

European Union Enlargement: What are the Agricultural Trade Models Missing?

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1. Introduction

In North America, Asia, South America and Europe, international commerce is increasingly characterized by regional trading arrangements between nations. Examples include the North American Free Trade Agreement (NAFTA) between the United States, Canada, and Mexico, the Asia Pacific Economic Council (APEC) between several East Asian and Pacific countries, and MERCOSUR in Latin America. The European Union (EU), consisting of fifteen countries¹ in Western Europe stands out as the largest customs union in the world. The European Single market established in 1992 removed all barriers to the movement of goods and factors in the EU.

The turn of the century may witness a further enlargement of the EU with the proposed accession of the ten Central and East European Countries (CEECs) to form the EU-25. Negotiations are underway and Europe Agreements are currently in operation between the EU and the nine CEECs - Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, and Slovak Republic - with Slovenia poised to follow. The eastward expansion of the EU is extremely topical for Europe watchers, regional integration analysts, politicians and bureaucrats, besides the citizens of the member nations themselves. What makes this economic integration exercise so special are the huge economic disparities between the CEECs as a group and the EU. Also the individual CEECs face an ongoing process of

¹ The evolution of the European Union spans many decades - Belgium, France, Germany, Italy, Luxembourg, and the Netherlands as the six founding members in 1957 were joined by Denmark, Ireland, and the United Kingdom in 1973, by Greece in 1981, by Portugal and Spain in 1986 (EU-12), and finally by Austria, Finland, and Sweden in 1995 (EU-15).

massive political, structural, and economic transformation dating from the fall of the Soviet Union. Finally, eastward enlargement of the EU has implications for reform of the Common Agricultural Policy (CAP) and implementation of the Uruguay Round Agreement in Agriculture (URAA).

The purpose of this paper is to quantify the potential impact of an EU enlargement on the EU-15, the CEECs and the rest of the world. Since most studies to date have only considered the implications of *agricultural* integration (Tangermann and Josling; Anderson and Tyers; European Commission), we offer a pair of simulations designed to identify the impact of ignoring the non-agricultural side of integration.

2. Background

To better appreciate the background under which this integration is proposed, we present a comparison of the macroeconomic and agricultural situation in seven individual CEECs, the CEEC-7 as a group², and the EU-15 in Table 1. An enlargement of the EU-15 to include the CEEC-7 will increase the combined population of the EU by 26%, land area by 28%, and GDP by a meager 3%. The richest among the CEECs are poorer than the poorest among the EU-15. Agriculture is far more important to the economy of the CEECs, contributing to 7.6% of GDP, thrice as large as the comparable statistic for the EU-15. It also employs a very large

² The CEEC-7 is the average/aggregate of the seven countries - Bulgaria, Czech Republic, Hungary, Poland, Romania, Slovak Republic, and Slovenia. The Central European Free Trade Area (CEFTA) includes Slovenia and the four Visegrad countries of Czech Republic, Hungary, Poland, and the Slovak Republic. Bulgaria and Romania comprise of the Balkan countries. All further analyses are carried out for the CEEC-7.

share of the labor force (22.5%), compared with only 5.7% for the EU-15. Sugar and cereal yields in the CEEC-7 are less than two-thirds of the EU-15 and milk yields are even lower.

