

Disinflation in Central and Eastern European EU Accession Countries

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1 Introduction

This paper examines the disinflation process in the Central and Eastern European EU accession countries, with a particular focus on the eight countries from Central and Eastern Europe which may qualify for a first round of EU enlargement, i.e. on the Central European and the Baltic EU accession countries (Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia). Occasional reference is made to the two other accession countries in Central and Eastern Europe, Bulgaria and Romania.

The paper has two main parts. The first part sheds some light on past developments. The approach is selective, with the intention to complement Marek Dabrowski's paper presented to the same conference (Dabrowski, 2002) which covers a number of highly pertinent issues, in particular the role of monetary and fiscal policies in the disinflation process. Two aspects which are explored in greater detail in the first part of this study are the interrelations between exchange rate strategies and disinflation and the role of relative price developments in the inflation process.

The second part of the paper focuses on current and future challenges that emerge in the context of completing and consolidating disinflation in the Central and Eastern European accession countries. This part examines what implications the completion of transition, the catching-up process to EU GDP per capita levels and the accession to the EU and to the euro area have and will have for disinflation in today's candidate countries.

There is no uniform terminology for different levels and ranges of inflation. In this paper, annual inflation rates above 40% are denoted as "high" inflation. The term "moderate" inflation is used for inflation rates between 10% and 40% annually. No explicit label is assigned to the inflation range from above 4% to below 10%, though usually a distinction is drawn between high and intermediate single-digit inflation. "Low" inflation stands for inflation rates between 2% and 4% p.a., inflation rates up to 2% are termed "very low" inflation or "price stability".

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2 The Disinflation Process to Date

Central European and Baltic accession countries have made **substantial and sustained progress in reducing inflation**, with only few and limited setbacks. In all these countries, inflation is now in the single digits: Average annual consumer price inflation in 2001 ranged between 1.2% and 8.4%, as is shown in table 1 which reports annual average consumer price inflation rates in the Central and Eastern European EU accession countries since the beginning of transition².

The range of outcomes is even smaller, if one focuses on the 12-month CPI in December 2001. This indicator ranged from 1.9% to 7.0% for the Central European and Baltic accession countries. Charts 1a and 1b display monthly headline inflation rates (year-on-year) from January 1995 to December 2001 for these eight countries.

[insert table 1 and charts 1a and 1b here]

2.1 Disinflation to Date: The General Pattern and Country-Specific Developments

Consumer price developments in the Central European and Baltic accession countries during the transition process so far, as presented in table 1, can be divided into **five phases**. First, in the early stages of transition, almost all Central and Eastern European countries experienced a corrective inflation phase associated with sweeping price and trade liberalization coupled with substantial exchange rate depreciation at the beginning of transformation to restore competitive positions. In some countries, the initial jump in the price level was also related to the removal of monetary overhangs. The size of the initial price level surge was diverse among individual countries, depending on inherited distortions and the design of individual stabilization packages. This phase was associated with substantial corrective adjustments of relative prices.

Second, as stabilization took hold in most accession countries, annual inflation was fairly quickly and substantially reduced to moderate rates. These inflation rates then proved to be persistent in a number of transition economies, while in a few others inflation was reduced somewhat further into the high single digits. In this phase, relative price adjustments became less turbulent but remained sizeable, while beginning to exhibit a typical pattern in which nontradables prices increased faster than tradables prices.

² Table 1 also includes Bulgaria and Romania to show how the stabilization path of these two economies differed from that of the Central European and the Baltic countries. Moreover, these two country experiences carry further interesting insights if compared against each other. While the disinflation record was similarly dismal until early 1997, stabilization patterns became starkly different thereafter. Bulgaria, after experiencing a financial crisis in 1996–97 associated with a sudden and sharp upturn in inflation and even a short period of hyperinflation, undertook a major turnaround in its policies and has made very substantial progress in disinflation in more recent years. Progress in Romania has been much more limited. Disinflation has been rather gradual (but uninterrupted) in past years and, as a consequence, the country has recently moved from the high into the moderate inflation range.

Third, further headway towards disinflation, though to a different extent, was made after the onset of the Russian crisis in the fall of 1998. This can be attributed to a combination of negative demand shocks (lower foreign demand by Russia and the European Union) and positive supply shocks (very low oil prices which actually started to fall already in the wake of the Asian crisis; constant or falling food prices, as food exports to Russia were redirected to the domestic markets).

The fourth phase began in the spring and summer of 1999, when disinflation came to a temporary halt in most, if not all accession countries. Subsequently, a number of applicant countries registered a pick-up of inflation. These less favorable developments can be ascribed to a combination of substantial negative supply shocks (rising import prices due to the surging oil price and to euro/U.S. dollar developments in conjunction with the euro-linked or euro-oriented exchange rate policies of various accession countries; growing food prices mainly due to bad harvests) and positive demand shocks (increasing growth dynamics mainly due to additional demand from the European Union until the second quarter of 2000 and higher demand from Russia).

Finally, around mid-2001, inflation again began to fall in some accession countries, with Bulgaria, Hungary and, in particular, Poland recording substantial disinflation. In fact, in Poland, the turning point towards lower inflation rates was already reached in the fall of 2000.

Apart from this **general pattern** of developments that applies in its essence to all Central European and Baltic accession countries, the disinflation process in each individual applicant country displays also **country-specific peculiarities** which relate to the speed of disinflation and to idiosyncratic temporary bouts of inflation. These dynamics are well displayed in Charts 1a and 1b which convey several insights and tendencies:

- A certain differentiation can be seen in terms of the speed of the disinflation process during the moderate inflation range: Hungary and Poland experienced a longer period of moderate inflation than other accession countries. In a similar vein, inflation in Slovenia has essentially been locked in at rates of somewhat below 10% since 1996. This issue of inflation persistence will be taken up in the next section which discusses the interrelations between exchange rate strategies and disinflation performance.
- Relative cyclical positions have become increasingly important in determining inflation since the latter part of the 1990s (compare the low inflation in the Czech Republic during the recession between the second half of 1997 and the first half of 1999 and the low inflation in the Baltic countries after the Russian crisis which constituted a major negative demand shock for these countries on the one hand with the higher inflation rates in Poland, Hungary and Slovenia during phases of buoyant aggregate demand growth in the late 1990s).

- The short-term effects of stabilization, liberalization and certain reform measures can be discerned well in the charts 1a and 1b.

Example 1: The impact of the adjustment of regulated prices on inflation can be seen best in the case of Slovakia in mid-1999/beginning of 2000. Note that there are practically no second-round effects in this case, which can be related to sound monetary policy, attempts to fiscal stabilization and a very a high and rising unemployment rate.

Example 2: The increase in inflation in Slovenia in the second half of 1999 can be largely traced to the introduction of VAT in mid-1999 (compare table 1 for the effects of the introduction of VAT in the Czech Republic and Slovakia in 1993).

Example 3: The Hungarian stabilization package of March 1995 led to a temporary increase in Hungarian inflation which was a combined effect of an upfront devaluation of the HUF in the order of 9%, a temporary introduction of a surcharge and an increase in regulated prices.

2.2 Disinflation and Exchange Rate Strategies

All eight countries under review have generally had **strong stabilization and reform programs** in place since the beginning of transition. According to Feldman and Watson (2001), the achievements are "surely one of the most impressive sustained policy reform by a group of countries in recent economic history." Despite this commonality, individual country programs have displayed quite some variation in exchange rate and monetary policies, fiscal policies, wage formation, and specific structural reform programs.

The **differences** are probably most pronounced **in the area of exchange rate policies** where practically the whole spectrum of possible regimes has been in place and the attitude towards regime shifts has differed among countries. Table 2 reports current exchange rate regimes and monetary policy frameworks, as well as previous regime shifts in Central and Eastern European EU accession countries. On the other hand, there have been some commonalities: Most countries achieved "gross" disinflation, i.e. the reduction of inflation from high to moderate levels with exchange rate anchors, the exceptions being Slovenia, Latvia and Lithuania which relied on a monetary anchor to advance to the moderate inflation range and did so successfully - in the case of Slovenia with a strong de facto weight being placed on exchange rate developments. While Latvia and Lithuania moved to rigid pegs in 1994 - and thus joined Estonia which had adopted such a regime from the outset of its monetary independence in 1992 -, Central European countries opted for greater exchange rate flexibility during the course of transition, at different times and with different strategies, in some cases as a default solution. Slovenia has stuck to its monetary targeting strategy, with a continued strong weight on the exchange rate.

[insert table 2 here]

Disinflation in Hungary, Poland and Slovenia has been somewhat slower, in terms of **inflation persistence** at moderate or high-single digit levels, than in other countries (but still impressive compared to recent stabilizations in other regions of the world). There is a link between this somewhat more gradual approach and the exchange rate regimes in place in the three countries: These regimes allowed, in different forms, for a trend depreciation of the nominal effective exchange rate until recently (in Slovenia until today). Poland and Hungary had a fixed but adjustable peg in place until 1991 and 1995 respectively; under this regime, Poland undertook one step-devaluation while Hungary devalued relatively frequently during most of the first half of the 1990s, with most of the parity adjustments being relatively small. Subsequently, both countries moved to pre-announced crawling pegs. Over time, the crawl rate was then lowered in both countries in line with a gradually lowering of inflation. Against the backdrop of mounting capital inflows, Poland widened its fluctuation band in several steps to $\pm 15\%$ between 1995 and 1999. Hungary, in turn, stayed with a narrow band ($\pm 2\frac{1}{4}\%$) until May 2001 when it shifted to a wide band ($\pm 15\%$) in one go and simultaneously introduced an implicit inflation targeting framework. Poland had adopted an inflation targeting strategy already in late 1998, while retaining the crawling band until April 2000. Hungary exited the crawl in October 2001, while keeping the wide band in place. These regimes helped to anchor and slowly lower inflation expectations but, at the same time, the crawl rate also provided a floor to these expectations, thus contributing to their persistence. Slovenia's managed float produced a rather smooth gradual depreciation (against the DEM), with a one-year pause in 1994/95 when the nominal exchange rate was temporarily stabilized. Against the backdrop of increasing capital inflows, Slovenia returned to its earlier gradual depreciation strategy which has been continued until today.

However, the slower disinflation in Hungary, Poland and Slovenia was not "caused" by the exchange rate strategies pursued. Rather, the authorities' **revealed** short- to medium-term **preferences** in these countries **in terms of price stability and export competitiveness** differed, to some extent, from those in other accession countries. This, in turn, manifested itself both in inflation persistence and in the trend depreciation of the nominal exchange rate.

In the other countries under review, the nominal exchange rate has been largely or fully stable during the disinflation process, with some qualifications for Latvia and Lithuania until 1993/94.³ The Czech Republic and Slovakia were forced to sever their exchange rate pegs in 1997 and 1998 due to speculative attacks but the nominal exchange rate returned quickly (in the case of Slovakia after a relatively short while) to the pre-crisis level. The Czech Republic introduced an inflation targeting framework at the turn of 1997/98, while Slovakia has followed an eclectic strategy which applies indicative bands or values for consumer

³ In the case of Latvia, it appreciated substantially during the monetary stabilization phase from 1992 to 1994; Lithuania went through a depreciation-appreciation cycle during 1992/93 before stabilizing its currency in August 1993.

price inflation, core inflation and M2 growth while also placing some weight on the exchange rate.

[insert charts 2a and 2b here]

Since 2000 and even more so since 2001, the **distinction** between accession countries in terms of their monetary and exchange rate policy stances has **increasingly** become **blurred**. On the one hand, this was due to a stricter monetary policy stance in Poland and in Hungary which led to a substantial nominal appreciation of the PLN and the HUF. In the case of Poland, the tightening was apparently motivated not only by the disinflation objective, but also by the need to contain domestic demand pressures which had led to a mounting current account deficit. In a way, monetary policy acted as a "policy of last resort" to limit the risk of a currency crisis, as no fiscal policy action was coming forward to handle the problem on the external side. Hungary, in turn, felt the need in the spring of 2001 to attack inflation more forcefully through a stronger nominal exchange rate. On the other hand, the Czech Republic has also experienced substantial nominal appreciation during 2001, while Slovakia recorded a largely stable nominal exchange rate.

