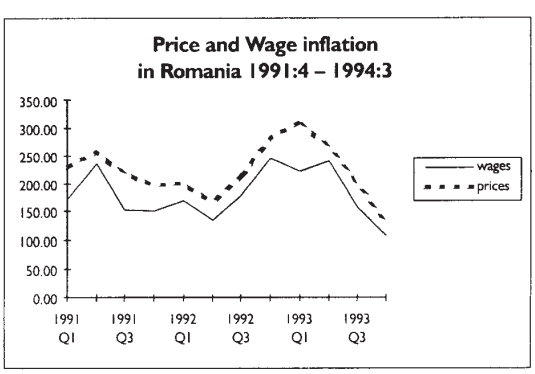
Chart 10. 7 Price and Wage inflation





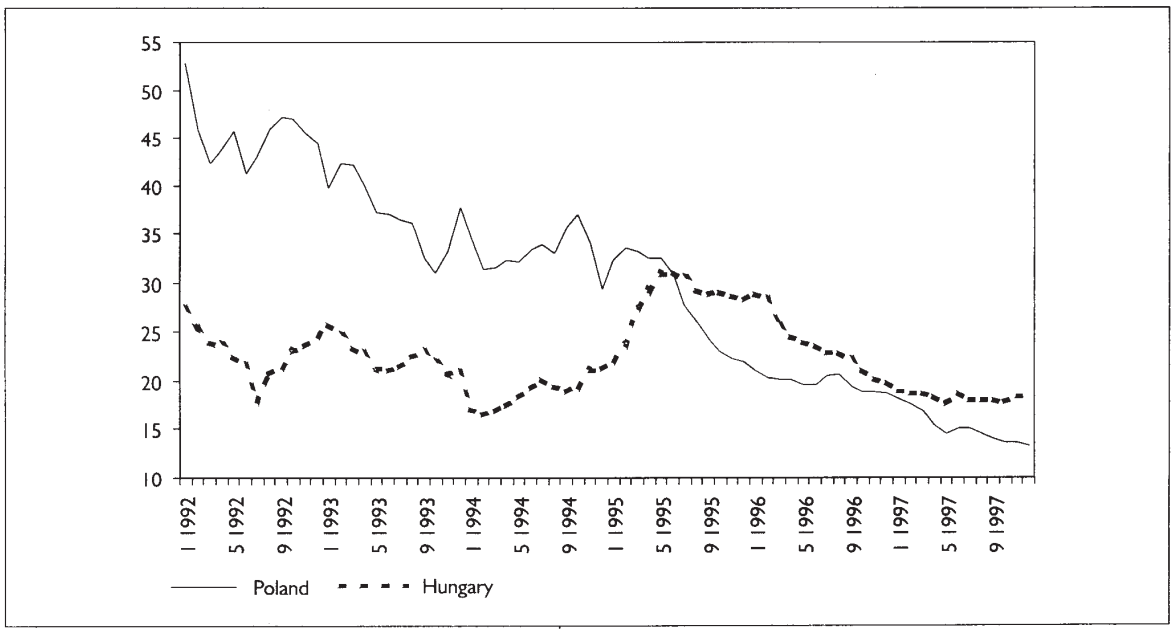


(B) High inflation period



Source: Walewski [1998]

