THE PATTERN OF AGRICULTURAL PRICE DISTORTIONS
IN CENTRAL AND EASTERN EUROPE
An Update: 1990 - 1995

Štefan BOJNEC and Johan F.M. SWINNEN

Policy Research Group
Working Paper
No. 2 1996

ABSTRACT

Nominal and adjusted protection rates for nine agricultural commodities in seven Central European and three Baltic states are estimated for the transition period 1990-1995. Our estimates indicate that agricultural and food price distortions differ strongly between Central and East European countries, between commodities, and varied over time. The average level of price distortions decreased in 1991 and 1992 after price and trade liberalization, but increased again in 1993 as many of these countries re-introduced protectionist price and trade policy measures. Since 1994, the average level of price distortions has declined again. Accounting for exchange rate policy effects further reduces estimates of protection of agricultural producers.

Keywords: price distortions, border price, exchange rate, protection rates

Policy Research Group, Department of Agricultural Economics, Katholieke Universiteit Leuven, Kardinaal Mercierlaan 92, 3001 Leuven, Belgium, Tel.: ++32 16 321614 - Fax: ++ 32 16 31996 - E-mail: jo.swinnen@agr.kuleuven.ac.be.

1. INTRODUCTION

After the initial liberalization of price and trade policies in 1989, government interventions in the agricultural and food markets have been re-introduced in Central and East European countries (CEECs). Initially, policy interventions were rather ad hoc, trying to address urgent demands from both consumers and producers for protection against negative impacts of liberalization and subsidy cuts on their welfare. Some of the ad hoc policy interventions were internally inconsistent and contributed to the (already large) uncertainties. Gradually, governments introduced more internally consistent policy packages in the agro-food sector (Swinnen, 1993 and 1996). These policy changes have been extensively discussed, but few studies have tried to quantify the impact of the policy changes. OECD calculations of producer and consumer subsidy equivalents (PSEs and CSEs) are the main exception. Thus far, however, the OECD calculations are limited to Hungary (1986-1992), Poland (1986-1993), and recently for the Czech Republic (1986-1994), Estonia (1986-1995), Latvia (1986-1995) and Lithuania (1986-1995).

The objective of this paper is (a) to analyze the effect of agricultural and food price and trade policy interventions in most CEECs since the 1989 reforms and (b) to study how these effects differ between the CEECs and commodities. Therefore we have calculated indicators of price and trade policy effects for 10 CEECs (Bulgaria, Czech Republic, Hungary, Poland, Slovakia, Slovenia, Romania, Estonia, Latvia and Lithuania), for 9 commodities (wheat, maize, barley, rapeseed/sunflowerseed, sugar beet, milk, beef and veal, pig meat and poultry meat), over the period 1990-1995. Our calculations were constrained by data availability. Therefore we have calculated nominal protection rates (NPRs) and adjusted protection rates (APRs), rather than PSEs.

Our results show that, on average, CEEC agricultural price distortions have declined during the first years of transition, but have increased again in 1993, stabilized in 1994, and declined in 1995. Adjusting the protection indicators for exchange rate policy effects further reduces estimates of protection of agricultural producers. But agricultural price levels differ widely between commodities and CEECs: 1994 protection rates varied from less than -30% in Bulgaria to more than 70% in Slovenia.

We emphasize that our results should be interpreted carefully. The key objective of our study is the comparison of price distortions over time, between commodities and between CEECs. The assumptions we have made in our calculations reflect these objectives. The protection indicators ("price distortions") measure only the effect of policy interventions that affect the difference between domestic and international prices. While that this is by far the most important protection instrument in the CEECs (according to the OECD PSE calculations), other policy interventions, such as credit subsidies, have been important support measures in some CEECs.[1] Furthermore, part of the indicators reflect the impact of other factors which affect the relative prices. The calculated NPRs and APRs thus depend on several assumptions, including those regarding exchange rate assumptions and reference prices. We discuss the impact of these assumptions on the calculations, including a series of sensitivity analysis. These sensitivity analyses suggest that our general conclusions regarding the pattern of protection during the transition and between CEECs are fairly robust with regard to our assumptions.

---

[1] See Swinnen (1995) for an analysis of the credit subsidy programs in CEECs during transition.

The paper is organized as follows: we first present the methodology, data and calculation assumptions. Then we present our calculation results and impacts of our assumptions on the results. We compare our results with OECD calculations. Our final section illustrates the need for careful interpretation of protection rates in transition economies.

2. METHODOLOGY

The advantages and disadvantages of using rates of protection to measure the impact of government interventions are well-known (see e.g. Tsakok, 1990). Protection rates are an imperfect measure of the impact of government intervention on producer and consumer incomes. We use them because the available data do not allow to calculate more sophisticated indicators.

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

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

where P_j^d is the domestic producer price of commodity j in current US\$ evaluated at the nominal exchange rate (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 positive when P_j^d is higher than P_j^b, implying that production of commodity j is nominally protected and consumption taxed, and vice versa. 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 the adjusted exchange rate (AER(t)) instead of the nominal exchange rate:

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

where $P_j^{d*}(t) = P_j^d / AER(t) = P_j^d / (NER * USCPI(t) / CPI(t))$ is the domestic producer price of commodity P_j^d evaluated at the AER(t). The adjusted exchange rate AER(t) is the nominal exchange rate NER adjusted for divergence between by the U.S. consumer price index USCPI(t) and the national consumer price index CPI(t).

The APR(t) 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

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

The APR(t) is smaller than the NPR when the nominal exchange rate NER is smaller than AER(t), and vice versa.

3. DATA AND CALCULATION ASSUMPTIONS

The calculation of the protection rates requires domestic producer prices, border (reference) prices for each product, exchange rates and consumer price indices. The calculation of weighted averages and desegregation between imported and exported products requires additional data on production

and on exports and imports. Data for some of these variables do not exist. Therefore, one needs to rely on proxy variables. The construction of these proxy variables and the data used for them affect the results. In this section we discuss the basic variables and proxy variables and the assumptions that underlay our calculations. For the most influential assumptions, we analyze further in the paper how alternative assumptions and calculation methods affect our results. Finally, the data used in calculations of the NPRs, the ExPRs and the APRs are annual averages. An important problem might be the sensitivity of calculations to the use of annual averages in periods of high inflation (Cochrane, 1990).

3.1. Domestic Product Prices

In general, two domestic product prices are available in the statistics: "procurement prices" and "free-market prices". Procurement prices are effective product prices for the share of the products which is sold through the procurement system. The procurement price is a farm gate price. Free-market prices are prices formed on the free-markets where farmers can sell their products directly to consumers and to other buyers. The free-market price is determined at the consumer level because it is the price which the farmers can receive in local free-trade markets in or close to the cities where prices are set by the daily market conditions. In general, procurement prices are below the free-market prices, especially were only small quantities are traded in the "free-markets".

The available data for Hungary (OECD, 1994), Poland (OECD, 1995b), the Czech Republic (OECD, 1995c), Estonia (OECD, 1996a), Latvia (OECD, 1996b) and Lithuania (OECD, 1996c) suggest that the major part of agricultural products in CEECs was traded through the procurement network. The limited data for other CEECs confirm the picture that the major part of the analyzed products were still sold through the procurement network[2]. As a consequence, where available, the weighted averages of procurement and free-market prices are close to the procurement price. For Bulgaria and partly for the Slovak Republic, there are no separate data on procurement and free-market prices of products but only average annual "producer prices" which partly take into account free-market channels.

In our calculations, we took the existing OECD weighted averages of prices for calculating "domestic producer prices" for Hungary (OECD, 1994), Poland (OECD, 1995b), the Czech Republic (OECD, 1995c), Estonia, (OECD, 1996a), Latvia (OECD, 1996b) and Lithuania (1996c). For the missing data for the domestic procurement and free market prices in the period 1993-1995 we used the same calculation procedure from the national statistical data. For Bulgaria, Slovak Republic and Slovenia, we use the reported statistical data on domestic "producer prices". For Romania, we used the World Bank data on producer prices in the period 1990-1995 (Deaconescu, 1996).

Two other assumptions underlay the calculations. First, the unprocured production (the intermediate and on-farm consumption) is evaluated at the procurement and not at the free market prices (as in the OECD PSE calculations). Evaluating this part of the production at free market prices would overestimate the rate of producers protection (Cochrane, 1990).

---

[2] The role of free markets differs between products. Also it is difficult to verify the reliability of these conclusions as the registration and availability of data on trade channels outside the procurement network are limited.

Second, for several products adjustments need to be made for the different units in which domestic and border prices are expressed to get comparative data. To convert the per unit prices for beef and veal, pig meat, and poultry meat in carcass weight we used the same conversion factors as in the OECD (1994) study for Hungary: 0.56 for beef and veal, 0.72 for pig meat and 0.74 for poultry meat. Sugar beet prices are converted into sugar (refined equivalent) using a technical conversion factor of 7 and a processing ratio of 14 for sugar from sugar beet.[3]

3.2. Reference Prices

Optimally, reference prices should be the relevant border prices adjusted for quality, handling margin and transport costs. However, such reference prices do not exist and the best proxy is the national border price for each country, i.e. national import or export prices. For imported agricultural products, the border price is defined as the unit c.i.f. import price of product. For exported agricultural products, the border price is defined as the unit f.o.b. export price of product. Data for the local import or export prices were collected from the FAO Trade Yearbook.