Table 1. A Comparison of Key Statistics for the EU-15 and the CEEC-7 in 1993

Country	Pop.		GDP		Area		Agriculture			Yield ^a		
	(mil)	(bil ECU)	(ECU)	Per capita	Total	Agricultur	Production	Employment	Cereals	Oilseeds	Sugar	Milk
				(million ha.)	(% GDP)	(% labor)	(tonnes/ha.)	(kg./cow)				
Poland	38.5	73.4	1907	31.3	18.6	6.3	25.6	2.6	2.0	3.3	3083	
Hungary	10.3	32.5	3150	9.3	6.1	6.4	10.1	3.9	1.6	4.3	4762	
Czech Republic	10.3	26.7	2586	7.9	4.3	3.3	5.6	4.1	2.1	4.1	4057	
Slovak Republic	5.3	8.7	1643	4.9	2.4	5.8	8.4	4.3	1.8	3.8	2253	
Slovenia	1.9	9.8	5018	2.0	0.9	4.9	10.7	5.1	1.7	4.6	2676	
CEFTA ^b	66.4	151.1	2277	55.4	32.3	5.5	22.1	3.2	1.8	3.6	3275	
Romania	22.7	21.8	961	23.8	14.7	20.2	35.2	2.9	1.2	2.7	2000	
Bulgaria	8.5	9.4	1110	11.1	6.2	10.0	21.2	3.0	1.2	1.6	2709	
BALKAN ^c	31.2	31.2	1001	34.8	20.9	18.0	32.9	2.9	1.2	2.6	2155	
CEEC-7	97.6	182.3	1868	90.2	53.2	7.6	22.5	3.1	1.5	3.5	2991	
EU-15	369.7	5905.1	15972	323.4	138.1	2.5	5.7	4.9	2.0	7.6	5156	
CEEC-7/EU-15 (%)	26	3	12	28	38	304	395	63	75	46	58	

^a Yield figures are for the year 1994.

^b CEFTA represents the average/total for Poland, Hungary, Czech Republic, Slovak Republic, and Slovenia.

^c BALKAN represents the average/total for Romania and Bulgaria.

Source: European Commission.

The EU-15 is the dominant trade partner of the CEEC-7, accounting for 8.53% of total sales and 9.96% of all purchases made. The EU-15 is far less reliant on the CEEC-7 or on the other partners. The CEEC-7 accounts for less than 0.5% of the EU-15's total sales/purchases (Hertel, Brockmeier, and Swaminathan, Table 2).

Levels of Agricultural and Non-agricultural Protection

Agricultural policy in the EU is characterized by a high level of protection and support. Rising budgetary costs and the pressure of the on-going Uruguay Round (UR) forced the EU to undergo a fundamental reform of the CAP in 1992. Agricultural policies in the CEECs have also shown significant volatility in the last five years due to their transition to market-oriented economies and also in anticipation of their potential EU membership, notwithstanding the substantial differences in the agricultural policies of the individual CEECs.

Figure 1 presents the export and import border wedges for wheat, cereals, meats, and milk for the CEEC-7 and the EU, using the most recent information from the OECD and the European Commission. On average, wheat exports are taxed to the tune of 17% in the CEEC-7 but subsidized in the EU-12 by 43%. Both regions tax imports of wheat, cereal, and meat but subsidize cereal and meat exports. The CEEC-7 taxes milk exports and subsidizes imports, while the opposite is true of the EU-12.

In contrast to agriculture, non-agricultural protection is higher in the CEEC-7 than in the EU-12 (Figure 2). Since accession of the CEECs to the EU did not occur until well into the implementation of the UR agreement, we use the post-UR tariffs presented in Figure 2 as our starting point for non-agricultural protection immediately prior to integration.

