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EXCHANGE RATES AND THE MEASUREMENT OF AGRICULTURAL PRICE DISTORTIONS IN CEECs AND OF CEEC-EU ACCESSION COSTS

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ABSTRACT

Exchange rates were heavily distorted under the central planning system in Central and Eastern Europe and are still adjusting in the transition process. The use of nominal exchange rates introduces a bias for international price comparisons and in calculations based on them. We present various exchange rates and discuss their relevance and usefulness for CEEC economic transition studies. We show that calculations of agricultural price distortions, protection rates and budgetary costs of EU-CEEC accession are sensitive to the exchange rate assumptions. More specifically, our simulations of EU-CEEC integration effects show that net exports are substantially smaller and budgetary costs less under the assumption of continued real appreciation of the CEC-4 currencies. However, the calculations also show that even under the extreme assumption of full adjustment to PPPs, the total budgetary costs remain large and GATT commitments on the maximum quantity of subsidized exports are still prohibiting an introduction of an unreformed CAP in the CEC-4.

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EXCHANGE RATES AND THE MEASUREMENT OF AGRICULTURAL PRICE DISTORTIONS IN CEECs AND OF CEEC-EU ACCESSION COSTS

1. INTRODUCTION

One of the many distorted economic variables under the central planning system in Central and Eastern Europe was the exchange rate. The exchange rate is a key factor for international comparisons of economic variables, such as prices. Because of the initial distortions which have not been removed instantaneously with the current reforms, the use of nominal exchange rates for international comparisons introduces a bias in the calculations of these variables and in all analyses based on them. Given the extent of the initial distortions, this bias can be substantial.[1]

While there is general agreement that the use of the nominal exchange rate introduces a bias and that this bias can be substantial, there is much less agreement on the most appropriate alternative. There is no simple or straightforward solution to this problem.

The objective of this paper is to provide a better insight in the importance of the exchange rate assumptions for several analyses on CEEC agriculture. First we present alternative exchange rates and discuss their relevance and usefulness for CEEC transition problems. Second, we analyze the sensitivity of calculations of agricultural price distortions and protection rates to the exchange rate assumptions. Third, we calculate the sensitivity of calculations of the costs of EU-CEEC agricultural integration to the exchange rate assumptions.

2. NOMINAL, REAL, ADJUSTED AND EQUILIBRIUM EXCHANGE RATES: SOME DEFINITIONS AND APPROACHES

Under central planning exchange rates in CEECs were tightly controlled and usually maintained at highly overvalued rates. Upon achieving (often restricted) internal convertibility nearly all currencies have undergone a massive devaluation. This early move caused a considerably amount of undervaluation and all CEEC currencies have afterwards embarked on a path of real appreciation, sometimes by impressive amounts. For example, figure 1 shows a strong increase in the *nominal exchange rate (NER)* (i.e. the number of domestic currency units per foreign currency unit) in the Czech Republic over the year 1989-1991. Figure 1 shows how the *real exchange rate (RER)* has appreciated substantially since 1991 and continues to do so, where the real exchange rate is defined as the development of the nominal exchange rate vis-à-vis the domestic inflation (CPI) compared to that of a reference country, in this case the USA, and reference year 1990. More generally, RER(t) is calculated as:

(1) $RER(t) = NER * USCPI(t) / CPI(t)$

where USCPI(t) refers to the consumer price index in the United States in year t.

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[1] For example, Tangermann (1994) shows how the assumptions on exchange rates is the most important factor determining the results of OECD and USDA analyses of CEEC agricultural protection rates.

The third exchange rate in figure 1 is the *adjusted exchange rate (AER)*, which adjust the nominal exchange rate in the opposite way than the RER for the relative inflation rate compared to a reference country. More generally, AER(t) is calculated as

(2) AER(t) = NER * CPI(t) / USCPI(t).

The AER is often used for accounting for macro-economic policy impacts in policy transfer calculations, such as protection coefficients or producer subsidy equivalents (PSEs) (e.g. Krueger, Schiff and Valdes, 1992; OECD, 1994, 1995a, 1996).

The values (but not the relative developments) of both the RER and the AER depend on the choice of the reference year. Table 1 summarizes the comparison of the AER and the NER for both 1992 and 1993 as a reference year. The variation between CEECs in AER strongly depends on the choice of reference year. With the relative inflation rate increasing substantially in 1993 versus 1992 in the Czech Republic, Slovakia, Bulgaria and especially Romania, the 1993 AER(92) is more than 10% above the 1993 NER in these CEECs. The 1995 AER(93)/NER ratio varies between 6% in Hungary and 25% in the Czech Republic; the latter reflects the effect of the Czech fixed exchange rate policy.[2]

The AER and RER are further influenced by the choice of the inflation index (e.g. consumer price index, wholesale price index and gross domestic product deflator) and the reference country in empirical calculations (Fleissig and Grennes, 1994). For example, using Germany as the reference country, the 1995 AER(93)/NER ratio with base 1993 would be 14 percent points lower, i.e. it would made the ratio negative for Hungary, less than 10% for most other CEECs, with the exception of the Czech Republic.

As mentioned above, the AER indicator is often used for accounting for macro-economic policy impacts in policy transfer calculations. Typically one selects a year in which it is assumed that the nominal exchange rate equals the "equilibrium exchange rate" and to adjust the calculations for the policy-induced divergence of the nominal exchange rate from the "equilibrium exchange rate" by measuring the relative inflation rate between the domestic consumer price index and an external price index (see further). An application of this approach to CEECs where AER(92)/NER ratios have been positive, leads to the conclusion that producers are taxed more heavily and consumers taxed less in recent years than the nominal exchange rates calculations indicate (OECD, 1994; 1995; Bojnec and Swinnen, 1996).

There are two important critiques on this approach. First, the divergence between the NER and the indicator of the "*equilibrium exchange rate" (EER)* may not be due to current macroeconomic policy, but to structural characteristics of the CEEC economies, and their restructuring. Hence, these divergences should not be included in the PSEs in this case.

Second, the measurement of the indirect (exchange rate policy) effect thus depends strongly on the choice of the reference year, or more generally on the choice of the proxi for the

[2] The exchange rate policies of the other CEEC governments are summarized by Halpern and Wyplosz (1995): Poland started out with a fixed exchange rate, but then adopted a crawling peg; Slovakia has operated a crawling peg since the transition started and Hungary adopeted a fixed but frequently adjustable rate. Bulgaria, Romania and Slovenia officially let their currencies float while maintaining a close look on the market.

equilibrium exchange rate, which is supposed to prevail in absence of government intervention affecting the exchange rate. The long term equilibrium exchange rate in very general terms is what ensures the simultaneous attainment of internal and external (general) equilibrium. Internal equilibrium means that non-tradable goods markets clear in the current period and are expected to do so in the future. External equilibrium is attained when current account balances are compatible with sustainable capital flows (see e.g. Williamson, 1994). Halpen and Wyplosz (1995) list a series of problems with this very general definition for empirical purposes. Moreover, it is very difficult to provide a good estimate of the equilibrium exchange rate in stable market economies without the additional problems of transition economies and their lack of past relevant variables.