Based on this procedure, our calculations indicate vast differences in export and import price for the same commodity within a country and also wide differences in calculated border prices between CEECs (see Bojnec and Swinnen, 1995).

The OECD (1994, 1995b and 1995c) calculations are based on "expert estimations" of reference prices for Hungary, Poland and the Czech Republic. These "expert estimations" may be the best proxies, but, of course, are impossible to reproduce or to use for other CECs in a comparative analysis.

Because the key objective of our study is the comparison of price distortions over time, between commodities and between CEECs, rather than the interpretation of each indicator value by itself, and given the large problems with calculating national reference prices for each CEEC (see above), we concluded that the (second) best procedure was the following. We use the same reference price for all CEECs. This single reference price is the one which is used by the OECD to calculate PSEs for the EU.[4] The EU border price (in ECU/t) is converted into US$ price and is taken from publications on OECD calculations of PSEs for the European Union (OECD, 1995d). Our calculations suggest that the introduced bias by using this reference price is likely to be smaller, and at least less ad hoc than any of the alternatives. The latter is important because expected biases because of differences in quality of the commodities (especially in products like beef) are likely to be similar for all CEECs in our analysis. As such, the comparison of NPRs and APRs between CEECs and over time should be less affected than the absolute values of the indicators.

This approach allowed to estimate price distortions indicators for many CEECs, commodities and years. Evidently, the assumptions affect the result and one should be careful with the interpretation of the numbers. More specifically, part of what the NPRs measure due (a) to transport costs, (b) to

---

[3] The conversion factor sugar-sugar beet is the most problematic assumption as it differs widely in various studies, over time and between countries. OECD (1994) and OECD (1995b) use two parameters: the first, (technical) conversion factor is based on sugar contents and varies between 6.25 and 9.1 in the case of Hungary (OECD, 1994) and between 7.56 and 8.38 in the case of Poland (OECD, 1995b). Anderson and Hayami (1986) used a conversion factor of raw sugar to sugar beet for Europe of 7. A second (economic) conversion parameter included the processing margin of sugar refineries. The processing ratio for Hungary is between 13.96 and 20.47, while for Poland it varies from 9.38 in 1987 and to 21.82 in 1990, respectively.

[4] The similar approach was taken by the OECD in calculating of the PSEs for Estonia, Latvia and Lithuania.

unaccounted quality differences, (c) to market imperfections in up- and down-stream industries, (d) to price and trade policies, and (e) to exchange rate policies. Some of these factors are also included in more sophisticated measures, such as PSEs.[5] In addition, market imperfections are partly due to lack of privatization and restructuring and are thus also effected by government policies, though to a different degree. For all these reasons, one should interpret the NPRs and APRs with care. Still, our sensitivity analyses suggest that the general conclusions regarding the pattern of protection during the transition and between CEECs are fairly robust with regard to our assumptions.

A key factor in the calculations is the choice of the "correct" exchange rate. In the next section we explicitly discuss and analyse the impact of this assumption by calculating an "adjusted" exchange rate which analyses the impact of different exchange rate assumptions on the results.

3.3. Exchange Rates

The NPRs are analyzed by using the official nominal exchange rate NER. Data on exchange rates are taken from the IMF statistics (International Financial Statistics Yearbook), and national statistical and financial data. The annual average "rf" exchange rates[6] in the IMF statistics are used in the calculation as the official nominal exchange rate. For Bulgaria, which was not a member of the IMF, data are taken from the World Bank (1993), national financial data and from the OECD (1995a).

The APRs are analyzed by using the adjusted exchange rate AER(t). Evidently, the APR(t) calculations are quite sensitive to the choice of the adjusted exchange rate. The real exchange rate conundrum is based on sensitivity of the empirical measures of the real exchange rate and the inflation index used (e.g. consumer price index, wholesale price index and gross domestic product deflator) in empirical calculations (Fleissig and Grennes, 1994).
    Divergences between the adjusted exchange rate and the nominal exchange rate are calculated by adjusting the nominal exchange rate NER by the ratio of the U.S. consumer price index USCPI(t) over the national consumer price index CPI(t). The source of consumer price index data are the IMF statistics, the World Bank (1993) and the national statistical and financial data.

3.4. Other Data

Production data are collected from the national statistical yearbooks and from the OECD (1995a). Import or export data are collected from the FAO Trade Yearbook.

4. CALCULATION OF CEEC AGRICULTURAL PROTECTION RATES

4.1. General Results

---

[5] See Swinnen (1996) for an analysis of how these various factors affect the transfers along the agro-food chain as they are measured with a PSE-CSE-type methodology by Ivanova, Lingard, Buckwell and Burrell (1995).

[6] The annual average "rf" exchange rate is the nominal "Par Rate/Market Rate" exchange rate. See line "rf" in the IMF statistics.

Nominal and adjusted protection rates for nine agricultural commodities in seven Central European and three Baltic states are estimated for the transition period 1990-1995 (tables 1 and 2). Figure 1 shows the evolution of average agricultural price distortions for seven Central European countries (CEC-7) and nine products. Agricultural price distortions in CECs were high in 1990 (around 50% above the world market levels).[7] After price and trade liberalizations, the average level of price distortions decreased in 1991 and 1992 to close to zero, but increased again in 1993 to around 30% as many of these countries re-introduced protectionist price and trade policy measures. Since 1994, the average level of price distortions has declined again and is around 15% in 1995.

The impact of positive protection rates since 1993 on agricultural producer incomes has been offset by a combination of real exchange rate appreciations and exchange rate policies both captured by the development of the ExPR indicator. Figure 1 shows that the ExPR(93) indicator has continually declined over the 1991-1995 period from +15% to - 15%, implying the same effect on producer incomes as when government policies would reduce prices with 30% for a given exchange rate over the same period. Therefore these macro-economic effects have had a substantial negative impact on farm incomes.

The combined impact of the ExPR and NPR over the last two years (1993-1995) is a decline in APR(93) from + 30% to close to zero.

4.2. Country Differences

There are important differences between CEECs and commodities. Tables 1, 2 and 3 provide detailed estimates of NPRs, ExPRs and APRs for all countries and commodities with 1993 as base year of the exchange rate adjustment for CECs and 1994 as base year for the Baltic countries.[8] The differences between the CEECs are summarized in figure 2 and table 2. The following conclusions can be drawn:
- the differences between countries are large. The 1994 NPR varies between - 18% in Bulgaria and +63% in Slovenia. The 1994 NPR was substantially negative as well in Estonia and Lithuania, while positive or close to zero in the other CEECs;
- in all countries except Slovenia the NPR has moved closer to zero in 1995. In some countries such as Hungary, Slovakia and Romania, the change was more than 15%;

---

[7] USDA and OECD calculations of PSEs for some CECs suggest that producer might have been subsidized, on average, under the old system (Cochrane, 1990; Lundell, 1994; OECD, 1994, 1995b and 1995c; Tangermann, 1993; Karp and Stefanou, 1994). However, there were several problems with the calculations of these PSEs (Jackson and Swinnen, 1994). First, the published numbers differ quite widely between authors. For example, the OECD calculations on Hungary are for some products and years quite different from the USDA calculations. Second, the PSEs show considerable variation between years which are more a result of international price fluctuations than of national policy as the main factor influencing the level of PSEs is the price intervention component. Third, the most important problem of the pre-reform PSE calculations is the choice of the "correct" exchange rate. (See Tangermann (1994) for an illustration of the impact of exchange rate assumptions on the PSE calculations). Bojnec (1996) showed that the producers in CEECs were more likely subsidized under the old communist system even with the backward adjusted exchange rate, but the level of subsidization differs between the individual CEECs.

[8] See Bojnec (1996) for a sensitivity analysis on this assumption.

- it is the price distortions of Romania, and especially Slovenia, which push the average CEC-7 NPR above 15% in 1995. In all other countries, including the Baltics, the 1995 NPR is very close to zero;
- the negative producer income effect of the exchange rate developments, measured by the ExPR, is strong for all CEECs.

More detailed conclusions are the following.

The price distortions for <u>Bulgaria</u> indicate subsidization of agriculture in 1990 due to higher domestic than reference prices. In 1991 the NPR is negative (-23%). Since 1992, NPRs and APR(93)s are negative indicating taxation of agriculture, in general due both to the direct effect of lower domestic prices than the reference prices and due to exchange rate effects.

<u>Czech</u> agriculture was substantially subsidized in 1990 mostly because of price and trade policy support (+54%). Between 1991 and 1992 the NPRs for the Czech agriculture indicate direct taxation of agriculture. In 1993 and 1994 the direct support through price and trade policies (NPRs 19% and 12%, respectively) was largely offset by exchange rate effect, reducing APR(93)s close to zero. In 1995 the NPR was further reduced to 8.4%.

<u>Hungarian</u> agriculture was subsidized in 1990 due to the direct price and trade policy support (NPR is +10.1%) as well as through the exchange rate effect. In 1991 and 1992 the direct price and trade support was reduced (NPRs turned negative). In 1993 and 1994 the Hungarian agriculture was subsidized again, due to a substantial increase in direct price and trade support. In 1995 the agricultural prices were moving close to the world market levels (NPR is 0.6%).