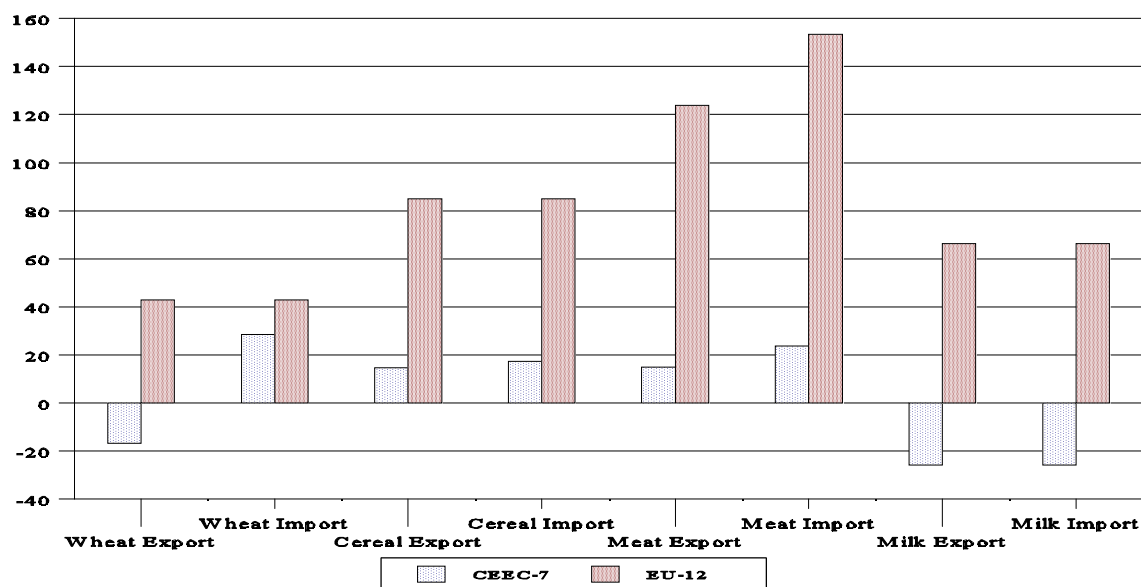


Figure 1: Estimated Level of Agricultural Border Protection in the CEEC-7 and the EU-12 in 1994 (Percent)

Source: European Commission and OECD.

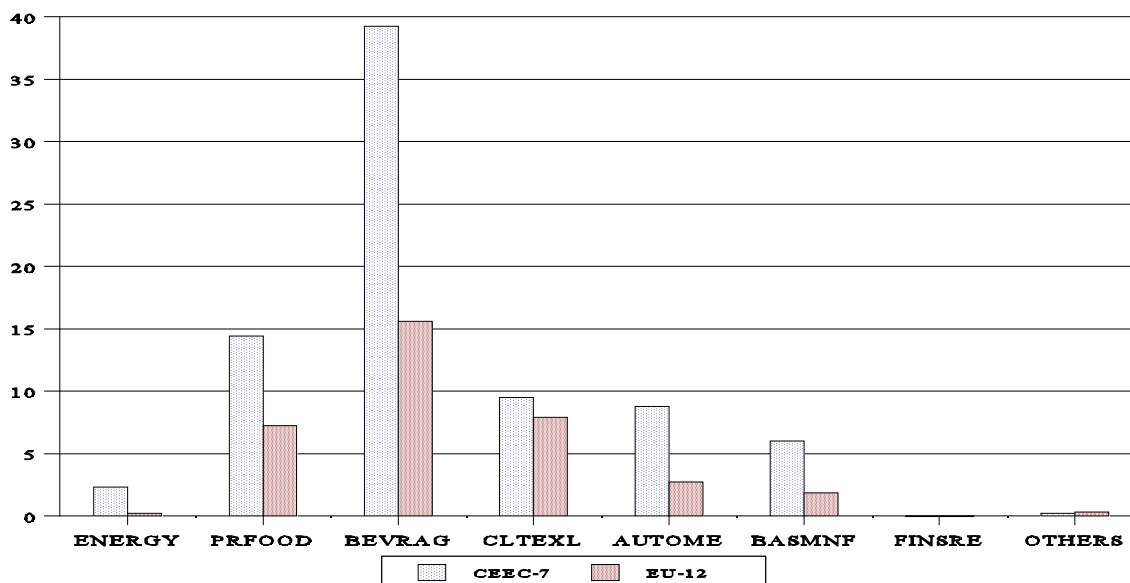


Figure 2: Post-Uruguay Round Levels of Non-agricultural Tariffs in the CEEC-7 and the EU-12 (Percent)

Source: GTAP data base, version 3.

3. Methodology and Experimental Design

We employ a modified version of an applied general equilibrium model known as GTAP (Hertel). The Global Trade Analysis Project model is a relatively standard, multiregion model which is currently used by many researchers. In this paper, we employ an extension to the standard GTAP model which permits monopolistic competition in a subset of the industries, modeling both scale and varietal effects (Swaminathan and Hertel). Furthermore, since accession to the EU involves participation in the EU budget, we introduce an accounting entity known as “Brussels”. Brussels collects revenues from the member countries, consisting of import duties and a GDP-based component, and disburses this to finance their food and agricultural export and output subsidies. We aggregate the full 37-sector, 30-region GTAP data base (version 3) up to 13-sectors and 9-regions³, preserving maximum disaggregation for Europe and for the agricultural sectors.