An indicator which is often mentioned as the best approximation of the equilibrium exchange rate is the *purchasing power parity (PPP).* PPPs express the ratio of the price of a standard basket of goods in currencies of two countries. A commonly used basket is in fact that of GDP which includes all goods and services, tradable and non-tradable produced by an economy. The components of GDP of the target country are valued at the local and numéraire currencies and compared.

The theory of purchasing-power-parity suggests that in the long run the exchange rate between two currencies should move towards the rate that would equalize the prices of an identical basket of goods and services in the two countries. However, empirical studies have shown that NERs deviate substantially from PPPs (e.g. Kravis and Lipsey, 1978; Genberg, 1978; Frenkel, 1981).[3] The assumption that currencies should converge on their PPP values is, therefore, an approximation (OECD, 1994). Furthermore, Halpern and Wyplosz (1995) are even more critical on the usefulness of PPP as a proxy of the equilibrium exchange rate in transition economies. The assumptions required for PPP to hold, always unlikely, but useful as a gross approximation in the West, are far removed from the experience of transition countries. One particular problem is that the PPP approach essentially assumes that the equilibrium exchange rate and PPPs are constant. However, the pace of adjustment and structural change in transition economies is so fast that it is likely to affect the equilibrium exchange rate even in the short run. This is reflected in strong declines in the PPP estimates in figure 1.

Despite these and other critiques we include the PPP in our analysis and derive what the implications are of using this indicator. There are two simple reasons for this: (1) it is the only readily available estimate of the equilibrium exchange rate, and (2) virtually everyone commenting on our previous work in this area (Bojnec and Swinnen, 1995) suggested we should use the PPP as the appropriate exchange rate. In our view, besides the critiques above, there is a better argument for using PPP exchange rates in future EU accession scenario simulations than in current protection analyses. The main reason is the time horizon of the analysis and the impact which CEC government policy can have on exchange rate divergence form the PPP. Using the PPP in protection rate calculations would implicitly assume that the wide divergence between the NER and the PPP (table 1) is caused by current government policies, which is unlikely.

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[3] It is often assumed that the NER is related to the prices of tradables while the PPP is affected also by the prices of non tradables (e.g. Clague, 1988).

The only available PPPs for CEECs are calculated by the Austrian Central Statistical Office, in the context of the International Comparison Project (ICP).[4] The latest PPP calculations were done for 1993; and these calculations have since been yearly extrapolated by OECD. The calculated PPPs are based on 1000 to 1300 products and services which are grouped in about 300 homogenous basic headings. Figure 1 shows that the PPPs of the Czech Republic strongly against the US$ between 1991 and 1995, which is also the case for other CECs. The EU-15's PPP is almost stable over the observed period.

The difference in the development of EU and CEC-4 PPPs could be interpreted as an indicator of important structural adjustments in the transition economies. In the early period of transformation, prices for tradables were freed while the service sectors were still subject to heavy regulations. Prices for non-tradables were initially low and have only afterwards strongly increased, among other factors due to deregulation (Münch, 1994).[5] Therefore, the absolute purchasing power of CEC-4 currencies vis-à-vis the US$ declined since 1991. As a consequence, the evolution of the PPPs is closer to that of the NERs than to that of real exchange rate indicators such as AER and RER (see figure 1).

The PPP calculations suggest that all CEECs' exchange rates were substantially undervalued in 1993: between 31% for Slovenia and 70% for Bulgaria (table 1). The OECD updates indicate that these differences have changed relatively little in most countries from 1993-1995. Table 1 also suggests that the ECU is overvalued vis-à-vis the US$.

More recent PPP estimates are unavailable for CEECs. Ongoing work in calculating 1996 PPPs, will probably not be available until end of 1997 or 1998. Given the important changes in macroeconomic variables since 1993, and Halpern and Wyplosz' claim that the EER was likely undergoing substantive changes as well during transition, we found it important to have a more recent estimate. Because of lack of alternatives, we calculated a very rough indicator of the PPPs, i.e. The Economist's *Big Mac PPP index*, for CEECs. The Big Mac Index uses as basket the McDonald's Big Mac, which is made to roughly the same recipe in more than 80 countries. The Big Mac PPP is the exchange rate that would make a burger cost the same in America as it does abroad. The comparison of the Big Mac PPP with the actual exchange rate has the same interpretation as the PPP comparison above.

The main bias of the Big Mac index for the EU and countries with CAP like policies is that the prices of components, e.g. flour, beef, salad, tomatoes, are distorted by trade and price policies. Hence, apparent overvaluation may merely reflect differences in price supports from the USA, which is the reference country.

Despite this and other weaknesses, studies suggest "that the Big Mac index seems to come up with PPP estimates which are similar to those based on more sophisticated methods" (The

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[4] The ICP was set up in 1968 as a collaborative research effort between several international institutions and has since grown to include more countries and more institutions and includes e.g. the OECD, World Bank, Eurostat.

[5] Typically, GDP calculations underestimates the real purchasing power in low-income countries because of low prices for services and other non-traded goods due to imperfections in product and factor markets and in international trading (Bhagwati, 1984; Kravis, 1984; Lancieri, 1990).

Economist, April 27th 1996).[6] The Big Mac PPP comparison suggests that most of the CEEC exchange rates are still substantially undervalued, but generally less so than in 1993 (Table 1). The variation between CEECs has widened as well. However, a striking observation is that important undervaluation of the US$ vis-à-vis Western European currencies (especially the German Mark (+37% in 1996 and +18% in 1997) and the French Franc (+46% in 1996 and 26% in 1997)). In 1996 this difference has increased substantially compared to the 1993 PPP comparison. The overvaluation diminished, however, according to 1997 Big Mac PPPs. This implies that the PPP/NER ratios are very sensitive to the choice of the reference (or numéraire) currency: using the German Mark as the reference currency in 1996 indicates substantially larger undervaluation of CEEC exchange rates.

For stable market economies, on the other hand, RER and PPP do not produce such varying results (Table 1). Important implications are the need for qualified statements on this issue, and the need to make the choice of the used exchange rate an explicit variable in policy analyses.

3. AGRICULTURAL PRICE COMPARISONS

This section discusses the implication of the exchange rate assumptions for the comparison of prices between CEECs and OECD countries. International price comparisons play an important role in several policy studies on CEEC agriculture, including analyses of agricultural protection, and the costs of EU-CEEC agricultural integration for the EU budget. In the next sections we will discuss the relevance of some of these assumptions for the two specific analyses.