In sum, the Central and Eastern European experience underscores that "the consistency of the overall policy mix matters more for stabilization and growth than the choice of the exchange rate regime as such" (Backé, 1999, echoing Radzyner and Riesinger, 1996, see also Corker et al., 2000). It is crucial for the sustainability of the disinflation process that the exchange rate regime interacts properly with the other policies and is supported by them. Too strong a reliance on the exchange rate in the stabilization may lead to exchange rate misalignments. Empirical evidence shows that strong overvaluations typically end in deep recessions and setbacks in the disinflation process (see Goldfajn and Valdes, 1996).

2.3 Relative Price Developments: An Important Driving Force of Inflation

In order to better understand the inflation process and thus the setting in which disinflation policies were designed and implemented in accession countries, it is key to analyze not only how the growth of monetary aggregates led to inflation but to investigate what induced money growth in the first place. Dabrowski (2002) shows how important sound fiscal policies are for successfully sustaining disinflation. This section focuses on another aspect which is important for inflation dynamics, namely the role of **relative price developments**.⁴

Economic theory suggests that relative price changes can lead to higher inflation if their distribution is positively skewed (Ball and Mankiw, 1995). Empirical work shows that relative price changes in transition countries have indeed been skewed positively, that this skewness has led to inflation pressures and that monetary authorities have accommodated these

⁴ This section rests partly on Backé et al. (2002). Most of the quantitative analysis was prepared by Franz Schardax, one of the authors of this study. See also earlier works by Schardax on this topic (Fidrmuc and Schardax, 2000, Schardax, 2001).

pressures (Pujol and Griffith, 1998, Cottarelli et al. 1998). Relative price movements have thus been a **major driving force of inflation** in Central and Eastern European accession countries.

When inspecting relative price changes in accession countries more closely, one **key stylized fact** emerges: Prices of nontradables have risen faster, and often much faster, than prices of tradables. Chart 3 reports the differentials between nontradables and tradables inflation in four accession countries, the Czech Republic, Hungary, Poland and Slovenia.⁵ Tradables are proxied with manufactured goods. The chart presents the ratio of implicit sectoral price deflators of gross value added. It displays a clear pattern in which nontradables inflation was almost always higher than tradables inflation.

[insert chart 3 here]

What are the **driving forces** for these relative price developments? Four different hypotheses can be put forward to explain the data.

First, the observed trends may be due to the **Balassa-Samuelson effect**, the standard supply-side explanation. This effect results from a positive differential in productivity growth rates between tradables and nontradables, while wages are assumed to develop uniformly across sectors, with wage increases being driven by productivity increases in the tradables sector. Consequently, under some standard assumptions on labor and capital mobility and on production functions, nontradables inflation is higher than tradables inflation, provided that the production of nontradable is equally or more labor-intensive than the production of tradables. These sectoral inflation differentials, in turn, lead to a trend appreciation of the real exchange rate and to a convergence of comparative price levels.⁶

A second possible explanation are **demand-side effects**. The idea here is that an increase in income levels induces a shift in expenditure towards the nontradables sector, if income elasticities of demand for services are higher than those for consumer goods. This then translates into rising absolute and relative prices of nontradables, in particular services, thereby adding to the relative increase of nontradables prices resulting from supply side developments (via the Balassa-Samuelson effect). These demand side effects may affect the competitive position of a country, at least in the short to medium term. If they lead to additional wage pressure in the tradables sector or if investment shifts to the nontradables sector at the expense of the tradables sector, they may even have a longer term impact.

A third proposition explains observed sectoral inflation differentials with **departures from the competitive paradigm**. The idea is that competition in the nontradable ("sheltered")

⁵ The analysis in this section is confined to these four accession countries. For the other accession countries, data were either not fully available (especially at the sectoral level) or time series exhibited serious breaks which could not be dealt with in a satisfactory manner.

⁶ The comparative price level is the ratio of the (market) exchange rate to purchasing power parity, both denominated in currency units of the reference country per one local currency unit.

sectors is less pronounced than in the tradables ("exposed") sectors, which leads to higher inflation pressures in the former sector. In a similar vein, labor market segmentation between tradables and nontradables sectors or different wage bargaining patterns in these two sectors may also affect sectoral inflation differentials. Canzoneri et al. (1998) argue that "the potential role of non-competitive forces has been a focal point of policy-oriented discussions in Europe. Our summary rendition of these discussions is that the [European Union's] common market forced the traded sector in each country to become more competitive; surplus labor shed by the traded sector was absorbed by government employment and by a service sector that was protected from competition by legislation, distribution networks, and tradition. Thus, according to this view, increases in the relative price of home goods were caused by excessive public-sector employment and by rents accruing to the protected home-good sector." Similar patterns could also be conceived to emerge during the transition process to a market economy.

A fourth driving force for sectoral inflation differentials relates to the **liberalization or the adjustment of regulated prices** to cost-recovery levels during the transition process. As most of the regulated prices apply to nontradable goods and services, this would be another factor pushing up inflation differentials between nontradables and tradables.

What is the **relative importance** of each of these four **potential determinants** for explaining the observed sectoral inflation differentials in accession countries?

At this stage, structural breaks and short time series limit a rigorous testing of the driving forces of sectoral inflation differentials in the Central and Eastern European accession countries. This constraint applies, in particular, to the use of time-series analysis and thus to the analysis for individual countries.⁷ Panel data analysis is more easily applicable to the issue at hand. The downside of this approach, however, is that it does not or only partially allow drawing conclusions for individual countries. In other words, panel data analysis essentially presumes a substantial degree of similarity among the countries included in the panel. This, however, cannot be taken for granted. A further point is that the panel studies done so far on the issue under consideration include one or more non-accession countries which may further limit their significance for assessing accession country cases.

An instructive starting point to approach the empirics of the matter is to relate observed sectoral inflation differentials to the development of sectoral productivity developments. This gives a certain indication on how relevant the Balassa-Samuelson effect is in the accession countries and whether the sectoral inflation and productivity dynamics are similar across these countries.

⁷ A possible solution would be to use higher-frequency (i.e. quarterly) data to get to a satisfactory number of observations, although it is not fully obvious whether long-term relationships can be tested in a meaningful way for a period of relatively few years, even if higher frequency data are used. However, the complete set of data series which would be necessary for doing meaningful econometric tests is not yet available for most accession countries.

[insert chart 4 here]

Chart 4 compares the relative price ratios of tradables and nontradables implied by the Balassa-Samuelson effect with actually observed sectoral inflation differentials in the Czech Republic, Hungary, Poland and Slovenia between 1992 and 2000. More specifically, the table presents the ratios of implicit sectoral price deflators of gross value added. As before, tradables are proxied with manufactured goods.

Chart 4 carries two major messages. First, except for the Czech Republic, observed sectoral inflation differentials are typically less pronounced than the productivity-based differentials predicted by the Balassa-Samuelson hypothesis, which is in accordance with other studies that examined different country samples (see e.g. Canzoneri et al., 1996). Overall, the data appear to suggest that the **Balassa-Samuelson effect** can explain an **important part** of relative price changes between tradables and nontradables observed in practice.

Second, during the observation period, the **magnitude** of Balassa-Samuelson effects **differed markedly** among individual accession countries, extending from modest (in the case of the Czech Republic) to large (for Poland). In quantitative terms, the data presented would translate into annual Balassa-Samuelson effects (contribution of inflation differentials between nontradables and tradables to the change of the deflator of total gross value added) in the order of 0.8 ppts for the Czech Republic, 3.5 ppts for Slovenia, 5.6 ppts for Hungary and 9.4 ppts for Poland. The quantitative results from this analysis have to be interpreted with great caution. Apart from data quality problems and the existence of structural breaks, there are a number of further caveats. First, the results are most likely distorted by the simplifying assumptions that were made in order to arrive at quantitative findings. For example, a number of services like financial services, tourism or business services are in fact tradables rather than nontradables which would most likely dampen the size of the effects, if it could be accounted for. Second, the strikingly high figures for Hungary and Poland reflect mainly massive gains in productivity in the tradables sector achieved during the 1990s and thus, in part, temporary productivity spurts at the early stages of transition due to improved allocation of existing resources. Third, as mentioned, sectoral productivity-based estimates of relative price developments tend to overpredict actual relative price developments. Fourth, the figures were calculated with national accounts data. In these data, nontradables account for a much higher percentage (on average, around 70% of value added) than they do in the consumer baskets of accession countries where they feature, on average, with approximately 35%. This clearly limits the transmission of the effect into consumer price inflation figures.

The **body of empirical papers** on the determinants of differential sectoral inflation rates and, more broadly, on the factors driving real appreciation in accession countries has been growing quickly in recent years (see e.g. Simon and Kovács, 1998, Rother, 2000, Fidrmuc and Schardax, 2000, Pelkmans et al., 2000, Schardax, 2001, Coricelli and Jazbec, 2001, Jazbec, 2001, Halpern and Wyplosz, 2001, Deutsche Bundesbank, 2001, Rosati, 2001, De Broeck and Sløk, 2001). A short and selective review of the most important papers shows the following picture.

Rother (2000), who estimates the Balassa-Samuelson effect in Slovenia using a very similar methodology as the one applied above but different data, arrives at somewhat lower estimates for productivity-implied inflation differences between Slovenia and the EU (1.5 to 2 percentage points). The results of Simon and Kovács (1998) for Hungary are based on a slightly different classification of sectors. Presenting results for different assumptions about developments in agriculture, their main scenario assumes a sectoral productivity-induced appreciation of the real exchange rate (based on the GDP deflator) of 2.9% a year.

Pelkmans et al. (2000) use a different approach to quantify the Balassa-Samuelson effect for the ten Central and Eastern European accession countries. The authors proceed in four steps. First, they regress the deviation of inflation rates of euro area countries from the euro area average on the relative consumer price levels of these countries. Then, they regress the relative consumer price levels of 29 OECD countries on the GDP-based comparative price levels of these countries (i.e. on ratios of the GDP measured in PPP and at current exchange rates). As expected, the coefficients of the independent variables in both equations are negative, and both are highly significant. In a third step, Pelkmans et al. calculate the relative consumer price levels of the ten Central and Eastern European accession countries, based on their comparative price levels and the coefficient estimated for the OECD countries in the second equation. Finally, the authors use the coefficient estimated in the first equation for the euro area countries to compute the accession countries' inflation differentials from the average euro area, which are implied by their relative consumer price levels. Their results show on average an inflation differential of 3.8 percentage points between the accession countries and the euro area average due to estimated differences in the price levels.

Schardax (2001) presents estimates for the impact of differences in price levels on inflation in the Czech Republic, Hungary, Poland and Slovenia based on the coefficients calculated by Pelkmans et al. (2000) and on the actual GDP-based comparative price levels of the accession countries in 1999, as calculated by the WIIW (see also table 2 of this paper). His estimates for the Balassa-Samuelson effect, following this approach, range from 2.4% to 4.3% annually for these four countries.

Halpern and Wyplosz (2001) analyze the determinants of changes in service-to-consumer goods price ratios for a panel of nine Central and Eastern European countries (including Russia) for the time period 1991 to 1999. In doing so, they add to the standard supply-side (sectoral productivity) variables two further variables to capture demand-side effects, namely GDP per capita (PPP-adjusted) and changes in the inflation rate. Halpern and Wyplosz find that GDP per capita enters the equation significantly and positively which suggests that demand growth is possibly biased towards nontraded goods. The evidence from the change-in-inflation term is less clear-cut. In general terms, depending on the exact specification of their equation, Halpern and Wyplosz estimate an average annual real appreciation (defined as the ratio between tradables and nontradables inflation) of about 3% for the nine-country panel.