The policy change from taxation of agriculture in the period 1990-1992 to subsidization in the period 1993-1994 is typical for <u>Poland</u>. Between 1990 and 1992 the taxation of agriculture was caused by direct price and trade policy measures: in 1990 the NPR was about -36%, while the APR(93) was close to zero. The agricultural prices increased in 1993 and 1994, solely due to price and trade policy measures. In 1995 the agricultural prices were formed close to the world market levels (NPR is -1%).

Between 1990 and 1992 the agricultural prices for <u>Slovakia</u> declined from more than 50% to -2.2%. In 1993 agricultural prices increased (NPR is 21.6%) and since then they declined very close to the world market levels; in 1995 the NPR is 0.2%.

In <u>Slovenia</u> the level of agricultural prices was high and rather stable over 1990-1995. The average NPRs varied between 56% and 80%.

The initial level of agricultural prices in Romania in comparison with other CEECs was modest (In 1990 the NPR was about 39%) partly caused by more intensive government interventions to keep the procurement price low for social reasons, i.e. to reduce food expenditures for household budgets. In 1992, like in other CEECs, the NPR was negative (-8.7%). In 1993 the NPR sharply increased to 51.3%. Since then the NPR declined but was still above the world market levels; in 1995 the NPR was 19.1%.

4.3. Trade Status

Figure 3 shows that average protection rates for imported agricultural products are higher than for exported ones, but in general the differences are smaller than one would expect. The average CEC-7 NPR for exports and imports differs less than 10% over the 1991-1995 period.

In some CECs, the differences between exported and imported products are more important. For example, Hungarian agricultural price distortions are higher for imported than for exported products (see table 1 and figure 4). In 1991 and 1992, Hungarian exports were taxed, but the export NPR increased to more than 24% in 1993. In 1994 the NPR on exported products is +9.6% and negative (-4.3%) in 1995. NPRs for imported products decreased strongly between 1990 and 1992 (from 42% to 12%). In 1993 the NPR of imports increased to about 51% and since then declined to about 19% in 1995.

Bulgarian exported agricultural products were taxed more than the imported products. Only in the Czech Republic, Slovenia and partly in Poland do we observe a different pattern with bigger price distortions for exported than for imported products[9]. In Slovenia exported and imported agricultural products are heavily protected. The subsidization has been determined mostly by the direct price and trade effects. Surprisingly for the Czech Republic, the level of protection was lower for imported than for exported products.

4.4. Commodity Differences

Figure 5 shows the CEC-7 average 1993 NPRs for the nine commodities (price distortions were highests in 1993). The figure shows that barley, milk, pork and sugar beet are the products with the highest average NPR. Price distortions for wheat, maize, and poultry are smaller than +15%, while beef and especially oilseeds have negative NPRs. The difference between barley and the other grains (maize and wheat) is striking, as is the lower protection rate for beef and veal versus pork, which is the mirror image of what we usually observe in e.g. the EU. The latter may be caused partially by demand factors in an imperfect trading system, while the former is related to a strong decline in barley prices relative to the other grain prices on the world market.

Bulgaria's wheat, maize, barley, sunflowerseed and sugar beet producers were taxed. Milk and poultry producers were also often taxed. Since 1993 the pig meat prices were above or close to the world market prices. Only beef and veal producers' prices in Bulgaria were set above the world market levels.

While, on average, the Czech agricultural prices distortions were becoming smaller with domestic prices close to zero, we observe large differences between commodities. Milk was the most protected product. The pattern of agricultural price distortions for Slovakia had been similar to the Czech Republic. In both countries, barley, sugar beet, milk and pig meat were often protected on the one side, while wheat, maize, rapeseed, beef and veal and poultry had mostly negative NPRs.

Milk producers in Hungary were also the most protected, due to the trade and price support policies. Sugar beet, barley, pig meat and poultry producers were more often subsidized, while maize, wheat, sunflowerseed and beef and veal producers were often taxed.

---

[9] Swinnen (1996) suggests that the reason may be the much better budget situation in both Slovenia and the Czech Republic.

Barley and poultry producers in Poland were subsidized, while milk and beef and veal were taxed.

Except in Slovenia, grain and oilseeds producers were mostly taxed in CEECs. In some CEECs oilseeds and sugar beet production might become competitive in the world market (e.g. Hungary, Romania), but sugar processing is inefficient with high processing margin of sugar beet to sugar. With the existing processing margin, the CEECs sugar production was highly subsidized.

Milk producers were protected in all CEECs except in Poland, Bulgaria and the Baltic States (e.g. Estonia, Latvia and Lithuania). The level of protection differ considerably between the countries. Beef and veal producers were subsidized in Bulgaria and Slovenia, while in the Czech and Slovak Republics, Hungary, and Romania they were either taxed or the level of protection was close to zero. Only in Poland beef and veal producers were taxed throughout the period 1990-1995.

In the period 1993-1995 the pig meat prices in CEECs were mostly formed above the world market levels. Poultry meat producers were either taxed or the level of protection was close to zero in Bulgaria, the Czech and Slovak Republics. In Hungary NPRs were between -2 and +20, while in Slovenia, Romania and Poland (except of 1990) between +7% and +76%.

5. IMPACTS OF ASSUMPTIONS ON CALCULATED PROTECTION RATES

5.1. Exchange rate assumptions

Figure 6 illustrates the impact of exchange rate assumptions on the 1993 price distortion indicators. The APR(93)s are estimated at the adjusted exchange rate AER(93), while the NPRs at the nominal exchange rate NER. The APR(93)s thus combine the direct effects of the NPR and the indirect (macroeconomic) effects caused by anappreciation (or depreciation) of the exchange rate due to structural changes or to government policies, and which is measured by ExPR(93).

Figure 6 shows that the impact of the exchange rate assumptions is fairly limited for Hungary, Poland and Slovenia, but important for the other CECs. The choice of 1992 versus 1994 as base rate changes the APR with more than 20% in Bulgaria, the Czech Republic, Slovakia and Romania. It should be emphasized that the impact of the exchange rate assumptions (reflected in the size of ExPR) is still important after 1993, despite more macroeconomic stabilization and the introduction of internal and external convertibility of exchange rates and the role of market forces in determining exchange rates. The 1995 ExPR(93) numbers in table 1 and 2 indicate that the exchange rate effect was especially important between 1993 and 1995 in the Czech Republic, Poland, Slovakia, Slovenia and the Baltic countries.[10]

5.2. Protection rates, reference prices and PSEs

---

[10] Bojnec (1996) and Bojnec, Münch and Swinnen (1996) analyze in greater detail the sensitivity of the agricultural protection rates in CEECs (and also production forecasts and EU-CEEC integration costs) with regard to the choice of the exchange rate adjustment (including the use of PPPs and other "real exchange rate" indicators) and the selected base year.

The NPR and APR indicators do not account for the impact of direct and input subsidies. Because of the limited availability of data on input and direct subsidies on a desaggregated level we opted for NPR and APR calculations rather than more sophisticated measures such as Producer Subsidy Equivalents (PSEs). PSEs are a better measure of the level of the subsidization or taxation of producers than the APR(93)s because they include, besides price and trade support measures and exchange rate distortions, input subsidies and direct subsidies to a particular producer group.[11] The PSEs estimate the value of the total (direct and indirect) transfers from government policies to producers of a given commodity and are often presented as a percentage PSE; which is positive when domestic producers are subsidized and vice versa (e.g. Webb, Lopez, and Penn, 1990).

We have compared our estimation results of our AER(93) with the OECD PSE calculations (Bojnec and Swinnen, 1995), before and after adjusting the calculations for different assumptions on reference prices and on "handling margin".[12] The reference price assumptions (see before) are more crucial with small net traded quantities and heterogeneous products. For the latter reason, grain reference prices are less sensitive, trade mainly represents seeds. The choice of the reference price is much more crucial for animal products. Meat is often less homogenous than grains and therefore the quality difference between domestic production and quantities traded with the rest of the world is possibly higher. There are also other factors which may contribute to the difference in prices such as different packaging, handling and transport costs.

After adjusting for these reference price differences a comparison with the OECD PSEs indicates that our APR(93) calculations underestimate the effective producer protection, because the APRs do not account for input subsidies (especially credit subsidies) and direct income support.

7. CONCLUDING REMARKS

Nominal and adjusted protection rates for nine agricultural commodities in seven Central European and three Baltic states are estimated for the transition period 1990-1995. Our estimates indicate that agricultural and food price distortions differ strongly between Central and East European countries, between commodities, and varied over time. The average level of price distortions decreased in 1991 and 1992 after price and trade liberalization, but increased again in 1993 as many of these countries re-introduced protectionist price and trade policy measures. There are important differences between CEECs and commodities. The 1994 NPR varies between - 18% in Bulgaria and +63% in Slovenia. Barley, sugar beet, milk and pork are the products with the highest average price distortions in CEECs.

Since 1994, the average level of price distortions has declined again and average NPR in 1995 was only around 15%. It was mainly large price distortions in Romania and especially Slovenia, which kept the NPR around 15%, because in all other CEECs price distortions have reduced to close to zero in 1995.

---

[11] Important work on concept, methodology and calculations of the PSEs for some CECs was done by the OECD (1994, 1995b, 1995c, 1996a, 1996b and 1996c) and by the USDA (1990). For former Yugoslavia and for some East European countries (e.g. Poland) important pioneering work was made by Cochrane (1990).