Table 2 presents wheat price ratios, calculated as the domestic wheat producer price over the US wheat price, calculated at various exchange rates for the seven CEECs and for France and Germany. The most important conclusions are the following:

- using the NER indicates a wide variation in wheat prices between CEECs. For example, 1993 wheat prices in Slovenia (and also Romania) were double the Bulgarian prices;
- with NERs, CEEC wheat prices, except for Slovenia, were below US and substantially below EU prices;
- with AER adjusted prices, these price gaps increase, the more so when the reference year is taken back. Therefore, when choosing AER as a proxy for EER it is crucial to determine the right year in which the NER is considered to be close to the EER. (Opposite to the results for the CEECs, prices in the EU countries Germany and France are relatively invariant to the choice of the base year for AER);
- with PPPs, all CEECs have wheat prices substantially above both US prices and EU prices: in 1995 most CEEC wheat prices were even double those in the EU using PPP exchange rates;

[6] The Big Mac index was originally introduced as a bit of fun and "to make economic theory more digestible" (The Economist, April 27th 1996). Yet is has inspired several serious recent studies. These studies conclude that the Big Mac PPP is surprisingly accurate in tracking exchange rates over the longer term (Lian Ong, 1995), that deviations for "McParity" are usually temporary (Cumby, 1995), and that the Big Mac does as well -- or as poorly -- at demonstrating the principles and pitfalls of PPP as more sophisticated measures (Pollard, 1996).

- with PPPs, higher EU prices come close to US prices as EU currencies are adjusted for the overvaluation.

Evidently, these differences have important implications for policy analyses that rely on inter-country price comparisons, such as the calculations of protection rates and the calculations of costs of EU-CEEC integration.

4. INDICATORS OF AGRICULTURAL PROTECTION

From the World Bank Study on the Political Economy of Agricultural Pricing Policies (Krueger, Schiff and Valdes, 1992) we know that an important part of taxation of agricultural producers in developing countries comes from overvalued exchange rates, and that a correct measure of transfers should include this factor.

The best indicators of CEEC agricultural protection currently available are the PSEs calculated by OECD. Exchange rates enter into PSE estimations in two ways. Firstly when an external reference price is used that is expressed in a foreign currency (see above) and secondly when total PSEs are converted to some numeraire currency such as the United States dollar for comparison with other country values. Given the over- or undervaluation of nominal exchange rates of CEECs during transition (see above), PSE estimation for CEECs therefore needs to rely on an appropriate choice of exchange rates.

The OECD (1994,1995) studies argue that "it would be inappropriate to assume that PPP exchange rates should be used instead of nominal exchange rates although a PPP series could be used to produce a series of nominal exchange rates adjusted to reflect real effective rates". Therefore, the OECD uses an AER approach for CEEC PSE calculations “because relative movements in GDP deflators between countries should reflect changes in relative PPP exchange rates between countries, as the GDP 'basket' is often used to construct PPP rates” (OECD, 1994, p.170). Their AER approach uses the United States as the numeraire country and the choice of the reference year (in which the nominal exchange rate is assumed to be close to the equilibrium exchange rate -- or "real effective rates" as they are called in the OECD report) varies between CEECs. For Hungary they chose 1991; for the Czech Republic 1994; for Poland, AER adjustments are only applied to the pre-reform period, and since 1990 NERs are used (OECD, 1994, 1995a, 1996).

One remarkable conclusion from looking at their results is that the pre-1990 PSEs were much less dependent on exchange rate assumptions than is generally thought: for the three countries, the maximum effect is 10 percentage points of the PSE.

The impact of the transition exchange rate choice is also relatively modest: 10-15%, except in 1991 in the Czech Republic where using AER instead of NER raises the average PSE from around 10% to almost 60%, indicating that exchange rate developments had a more important impact on farm incomes than trade and price policies in that year.

The OECD calculations indicate that market price support is by far the most important factor in the PSEs. Therefore, more simple indicators of agricultural protection, such as protection rates, capture the most important aspects of government intervention to affect farm incomes.

Bojnec and Swinnen (1995) have calculated agricultural protection rates for seven CEECs (Bulgaria, Czech Republic, Hungary, Poland, Slovakia, Slovenia and Romania), for 9 commodities (wheat, maize, barley, rapeseed/sunflowerseed, sugar beet, milk, beef and veal, pig meat and poultry meat), over the period 1990-1994. For similar reasons as OECD they have chosen the AER approach as the most relevant one.

The *nominal protection rate (NPR)* of commodity j is calculated by the following definition:

(3) $NPR_j = (P_j^d / P_j^b - 1) * 100$,

where P_j^d is the domestic producer price of commodity j in current US$ evaluated at the NER of a country's currency unit to US$, and P_j^b is the border (reference) price of commodity j in US. The NPR is an indicator of the "direct" trade and price policy distortions by comparing domestic prices with border (or world market) prices in US$, which are assumed to prevail in the absence of government intervention.

The *adjusted protection rate (APR(t))* is calculated by using AER(t) instead of the NER:

(4) $APR_j(t) = (P_j^{d*}(t) / P_j^b - 1) * 100$,

where $P_j^{d*}(t) = P_j^d /AER(t)$ is the domestic producer price of commodity P_j^d evaluated at the AER(t). The APR_j measures the total policy impact which combines the "direct" effect of sectoral price and trade policies (NPR_j) and the "indirect" effect of economy-wide policies which affect the exchange rate ($ExPR_j(t)$), where

(6) $ExPR_j(t) = APR_j(t) - NPR_j$.

Figure 2 shows how the ExPR(92) has declined around 20 percent points over the 1991-1994 period, with a positive effect before the reference year 1992 and a negative impact afterwards. Taking this into account in the analysis increases the pre-1992 total protection for agriculture and reduces the post-1992 protection.[7]

This effect is not uniformly distributed, but differs importantly between CEECs. Especially the protection rates of Bulgaria and Romania and to a lesser extent the Czech Republic and Slovakia are affected by the ExPR effect (see table 1). This is also reflected in Figure 3, which shows the sensitivity of the results of choosing a different reference year. The 1993 APR(92) and APR(94) are fairly close in Hungary, Poland and Slovenia. But the APRs for Bulgaria, Romania, the Czech Republic are quite sensitive to the choice of the reference year.
It might be important to emphasize that the *evolution* of the ExPR is independent of the choice of the reference year, i.e. the ExPR declines in all CEECs over the transition period, implying that the impact of exchange rate policies and developments is increasingly hurting agricultural producers.

Finally, the previous analysis implicitly assumes that the ExPR impact is policy-induced. Otherwise there is no reason to include it in the protection rate calculations. An alternative interpretation is the following. The ExPR reflects the real appreciation of the CEEC

[7] Note that this approach ignores the fact that at the same time when exchange rate "overvaluation" taxes producers through the effect on their output prices, they are subsidized by the exchange rate effect on imported inputs.

currencies after the initial devaluation of the currency. Such a real appreciation has been observed in most CEECs in recent years (see e.g. figure 1 for the Czech Republic). In this interpretation, ExPR not so much (or not only) captures macroeconomic *policy* effects, but instead reflects structural adjustments in the economy which influence the real exchange rate. This real appreciation benefits consumers and hurts producers. The alternative interpretation of the ExPR values is therefore that the (negative) income effects for producers are caused by an *exogenously* induced real appreciation of the currency.