Jazbec (2001) explains changes in tradables-to-nontradables price ratios for a panel of 19 transition economies for the period 1990 to 1998 by using productivity measures, structural variables (to capture the unwinding of structural distortions during the transition process) and demand-side variables, specifically the share of nontradables consumption in total private consumption and real government consumption as a percentage of GDP. Both demand-side variables are found to be significant and entering with the right sign, i.e. contributing to the faster rise of nontradables prices relative to tradables prices. Coricelli and Jazbec (2001) using the same dataset and a very similar approach find "an elasticity of the real exchange rate with respect to [sectoral] productivity differentials of about $\frac{1}{2}$. If we take the typical 2 percent yearly rate of convergence for CEE countries [Bulgaria, Croatia, the Czech Republic, Hungary, Poland, Romania, Slovakia and Slovenia] relative to EU countries, the pressure on the real exchange rate due to the Harrod-Balassa-Samuelson effect should [ceteris paribus] be on the order of one percent a year in the medium to long run."

De Broeck and Sløk (2001) regress real effective exchange rates on different measures of productivity in tradables and nontradables sectors for the ten Central and Eastern European accession countries from 1991 to 1998, using panel data estimations. Productivity increases in the tradables sector which imply an appreciation of the exchange rate are interpreted as evidence in support of the Balassa-Samuelson effect. De Broeck and Sløk find that an increase in the relative productivity differential by one percent leads to an increase in the real exchange rate of slightly above 0.3 percent for the Central and Eastern European EU accession countries. According to Deutsche Bundesbank (2001), the analysis by De Broeck and Sløk (2001) would translate into an annual Balassa-Samuelson effect on the order of 1.4% to 2%. Finally, provisional results of a study of the Deutsche Bundesbank itself put the magnitude of the Balassa-Samuelson effect for the ten Central and Eastern European EU accession countries at 1.9% to 2.6% annually for the period 1994 to 1999. As the study was not yet published at the time of writing, the methodology applied is not yet known.

This short survey shows that the **estimates** are **fairly sensitive to** the **methodology** and the **datasets** that are used. Moreover, some quantifications, in particular Pelkmans et al. (2000), do not quantify the Balassa-Samuelson effect directly by using sectoral productivity data. Furthermore, some estimates include demand-side effects while others do not.

It is useful to explore the relevance of **demand-side factors** somewhat further by the following observations. First, empirical research shows that income elasticities of demand for services are indeed high in most Central and Eastern European EU accession countries (see Podkaminer, 1998). This may reflect the very low share of services in aggregate supply and demand at the outset of transition. Thus, an increase in income levels should have induced a shift in expenditure towards the nontradables sector. And indeed, the share of nontradables in total output has risen in a number of accession countries during the observation period (namely in the Czech Republic, Poland and Slovenia; not, however, Hungary, which recorded an increase in the share of tradables in GDP in the period), while

the Balassa-Samuelson effect should rather produce falling shares of nontradables in total output.⁸

Moving to the two other potential determinants of tradables/nontradables inflation developments, it appears that formal evidence for the proposition that **departures from the competitive paradigm** have determined to some extent sectoral inflation differentials is scarce for accession countries. Some discussion of this aspect can be found in a recent case study on Slovenia. Bole (2001) finds that wage growth in different sectors has been quite diverse during Slovenia's transition which in fact violates one of the assumptions underlying the Balassa-Samuelson effect. According to Bole, this has been partly due to different trade union behavior in the two sectors. Furthermore, a relatively low degree of competition in the market services sector allowed for price increases above marginal costs in this sector; this then reduced employers' resistance to wage pressures in this sector.

There is some empirical evidence that **price liberalization and the adjustment of administered prices** has tended to increase sectoral inflation differentials in a number of Central and Eastern European EU accession countries (compare Cottarelli et al., 1998, Pujol and Griffith, 1998). Administered prices for nontradables have typically risen faster over time than non-regulated prices for nontradables in the Central and Eastern European EU accession countries. This has essentially been the case because prices for nontradables which were kept regulated beyond the very early stages of the transition process (i.e. beyond the first wave of price liberalization) have, in most cases, been adjusted to cost-recovery levels only gradually.

In sum, the Balassa-Samuelson effect is a major driving force of observed relative price trends in accession countries, while the other three propositions – demand-side effects, departures from the competitive paradigm, and the adjustment (liberalization) of regulated prices – also appear to have a certain validity in explaining sectoral inflation differentials in general. At the same time, there remains a considerable degree of uncertainty about the relative size and importance the individual determinants had in recent years in determining sectoral inflation differentials in Central and Eastern European EU accession countries.

3 Current and future challenges

As disinflation in Central European and Baltic EU accession countries is reaching an advanced stage, challenges are changing and new questions emerge. **Five issues** which are particularly relevant for the current and future disinflation process are raised and explored in this part of the paper.

⁸ Higher factor productivity in the tradable sector should induce labor and capital to move out of the nontradables sector, reducing the supply of nontradables and increasing the supply of tradables (Rother, 2000).

First, how solidly established are the disinflation results achieved so far? Is there a danger of a serious setback?

Second, what is the optimal inflation rate in Central European and Baltic countries? In other words, how far should inflation be reduced in these countries?

Third, how should the disinflation strategy towards the optimal inflation rate be designed, in particular in terms of speed and timing? What do we know about the costs of alternative disinflation strategies?

Fourth, what is the potential for inflationary pressures, in particular in the context of completing transition and preparing for EU accession? How much should central banks respond to (positive and negative) temporary shocks to inflation?

Fifth, how does the disinflation issue fit into the prospective monetary integration of today's candidate countries?

3.1 Sustainability of Disinflation Achievements to Date

Whether the disinflation results achieved to date can be sustained and further consolidated depends on a multitude of factors. A first question is whether the **institutional framework** of macroeconomic policymaking is conducive to stability. In the run-up to EU accession, the candidate countries have allotted a high degree of legal independence to their central banks and have given them a clear mandate to pursue price stability (see Cukierman et al., 2001, Dvorsky, 2000). Unless central bank independence is undermined by the actual policy process, this should constitute a good basis to overcome time-inconsistency problems.

Moreover, upon EU accession, today's candidates will participate in the coordination and surveillance of economic policies within the European Union (broad economic policy guidelines, stability and convergence programs, excessive deficit procedure, Stability and Growth Pact), and fiscal policy will be subject to explicit legal limits on deficit and debt levels. This framework should ensure a setting of monetary dominance, to borrow a notion from Sargent and Wallace (1981). In such an environment, there is no room for a monetization of government debt; any build-up of such debt will have to be handled by fiscal means, i.e. fiscal policy will eventually have to adjust. This allows to anchor inflation expectations at low levels. Thus, in short, institutional features and constraints go a long way to solving the commitment problem of the accession countries' monetary and fiscal authorities. In principle, if enacted and lived in practice, this bodes well for a further consolidation of disinflation.

From an **economic angle**, the following picture emerges on the sustainability of inflation achievements. Progress in disinflation in accession countries in 2001 was substantial, and it has been helped by **favorable supply shocks**, in particular lower oil prices and in some countries by a marked deceleration in food price inflation. A potential reversal of these beneficial factors could slow further disinflation or even stall it temporarily, in a similar vein

as in late 1999 and in 2000. However, a substantial or more lasting setback in inflation due to persistent and large supply shocks appears, on the whole, very unlikely.

A second and more complex issue is whether the disinflation achievements are sustainable from an **exchange rate perspective**. This issue is particularly relevant for those accession countries which have experienced a strong real effective exchange rate appreciation in recent years as a consequence of nominal effective appreciation, namely the Czech Republic, Hungary, Latvia, Lithuania, and Poland. While this appreciation is having a favorable impact on inflation developments through falling prices of imported goods, it may not or not fully persist. A potential downward correction of the exchange rate could undo the gains that have already been reaped, given that the pass-through from the exchange rate into inflation developments is typically pronounced in small open economies like the accession countries. The question therefore arises whether the current appreciated exchange rate levels are sustainable. This, in turn, should be the case if present exchange rate valuations are basically in line with equilibrium real exchange rate levels.

[insert Table 3 here]

Estimates on equilibrium real exchange rates of accession countries are relatively scarce and exhibit deviating results, due to differences in methodology, assumptions, datasets and data limitations. An in-depth discussion of this issue would go beyond the scope of this paper. A pragmatic approach which may be instructive for inspecting this issue a bit further, without however leading to any hard conclusions, is through an analysis of **comparative price level developments** which are reported in Table 3.

De Broeck and Sløk (2001) show that the comparative price levels of the Baltic countries and Poland were somewhat lower than the average price level of non-transition countries with similar GDP-per-capita levels in 1999, while Slovenia's comparative price level had already fully converged to this benchmark. The comparative price levels of the other accession countries, in particular those of the Czech Republic and Slovakia, were still tangibly lower than the average price level of non-transition countries with similar GDP per capita levels in 1999. With further real appreciation in 2000 and 2001, it appears that the comparative price levels of Latvia, Lithuania and Poland have fully approached the benchmark values of non-transition countries, while the comparative price level in Slovenia (where real appreciation was minimal) remained at the benchmark level. The comparative price levels of other accession countries are still, to a different extent, below the average price level of non-transition countries with similar GDP-per-capita levels, although the differentials have narrowed considerably in the past two years. Thus, the recent catching-up in comparative price levels of accession countries may still be interpreted as a move towards equilibrium and not yet beyond it. This simple analysis does therefore not highlight any apparent

sustainability concerns, as regards comparative price levels and real exchange rate positions.⁹

On the other hand, the preceding analysis shows that there is no tangible scope for a further "corrective" increase in comparative price levels for the first set of countries. Thus, for these countries, sustainable comparative price level increases will largely be confined to the trend real appreciation associated with the supply-side changes of the catching-up process. A further qualification is that financial markets may focus, in their assessment of a country, at the dynamics rather than at comparative levels. This may give rise to temporary setbacks; over the medium and longer term, however, equilibrating forces should prevail. Obviously, the best safeguard for a longer-term sustainability of real exchange rate levels is a continuation of structural reforms to support the dynamics of labor productivity growth, alongside with real wage developments that stay in line with productivity developments in the tradables sectors of the accession countries.

3.2 The Optimal Level of the Inflation Rate

A central question in the debate about inflation and price stability issues concerns the **optimal inflation rate**. In the literature, four reasons are put forward to make the case for inflation to be kept in the low single-digits rather than for zero inflation, namely grease effects (which facilitate relative price and wage adjustments if prices and wages are not fully flexible downwards), seigniorage considerations, the zero bound of nominal interest rates and upward measurement bias. On the other hand, it is argued that sand effects (i.e. costs resulting from misallocations, inefficiencies and uncertainties due to inflation) and other microeconomic distortions, in particular with relation to the tax system, call for a zero (or very low) inflation as the optimal inflation rate.

Against this background, what is the optimal inflation rate in the accession countries under review? How far should inflation be reduced in these countries? The obvious approach to discuss this issue is to examine how relevant the arguments raised in the literature on the optimal inflation rate are in the case of Central and Eastern Europe. In doing so, note is taken of a recent discussion of this issue in van Elkan et al. (2001) who argue that in the real convergence context, in which Central European EU accession countries are placed, the optimal inflation rate should be between "some 2 to 4% per annum, or slightly higher". This range corresponds to the medium-term inflation targets announced by inflation-targeting central banks of Central European accession countries (Poland: below 4%, Czech Republic: 2% to 4%). Thus, views on the optimal inflation range for Central European and probably also for the Baltic accession countries appear to coincide to a large degree.