[12] Bojnec and Swinnen (1995) provide more details on the impact of the FAO and other reference price assumptions on the calculated protection rates. The main conclusions are largely consistent with the discussion here.

The impact of positive protection rates since 1993 on agricultural producer incomes has been offset by a combination of real exchange rate appreciations and exchange rate policies,. Our ExPR indicator has declined over the 1991-1995 period from +15% to - 15. These macro-economic effects have had a substantial negative impact on farm incomes. The combined impact of the ExPR and NPR over the last two years (1993-1995) is a decline in APR(93) from + 30% to close to zero.

We emphasize that our results should be interpreted carefully. The key objective of our study is the comparison of price distortions over time, between commodities and between CEECs. The assumptions we have made in our calculations reflect these objectives. The protection indicators ("price distortions") measure only the effect of policy interventions that affect the difference between domestic and international prices. While that this is by far the most important protection instrument in the CEECs (according to the OECD PSE calculations), other policy interventions, such as credit subsidies, have been important support measures in some CEECs. Furthermore, part of the indicators reflect the impact of other factors which affect the relative prices. The calculated NPRs and APRs thus depend on several assumptions, including those regarding exchange rate assumptions and reference prices. Our sensitivity analyses suggest that our general conclusions regarding the pattern of protection during the transition and between CEECs are fairly robust with regard to our assumptions.

References

Anderson, K. and Hayami, Y. (1986). *The Political Economy of Agricultural Protection*. Sydney: Allen & Unwin.

Bojnec, Š. (1996). Exchange Rate and Agricultural Prices in East Central Europe and the Baltics: An Overview. mimeo.

Bojnec, Š and Swinnen, J. (1995). *The Pattern of Agricultural Protection in Central Europe*. Licos Working Paper, Leuven: Katholieke Universiteit.

Bojnec, Š, W. Münch, and J. Swinnen (1996). Exchange Rates and the Measurement of Agricultural Price Distorsions in CEECs and Costs of CEEC-EU Accession. Paper presented at the 50th Seminar of the EAAE, Giessen, October 1996.

Cochrane, N. (1990). *Trade Liberalization in Yugoslavia and Poland. Washington*, USDA-ERS, Agriculture and Trade Analysis Division, Washington, D.C.: USDA.

Deaconescu, C. (1996). Techniques for Analysis of Agricultural Price Interventions in Romania. Bucharest, The World Bank, mimeo.

FAO. various issues. *Trade Yearbook*. Rome: FAO.

Fleissig, A. and Grennes, T. (1994). The Real Exchange Conundrum: The Case of Central America. *World Development*, 22(1): 115-128.

IMF. various issues. *International Financial Statistics Yearbook*. Washington, D.C.: International Monetary Fund.

Ivanova, N. and Lingard, J. (1994). Measuring Government Transfers from Agriculture in Bulgaria: Calculations of PSEs. *Oxford Agrarian Studies*, 22(2): 123-137.

Ivanova, N., Lingard, J., Buckwell, A. and Burrell, A. (1995). Impact of Changes in Agricultural Policy on the Agro-Food Chain in Bulgaria. *European Review of Agricultural Economics,* 22(3): 354-371.

Jackson, M. and Swinnen, J. (1994). A Statistical Analysis and Survey of the Current Situation of Agriculture in the Central and Eastern European Countries, Report to DG I. Leuven: Katholieke Universiteit Leuven.

Karp, L. and Stefanou, S. (1994). Domestic and Trade Policy for Central and East European Agriculture. *The Economics of Transition*, 2(3): 345-371.

Krueger, A.O., M. Schiff, and Valdés, A. (1988). Agricultural Incentives in Developing Countries: Measuring the Effect of Sectoral and Economywide Policies. *World Bank Economic Review,* 2(3): 255-272.

Lundell, M.R. (1994). *Hungary*. Washington, D.C.: USDA.

OECD. (1994). *Review of Agricultural Policies: Hungary*. Paris: OECD.

OECD. (1995a). *Agricultural Policies, Markets and Trade in the Central and Eastern European Countries, Selected New Independent States, Mongolia and China: Monitoring and Outlook 1995*. Paris: Organisation for Economic Co-operation and Development.

OECD. (1995b). *Review of Agricultural Policies: Poland*. Paris: OECD.

OECD. (1995c). *Review of Agricultural Policies: the Czech Republic*. Paris: OECD.

OECD. (1995d). *Tables of Producer Subsidy Equivalents and Consumer Subsidy Equivalents*. Paris: OECD.

OECD. (1996a). *Review of Agricultural Policies: Estonia*. Paris: OECD.

OECD. (1996b). *Review of Agricultural Policies: Latvia*. Paris: OECD.

OECD. (1996c). *Review of Agricultural Policies: Lithuania*. Paris: OECD.

Swinnen, J. (1993). The Development of Agricultural Policies in Eastern Europe: An Endogenous Policy Theory Perspective. *Food Policy*, June: 187-191.

Swinnen J. (1995). Agricultural Credit Problems during the Transition to a Market Economy in Central and Eastern Europe. In: *Agro-Food Sector Policy in OECD Countries and the Russian Federation*, Paris: OECD Centre for Co-operation with the Economies in Transition, p. 50-62.

Swinnen, J. (1996a). Endogenous Price and Trade Policy Developments in Central European Agriculture. *European Review of Agricultural Economics*, 23(2): forthcoming.

Swinnen, J. (1996b). A Note on Policy Induced Transfers in the Bulgarian Agro-Food Chain: The Case of Wheat-Flour-Bread Chain, mimeo.

Tangermann, S. (1994). Aspects of Integration Between Western and Eastern Europe: West looks East, Proceedings of the Seventh Congress of the European Association of Agricultural Economists. *European Review of Agricultural Economics*, 21(3/4): 375-392.

The World Bank. (1993). *Historically Planned Economies: A Guide to the Data, 1993 edition Featuring economies of the former Soviet Union*. Washington, D.C.: The International Bank for Reconstruction and Development.

Tsakok, I. (1990). *Agricultural Price Policy: A Practitioner's Guide to Partial-Equilibrium Analysis*. Ithaca and London: Cornell University Press.

Webb, J.A., M. Lopez, Penn, R. 1990. Estimates of Producer and Consumer Subsidy Equivalents: Government Intervention in Agriculture, 1982-87. USDA-ERS, Agriculture and Trade Analysis Division, Statistical Bulletin No. 803. Washington, D.C.: USDA.

Table 1. NPR, ExPR93, and APR93 for Exported, Imported and All Products (for nine products, in percent).

	Bulgaria			Czech Republic			Hungary			Poland			Slovakia			Slovenia			Romania		
	NPR	ExPR93	APR93	NPR	ExPR93	APR93	NPR	ExPR93	APR93	NPR	ExPR93	APR93	NPR	ExPR93	APR93	NPR	ExPR93	APR93	NPR	ExPR93	APR93
Exported																					
1990	95.8	-37.5	58.3	61.9	27.7	89.6	0.8	25.9	26.7	-29.9	46.7	16.8	15.2	17.5	32.7	102.3	-43.5	58.8	34.3	-25.6	8.7
1991	-20.7	48.3	27.6	1.5	27.6	29.1	-8.7	14.0	5.3	-15.3	8.0	-7.3	-14.2	21.6	7.4	51.4	-12.8	38.6	-1.9	4.6	2.7
1992	-29.4	11.7	-17.7	2.8	13.8	16.6	-12.8	1.8	-11.0	17.1	0.0	17.1	-11.7	-10.2	-1.5	58.3	-12.8	45.5	-10.2	35.7	25.5
1993	-6.4	0.0	-6.4	24.2	0.0	24.2	24.4	0.0	24.4	31.0	0.0	31.0	14.3	0.0	14.3	54.5	0.0	54.5	54.5	0.0	54.5
1994	-23.0	-6.0	-29.0	11.2	-8.9	2.3	9.6	-1.5	8.1	4.8	-3.6	1.2	11.7	-6.5	5.2	68.0	-4.5	63.5	21.6	-7.0	14.6
1995	-18.5	-9.6	-28.1	11.5	-22.4	-10.9	-4.3	-5.7	-10.0	8.2	-17.9	-9.7	-13.4	-15.9	-29.3	76.5	-32.2	44.3	9.6	-10.9	-1.3
Imported																					
1990	204.1	58.4	145.7	34.8	23.1	57.9	42.3	36.5	78.8	-37.4	41.8	4.4	53.9	23.4	77.3	65.4	-35.6	29.8	44.2	-27.5	16.7
1991	-24.5	46.0	21.5	-14.5	23.2	8.7	18.9	18.3	37.2	-20.1	7.6	-12.5	0.1	25.1	25.2	62.4	-13.7	48.7	21.5	5.6	27.1
1992	-21.5	13.1	-8.4	-14.4	11.4	-3.0	11.5	2.5	14.0	-13.4	-0.1	-13.5	-0.5	11.5	11.0	55.3	-12.5	42.8	-6.8	37.1	30.3
1993	12.0	0.0	12.0	2.7	0.0	2.7	51.3	0.0	51.3	11.4	0.0	11.4	23.0	0.0	23.0	69.6	0.0	69.6	49.5	0.0	49.5
1994	-10.9	-7.0	-17.9	13.0	-9.0	4.0	48.8	-1.9	46.9	8.1	-3.8	4.3	17.6	-6.8	10.8	59.7	-4.2	55.5	33.9	-7.6	26.3
1995	4.5	-12.3	-7.8	-1.3	-19.8	-21.1	18.9	-7.1	11.8	-2.2	-16.1	-18.3	3.0	-18.9	-15.9	60.2	-29.2	31.0	23.7	-12.3	11.4
Total																					
1990	142.0	-46.4	95.6	54.3	26.4	80.7	10.4	28.3	38.7	-36.4	42.4	6.0	50.3	22.9	73.2	79.6	-38.6	41.0	39.3	-26.6	12.7
1991	-23.3	46.9	23.6	-3.2	26.2	23.0	-2.6	15.0	12.4	-19.6	7.6	-12.0	-1.9	24.6	22.7	58.2	-13.4	44.8	16.1	5.5	21.6
1992	-25.5	12.4	-13.1	-1.3	13.1	11.8	-6.6	2.1	-4.5	-10.4	-0.1	-10.5	-2.2	11.3	9.1	56.6	-12.6	44.0	-8.7	36.3	27.6
1993	1.7	0.0	1.7	18.6	0.0	18.6	31.4	0.0	31.4	13.8	0.0	13.8	21.6	0.0	21.6	64.5	0.0	64.5	51.1	0.0	51.1
1994	-17.4	-6.5	-23.9	11.7	-9.0	2.7	20.2	-1.5	18.7	7.8	-3.8	4.0	16.8	-6.8	10.0	62.6	-4.3	58.3	31.2	-7.5	23.7
1995	-6.2	-11.1	-17.3	8.4	-21.7	-13.3	0.6	-6.0	-5.4	-1.0	-16.3	-17.3	0.2	-18.4	-18.2	65.9	-30.2	35.7	19.1	-11.8	7.3