In conclusion, while it is important to distinguish between these two interpretations, i.e. to understand whether the macroeconomic impact on consumer and producer incomes is (macroeconomic) *policy induced or not*, the impact on consumers and producers is the same. Therefore, incorporating these exchange rate developments in the analysis provides additional insights on income distribution and the relative effect of price and trade distortions.

5. BUDGETARY COSTS OF EU-CEEC INTEGRATION

One of the key assumptions underlying recent analyses of budgetary implications of accession is that exchange rates remain constant in real terms. In this section we identify and discuss the effects of exchange rate evolution on EU accession costs. Furthermore, we quantitatively test the impact of revaluating CEEC currencies on markets and budgets and maximum quantities of subsidized exports allowed under the GATT agreement in an EU accession scenario.

5.1 Exchange Rates and Budgetary Costs of EU-CEEC Integration

Recent studies came to the conclusion that EU accession causes a significant expansion of budgetary spending. Additional budgetary costs for the Czech Republic, Hungary, Poland and Slovakia (the CEC-4) acceding the EU are estimated at 13.3 Bill. ECU by Tangermann and Josling (Tangermann and Josling, 1995), Berkum and Terluin calculated 7.6 Bill. ECU (Berkum and Terluin, 1995), Münch estimated 15 Bill. ECU (Münch 1995) and for all 10 CEECs the EU-Commission came to 11.7 Bill. ECU (EU-Commission, 1995 b). All the above studies expect CEC-4 agriculture to expand production in case the CAP is applied. This causes CEC-4 to become significant net exporters of agricultural and food products. The studies identify the potential driving forces of this development: first, the large expansion of agricultural prices in CEC-4 during accession as policies adjust to the high EU protection levels. And, second, a potential recovery of agricultural production due to transformation effects. Differing assumptions on a future CAP and the extent of a return to pre-transformation production potentials explain among other things the differences in results between the studies.

The agricultural sector of the EU is one of the most protected among OECD countries with generally double the protection of CEC-4 countries (OECD, 1996 a, b). The CAP consists of sophisticated instruments designed for elevating domestic prices above world market levels. For highly protected markets, intervention schemes effectively provide for minimum prices on markets which generally exceed by far long term world market prices (e.g. most coarse grains, dairy products, beef, sugar). This is accompanied by prohibitively high import barriers which limit for most products the access to few preferential imports. Direct payments coupled to production (compensatory payments for crops, headage payments for beef cattle) provide for additional incentives to produce.

Administrative prices and payments play an important role in delivering support and protection. While fixed in ECU, they have to be converted into national currencies before being applied on national markets and to agricultural producers. Exchange rates, therefore, play an important role in terms of incentives these instruments ingrain.

While some prices in the EU are close to CEC-4 prices (e.g. oilseeds, wheat), prices on highly protected markets in the EU exceed them significantly. For example, in 1995 the intervention price for rye and skimmed milk powder in Poland were 50 and 61 per cent of those in the EU. Quality adjusted market prices for beef differed by the same amount (EU-Commission, 1995 a). This would imply doubling prices in Poland for these products, if the CAP of 1995 had been applied.

Exchange rate movements directly affect the price gap between EU and CEC-4 prices and with that the development of national prices during accession. While a devaluation of CEC-4 currencies against the ECU increases the gap, a revaluation diminishes it (table 2). The smaller the price gap to be bridged in an accession, the less producers are encouraged to produce and consumers are discouraged to consume. This has important implications for EU accession: a revaluation of CEC-4 currencies against the ECU lessens the distortive effects of an introduction of the CAP. A devaluation increases the distortion.

In case of revaluation against the ECU, production expands less and consumption decreases less then under constant exchange rates. The growth of net exports is smaller. Generally speaking CEEC-4 farmers lose competitiveness on the Single Market vis-à-vis their competitors in the EU-15 the more currencies revalue against the ECU. However, this effect is also influenced and partly offset by developments on the factor markets. The more a currency revalues the cheaper international tradable inputs (e.g. fuel, pesticides, fertilizer) become for producers in the CEECs. This encourages the use of them and is, cp., increasing intensities of production. At the same time prices for non-tradable inputs (e.g. labor, land) stay constant in domestic currency, i.e. become more expensive relative to output and tradable input prices. This discourages the use of them in production.

The offsetting effect, i.e. the extent CEEC farmers loose competitiveness is depending largely on the production technology. In capital intensive production (e.g. cereals) offsetting effects are, therefore, bigger than for labor intensive production (e.g. fruits, vegetables).[8]

A revaluation of currencies in CEC-4 against the ECU during accession nevertheless will lead to less an expansion of production than under constant or devaluing currencies. Therefore, additional budgetary costs can be expected to be smaller as net exports grow less rapidly during accession.

The impact of exchange rate evolution on EU-accession costs depends on: first, the extent of the change in value of CEC-4 currencies vis-à-vis the ECU. Second, the change in value of the ECU against the US$ - the standard currencies for transactions on the world markets. Third, the price responsiveness of agricultural production and consumption.

[8] In the medium to long run this directed technical progress may increase the substitution of non-tradables by tradables in production as the production technology changes. This increases the offsetting effects for labor intensive production.

5.2. A Calculation of the Exchange Rate Effects on Net Exports and on Budgetary Costs of EU-CEEC Accession with ESIM

We calculate the impact of exchange rate adjustments on the costs of integration, based on previous simulations using the ESIM sector model (Münch, 1995). This model was initially developed by the USDA/ERS in co-operation with Stefan Tangermann and Tim Josling (Tangermann and Josling, 1995) and its incorporation of CEECs has been further extended recently (Münch, 1995).

The ESIM model is a partial equilibrium model which incorporates agricultural price and trade policy instruments in detail. It contains 27 major agricultural products and currently includes 14 countries or country blocks, including four CEECs: the Czech Republic, Hungary, Poland and Slovakia. As these CEC-4 are generally assumed the most likely candidates for the first wave of EU integration, the simulation analysis focuses on the CEC-4, assuming an adjustment period from 1998 to 2005.[9]

Policy instruments (e.g. intervention prices, compensatory payments, ...) are modeled in great detail in the ESIM model. Therefore the impact of exchange rate developments on policy instruments can be simulated quite accurately. For this purpose, we assume that:

- administrative prices and payments are introduced in a harmonization period between 1998 and 2004 on CEC-4 markets;
- in 2005 the Single Market applies for the CEC-4, i.e. trade between EU-15 and CEC-4 is completely liberalized by then;
- during the accession scenario the CAP remains unreformed, e.g. administrative prices and payments decrease only slightly in real terms (see Table 3).