⁹ This tentative conclusion is corroborated by Schardax (2002) from a very different methodological angle. Schardax builds a probit-based early warning model. This model which performs well in in-sample forecasts does not detect any major risk of substantial downward corrections of exchange rates in Central and Eastern European accession countries for the next two years to come.

The following points emerge:

First, the relevance of **grease effects** deserves closer examination against the backdrop of ongoing relative price changes in accession countries. Whether such effects are important, depends on the presence and persistence of nominal rigidities. As inflation decreases, downward nominal rigidities become more biting, relative price changes will ceteris paribus imply an increasing number of downward movements of prices for individual goods and services. On the other hand, nominal rigidities may become less pronounced as inflation is sustainably reduced to low or very low levels. Neither economic theory nor empirical studies provide conclusive guidance on this latter issue.

For van Elkan et al. (2001) who take a pragmatic approach to the issue, **relative price changes** are the key argument for determining the optimal inflation rate in accession countries. In their view, the case rests on three points: (i) relative price adjustments between nontradables, (ii) the increase of relative prices of regulated goods and services, (iii) overly ambitious inflation targets may raise suspicions that needed price deregulations have been postponed or may give countries a motive to postpone such increases to improve the likelihood of achieving the inflation target.

All these arguments which are partly interrelated (argument (ii) is largely a special case of argument (i)) are valid and supported by empirical research, as shown in section 2 of this paper. Argument (iii) comes from historical evidence. A good example in the Central and Eastern European case are the disinflations in Hungary in 1993/94 which were based, to a large degree, on a delay of administered price adjustments; this approach proved to be short-lived and led to temporary rise of inflation in the context of the 1995 stabilization package. Slovakia, until 1998, is another case in point.

Van Elkan et al. (2001) remain a bit vague in their discussion on the implications of Balassa-Samuelson effects for the optimal inflation range in accession countries. They claim that a sharp drop in inflation may not be perceived as sustainable in the light of an eventual euro area participation which will lead to a certain rebound of inflation, as real appreciation pressures will then appear in the inflation rate rather than in the (irrevocably fixed) nominal exchange rate. This argument seems to be a bit far-fetched because it is doubtful that such considerations already play a major role in the formation of inflation expectations today, given that euro area participation is still a bit distant perspective for the accession countries (see section 3.5).

Other matters and factors appear to be more important in deciding how much of the real appreciation should be taken through the inflation channel and how much through the nominal exchange rate channel. What the most appropriate policy course is depends on a whole range of issues, like a possible unsettling of expectations as a consequence of nominal appreciation (e.g. if this would imply a major exchange rate regime shift), the

potential for exchange rate overshooting or the existence of price and/or wage rigidities in the tradables sector. It is therefore case- and time-dependent (see Backé et al., 2002).

Second, **seigniorage considerations** are irrelevant for defining the appropriate inflation rate in a setting of monetary dominance. This is so for two main reasons: (i) the reduction of seigniorage needs is a precondition for the credibility of disinflation in the first place and thus for the reduction of the sacrifice ratio, (ii) base money and, in particular, cash in circulation is lower in most accession countries than public debt. Thus, ceteris paribus (in particular under unchanged real interest rates), disinflation tends to have a positive net effect on the accession countries' budget balances.¹⁰

Third, an **upward measurement bias** typically occurs in the context of the introduction of new products, of quality improvements, of changes in the structure of retail trade and of the substitution of goods and services. There are good reasons to believe that measurement bias is a relevant issue in the accession countries at this stage. However, published empirical studies on the issue are relatively scarce. A recent study of the National Bank of Hungary suggests that "the virtual price increase due to new products, improvement in the quality of services and the transformation of financial links between the public and the private sector would continue to play a more significant role in Hungary than, say in the USA" and thus be significantly higher than 1 percentage point (Ferenczi et al. 2001). Skreb (1998) takes a similar view. Van Elkan et al. (2001) echo this point by arguing that quality upgradings would be one consideration to justify inflation in the accession countries to be in the lower and not in the very low single digits. It should be noted, though, that in the future the measurement bias should gradually lose some of its importance, as the forces that drive it will become less virulent. At the same time, improved statistical methods and procedures should allow to capture quality improvements increasingly well.

Finally, as regards the **other determinants** of the optimal inflation rate, it is not fully clear whether the zero-bound to the nominal interest rate will become of relevance to low-inflation accession countries. In general, higher trend growth than in advanced industrialized countries should reduce any zero-bound concerns, unless an accession economy with not overly flexible product and labor markets would experience a major negative asymmetric real shock.

There is little knowledge about how important sand effects or other microeconomic distortions are across the single-digit inflation spectrum in accession countries. While this calls for caution, as regards the upper end of the optimal inflation range, it appears safe to presume that, for the accession countries, such effects should not alter the overall assessment in the lower single-digit inflation range.

¹⁰ To be precise, to the extent that the state debt is long-term and fixed-rate, the positive effects will only materialize with a delay, as the lower nominal interest rates apply only to newly issued debt.

The basic implication of this discussion about the optimal inflation rate level for accession countries is straightforward. In some accession countries, in particular in Hungary, Slovakia and Slovenia, there is still some scope and, in fact, need to disinflate further from 2001 inflation levels. Other countries have already moved to what appears to be the optimal inflation rate range for accession countries. For these latter countries, the focus has shifted or is shifting to the consolidation of the disinflation achievements. In other words, while the first group of countries is still in the course of a regime shift, the latter group is apparently entering the new regime of low inflation or has already entered it.

3.3 The Final Stages in the Disinflation Process

Another standard theme in the debate about inflation and disinflation is the question of how to **minimize the output and employment costs** of moving to a low inflation regime. This issue is particularly relevant for those Central European accession countries which still record inflation rates in the higher single-digits. Two points should be noted at the outset:

First, calculating the costs of disinflation, in particular from moderate to low levels, is hardly possible in transition economies, as the standard approach for quantifying the **sacrifice ratio**, developed by Ball (1994), cannot be applied meaningfully to transition economies. This approach focuses on the output loss and proceeds by identifying peaks and troughs in trend inflation and, thereby, disinflation episodes. It is assumed that output is at its trend level at the inflation peak and a year after the inflation trough, and on this basis the sacrifice ratio is calculated by comparing the trend output line with the actually observed output developments over the disinflation-plus-one-year period. However, for Central European and Baltic accession countries, it would be difficult, if not impossible, to delineate distinct disinflation episodes, given the fairly continuous disinflation process since the early stages of transition. Moreover, the trend output concept cannot be fully applied to a transition context and it is highly uncertain whether the assumptions about inflation and trend output developments hold in transition economies.

Furthermore, it should be noted that the standard approach of calculating sacrifice ratios itself has considerable limitations, as it attributes the whole reduction of inflation to policy induced demand contraction. Other demand shocks as well as supply shocks are largely ignored. This can grossly under- or overstate the true sacrifice ratio, in particular in transition and catching-up economies.

Empirical work on the costs of disinflation in accession countries is scarce and relates primarily to the first stages of transition, which were characterized mostly by a reduction of inflation rates from high to moderate levels. Typically, such disinflations are low-cost and thus it is no surprise that Christoffersen and Doyle (1998) did not find evidence of output costs for stabilizations from high and very high to moderate inflation rates. However, in the case of disinflations from moderate to high single-digit inflation the tentative evidence

presented in Christoffersen and Doyle (1998) is more mixed. And, importantly, these findings are not necessarily good guides for assessing the costs of disinflation from higher- to lower-single digits levels.

Second, **disinflation costs** are **temporary** while the **benefits** of a low inflation environment are **permanent**. Thus, the net gains of disinflation will, under most circumstances, be positive, even if the annual components of the permanent gains are small and the calculation is done on a present value basis (applying reasonable discount rates). Moreover and more importantly, in the case of the accession countries, the discussions about the costs and the benefits of disinflation will have to be placed into the monetary integration context, an aspect which will be discussed in section 3.5.

How can the temporary costs of disinflation be reduced?

A first question to be considered is how **speed and timing** of disinflation impact on the costs of the process. On a theoretical level, aggregate supply models do not help much to clarify the issue of how speed and timing of disinflation affect costs. The effects are very much dependent upon the specification of the model chosen. In other words, the limited understanding of wage-price-output dynamics does not allow any well-founded general conclusions on how the speed and path of disinflation impacts on the sacrifice ratio (see McCallum, 1996).

As regards the **speed** of disinflation, an argument from the credibility literature, originally due to Sargent, is that gradual disinflations are more prone to speculations of future reversals and U-turns and that this makes them more costly.¹¹ The counterargument is that rapid disinflation from moderate to low levels may not appear reasonable or achievable to public opinion, which then makes it very hard to maintain credibility (Summers, 1996). Like excessive gradualism, excessive radicalism invites for speculations of future reversals or U-turns in policy (King, 1996). Empirical analyses (Ball 1994, Ball 1997, Bernanke et al., 1999) show that fast disinflations tend to display a lower sacrifice ratio than slow disinflations, although the variation is quite large. Taken all arguments together, there tends to be a premium on a relatively fast disinflation, while there is less that one can conclude from this discussion for the optimal timing of disinflation.

The concept of credibility does not only relate to the speed issue but also to the institutional aspects of central bank independence and legal restraints on fiscal policy and surveillance procedures, discussed above. Adopting these institutional devices can be a particularly effective way for accession countries to foster credibility, compared to the other alternative to do so, namely to build-up a long-standing track record. Furthermore, it should be noted that EU accession will boost credibility more generally, e.g. by the higher growth

¹¹ This argument has also become very influential in the discussion about "shock therapy versus gradualism" during the early year of the transition of formerly centrally-planned into market economies.

perspectives it holds. Cukierman (1998) points at a further incentive to build up credibility, namely to avoid disadvantages associated with low relative credibility, compared to other accession countries or EU incumbents.

Incomes policy can also help to lower the sacrifice ratio if it facilitates the adjustment of expectations. Two points emerge very clearly from the historical experience. First, incomes policy only succeeds if it involves all key players. This involvement is easier if a broad consensus about the key elements of economic policy exists - a feature which can be more often observed in small countries than in larger ones. Second, incomes policy cannot substitute for sound macroeconomic and, in particular, fiscal policies.

This leaves the question about the **timing** of disinflation. Obviously, the earlier inflation is tackled, the earlier the gains can be reaped, all other things equal. Delaying disinflation does only make economic sense if the intermediate period is used for implementing measures which lower the sacrifice ratio in the future sufficiently, so that reduced disinflation costs outweigh the lower benefits of deferred disinflation.

In the case of the accession countries, are there any good reasons to delay a reduction of inflation from higher to lower single-digits, i.e. to the inflation range that is optimal for these countries? The widely held view on this (see e.g. Blanchard, 1998, Cottarelli, 1998) is that countries which have achieved an advanced stage of macroeconomic and structural adjustment and in which inflation is mainly driven by inertia should start tackling the last stages of disinflation quickly. As Central European and Baltic countries complete transition and are getting ready for EU accession, it becomes increasingly difficult to make a case for delaying inflation to low levels, since there should no longer be a need to correct major real disequilibria via inflation and fiscal solvency should essentially be ensured.¹²

What is the appropriate **monetary and exchange rate policy framework** to achieve an effective disinflation from higher to lower single digits? There is no convincing evidence that any of the three standard monetary regimes - exchange rate targeting, monetary targeting and inflation targeting - is generally superior to other possible strategies in delivering disinflation at a lower sacrifice ratio (see Koromzay, 1996, Debelle, 1996). Different regimes are most appropriate for different countries at different times. Regime choices should therefore be based on country- and time-specific considerations, rather than on universal prescriptions. None of the standard monetary regimes should be excluded in principle from the arsenal of potentially meaningful frameworks to complete disinflation in accession countries.