Note:
Exported products: wheat, barley, milk and poultry for Bulgaria; wheat, sugarbeet, milk, pigmeat and poultry for the Czech Republic; wheat, maize, sunflowerseed, sugarbeet, pigmeat and poultry for Hungary; barley, rapeseed and sugarbeet for Poland; maize, barley and rapeseed for the Slovak Republic; milk and poultry for Slovenia; and pigmeat and oilseeds for Romania.
Imported products: maize, sunflowerseed, sugarbeet, beef and veal, and pigmeat for Bulgaria; maize, barley, rapeseed and beef and veal for the Czech Republic; barley, milk, and beef and veal for Hungary; wheat, maize, milk, beef and veal, pigmeat and poultry for Poland; wheat, sugarbeet, milk, beef and veal, pigmeat and poultry for the Slovak Republic; wheat, maize, barley, rapeseed, sugarbeet, beef and veal, and pigmeat for Slovenia; and wheat, maize, barley, sugarbeet, milk, beef and veal for Romania.

Table 2. NPR, ExPR93, and APR93 by Product, CEECs and Year (percent)[+]

Country / Year	Wheat NPR	Wheat ExPR93	Wheat APR93	Maize NPR	Maize ExPR93	Maize APR93	Barley NPR	Barley ExPR93	Barley APR93	Rapeseed NPR	Rapeseed ExPR93	Rapeseed APR93	Sugarbeet NPR	Sugarbeet ExPR93	Sugarbeet APR93	Milk NPR	Milk ExPR93	Milk APR93	Beef and veal NPR	Beef and veal ExPR93	Beef and veal APR93	Pigmeat NPR	Pigmeat ExPR93	Pigmeat APR93	Poultrymeat NPR	Poultrymeat ExPR93	Poultrymeat APR93
Bulgaria																											
1990	31.4	-25.2	6.2	172.5	-70.3	102.2	33.3	-25.6	7.7	36.3	-26.1	10.2	330.5	-82.6	247.9	181.1	-53.9	127.2	365.8	-89.4	276.4	75.4	-33.6	41.8	91.9	-36.8	55.1
1991	-21.1	48.0	26.9	-25.9	45.1	19.2	-21.6	47.8	26.2	-31.1	41.9	10.8	-33.4	40.6	7.2	-22.9	47.0	24.1	-10.1	54.8	44.7	-31.0	42.1	11.1	-11.6	53.9	42.3
1992	-46.3	9.0	-37.3	-32.1	11.3	-20.8	-39.0	10.1	-28.9	-47.0	8.8	-38.2	-31.9	11.3	-20.6	-15.0	14.1	-0.9	7.2	17.9	25.1	-28.4	11.9	-16.5	-10.5	14.9	4.4
1993	-25.8	0.0	-25.8	-6.8	0.0	-6.8	-0.7	0.0	-0.7	-59.3	0.0	-59.3	-40.7	0.0	-40.7	12.3	0.0	12.3	11.3	0.0	11.3	33.5	0.0	33.5	4.1	0.0	4.1
1994	-44.1	-4.4	-48.5	-28.1	-5.6	-33.7	-27.9	-5.7	-33.6	-54.5	-3.6	-58.1	-40.8	-4.7	-45.5	-3.7	-7.6	-11.3	11.8	-8.8	3.0	2.8	-8.1	-5.3	0.2	-7.9	-7.7
1995	-57.1	-5.0	-62.1	-36.5	-7.5	-44.0	-53.1	-5.5	-58.6	-55.5	-5.3	-60.8	-32.7	-7.9	-40.6	12.9	-12.5	-0.4	56.3	-18.4	37.9	16.0	-13.6	2.4	18.2	-13.9	4.3
Czech Republic																											
1990	-26.1	12.7	-13.4	19.8	20.5	40.3	5.6	18.1	23.7	40.6	24.1	64.7	27.5	21.9	49.4	134.8	40.2	175.0	46.4	25.1	71.5	11.8	19.1	30.9	11.3	19.1	30.4
1991	-19.0	22.0	3.0	-24.5	20.5	-4.0	-25.8	20.1	-5.7	-21.4	21.3	-0.1	39.9	38.0	77.9	23.9	33.6	57.5	-9.8	24.4	14.6	-13.2	23.5	10.3	-23.4	20.8	-2.6
1992	-34.0	8.8	-25.2	-1.8	13.2	11.4	-21.5	10.5	-11.0	-17.6	11.0	-6.6	51.9	20.3	72.2	34.3	17.9	52.2	-10.9	11.9	1.0	-17.4	11.1	-6.3	-19.9	10.6	-9.3
1993	-11.9	0.0	-11.9	3.9	0.0	3.9	19.8	0.0	19.8	-28.6	0.0	-28.6	35.8	0.0	35.8	41.7	0.0	41.7	-2.5	0.0	-2.5	30.3	0.0	30.3	-9.0	0.0	-9.0
1994	-15.9	-6.7	-22.6	-3.0	-7.8	-10.8	20.4	-9.6	10.8	-18.3	-6.6	-24.9	-10.4	-7.2	-17.6	33.0	-10.7	22.3	16.3	-9.3	7.0	11.6	-8.9	2.7	-4.0	-7.7	-11.7
1995	-37.2	-12.6	-49.8	-4.0	-19.2	-23.2	-28.7	-14.3	-43.0	-13.5	-17.3	-30.8	13.3	-22.7	-9.4	43.1	-28.7	14.4	15.8	-23.3	-7.5	11.5	-22.3	-10.8	-8.4	-18.3	-26.7
Hungary																											
1990	-22.3	19.9	-2.4	9.5	28.0	37.5	2.0	26.1	28.1	19.4	30.6	50.0	6.2	27.2	33.4	71.7	44.0	115.7	-0.5	24.5	25.0	1.9	26.1	28.0	8.0	27.6	35.6
1991	-6.8	14.3	7.5	-8.2	14.0	5.8	-1.3	15.2	13.9	2.2	15.6	17.8	9.6	16.8	26.4	42.2	21.8	64.0	-18.8	12.4	-6.4	-19.2	12.4	-6.8	2.4	15.7	18.1
1992	-28.9	1.5	-27.4	-12.6	1.9	-10.7	-16.0	1.9	-14.1	-23.0	1.7	-21.3	32.5	2.9	35.4	38.6	3.0	41.6	-23.1	1.7	-21.4	-14.5	1.9	-12.6	-1.6	2.2	0.6
1993	3.8	0.0	3.8	15.2	0.0	15.2	35.7	0.0	35.7	-49.1	0.0	-49.1	17.2	0.0	17.2	78.9	0.0	78.9	-13.9	0.0	-13.9	51.8	0.0	51.8	10.4	0.0	10.4
1994	-10.8	-1.2	-12.0	-10.0	-1.2	-11.2	21.3	-1.6	19.7	-16.7	-1.1	-17.8	4.3	-1.4	2.9	72.1	-2.3	69.8	13.9	-1.5	12.4	43.4	-1.9	41.5	20.4	-1.6	18.8
1995	-40.8	-3.5	-44.3	-22.3	-4.7	-27.0	-28.2	-4.3	-32.5	-18.9	-4.8	-23.7	4.9	-6.3	-1.4	37.7	-8.3	29.4	4.4	-6.3	-1.9	16.7	-7.0	9.7	8.0	-6.5	1.5
Poland																											
1990	-36.9	42.0	5.1	-34.6	43.6	9.0	-27.3	48.4	21.1	-25.6	49.6	24.0	-35.0	43.4	8.4	-46.7	35.6	-11.1	-61.2	25.9	-35.3	-27.9	48.1	20.2	-14.6	57.0	42.4
1991	-16.9	7.8	-9.1	-10.2	8.4	-1.8	-27.6	6.8	-20.8	-21.0	7.5	-13.5	5.1	6.2	11.3	-27.1	6.9	-20.2	-55.2	4.2	-51.0	-11.5	8.3	-3.2	6.6	10.0	16.6
1992	-7.0	0.0	-7.0	14.0	0.0	14.0	-8.7	0.0	-8.7	-19.4	-0.1	-19.5	13.5	0.0	13.5	-2.4	0.0	-2.4	-46.9	0.0	-46.9	-22.3	-0.1	-22.4	20.8	0.0	20.8
1993	23.5	0.0	23.5	5.5	0.0	5.5	61.5	0.0	61.5	-39.7	0.0	-39.7	13.5	0.0	13.5	-7.4	0.0	-7.4	-35.2	0.0	-35.2	18.9	0.0	18.9	55.0	0.0	55.0
1994	0.2	-3.5	-3.3	-3.2	-3.4	-6.6	10.0	-3.8	6.2	17.4	-4.1	13.3	-9.1	-3.2	-12.3	-20.9	-2.7	-23.6	-24.9	-2.6	-27.5	30.1	-4.6	25.5	23.3	-4.3	19.0
1995	-7.0	-15.3	-22.3	19.0	-19.6	-0.6	2.6	-16.9	-14.3	-2.1	-16.1	-18.2	17.6	-19.4	-1.8	6.1	-17.5	-11.4	-17.3	-13.7	-31.0	-8.5	-15.0	-23.5	26.4	-20.9	5.5
Slovakia																											
1990	-17.8	12.4	-5.4	19.8	18.2	38.0	3.7	15.8	19.5	40.6	21.4	62.0	27.5	19.4	46.9	134.7	35.8	170.5	46.4	22.3	68.7	11.7	17.0	28.7	11.3	16.9	28.2
1991	-14.2	21.5	7.3	-20.0	20.0	0.0	-14.1	21.6	7.5	-3.4	24.2	20.8	35.5	15.7	51.2	29.6	32.5	62.1	-5.1	23.7	18.6	-14.1	21.5	7.4	-39.8	15.1	-24.7
1992	-22.7	9.0	-13.7	-0.1	11.6	11.5	-19.6	9.4	-10.2	-22.1	9.1	-13.0	35.5	15.7	51.2	37.6	15.9	53.5	-5.4	10.9	5.5	-16.5	9.7	-6.8	-37.2	7.3	-29.9