The standard ESIM simulations (as other accession cost calculations -- see section 5.1) typically assume a constant real exchange rate during the simulation period. However, table 1 shows that CEC-4 currencies have been appreciating in real terms in the past years. Furthermore, experience from the accession of Portugal and Spain to the EU indicates that we should expect a further real appreciation because of increasing inflow of transfers and other capital (e.g. foreign direct investments) with EU membership and transformation effects (Orlowski, 1997). The same conclusion derives from computable general equilibrium (CGE) simulations for Hungary (Banse, 1996, Banse and Tangermann, 1996).

Therefore, all these conclusions suggest that a further revaluation of CEC-4 currencies is likely. However, the extent of this revaluation is uncertain. In our calculations we compare two extreme scenarios. One scenario is the Constant RER scenario, which has underlined most simulations so far. The other scenario, based on the assumption that the PPP indicator reflects the long term equilibrium real exchange rate, assumes an appreciation of the RER to 1995 PPP values by 2005. This scenario implies that the ECU will devalue slightly, whereas the CEC-4 currencies revalue substantially against the US$. The strongest revaluation takes place in the Czech Republic and Slovakia with 7 per cent per year whereas the Forint and the Zloty appreciate only by 2 per cent per year (Table 4). This assumption is an extreme case because, as pointed out in section 2, further deregulation of the non-tradable sector and quality adjustments could cause PPP values themselves to decline.

[9] For comprehensive description see Nunez-Ferrer and Buckwell, 1995.

In summary, to measure the impact of the exchange rate developments on accession and its accompanying budgetary costs, three different scenarios are considered:

- The "Non-Accession Scenario" provides a benchmark for comparison. This scenario assumes that there is no EU-CEEC integration and that market and trade policies in the CEC-4 remain unchanged during the simulation period: institutional prices remain at their 1993 level. The Non-Accession Scenario assumes also that agricultural recovers between 1993 to 1997 from the transition disruptions, i.e. a return to pre-transformation production potentials is assumed to take place for crops. In this scenario the CEC-4 become net exporters for several major agricultural products.
- The "Constant RER Scenario" assumes that CEEC-EU accession takes place (modeled as explained above) and that real exchange rates remain constant.
- The "PPP Scenario" models accession under the assumption that real exchange rates adjust to their 1995 PPP value until 2005.

5.3. Exchange Rate Adjustment Effect on Net Exports

Besides the effects of a recovery of agricultural production potential, which is assumed under all three scenarios, the main factor affecting the demand, supply and trade in agro-food products in the CEC-4 will be the prices. In the case of EU-CEEC integration, the future development of net exports in CEC-4 are largely determined by the size of the price gap between EU-15 and CEC-4 markets.

The largest increase of net exports takes place on markets which are heavily protected under the current CAP. These are the markets of some coarse grains, sugar, beef, and dairy products, all of which are stabilized by intervention schemes and export subsidies. Production expands and demand declines strongest for these commodities during accession.

Since administrative prices and payments of the CAP are defined in ECU they have to be converted into national currencies. In the case of a real appreciation of CEC-4 currencies against the ECU - as assumed in the PPP Scenario - this price gap will be much smaller because the CEC-4 currencies strongly revalue (and also because the ECU devalues slightly) against the US$ during the adjustment period. Supply and demand reactions during accession are therefore less than in the Constant RER Scenario. As a result, net exports expand less and less export subsidies are required under the PPP scenario than under the Constant RER scenario.
Table 5 summarizes the impact on net exports for cereals, oilseeds, sugar, butter, beef and pork. Under the accession- Constant RER scenario, net exports expand strongly for coarse grains, butter, sugar and beef, which are more protected commodities than wheat and oilseeds under the current CAP.[10] Under the PPP scenario, net exports for these commodities still increase, but substantially less (about one-third to one-half compared to the Constant RER scenario). The impact on the wheat market, which since the MacSharry Reforms receives substantially less price and trade policy protection, is remarkably different. Currently, the CEC-4 import net almost half a million tons of wheat. Under the Constant RER scenario, the CEC-4 become large net exporters of wheat with about 2.5 million tons. However, under the PPP scenario, they become substantial net importers of

[10] In order to identify the price effects resulting from introducing CAP prices and payments our simulations do not contain production quotas. Quotas restrict production and net exports. However, they greatly distort production and markets.

wheat (1.5 million tons) under the PPP scenario. These simulation results are consistent with the data in table 2, which indicate that at the PPP exchange rate, wheat prices in CEC-4 are actually higher than in the EU and, therefore, integration will bring CEC-4 wheat prices down, stimulating net imports. Only Hungary remains a net wheat exporter under the PPP scenario. Other CEC-4, and especially Poland, become large net wheat importers.

The effects of the exchange rate assumptions on net exports are important by themselves, because of their importance for the EU GATT commitments, which include volume restrictions on subsidized exports. While much of the debate in the policy community has focused on the costs of accession, some have argued that the likely conflict of an unreformed CAP with GATT commitments after CEEC accession is a more important constraint (see e.g. Buckwell, 1995). In table 5 net exports under different scenarios and maximum quantities of subsidized exports are compared. The last column indicates if export subsidies are required or not. Please note that the net exports derived from the simulation are not directly comparable to the export figures of the GATT commitments in the second last column because net exports incorporate imports. Therefore, actual export figures would be bigger than the numbers included. Moreover, since GATT commitments are generally more restrictive for Hungary - the main exporting country - than for Poland - the main importing country, implications for individual CECs are more severe than the aggregated figures show.

In the constant RER scenario the CEC-4 have substantial difficulties to meet these constraints, especially for coarse grains, sugar, dairy products, beef and pork (see also Tangermann and Josling, 1995).. Under extreme revaluation of CEC-4 currencies vis-à-vis the ECU, subsidized net exports for these products are smaller but still exceeding by far GATT commitments. Only for pork commitments become non-binding (table 5): for all the other commodities, the GATT constraints will pose a serious obstacle for introducing an unreformed CAP in CEC-4 during accession. This has serious implications for the position of a larger EU in WTO negotiations on enlarging a customs union which inevitably will follow EU accession. The figures show that CEC accession will much more difficult to handle in front of the WTO than accession of Austria, Finland and Sweden.