Chart 10. 8. Moderate range of inflation in Poland and Hungary



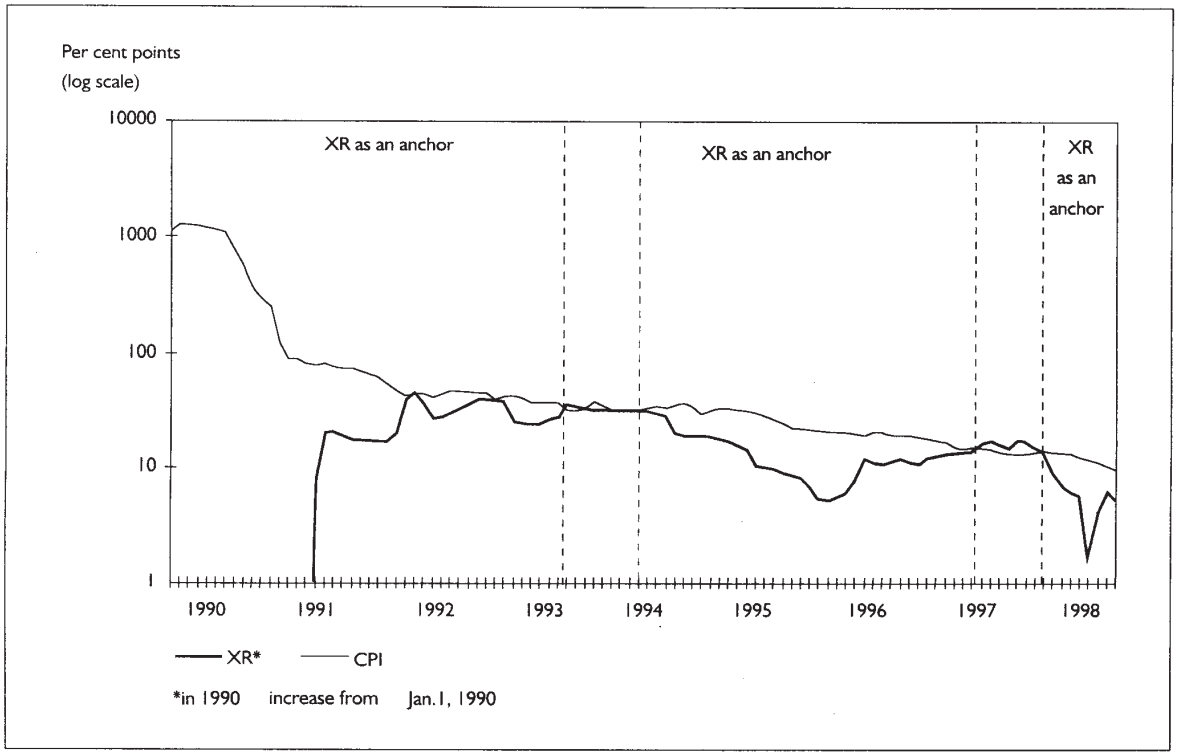
Source: Antczak and Górski [1998]

Table 12. 1. Price levels of various components of GDP in Poland and selected EU countries (average OECD prices=100, data for 1994)

Indicator	Rich EU countries	Poorer EU countries				Poland
		Ireland	Spain	Portugal	Greece	
Absolute price levels						
Gross Domestic Product	101.5	84.9	81.3	64.4	71.2	42.5
Personal consumption	103.3	86.9	83.9	68.3	74.2	36.2
Government consumption	97.8	75.5	72.8	38.8	53.0	37.7
Total consumption	102.7	85.7	82.3	63.5	70.8	36.3
of which tradable	106.7	97.1	86.5	76.3	77.4	51.7
non-tradable	100.9	79.8	79.7	54.9	65.4	29.7
Gross fixed capital formation	95.6	78.9	83.2	73.3	79.2	58.0
Relative price levels						
Gross Domestic Product	100.0	100.0	100.0	100.0	100.0	100.0
Personal consumption	101.7	102.3	103.2	106.1	104.3	85.2
Government consumption	96.4	88.9	89.5	60.2	74.5	88.7
Total consumption	101.1	101.0	101.1	98.6	99.4	85.6
of which tradable	105.1	114.4	106.4	118.6	108.8	121.7
non-tradable	99.4	94.0	98.0	85.3	91.8	70.0
Gross fixed capital formation	94.2	93.0	102.3	113.9	111.2	136.7