1993	3.3	0.0	3.3	4.1	0.0	4.1	34.9	0.0	34.9	-31.2	0.0	-31.2	25.7	0.0	25.7	41.2	0.0	41.2	-2.8	0.0	-2.8	39.9	0.0	39.9	-28.8	0.0	-28.8
1994	-0.4	-5.8	-6.2	-4.7	-5.5	-10.2	33.0	-7.7	25.3	-18.8	-4.7	-23.5	-16.5	-4.9	-21.4	37.1	-7.9	29.2	12.4	-6.6	5.8	26.4	-7.4	19.0	-18.1	-4.8	-22.9
1995	-33.3	-12.2	-45.5	-11.9	-16.1	-28.0	-19.9	-14.7	-34.6	-6.4	-17.1	-23.5	7.4	-19.7	-12.3	30.9	-24.0	6.9	-11.3	-16.2	-27.5	7.9	-19.7	-11.8	8.0	-19.8	-11.8
Slovenia																											
1990	40.9	-30.3	10.6	89.0	-40.6	48.4	81.7	-39.0	42.7	88.2	-40.4	47.8	122.8	-47.9	74.9	137.7	-51.1	86.6	50.9	-32.4	18.5	74.3	-37.5	36.8	35.7	-29.2	6.5
1991	109.7	-17.7	92.0	75.2	-14.7	60.5	87.6	-15.8	71.8	83.8	-15.5	68.3	125.3	-19.0	106.3	68.3	-14.2	54.1	41.8	-12.0	29.8	60.6	-13.6	47.0	21.3	-10.3	11.0
1992	69.0	-13.6	55.4	47.6	-11.8	35.8	88.2	-15.2	73.0	108.4	-16.8	91.6	134.8	-18.9	115.9	72.7	-13.9	58.8	42.0	-11.4	30.6	60.6	-13.0	47.6	27.9	-10.3	17.6
1993	84.4	0.0	84.4	37.4	0.0	37.4	128.7	0.0	128.7	67.3	0.0	67.3	178.3	0.0	178.3	69.2	0.0	69.2	40.8	0.0	40.8	97.2	0.0	97.2	14.4	0.0	14.4
1994	77.9	-4.7	73.2	21.9	-3.2	18.7	136.1	-6.2	129.9	69.2	-4.4	64.8	71.6	-4.5	67.1	80.3	-4.8	78.5	55.9	-4.1	51.8	66.1	-4.4	61.7	14.1	-3.0	11.1
1995	43.2	-26.1	17.1	8.8	-19.8	-11.0	31.9	-24.0	7.9	113.3	-38.8	74.5	107.9	-37.9	70.0	94.0	-35.3	58.7	85.2	-33.8	51.4	46.3	-26.7	19.6	22.7	-22.3	0.4
Romania																											
1990	-16.1	-16.0	-32.1	32.8	-25.3	7.5	-20.4	-15.2	-35.6	-20.7	-15.1	-35.8	5.3	-20.1	-14.8	124.2	-42.7	81.5	3.5	-19.8	-16.3	38.3	-26.4	11.9	36.4	-26.0	10.4
1991	43.1	6.6	49.7	11.6	5.2	16.8	18.0	5.5	23.5	-2.2	4.6	2.4	71.7	8.1	79.8	32.9	6.2	39.1	-39.5	2.8	-36.7	-1.9	4.6	2.7	13.1	5.3	18.4
1992	-25.9	29.4	3.5	-4.3	38.0	33.7	-38.3	24.5	-13.8	-33.1	26.5	-6.6	12.8	44.8	57.6	-20.0	31.7	11.7	-13.4	34.4	21.0	-6.9	37.0	30.1	19.5	47.5	67.0
1993	55.6	0.0	55.6	63.4	0.0	63.4	62.9	0.0	62.9	-32.6	0.0	-32.6	64.6	0.0	64.6	47.1	0.0	47.1	-19.5	0.0	-19.5	67.5	0.0	67.5	49.1	0.0	49.1
1994	23.0	-7.1	15.9	5.2	-6.0	-0.8	30.4	-7.4	23.0	-31.5	-3.9	-35.4	0.7	-5.7	-5.0	71.2	-9.7	61.5	-23.0	-4.4	-27.4	30.4	-7.5	22.9	70.5	-9.8	60.7
1995	-28.8	-7.1	-35.9	-24.6	-7.5	-32.1	-21.1	-7.8	-28.9	-30.8	-6.9	-37.7	-8.2	-9.1	-17.3	75.6	-17.4	58.2	-17.2	-8.2	-25.4	16.9	-11.6	5.3	76.1	-17.5	58.6
Estonia																											
1990	77.3	-17.7	59.6	115.0	-21.5	93.5	147.7	-24.7	123.0	-	-	-	-	-	-	180.9	-28.0	152.9	135.9	-23.6	112.3	107.9	-20.8	87.1	182.8	-28.3	154.5
1991	458.6	-214.1	244.5	161.0	-100.1	60.9	215.1	-120.8	94.3	-	-	-	-	-	-	139.7	-91.9	47.8	76.8	-67.8	9.0	118.6	-83.8	34.8	45.6	-55.8	-10.2
1992	-10.8	99.6	110.4	-37.0	92.8	55.8	-45.3	80.4	35.1	0.8	148.5	149.3	-12.3	129.0	116.7	-51.9	70.8	18.9	-81.2	27.6	-53.6	-68.2	46.9	-21.3	-57.9	62.0	4.1
1993	-22.0	36.3	14.3	-41.4	27.3	-14.1	-21.5	36.6	15.1	-26.8	34.1	7.3	-0.4	46.4	46.0	-33.7	30.9	-2.8	-42.6	26.8	-15.8	-11.7	41.2	29.5	-17.0	38.7	21.7
1994	-16.9	0.0	-16.9	-47.6	0.0	-47.6	-20.9	0.0	-20.9	-17.1	0.0	-17.1	31.1	0.0	31.1	-22.6	0.0	-22.6	-31.8	0.0	-31.8	17.9	0.0	17.9	11.0	0.0	11.0
1995	-16.6	-24.7	-41.3	-15.5	-25.0	-40.5	0.6	-29.8	-29.2	13.5	-33.6	-20.1	29.3	-38.3	-9.0	6.8	-31.6	-24.8	-28.6	-21.2	-49.8	-2.0	-29.0	-31.0	35.7	-40.2	-4.5
Latvia																											
1990	52.9	-	-	103.9	-	-	131.2	-	-	178.6	-	-	127.9	-	-	175.4	-	-	108.5	-	-	128.4	-	-	123.4	-	-
1991	311.3	-236.3	75.0	192.9	-168.3	24.6	285.2	-221.3	63.9	-4.0	-55.1	-59.1	354.2	-260.9	93.3	117.0	-124.7	-7.7	75.3	-100.7	-25.4	137.2	-136.2	1.0	65.2	-94.9	-29.7
1992	-35.9	162.4	126.5	-38.7	155.2	116.5	-39.8	152.4	112.6	-8.6	231.6	223.0	22.5	310.2	332.7	-64.6	89.7	25.1	-86.7	33.7	-53.0	-68.5	79.6	11.1	-77.4	57.1	-20.3
1993	-34.6	39.1	4.5	-46.1	32.3	-13.8	-28.4	42.9	14.5	-33.8	39.5	5.7	59.5	95.4	154.9	-38.5	36.8	-1.7	-76.5	14.1	-62.4	17.0	69.9	86.9	-1.2	59.2	58.0
1994	-19.7	0.0	-19.7	-41.1	0.0	-41.1	-9.2	0.0	-9.2	-25.1	0.0	-25.1	42.2	0.0	42.2	-18.5	0.0	-18.5	-52.5	0.0	-52.5	63.1	0.0	63.1	47.4	0.0	47.4
1995	-15.5	-18.9	-34.4	-37.0	-14.1	-51.1	-32.9	-15.1	-48.0	-23.8	-17.1	-40.9	40.4	-31.5	8.9	-4.8	-21.3	-26.1	-44.3	-12.5	-56.8	27.9	-28.7	-0.8	42.6	-32.0	10.6

```
Lithuania
1990       86.5  -68.9   17.6    141.0  -89.1   51.9    196.4 -109.5   86.9    335.0 -160.7  174.3    140.9  -89.0   51.9    156.7  -94.8   61.9    104.3  -75.5   28.8    135.0  -86.8   48.2    153.7  -93.7   60.0
1991      -73.8  139.6   65.8    -76.9  123.1   46.2    -68.5  167.7   99.2    -70.1  159.2   89.1    -53.1  250.0  196.9    -87.4   77.3  -20.1    -85.0   80.1   -4.9    -82.2   95.0   12.8    -82.4   93.7   11.3
1992      -55.4  120.4   65.0    -55.3  120.8   65.5    -54.9  121.9   67.0     35.4  365.9  401.3     59.2  430.4  489.6    -73.6   71.5   -2.1    -86.2   37.2  -49.0    -74.5   68.8   -5.7    -67.8   87.1   19.3
1993      -42.8   47.7    4.9    -43.6   46.9    3.3    -21.5   65.4   43.9    -65.2   29.1  -36.1     52.1  126.7  178.8    -53.7   38.7  -15.0    -63.7   30.2  -33.5     13.2   94.2  107.4     -7.8   76.9   69.1
1994      -37.2    0.0  -37.2    -51.1    0.0  -51.1    -20.6    0.0  -20.6    -27.2    0.0  -27.2     11.6    0.0   11.6    -52.5    0.0  -52.5    -48.9    0.0  -48.9     34.3    0.0   34.3     50.0    0.0   50.0
1995      -15.3  -22.1  -37.4    -27.0  -21.6  -48.6    -15.8  -21.9  -37.7     -7.3  -24.1  -31.4     53.5  -39.9   13.6    -27.2  -18.9  -46.1    -41.5  -15.2  -56.7      8.1  -28.1  -20.0     49.3  -38.8   10.5
```