5.4. Exchange Rate Adjustment Effect on EU budget

The issue that has attracted most attention on the EU-CEEC integration are the estimated additional budgetary costs of an unreformed CAP. Figure 4 illustrates the budgetary cost developments for market stabilization in the CEC-4 under the three scenarios. The most important cost factor is the export subsidies required to export surplus production under an unreformed CAP in an EU-19. These additional export subsidies are directly related to the size of the net exports of the CEC-4 after accession (see table 5). Hence, due to lower net exports and smaller differences between long term world and domestic market prices under the PPP scenario, the required export subsidies are around 50% smaller than under the Constant RER scenario (table 6). While the simulation results clearly show that the exchange rate assumption has a very important effect on these cost estimates, the results also indicate that even under the extreme exchange rate adjustment assumptions implicit in the PPP scenario, the total export subsidy costs remain at a very substantial 6 billion ECU (in real 1993 terms).[11]

The second most important budgetary component are compensation payments, which induce additional effects of the exchange rate assumptions on the wheat and also the oilseed market. Additional support for cereal and oilseed producers in the EU comes from compensation payments. Under the PPP scenario, the compensatory payments are less in local currencies because of the assumed revaluation. This implies that under the PPP scenario, the distortive impact of the compensation payments on area allocation and production, which tends to stimulate oilseed production in spite of set aside, is smaller as well. The budgetary impact of the exchange rate assumption for the compensation payment costs is considerably smaller than for the export subsidy costs. The cost reduction is only 9% under the PPP scenario compared to the Constant RER scenario.

In total, expected expenditures under the PPP scenario are around 40% (6 Bill. ECU) less than under the Constant RER scenario, emphasizing the need for careful consideration of the exchange rate issue in this debate. However, at the same time, the results show that total additional expenditures remain high at 9 billion ECU, of which most is still for export subsidies, under an unreformed CAP.

For interpretation of these results, two important considerations need to be added:

- In order to illustrate the importance of the exchange rate assumption -- this analysis has considered the two most extreme scenarios, i.e. constant 1993 real exchange rates, and full appreciation to the PPP value. However, it is likely that the effective appreciation of the local currency will be somewhere between these two scenarios, and therefore the impact on net exports and budgetary costs is likely to be in between both scenarios.

- An additional factor which needs to be taken into account is the effect on factor markets. The ignored effects on input factor markets are likely to overestimate the supply reaction under the PPP scenario. Including the factor market effects will therefore bring the simulated net export and cost effects of both scenarios closer.

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[11] In order to make them comparable to actual FEOGA guarantee spending model calculations have to be adjusted by expenditure not included in ESIM calculations such as storage, administrative costs and headage payments. Moreover vegetables and fruits - to name the most important market regimes - which are also important beneficiaries of FEOGA guarantee spending but are excluded from the quantitative analysis.

Both these factors induce convergence of the most likely integration impact on net CEC-4 exports and budget costs to figures in between the PPP scenario and the Constant RER scenario simulation results.

In conclusion, this analysis shows that exchange rate developments in CEC-4 could make an important difference for the market and budgetary implications of EU-CEEC integration. More specifically, our calculations show that net exports are likely to be smaller and budgetary costs less under the assumption of continued real appreciation of the CEC-4 currencies. However, the calculations also show that even under the extreme assumption of full adjustment to PPPs, the total budgetary costs of integration with an unreformed CAP remain large and GATT commitments are still a serious obstacle for EU-accession. Therefore, even under huge revaluations of CEC currencies a reform of the CAP in key market regimes such as coarse grains, beef and dairy products is a prerequisite for an accession of the CECs.

6. CONCLUSIONS

The exchange rate is a key factor for international comparisons of economic variables. Because of the initial distortions which have not been removed instantaneously with the current reforms, the use of nominal exchange rates for international comparisons introduces a bias in the calculations of these variables and in all analyses based on them. While there is general agreement that the use of the nominal exchange rate introduces a bias and that this bias can be substantial, there is much less agreement on the most appropriate alternative. There is no simple or straightforward solution to this problem.

This paper has presented alternative exchange rates and discussed their relevance and usefulness for CEEC transition problems and economic studies related to them. We show that the various exchange rates differ substantially between CEECs and during transition. We analyzed the sensitivity of calculations of agricultural price distortions, protection rates and budgetary costs of EU accession to the exchange rate assumptions.

Our calculations show that the choice of the exchange rate has important implications for these studies. Protection rate calculations are sensitive to the choice of adjusted versus nominal, but the sensitivity varies strongly between CEECs. Our analysis shows that exchange rate developments in CEC-4 could make an important difference for the market and budgetary implications of EU-CEEC integration. More specifically, our calculations show that net exports are likely to be smaller and budgetary costs less under the assumption of continued real appreciation of the CEC-4 currencies. However, the calculations also show that even under the extreme assumption of full adjustment to PPPs, the total budgetary costs remain large, and including factor market effects would further increase the budgetary costs. Even under extreme revaluation GATT commitments of CEC-4 are prohibiting an introduction of an unreformed CAP to new member states without facing very difficult WTO negotiations. Appreciating CEC-4 currencies tend to ease the pain inflicted by budgetary and WTO constraints during accession. However, even in the extreme case, a comprehensive reform of the CAP is a precondition for accession of the CEC-4.

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Table 1: Ratio of PPP and Adjusted Exchange Rates over Nominal Exchange Rate in per cent valuation (*)

	1993 AER(92)	1995 AER(92)	1995 AER(93)	1993 PPP	1994 PPP	1995 PPP	Apr-96 BigMac PPP	Apr-97 BigMac PPP
BULGARIA	17	32	13	-70	-73	-68	-65	-
CZECH R.	13	42	25	-64	-61	-54	-22	-25
HUNGARY	2	9	6	-37	-36	-46	-39	-37
POLAND	0	20	20	-52	-52	-44	-39	-43
ROMANIA	40	55	11	-68	-67	-64	-40	-
SLOVAKIA	12	37	22	-64	-63	-55	-22	-
SLOVENIA	-8	12	22	-31	-28	-11	0	-
GERMANY	-5	9	15	27	28	44	37	18
FRANCE	-7	3	11	16	19	32	46	26
U.K.	16	11	-4	-4	-23	-16	14	22
EU	9	3	12	17	20	9	-	-

(*) Base rate is US$

Table 2: Wheat Price Ratios (USA=100)

	1993				1994				1995				
	NER	AER (1992)	AER (1994)	PPP	NER	AER (1992)	AER (1993)	PPP	NER	AER (1992)	AER (1993)	AER (1994)	PPP
Bulgaria	69	59	74	259	48	38	44	185	52	39	46	50	163
Czech Rep.	81	72	89	226	72	59	66	184	76	53	61	66	165
Hungary	96	94	97	153	76	74	75	119	71	66	67	68	131
Poland	114	114	118	239	86	83	83	179	112	94	94	97	201
Romania	144	103	153	460	105	71	99	313	86	55	77	82	236
Slovakia	96	86	101	267	85	72	80	223	80	59	66	70	180
Slovenia	171	186	175	247	153	162	149	210	173	154	141	145	195
Germany	147	154	150	116	128	131	125	101	131	120	114	117	90
France	146	158	148	126	123	131	121	103	131	127	117	119	98
USA	100	100	100	100	100	100	100	100	100	100	100	100	100

Table 3: Scenario Assumptions for the CEC-4

	NON ACCESSION	*ACCESSION*
Recovery period of agricultural production 1993-1997	yes	yes
Current agricultural policies assumed to be unchanged		
1993-1997	yes	yes
1998-2005	yes	no
Harmonization of price and trade policy instruments with EU-15 1998-2004	no	yes
Production quotas and compensatory payments	no no	no yes
Single Market 2005	no	yes

Table 4: Revaluation of Currencies against the US$ under the PPP Scenario in %, from 1993 to 2005*

	Total Change	*Annual Change*
Czech Republic	138.9	7.5
Hungary	34.4	2.5
Poland	34.3	2.5
Slovakia	131.7	7.3
EU-15	-7.5	-0.7

* Positive numbers indicate a revaluation, negative numbers a devaluation vis-à-vis the US$.