¹² A more subtle issue about timing is whether, as some authors (Cukierman, 1998, King, 1996) argue, an attack on disinflation should be geared to a point in time when (non-policy-induced) shocks occur which drive inflation down (e.g. a positive supply shock). This is sometimes termed as "opportunistic" approach to disinflation. This may be a pragmatic approach, if such a shock indeed occurs before long. If however this is not the case, the "opportunistic" approach may postpone disinflation for an overly long time.

The dominant view on this issue appears to be less differentiated: It argues that exchange rate based stabilization is a good instrument to reduce inflation to moderate levels and perhaps to high single-digit levels. But then it needs a more aggressive attack on inflation (see e.g. Crockett 1996, Koromzay 1996, Cottarelli 1998) to drive inflation down further into the low single-digits, and this can, by definition, only be done by adopting a domestic anchor. In the final instance, this stance often culminates in a preference for inflation targeting.

This posture, however, does not necessarily apply to small open economies with flexible markets and a solid fiscal stance. Such economies may credibly operate a rigid exchange rate peg. If this is the case, it is difficult to see what such a country could gain from a regime shift (all the more so, as it will anyway return to fixity eventually when entering the euro area, implying another regime shift). The dominant view on monetary and exchange rate framework seems therefore to be too narrow, and there is a case for taking a more encompassing approach to the issue.

3.4 Potential for Future Shocks to Inflation

Central European and Baltic EU accession countries are **completing transition** and are **preparing for EU accession**. What are the implications of these processes on the price level and on inflation? This question is crucial for monetary policymaking, in particular for designing central banks' responses to inflation shocks.

As a backdrop to this discussion, it is useful to examine to what extent temporary shocks to inflation in the accession countries are already similar to the inflation shocks the euro area experiences. Fidrmuc (2001) undertakes a correlation analysis to inspect this issue. As a first step, a variable trend of price level developments in accession countries and in the European Union for the period 1991 to 2000 is calculated by using the Hodrick-Prescott (HP) filter technique. While the HP trend shows long-run price dynamics, the residuals can be interpreted as short-term shocks to inflation. These short-term dynamics can either be due to country-specific factors, to region-specific factors relating to the accession countries as a group, or to common factors that pertain to both the accession countries and the European Union.

The correlation results show that common factors play an important role in short-term price dynamics for Hungary, Latvia, Poland, Slovenia and, to a somewhat lesser extent, also for Estonia (correlation coefficients between 0.44 and 0.52 for the first four countries and 0.32 for Estonia, all significant at the 1% level). In general, this relation gains in strength if the analyzed period is restricted to more recent years. Country-specific factors still dominate short-run price dynamics in the Czech Republic, Lithuania and Slovakia, while region-specific factors do not seem to be important for the Central and Eastern European accession countries.

Turning to future challenges, the completion of transition may have several potential effects on inflation. One of these effects stands out, namely the impact of the **liberalization of administered prices** or their **adjustment to cost-recovery levels**. The price liberalization and adjustment process has reached an advanced stage in most accession countries. However, it is not yet complete. Administered prices still had a share of approximately 13% to 24% in the accession countries' consumer baskets in 2000/01.¹³ Not all administered prices do yet cover costs, with some variation among individual countries.

The final steps towards price liberalization and adjustment will still have a bearing on the price dynamics in accession countries in the near future. These adjustments are very much "transition-related" dynamics, as they emanate from the legacy of central planning in Central and Eastern Europe.

At the same time, the liberalization of administered prices is also relevant from an EU accession viewpoint. The Copenhagen criteria, as interpreted by the European Commission in its "Agenda 2000" strategy document (July 1997), require that "prices... are liberalised" as a precondition for EU accession. Consequently, this issue should in principle be settled when EU accession takes place. Two qualifications have to be added here. First, in some specific areas (like e.g. public transportation in urban areas), a case can be made for keeping prices below cost-recovery levels. Second, in the area of public utilities, it is useful distinguish between two stages of price adjustments: The first is the increase to marginal operating cost levels. This adjustment can be completed gradually or in one step, with direct implications for the disinflation path. The second stage of the adjustment process relates to factoring in capital cost into prices, as existing capacities are renewed and new facilities are built to meet increasing demand; in other words, this is an adjustment of prices to marginal long-run cost. This is a gradual process that evolves over a more extended time period, well beyond EU accession. According to the EBRD, the optimal pricing rule for transition economies, in which demand is stagnant and excess capacity often exists, would set the price somewhere between marginal operating cost and long-run marginal cost. As demand picks up and investments are undertaken, the price would gradually move towards long-run marginal cost (EBRD, 2001).

In the area of regulated prices, the **adjustment of energy prices for households** is the most significant task that has to be completed. The following analysis builds on Reiningger (2000) who analyzes energy price developments in four Central and Eastern European accession countries and in selected EU countries during the period 1992 to 1999.¹⁴ Reiningger finds that the candidate countries under review have largely reached EU energy price levels for

¹³ According to European Commission (2000) and European Commission (2001b), the share of administered prices in the consumer basket in 2001 is 20.6% in Bulgaria, nearly 18% in the Czech Republic, 15% in Estonia, 18.5% in Hungary, 22% in Latvia, 20.5% in Lithuania, about 24% in Poland (figure for 2000), 18% in Romania, 19.3% in Slovakia (figure for 2000) and 12.7% in Slovenia (figure for 2000).

¹⁴ Due to constraints on the availability of data that are comparable across countries, the analysis in Reiningger (2000) had to be restricted to the Czech Republic, Hungary, Poland and Slovakia.

industrial use in most (but not all) types of energy. However, energy prices charged on households were still low (apart from gasoline) in 1998/99, as compared to those in the European Union, even if they are higher than in the EU when compared to relative levels of GDP per capita. Reininger concludes that major adjustments in household energy prices are needed to reach the levels of EU economies.

A rough and selective update of Reininger's calculations shows that the price level convergence in energy prices for households proceeded in 2000 and in 2001, driven partly by further upward adjustment of prices and partly by exchange rate appreciation. A certain gap to EU countries still remains, though. Increases in administered prices of energy for households were particularly pronounced in Slovakia (from low levels) and relatively large also in the Czech Republic in 2000 and 2001. As approximate calculations show, household prices for electricity and natural gas, two very important energy sources, reached between 55% and 70% of French levels for electricity and between 35% and 80% for natural gas in the four countries under review.

Completing the adjustments of energy prices will mainly affect consumer prices, while the direct influence on industrial producer prices and, hence, on tradables inflation will be relatively less important. However, the upward push on the CPI triggered by the adjustment of energy prices for households will be still be tangible, as energy constitutes a sizeable share of the accession countries' consumer baskets, typically on the order of around 15% (around 10% excluding gasoline). This, in turn, may lead to higher wage claims, which may result in indirect upward pressure on tradables prices.

The overall upward adjustment of energy prices will probably be mitigated by increasing productivity and efficiency in the energy sectors that may result from the process of restructuring and liberalizing these sectors in Central and Eastern Europe, which is often linked to privatization to foreign strategic investors. In particular, the level of energy prices for industry may even decrease relative to the corresponding level in EU countries.

In fact, this latter point applies to other sectors of the economy as well. Further privatization, deregulation and liberalization measures which are taken to complete transition will tend to increase competition and thus have a dampening effect on inflation. To what extent these factors will mitigate upward pressures on inflation in the individual countries, is an open question.

Alongside with the completion of transition, accession to the European Union will also affect price dynamics in Central European and Baltic countries.

The most apparent case of potential "EU accession-related" price dynamics pertains to **agricultural and food prices**. Presently, the agricultural price levels in accession countries are below that in the European Union. However, the current situation is different from accession country to accession country, but also among EU Member States, and varies considerably among product groups.

Among the former, agricultural producer price level convergence has progressed farthest in Slovenia, followed by the Czech Republic, Slovakia, Poland and Hungary. Rough estimates show that comparative agricultural price levels in these countries were between half and three quarters of the EU average in 2000. As regards key agricultural commodities, price gaps, compared to the EU average, were particularly pronounced for livestock products and some selected crop products like sugarbeets or apples.¹⁵

Changes in agricultural prices will impact on food prices, which constitute a sizeable share of accession countries' consumer baskets (on average a third, as compared to 16½% in the European Union) and are still tangibly below the EU average in almost all accession countries: Comparative food price levels were roughly between 55% and 75% of the EU average level for most Central European and Baltic countries in 2001. The exception is Slovenia where food prices have already come very close to the EU level.¹⁶

It should be noted that agricultural price level convergence has proceeded dynamically in recent years between the EU and the accession countries. On the one hand, agricultural prices in the EU have fallen due to the some reforms of the European Union's Common Agricultural Policy (reduction of intervention prices); some limited further decrease can be expected as not all price reductions have taken their full effect yet. On the other hand, agricultural prices in the accession countries have increased in recent years, and recent nominal exchange rate movements in some countries have accelerated this process. Clearly, this rapid price convergence has reduced, but not eliminated, the potential for shocks to inflation upon accession.

The future momentum of agricultural price developments is determined by a complex multitude of factors and any simulation of potential effects is highly dependent on the assumptions one takes on these factors. Potential price dynamics in this area heavily depend on the following partly interrelated aspects:

- (i) possible reform measures as a consequence of the 2002/03 "mid-term review" of the Common Agricultural Policy, in light of the current WTO trade liberalization negotiations and/or enlargement,
- (ii) future development of world market prices for agricultural products,
- (iii) USD/EUR exchange rate developments, as most agricultural goods are priced in USD on the world markets,
- (iv) prospective demand and supply trends of agricultural markets in the EU-15 and in the accession countries,
- (v) real exchange rate developments between the accession countries' currencies and the EUR,

¹⁵ Own calculations based on WIIW and Eurostat figures. Comparable data for the other accession countries were not available, which restricted the analysis to the five countries covered above. See also Münch (2000) who arrives at similar results using OECD data.

¹⁶ Own calculations based on Eurostat figures.

- (vi) detailed agreement on agricultural issues in the accession agreements between the EU and the candidate countries,
- (vii) the extent to which increases in agricultural producer prices would feed into food prices.

Against this backdrop, a number of scenarios could be drawn up, with very different inflation implications for accession countries. As it is not possible to assess the likelihood of any of these scenarios with a reasonable degree of certainty, the analysis, at this stage, has to restrict itself to flagging the issue rather than "predicting" whether there will be a shock to inflation due to food price developments upon EU accession, let alone what size it may take, should it materialize.

As in the case of energy prices, a potential adjustment of food prices as a consequence of EU accession and integration into the Common Agricultural Policy holds the risk of second-round inflation effects and a weakening of external competitiveness, if it spills over to wage developments.

EU accession will have **additional impacts** on price formation. On the fiscal side, bringing VAT and excise tax regulation in line with EU requirements may lead to price rises for certain categories of goods and services. On the monetary side, reducing mandatory reserve rates, which are relatively high in most accession countries (in preparation for prospective euro area accession), will constitute a challenge for monetary policy; in particular in the currency board countries, where other monetary policy instruments are not available, such a move may lead to additional inflationary pressures. Furthermore, rising capital (in)flows in the context of the full liberalization of capital movements (which is a precondition for EU membership) and of accession-related perceptions of enhanced growth perspectives, may well complicate monetary management and have an impact on inflation performance (depending on policy frameworks and responses to such flows).

Apart from these sources for future shocks to the price level which are essentially permanent in nature (corrective price level adjustment), a number of structural factors suggest that **inflation variability** (i.e. temporary shocks to inflation) will tend to be higher in accession countries than in the incumbent Member States of the European Union. Again, these structural features relate to the areas of energy and food in the CPI baskets of the accession countries. Recall that both components together amount to at least 40%, some cases more than 50% of these baskets.

The EBRD has recently analyzed the energy intensity (energy consumption/output) of accession countries (EBRD, 2001). Between 1992 and 1998, energy intensity of Central and Eastern European accession countries fell by 21%. Despite this reduction, the energy intensity of these countries was still four times as high as that of Western Europe in 1998. The variation among individual accession countries was rather large, with Estonia, Latvia and

Hungary displaying below-average energy intensity, while Lithuania and the Slovak Republic were the most energy-intensive accession countries.