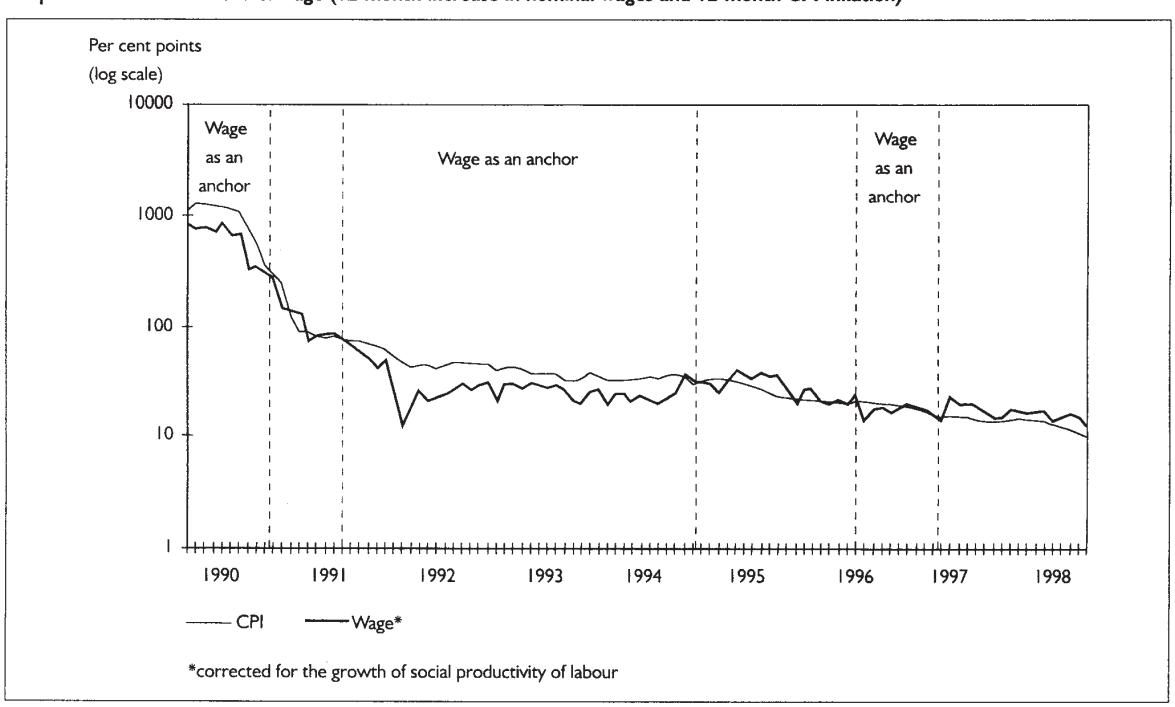
Source: Orłowski W. [1998] based on the OECD data

Graph 12. 1. Nominal anchors: exchange rate (XR) (12-month devaluation rate and 12-month CPI inflation)



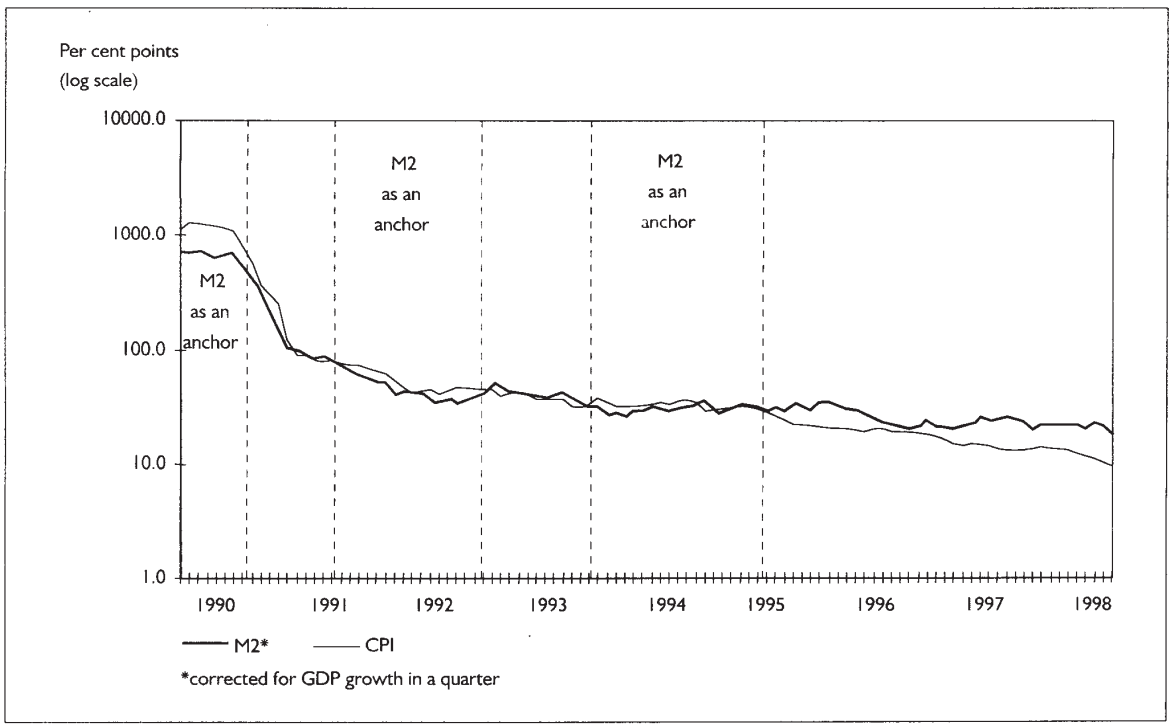
Source: Orlowski W. [1998]