+ For the Baltic states (Estonia, Latvia and Lithuania) ExPR94 and APR94.

* Sunflowerseed instead of rapeseed for Hungary, Bulgaria and Romania, and coarse grains instead of maize for the Baltic states.

Table 3. APR93s vs. PSEs

Hungary	APR93s (%)				PSEs (%)		
	1990	1991	1992		1990	1991	1992
Wheat	-2	8	-27		-15	16	4
Maize	38	6	-11		31	19	-3
Barley	28	14	-14		–	–	–
Rapeseed*	50	18	-21		-22	-2	-35
Sugarbeet	33	26	35		49	72	56
Milk	116	64	42		50	38	33
Beef and veal	25	-6	-21		39	33	26
Pork	28	-7	-13		14	-13	-7
Poultry	36	18	1		36	25	14
Sheep	–	–	–		11	-11	-20
Eggs	–	–	–		30	24	37
ALL COMMODITIES	39	12	-5		22	15	8

Poland	APR93s (%)				PSEs (%)			
	1990	1991	1992	1993	1990	1991	1992	1993
Wheat	5	-9	-7	24	-49	-48	8	24
Maize	9	-2	14	6	-43	22	40	31
Barley	21	-21	-9	62	6	-6	3	37
Rapeseed	24	-14	-20	-40	-35	-17	21	4
Sugarbeet	8	11	51	14	20	41	31	19
Milk	-11	-20	-2	-7	-64	-20	7	-5
Beef and veal	-35	-51	-47	-35	-54	-22	-37	7
Pork	20	-3	-22	19	29	10	27	10
Poultry	42	17	21	55	22	53	62	75
Sheep	–	–	–	–	-8	-24	13	11
Eggs	–	–	–	–	-6	40	19	15
ALL COMMODITIES	6	-12	-11	14	-18	-3	15	16

Czech Republic	APR93s (%)					PSEs (%)				
	1990	1991	1992	1993	1994	1990	1991	1992	1993	1994
Wheat	-13	3	-25	-12	-23	15	44	-4	14	4
Maize*	40	-4	11	4	-11	43	38	6	29	23
Rye	–	–	–	–	–	78	67	47	26	-3
Barley	24	-6	-11	20	11	33	32	2	29	26
Oats	–	–	–	–	–	53	47	9	34	28
Potatoes	–	–	–	–	–	51	72	54	2	59
Rapeseed	65	0	-7	-29	-25	54	45	19	-1	2
Sugarbeet	50	78	72	36	-18	56	69	49	37	-3
Milk	175	58	52	42	22	72	58	45	41	33
Beef and veal	72	15	1	-3	7	54	41	13	10	15
Pork	31	10	-6	30	3	41	40	25	46	39
Poultry	30	-3	-9	-9	-12	45	42	26	26	23
Eggs	–	–	–	–	–	27	25	14	-3	16
ALL COMMODITIES	81	23	12	19	3	51	48	27	28	26

* Sunflowerseed for Hungary and coarse grains for the Czech Republic.
Sources: Tables 1 and 2, OECD (1994), OECD (1995b), and OECD (1995c).

16

Figure 1: Average Protection Rates for CEC Agriculture, 1991-1995 (*)
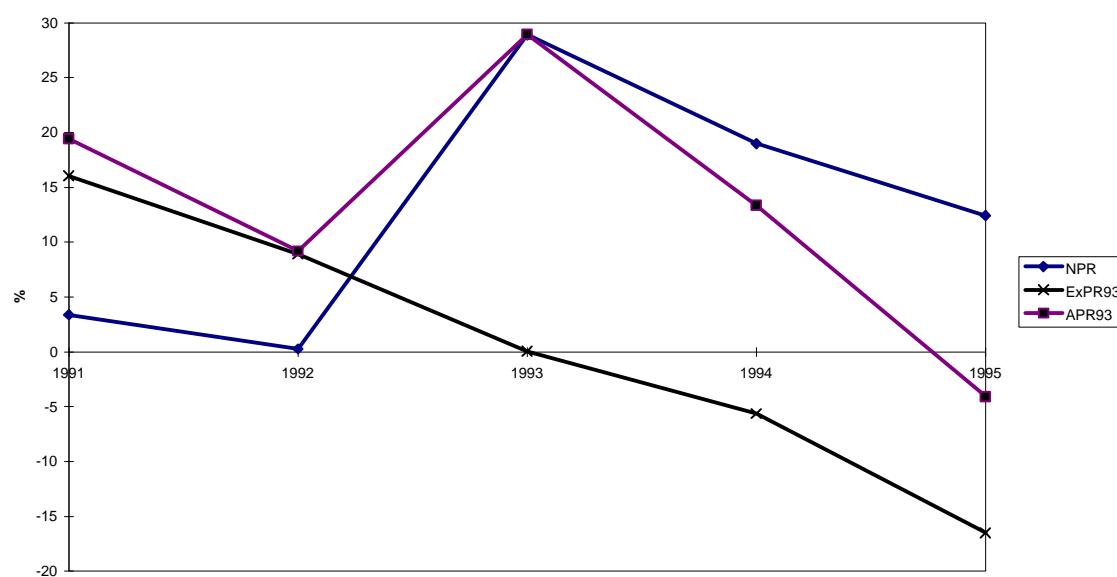
(*)   Bulgaria, Czech Republic, Hungary, Poland, Romania, Slovakia and Slovenia.