This high energy intensity means that energy price shocks, in particular oil shocks, will have much larger effects on inflation developments in the accession countries than, for example, in the European Union.

EBRD (2001) also examines how energy price increases affect energy intensity in transition economies and finds that, between 1992 and 1998, price increases explained 50% of the drop in energy intensity in the transition economies. Thus, the full adjustment of administrative prices in the area of energy, discussed beforehand, will dampen inflation variability. But, even then, differences in energy intensity will only gradually be reduced, considering the big present gap in energy efficiency between the EU and the accession countries.

A further source of inflation volatility in accession countries relates to the high share of food products in consumer baskets, with food prices exhibiting a particularly high inflation variability. In addition, it is sometimes argued that productivity advances are highly variable which is particularly relevant for catching-up economies. Thus, the real convergence process may also add to inflation variability.

What are the **policy implications** of this analysis?

First, in order to design the appropriate policy response to shocks to inflation, it is important to determine whether the sources that drive inflation are temporary or permanent. The standard best practice of successful central banks is to accept one-time rises in the price level that result from the correction of underlying real disequilibria (e.g. corrective relative price movements in the area of administered prices) but to keep policy tight subsequently to ensure that the increase in the price level does not feed into the wage formation process. Key to this is that the central bank succeeds in reassuring the public that it is a one-time effect and that an increased nominal wage dynamics would not lead to a sustained increase in real wages but only to higher inflation. Avoiding wage-price spirals is key, in particular in a disinflation process, not the least because it takes a possibly lengthy process to unwind such dynamics.

Second, inflation variability will be higher in accession countries than in the euro area. How should the central bank react of such temporary shocks to inflation? How much variability around the optimal rate should the central bank tolerate? (Clearly, these questions are primarily relevant for countries with flexible exchange rate regimes, i.e. in cases in which monetary policy has, in principle, room to maneuver.)

The general opinion on this issue is that central banks should be cautious in tolerating temporary deviations of inflation from its medium-term objective, as long as disinflation is not yet completed. As inflation is reduced to low levels and credibility is built up, the room

for accommodating temporary shocks to inflation tends to increase (King, 1996, Crockett, 1996). The policy issue then is whether to use this room. Views on this issue are rather divergent: While some stress the long and variable lags of monetary policy, others argue that monetary policy is only the instrument that can be used quickly to move along the short-term Phillips curve. Apart from the standard arguments on this issue that relate to the size and openness of an economy, to the flexibility of fiscal policy, to the functioning of product and labor markets, the issue has a further dimension for the accession countries, namely the integration dimension which is examined in the next section.

3.5 Disinflation and Prospective Monetary Integration of Accession Countries

The preceding analysis has already indicated that disinflation is closely associated with the issue of monetary integration. The most obvious link is that accession countries will have to fulfill the Maastricht convergence criteria in order to qualify for participation in the euro area and these criteria include, inter alia, an explicit inflation criterion. However, there are other interlinkages as well.

Before going into these issues, it should be noted that the (dis)inflation performance is already of relevance for the assessment of whether a country is prepared for EU accession. This is spelt out in the Agenda 2000 (European Commission, 1997) which has a section that makes the Copenhagen criteria for EU membership operational by defining their content more precisely. The "functioning market economy" criterion, one of the two economic criteria for EU accession, includes that "macroeconomic stability has been achieved including adequate price stability and sustainable public finances and external accounts". Already back in December 1995, the European Council in Madrid had referred to the need "to create the conditions for the gradual, harmonious integration of [the candidate countries], particularly through the development of the market economy, the adjustment of their administrative structures, and the creation of a stable economic and monetary environment."

The European Union has outlined a **three-step approach** to the monetary integration of candidate countries. The applicants will first join the EU, then enter the exchange rate mechanism (ERM II) of the European Union and finally, after fulfillment of the Maastricht convergence criteria, accede to the euro area, i.e. participate fully in Economic and Monetary Union (EMU). This means that the euro is to be introduced in today's accession countries in a multilateral framework, based on the standard convergence examination procedure and not sooner than at least two years after EU accession. The latter aspect results, in particular, from the exchange rate criterion which foresees a two-year participation in the ERM II without a devaluation of the parity rate against the euro.

What are the **implications** of this path of monetary integration for accession countries?

A first and most direct implication relates to the **inflation criterion**. This criterion has to be fulfilled in the twelve-month period before the convergence examination, i.e. roughly

speaking in year two before the target date for euro area accession. The criterion is slightly variable as it refers to the average of the inflation rate of the three best-performing EU countries which may be exceeded by up to 1.5 percentage points, but typically it comes in between 2% and 2½%.

This raises the question of whether there is a conflict between this criterion and the optimal level of the inflation rate for accession countries. The preceding analysis suggests that this could be the case for an accession country which operates a fully fixed nominal exchange rate (e.g. a currency board) and experiences a fairly pronounced Balassa-Samuelson effect, unless other structural or cyclical factors dampen inflation in the run-up to euro area accession. In such a case, the fulfillment of the inflation criterion may involve a temporary cost in terms of lost output and employment. The size of such a potential transitory loss would depend on the shape of the short-term Phillips curve at that time. Feldman and Watson (2001) conclude that there is a potential dilemma, down the line, between the appropriate inflation rate for accession countries and the Maastricht inflation criterion, "but probably not to a degree that is insuperable in pragmatic terms when the time comes". Pelkmans et al. (2000) take a similar view.

Countries with a more flexible exchange rate regime can opt for some nominal appreciation in order to achieve the inflation criterion. Such a nominal appreciation/revaluation of the exchange rate is perfectly possible in the Maastricht framework (and has, indeed, been applied in the cases of Ireland and Greece). There are good reasons to think that past real appreciation of accession countries' exchange rates is not predictive for future developments, as it was amplified by several factors, in particular corrective exchange rate movements after strong upfront devaluations, increases of regulated prices, dynamic (unrecorded) quality upgradings and temporary productivity spurts at the early stages of transition. As these effects fade, the real appreciation of accession countries and thus inflation rate differentials between the individual accession countries and the euro area will increasingly be limited to the trend real appreciation associated with the supply-side changes of the catching-up process. Moreover, productivity in the nontradables sectors may be spurred by EU accession, e.g. due to liberalization in public utilities, which would ceteris paribus lower the Balassa-Samuelson effect further. Thus, a relatively modest and temporary nominal exchange rate appreciation would suffice to meet the inflation criterion, provided that there is some pass-through from the exchange rate to consumer price developments (which is likely in small open economies) and that, apart from the Balassa-Samuelson effect, there are no other major inflation sources in the economy (which is exactly what the inflation criterion is to ensure).

A second implication relates back to the discussion on the **costs and benefits of disinflation**. For an accession country that intends to qualify for participation in the euro area (and is expected to do so at some point in time after entry into the EU), it turns out that this

discussion has to be placed into a broader context, namely into the cost-benefit equation of monetary integration. While the views on how to assess this wider equation differ, in particular with respect to the cost side (which in turn affects conclusions about the optimal date for acceding to the euro area), there is a wide basic agreement that full monetary integration offers substantial benefits for small open economies in Europe. (The disagreement is whether giving up monetary and exchange rate policy comes at a cost and, if so, at what point in time the related risk will be sufficiently contained to allow for a smooth participation of today's candidate countries in the euro area.¹⁷) What counts in this context is that, for accession countries, successful disinflation will allow to ripe added benefits resulting from prospective participation in monetary union, and these may well dwarf the standard disinflation costs.

A third implication of the monetary integration framework is that **exchange rate policy** will have to be treated as a matter of common concern upon EU accession. Furthermore, in the run-up to full monetary integration, nominal exchange rate fluctuations against the euro will have to be contained for two years through formal participation in **ERM II**, which is one of the requirements to qualify for euro area accession. ERM II participation will limit the range of possible monetary arrangements, as crawling pegs, free floats and pegs to other currencies than the euro are not compatible with this mechanism. It should be noted that ERM II participation can, in practice, be combined with an inflation targeting framework, as the cases of Spain and Finland in the 1990s show.

The ERM II arrangement has met with some criticism. Coricelli (2001) considers the mechanism to be potentially harmful to growth, due to a purportedly in-built appreciation bias. Furthermore, Coricelli (2001) argues that ERM II may be unstable because of the dynamics of the "convergence play" in financial markets (speculating on rising bond and equity prices as well as nominal exchange rate appreciation) in the run-up to euro area accession. Halpern and Wyplosz (2001) argue that ERM II participation in the run-up to euro area participation may be particularly problematic for catching-up economies like those of Central and Eastern Europe: When aiming to qualify for euro area participation, these countries would have to take the trend real appreciation of the exchange rate as nominal appreciation in order to keep inflation in line with the respective Maastricht criterion. If this nominal appreciation tendency is reinforced by capital inflows, "the risk of currency crises in the acceding countries is far from negligible".

All this would hold potentially substantial implications for prospective inflation developments in today's accession countries. However, the arguments that have been put forward against ERM II are disputable. First, there is no convincing evidence for the suggestion that the ERM II has an in-built appreciation bias. Rather, it seems that nominal exchange rate appreciation has been used as instrument to achieve a sufficient degree of

¹⁷ Backé and Wójcik (2002) survey the most important issues of this debate.

inflation convergence in the run-up to euro area participation by some of the current euro area members and is thus not a systemic feature of ERM II. In a similar vein, it appears that the convergence play will take place under any standard exchange rate regime and there is no obvious reason why it should be of a different quality under the ERM II.

Second, ERM II cannot be likened to unilateral soft pegs which tend to be unstable regimes, as it provides a setting that is multilateral and dynamic (i.e. oriented to eventual full monetary integration). The flexibility of ERM II adds further to its robustness. ERM II can and should be operated in a way that provides reasonable shelter against speculative attacks not related to changes in fundamentals, so that the risk of "unjustified" capital flow reversals will be greatly reduced for those economies which are basically healthy. Equilibrium movements of the real exchange rate associated with the catching-up process can be dealt with under ERM II, given the flexibility of the arrangement. Excessive nominal appreciation pressures resulting from capital inflows may constitute a problem in the run-up to euro area membership (although such pressures proved manageable in all euro area accessions so far) but there is no obvious link between such flows and participation in ERM II. While a combination of appropriate macroeconomic policy measures can help mitigate such pressures, ERM II participation and, in the last phase before the entry into the Eurosystem, the credible announcement of the conversion rate should in fact instigate stabilizing speculation and thus reduce the risk of exchange rate overshooting. This all supports to take a distinctly dispassionate view on the ERM II and the issues that arise with regard to this mechanism. This also applies to inflation developments and, in particular, the fulfillment of the Maastricht inflation criterion.

4 Conclusions

This paper examines disinflation experiences of Central and Eastern European EU accession countries, with a particular focus on the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia. After investigating the disinflation process between 1991 and 2001, the analysis turns to current and future challenges that emerge in the context of completing and consolidating disinflation. Against this backdrop, the paper discusses policy implications in the run-up to EU accession and subsequent monetary integration. The **main findings** can be summarized as follows:

Since the beginning of transition, Central European and Baltic EU accession countries have made **substantial and sustained progress in reducing inflation**, with only few and limited setbacks. In all these countries, inflation is now in the single digits. The accession countries' experience confirms that proper interaction of the exchange rate regime is a crucial condition for the sustainability of the disinflation process.

An analysis of **relative price movements** is critical for a good understanding of the **inflation process** and thus of the setting in which disinflation policies were designed and

implemented in accession countries. This is so because empirical evidence shows that relative price changes can lead to inflation pressures and monetary policy tends to accommodate first-round effects of relative price movements. In this respect, the key stylized fact in Central and Eastern European countries is that prices of nontradables have risen faster than prices of tradables. A number of alternative explanations for observed relative price trends are examined. The main finding is that the **Balassa-Samuelson effect** is an **important driving force** of relative price movements in accession countries, while three **other factors** – demand-side effects, digressions from perfect competition, and the adjustment (liberalization) of regulated prices – also have some validity in explaining sectoral inflation differentials.