Graph 12. 2. Nominal anchors: wage (12-month increase in nominal wages and 12-month CPI inflation)



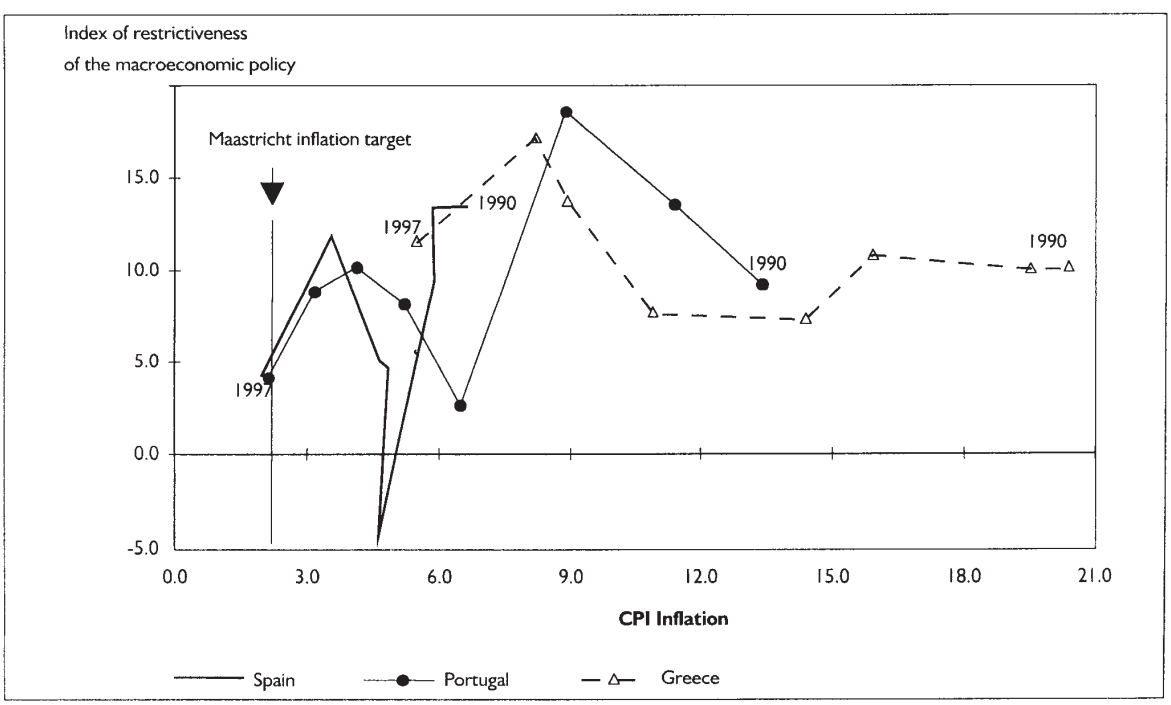
Source: Orlowski W. [1998]

Graph 12. 3. Nominal anchors: money supply (12-month increase in M2 and 12-month CPI inflation)



Source: Orłowski W. [1998]

Graph 12. 4. Nominal convergence in the Mediterranean countries during the 1990s



Source: Orłowski W. [1998]