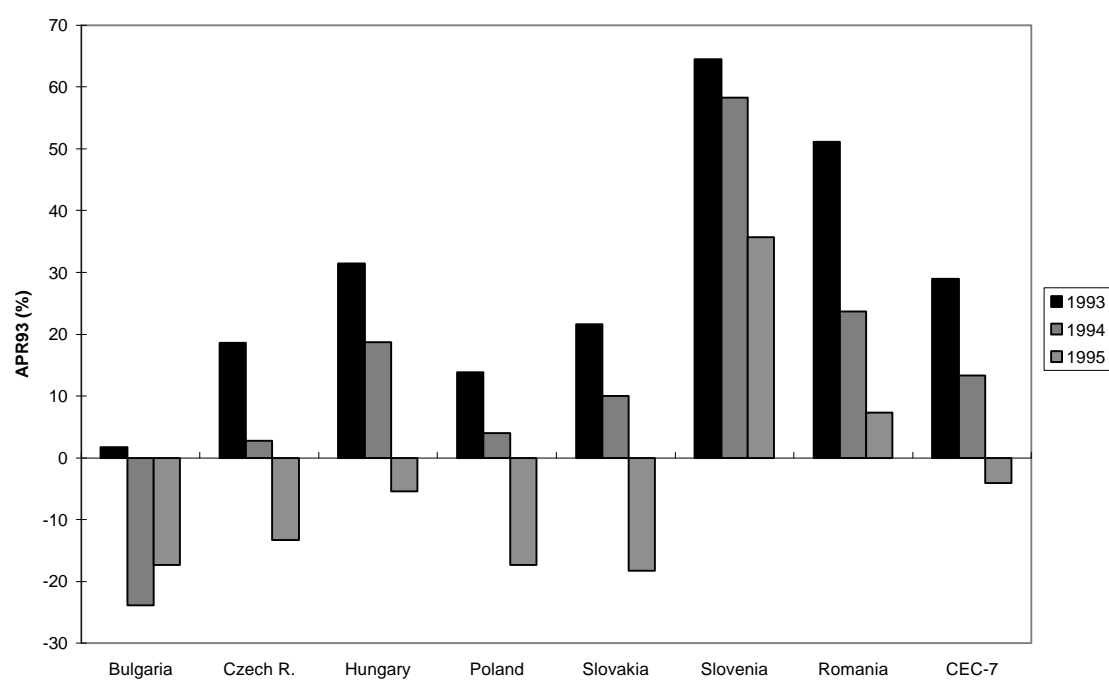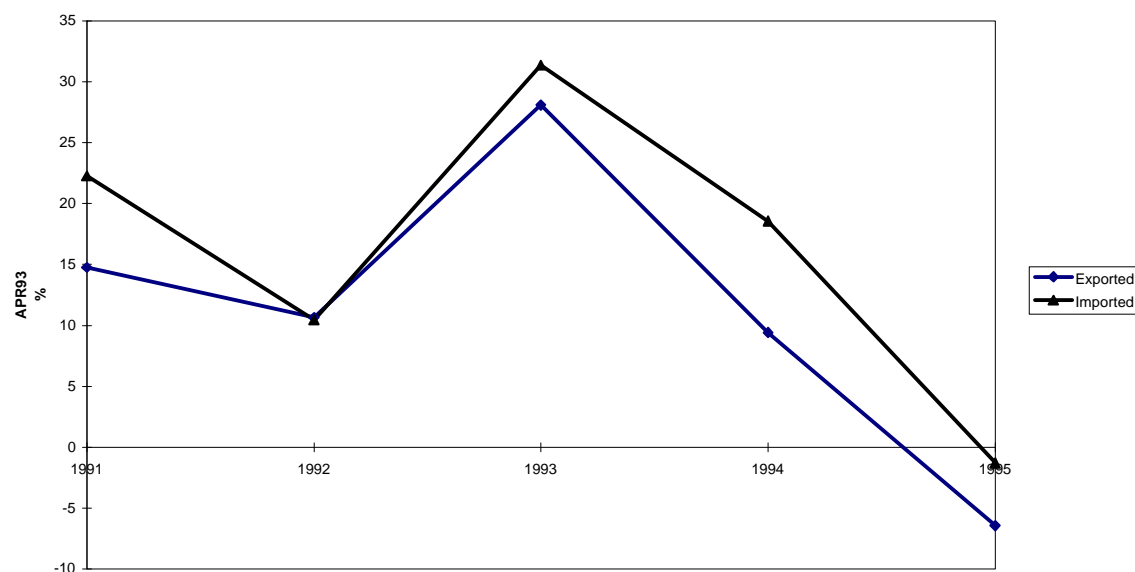**Figure 2: Average Agricultural APR93 in CECs, 1993-1995 (*)**

Figure 3: APR93 for Imported and Exported CEC Agricultural Products, 1991-1995

(*)   Bulgaria, Czech Republic, Hungary, Poland, Romania, Slovakia and Slovenia.

Figure 4: Average APR93 for Export, Import and Total in 1995.
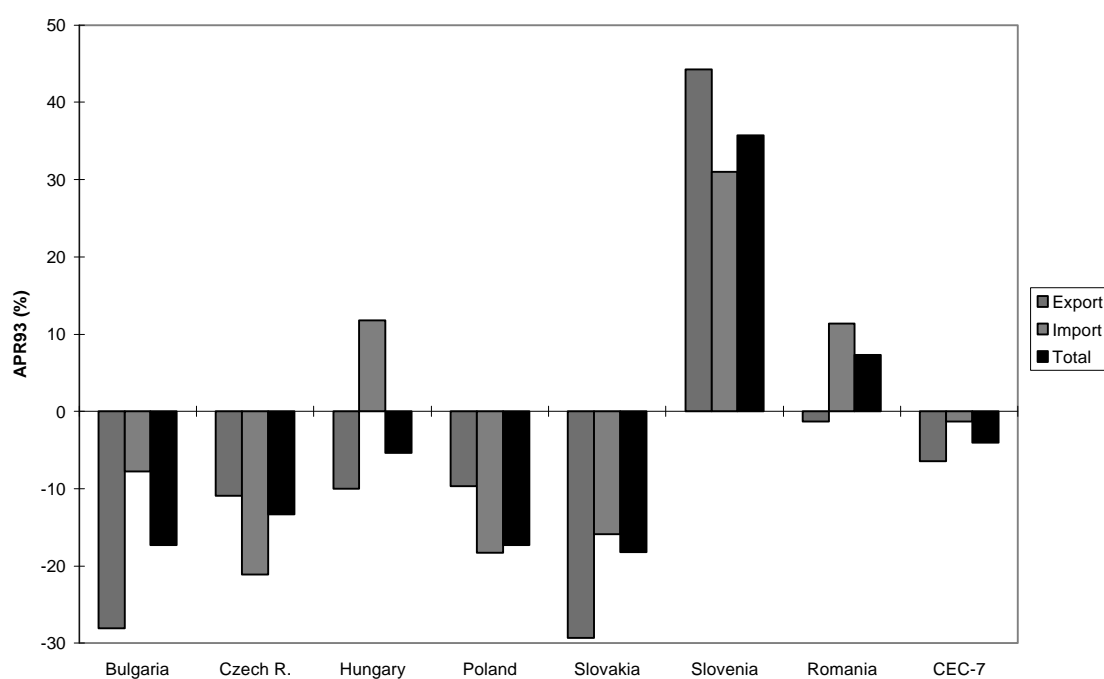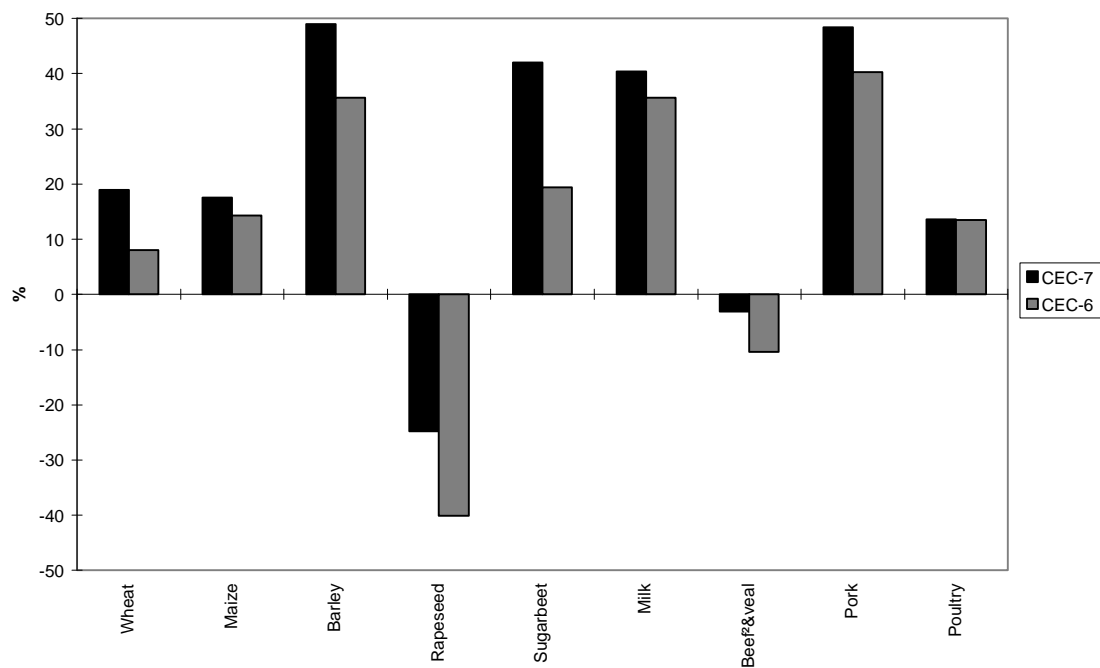

Figure 5: Average 1993 NPRs for CECs by Commodities (*)

(*)   CEC-7: Bulgaria, Czech Republic, Hungary, Poland, Romania, Slovakia and
       Slovenia.
       CEC-6: Bulgaria, Czech Republic, Hungary, Poland, Romania and Slovakia.

Figure 6: NPR and APRs for 1993 on the basis of 1992 and 1994 Equilibrium Exchange Rates