As disinflation in Central European and Baltic EU accession countries is reaching an advanced stage, **challenges** are changing and new questions arise. The paper examines five of these issues in greater detail.

First, the question is raised of **how solidly established the disinflation results are** which have been achieved so far. The overall assessment on this issue is favorable, pointing at the creation of an institutional setting, which is conducive to low inflation, and on comparative price level developments which appear to be sustainable, if reforms are continued.

Second, what is the **optimal inflation rate** in accession countries? The tentative answer to this question is that ongoing relative price movements and the measurement bias in consumer price inflation are good reasons to aim for a medium-term inflation rate in the lower, but not in the very low single digits.

A third question is how to **minimize the output and employment costs** of moving to a low inflation regime. The analysis argues for a relatively speedy disinflation in advanced accession countries towards the optimal inflation rate range. Credibility is important in reducing the sacrifice ratio. There is no single monetary and exchange rate policy framework which would be generally superior to or more effective than other possible strategies in delivering disinflation and in securing low inflation. Judgments should be based on country- and time-specific considerations, rather than on universal prescriptions.

A fourth issue that appears particularly relevant for policymaking relates to exploring the **potential for future inflationary pressures** in Central and Eastern European countries, in particular in the context of completing transition and preparing for EU accession. The completion of energy price adjustments for households and a potential rise in the food price level upon EU accession are singled out as two main sources for future inflationary pressures. Also, inflation variability will be relatively high, mainly due to the high shares of volatile food prices in the consumer basket and due to the high energy intensity of accession countries.

Fifth, disinflation is closely interrelated with the **prospective monetary integration** of today's candidate countries. The most obvious link is that accession countries have to fulfill the Maastricht convergence criteria and, in particular, the inflation criterion in order to qualify for participation in the euro area. Even though the inflation criterion seems to be at the lower end of the range for optimal inflation rates in accession countries, there will be no conflict in most cases, in particular as modest nominal appreciation can be applied to facilitate the fulfillment of this criterion. Also, real appreciation of the candidate countries' exchange rates will be much more moderate in the future, as corrective exchange rate movements are coming to an end and one-time effects which augmented the Balassa-Samuelson effect in some accession countries in the 1990s will not be present in the future. For accession countries, the discussion about the costs and benefits of disinflation has to be placed into a broader context, namely into the cost-benefit equation of monetary integration. Full monetary integration will prospectively offer substantial benefits for the accession countries and disinflation will allow to ripe these added benefits which may well dwarf the costs of disinflation.

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Table 1: Consumer Price Inflation in the Central and Eastern European EU Accession Countries (annual average, in %)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Bulgaria	23.8	338.5	91.2	72.8	96.0	62.1	121.6	1058.4	18.7	2.6	10.3	7.3
Czech R.	9.7	56.6	11.1	20.8	10.0	9.1	8.8	8.5	10.7	2.1	3.9	4.7
Estonia	n/a	210.5	1076.0	89.8	47.7	28.8	23.1	10.6	8.2	3.3	4.0	5.0
Hungary	28.9	35.0	23.0	22.5	18.8	28.2	23.6	18.3	14.3	10.0	9.8	9.2
Latvia	n/a	172.0	951.2	108.8	35.9	25.0	17.6	8.4	4.6	2.4	1.8	2.5
Lithuania	n/a	224.7	1020.5	410.2	72.2	39.7	24.6	8.9	5.1	0.8	1.0	1.2
Poland	585.8	70.3	43.0	35.3	32.2	27.8	19.9	14.9	11.8	7.3	10.1	5.5
Romania	5.1	170.2	210.4	256.1	136.8	32.3	38.8	154.8	59.1	45.8	45.7	34.5
Slovakia	10.4	61.2	10.0	23.2	13.4	9.9	5.8	6.1	6.7	10.6	12.2	7.3
Slovenia	549.7	117.7	201.3	32.3	19.8	12.6	9.7	9.1	8.6	6.6	8.9	8.4

Source: WIIW (collected from national sources), EBRD Transition Report for the Baltic countries 1991 and 1992.

Chart 1a

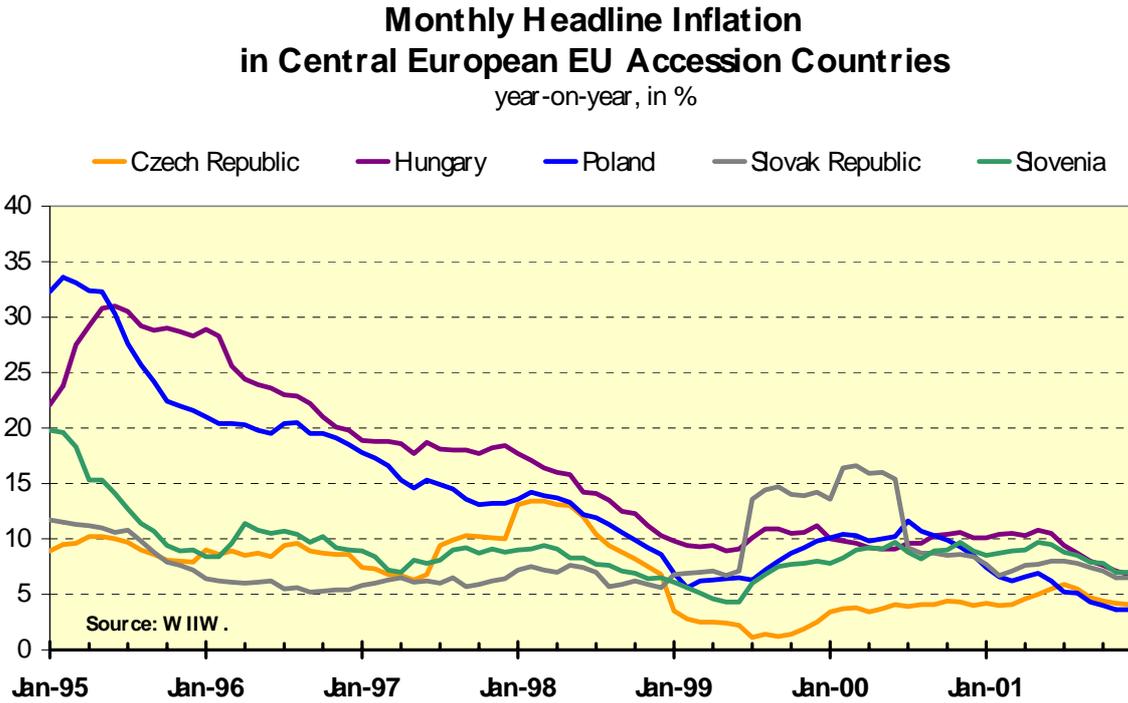


Chart 1b

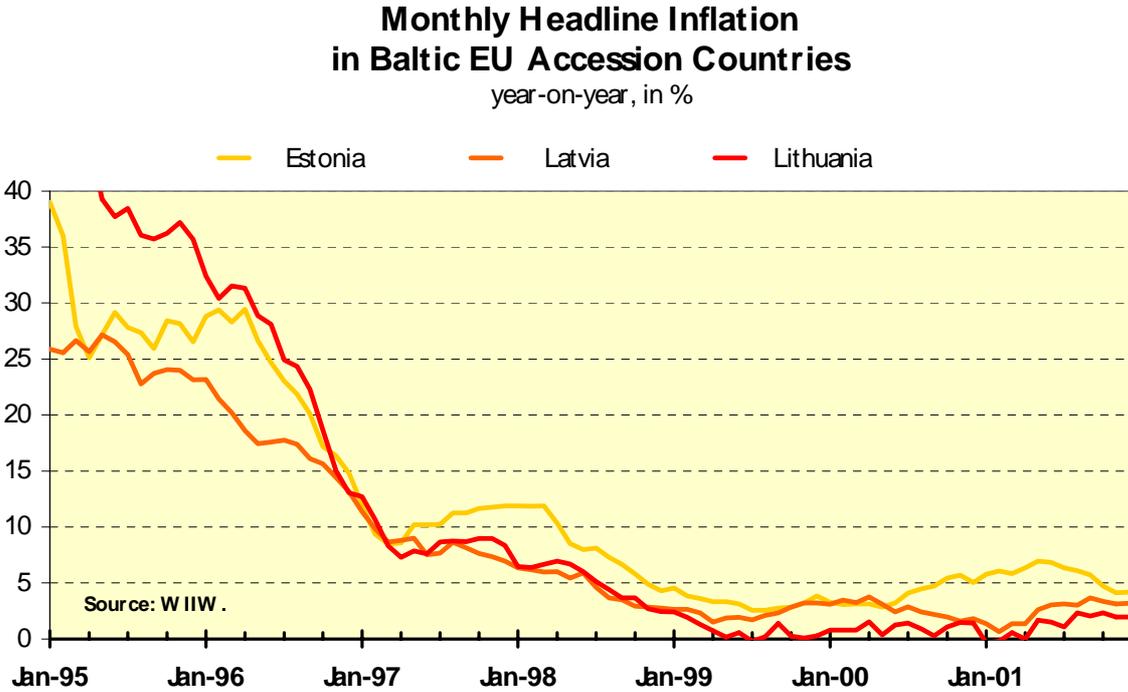


Table 2: Exchange rate and monetary policy strategies of Central and Eastern European EU Accession countries (as of February 2002)

Country	Exchange Rate Regime	Monetary Policy Framework	Since	Previous Exchange Rate Regimes
Bulgaria	Currency Board	Exchange rate anchor EUR	1997	Managed float (1991-1997)
Czech Rep.	Managed float	Inflation targeting	1997	Fixed peg (1991-1997)
Estonia	Currency board	Exchange rate anchor EUR	1992	No regime shift during transition
Hungary	Wide-band fixed peg	Implicit inflation targeting	2001	Fixed but adjustable peg (1990-1995), narrow-band crawling peg (1995-2001)
Latvia	Narrow-band fixed peg	Exchange rate anchor SDR	1994	Managed float (1992-1994)
Lithuania	Currency board	Exchange rate anchor EUR	1994/ 2002	Managed float (1992-1994), USD-based currency board (1994-2002)
Poland	Float	Inflation targeting	1999/ 2000	Fixed but adjustable peg (1990-1991), crawling peg with increasingly wide band (1991-2000)
Romania	Managed float	Monetary targeting	1991	Fixed but adjustable peg (1990-1991)
Slovakia	Managed float	Multi-indicator monitoring	1998	Fixed but adjustable peg (1993-1998)
Slovenia	Tightly managed float	Monetary targeting (M3)	1991	No regime shift during transition