Table 5: Development of Net Exports for Selected Products in the CEC-4 under Different Scenarios and GATT commitments (Mill. t)

	base	*2005*			*URA max. quantity of subsidized exports CEC-4 in 2000*	*domestic prices > world market prices 2005**
		non-accession (const. RER)	*accession (const. RER)*	*accession (PPP)*		*accession const. RER/PPP*
Total Grains	*-0.78*	*3.69*	*7.39*	*-0.26*	*1.64*	
of which						
Wheat	*-0.45*	*1.63*	*2.45*	*-1.50*	*1.49*	*no/no*
Coarse Grains	*-0.33*	*2.06*	*4.94*	*1.24*	*0.15*	*yes/yes*
Oilseeds	*0.18*	*0.50*	*1.24*	*0.87*	*0.41*	*no/no*
Sugar	*0.52*	*0.18*	*2.32*	*0.75*	*0.15*	*yes/yes*
Butter	*0.11*	*0.05*	*0.74*	*0.37*	*0.14*	*yes/yes*
Beef	*0.03*	*0.02*	*0.19*	*0.07*	*0.26*	*yes/yes*
Pork	*0.08*	*0.07*	*0.67*	*-0.42*	*0.12*	*yes/no*

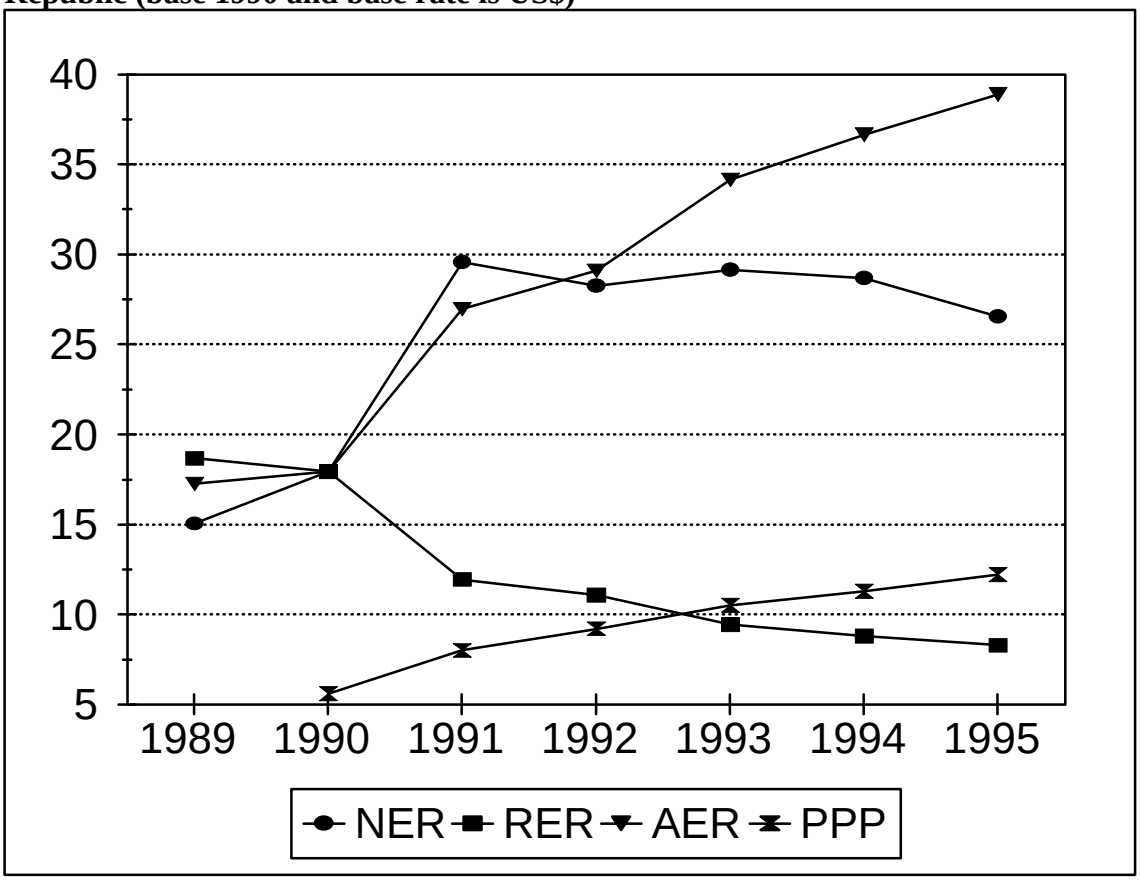
*market price higher than world market price in simulations
Source: ESIM calculations, GATT Schedules Electronic Version.

Table 6: Budget Expenditures for CEC-4 Accession on Market Stabilization in 2005 (Billion real 1993 ECU)

	Constant RER Scenario	*PPP Scenario*	*Difference (%)*
Export subsidies	11.8	6.0	- 49.3
Compensation payments	3.2	2.9	- 8.6
Total	**15.0**	**8.9**	**- 40.6**

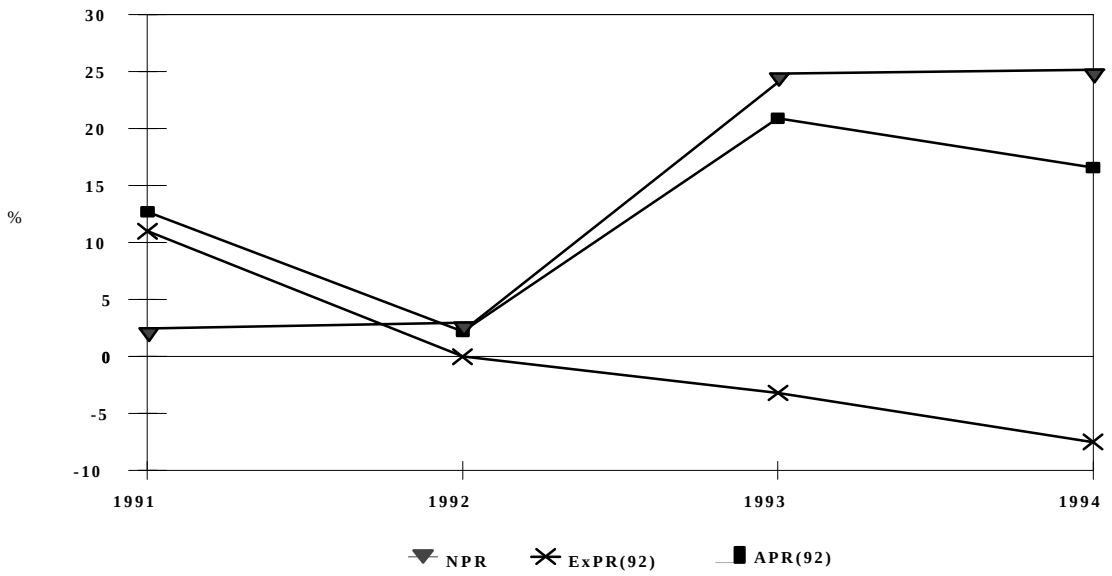
Source: ESIM calculations.