Chart 2a

Nominal Spot Exchange Rate of Central European currencies to the EUR

January 1, 1999 = 100

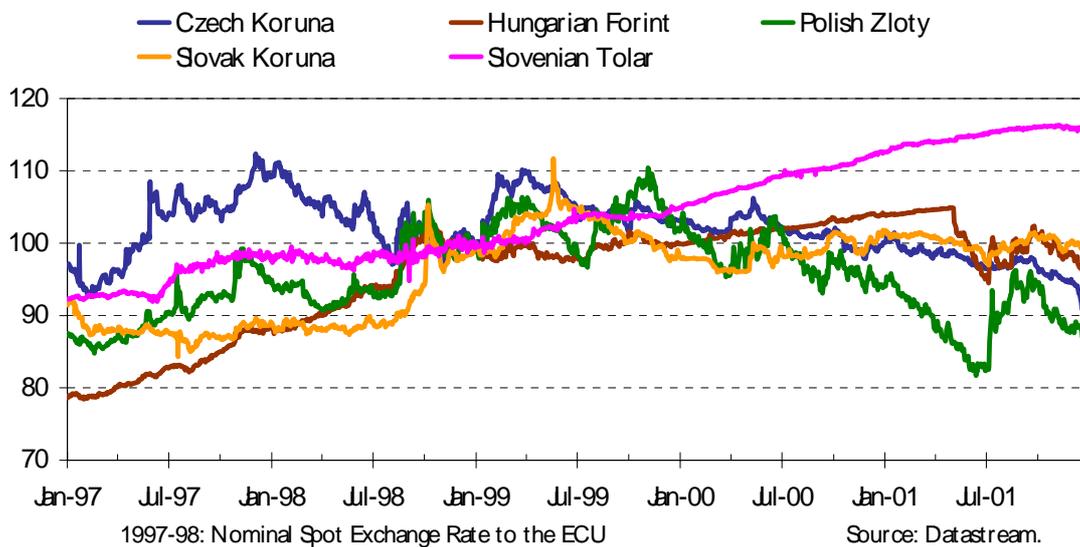


Chart 2b

Nominal Spot Exchange Rate of Baltic currencies to the EUR

January 1, 1999 = 100

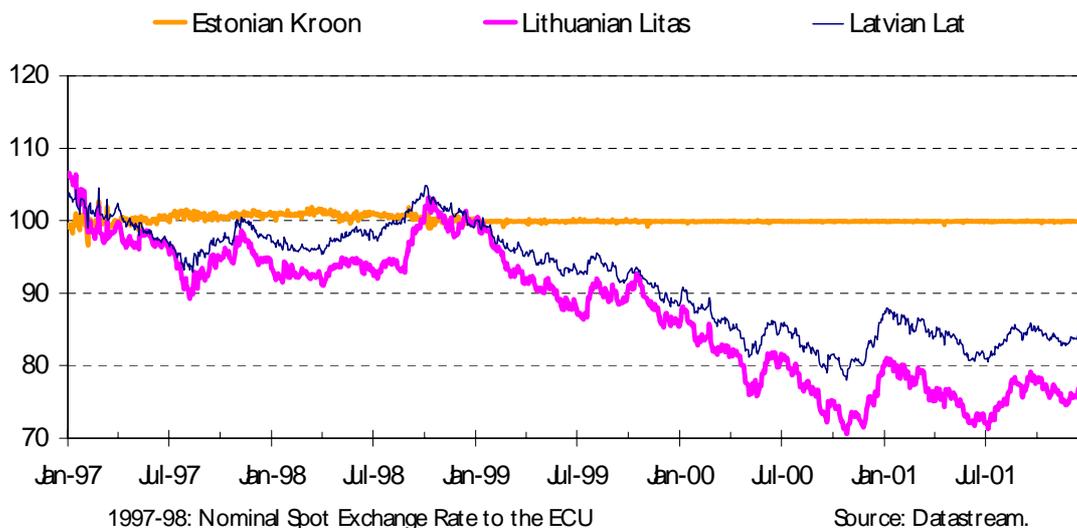
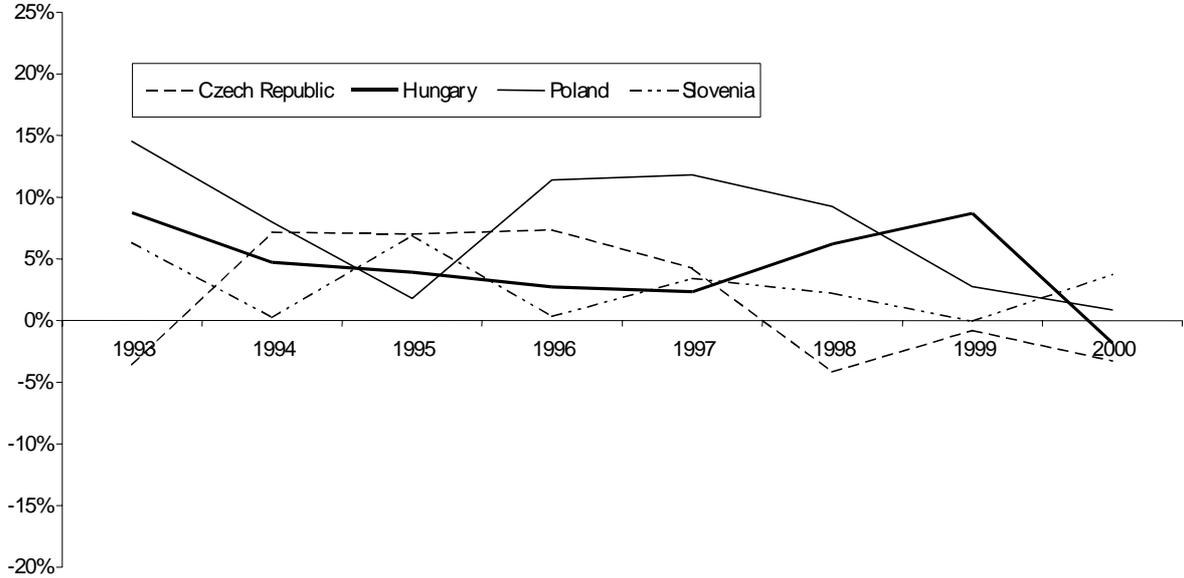


Chart 3

Inflation Differentials: Nontradables/Tradables, 1993-2000

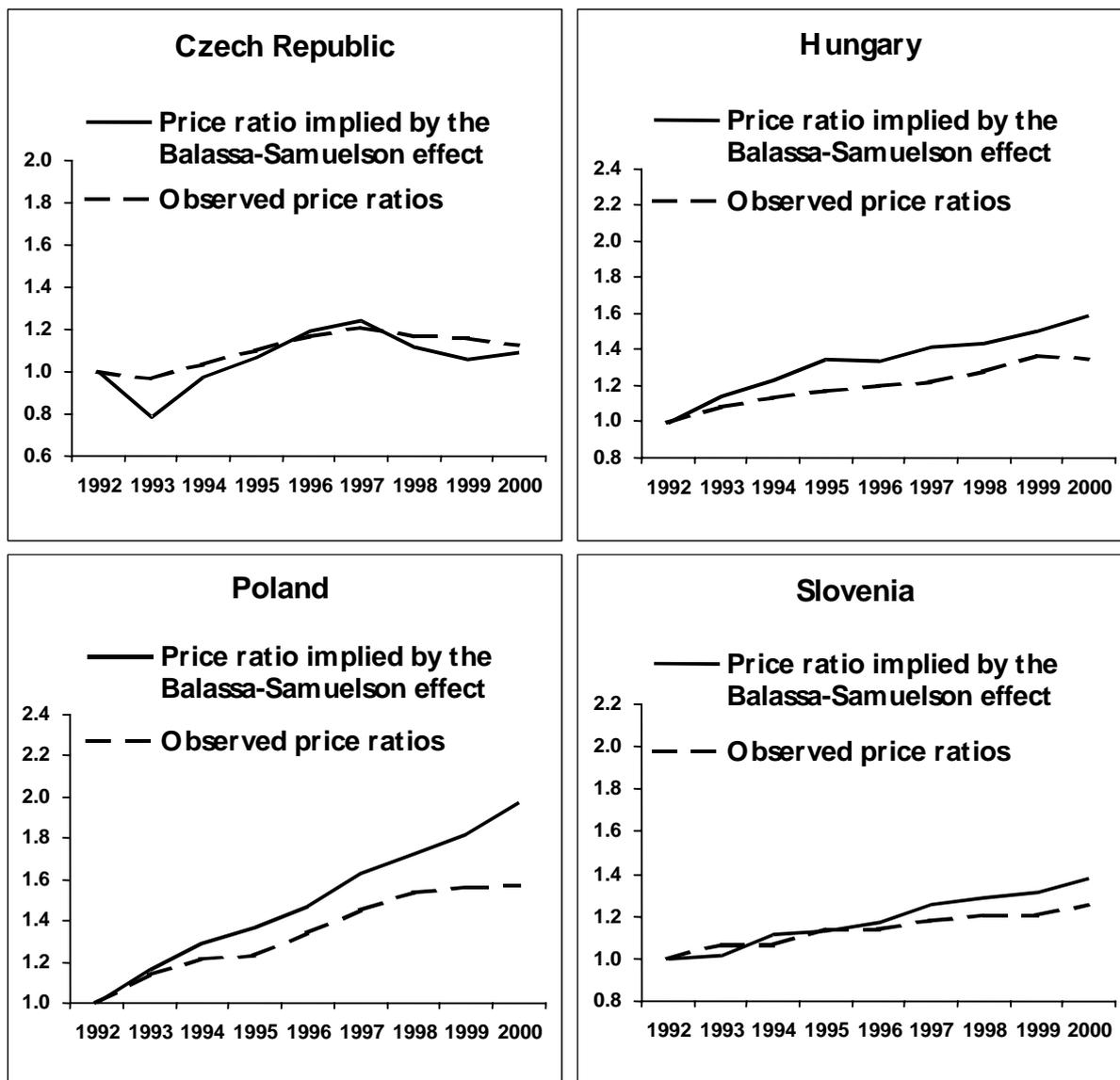


Note: Chart 4 is based on implicit sectoral deflators of gross value added. Tradables are taken as a proxy for manufactured goods.

Source: WIIW, OeNB calculations.

Chart 4

Relative Prices: Nontradables/Tradables Price Ratios, 1992 to 2000 (1992=1)



Note: Tradables are taken as a proxy for manufactured goods. Gross value added figures are used as weightings for the tradables and the nontradables sectors, and the implicit deflators of gross value added capture sectoral (tradables and nontradables) inflation. Labor productivities were used as a proxy for total factor productivities. Labor elasticities of production in the tradables and the nontradables sectors are taken as being equal to the share of the total wage sum in gross value added in the respective sectors, as the production functions are assumed to be linearly homogeneous.

Source: WIIW, OeNB calculations.

Table 3: GDP-Based Comparative Price Levels (in % of the German Price Level), 1989 to 2001
(Selected Years)

	1989	1990	1991	1992	1995	1998	1999	2000	2001*
Bulgaria	88.0	99.3	15.7	16.3	20.6	26.3	27.0	28.7	31
Czech Republic	31.9	24.3	21.4	21.4	29.5	37.2	37.2	39.1	43
Estonia	n/a	n/a	n/a	9.1	27.2	39.3	40.6	42.9	44
Hungary	32.9	32.2	34.0	35.5	34.6	38.7	39.6	41.5	46
Latvia	n/a	n/a	n/a	8.9	26.6	37.1	41.8	48.8	49
Lithuania	n/a	n/a	n/a	6.3	21.3	38.8	41.6	49.3	50
Poland	33.5	24.6	34.1	33.3	34.5	42.7	41.9	47.5	54
Romania	35.7	20.6	19.3	13.1	17.9	26.7	24.1	28.8	30
Slovakia	38.2	28.3	23.2	24.4	28.6	33.2	31.4	34.9	37
Slovenia	49.3	62.7	50.1	47.4	53.7	58.9	59.7	59.9	60
Austria	95.5	95.6	96.2	96.2	96.9	96.9	97.5	99.1	100
Greece	66.9	68.7	70.1	67.5	62.4	70.4	72.4	75.0	76
Ireland	91.9	88.6	85.4	82.2	72.4	89.7	90.9	95.6	98
Portugal	54.4	56.3	60.3	64.7	56.0	62.4	63.4	65.7	68
Spain	80.3	83.1	84.2	84.7	69.6	76.4	77.4	80.3	82

* preliminary estimates

Source: WIIW database and WIIW (2001), OECD (2001), OECD (2002), OeNB calculations.

Note: These values were calculated by extrapolating with GDP deflators the benchmark results of the international comparison of price levels for 1996 conducted by Eurostat and OECD.