Figure 1: Nominal, real, adjusted real exchange rate and PPP for the Czech Republic (base 1990 and base rate is US$)



Source: OECD (various issues), Short Term Economic Indicators. Transition Economies. Paris. OECD (various issues), Main Economic Indicators. Paris.

Figure 2: Average Protection Rates for CEEC Agriculture, 1991-1994 (*)



(*) Bulgaria, Czech Republic, Hungary, Poland, Slovakia and Slovenia (Romania is not included because 1994 APR was unavailable).

Figure 3: NPR and APRs for 1993 on the Basis of the 1992 and 1994 Exchange Rates

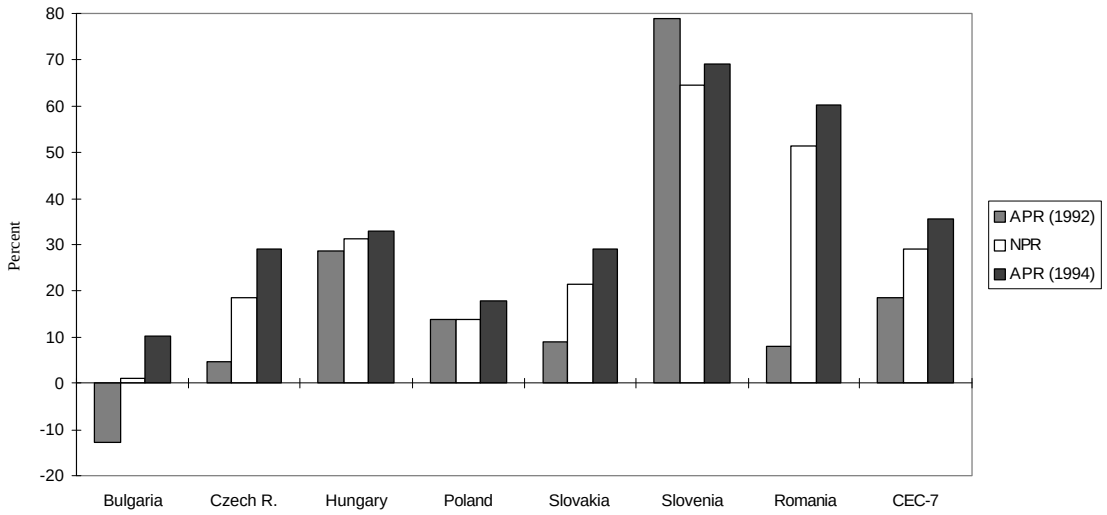
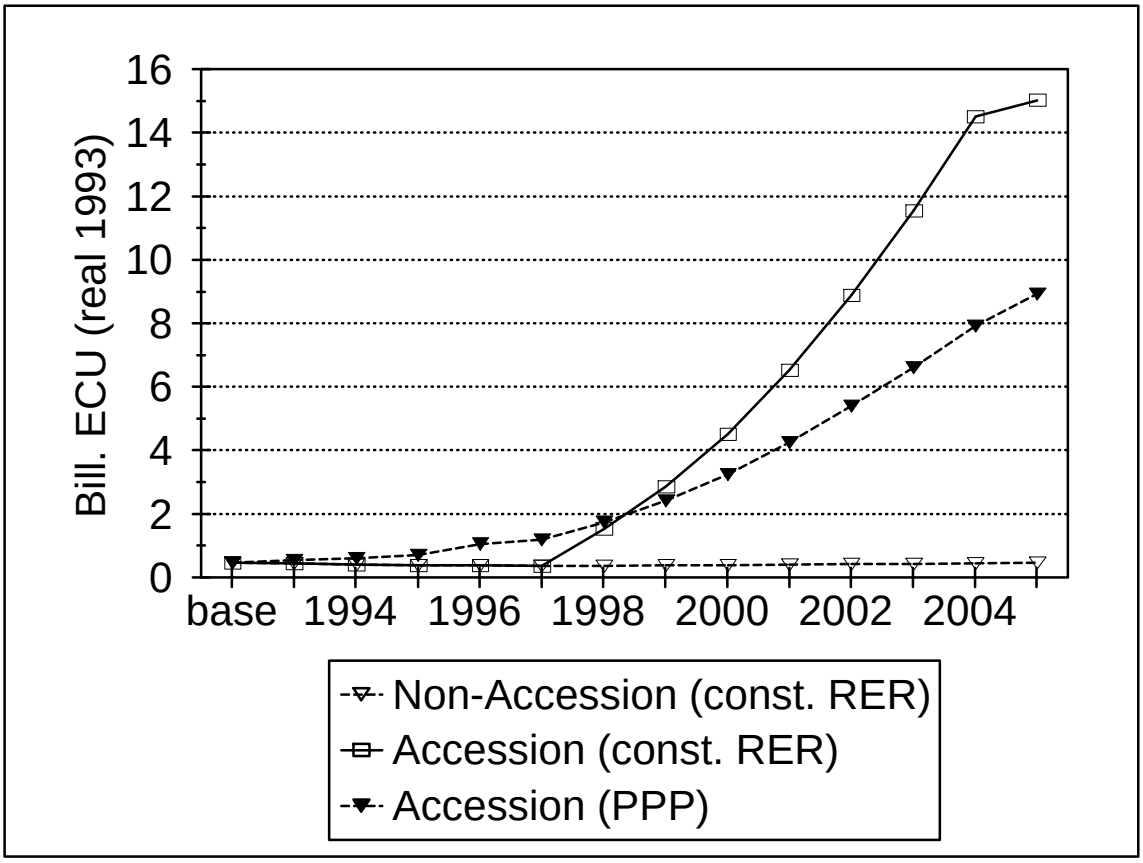


Figure 4: Development of Adjusted Budget Expenditure for Market Stabilization in the CEC-4 under different Scenarios.



Source: ESIM calculations.