CEEC-7 Accession to the EU-15 In the base case, denoted *EU*, we remove *all* trade barriers between the CEEC-7 and the EU-15⁴ regions. CEEC-7 import protection with respect to third countries is harmonized with the EU-12’s rates and it participates in the EU budget.

³ The 13 sectors are - wheat (WHEAT), cereal (CEREAL), other crops (OCROPS), milk products (MILKPR), livestock (LIVSTK), energy (ENERGY), processed food (PRFOOD), beverages and tobacco (BEVRAG), auto, machinery, and equipment (AUTOME), basic manufactures (BASMNF), finance, insurance, and real estate (FINSRE), and all other sectors (OTHERS). The 9 regions are - Central European Associates (CEEC-7), European Union 12 (EU-12), Austria, Sweden, and Finland (EU3), Former Soviet Union (FSU), United States (USA), Middle East and North Africa (MEA), European Free Trade Area (EFT), High Income Countries (HIC), and Low Income Countries (LIC). We treat the AUTOME sector as the monopolistically competitive sector.

⁴ Since the version 3 GTAP data base precedes the formation of the EU-15, we first integrate the EU3 in to the EU-12 to form the EU-15. We also implement the UR tariff cuts, a 36% cut in export subsidies, and abolish all bilateral quotas on clothing trade for all regions. For agriculture, we substitute the improved protection estimates summarized in Figure 1.

CEEC-7 Accession to the EU-15 Leaving Non-agriculture Out: Many studies of EU integration have focused only on agriculture. To explore the consequences of this, we conduct ***E2***, which is same as E1 but without any change to non-agricultural protection. A comparison of E1 and E2 will assist us in identifying what these previous studies might be missing.

4. Results

For better exposition of results, we report the simulation results for the following regions: CEEC-7, EU-15 (an aggregate of EU-12 and EU-3 regions), and ROW (an aggregate of the remaining six regions). All values are presented in millions of ECU using an exchange rate of 1 ECU = 1.29809 US \$, for the year 1992 (Eurostat).

Impact on Output

Table 2 presents the changes in sectoral output in the CEEC-7, EU-15, and ROW regions due to integration under alternative scenarios. Under the base case (E1), all the agricultural sectors in the CEEC-7 increase production greatly following integration. These increases are in rough proportion to the differential between current protection levels in the CEEC-7 and the EU-12 (see Figure 1). This dramatic expansion in the agricultural sectors diverts resources from the rest of the economy, and output falls in all of the non-agricultural sectors, excepting for clothing and textiles. In sum, economic integration results in a ~~supply~~ *specialization* between the two regions, whereby the CEECs supply more agricultural products and more manufacturing / services are supplied by the current members of the EU. Adjustments in ROW are very small.

In the alternative scenario, omitting harmonization or free trade in non-agriculture (E2), CEEC-7 agricultural output increases are slightly higher than the base case, indicating that previous agriculturally focused studies are not likely to be significantly in error here. The output changes in the non-agricultural sectors follow a different pattern. The BASMNF sector contracts more and the AUTOME sector contracts less, though experiencing the same protection differential. The clothing sector also contracts as a result of lack of liberalization with respect to EU-15 imports.

Impact on World and Bilateral Trade Volumes

Table 3 displays the change in world trade volumes, by commodity and region. In the base case, the largest increases in trade volumes are in the agricultural sectors, followed by the non-agricultural sectors. When non-agricultural trade is not liberalized in the CEEC-7, the world trade volume changes are negligible in these sectors. Therefore, it is not surprising that the increase in trade volume is also much lower in E2. Furthermore, the increase in CEEC-7 exports is now much lower -- only 4.81% vs. 20.27% in E1.

Economic integration is a very big event for the CEEC-7, but fairly modest for the EU-15, due mainly to the economic disparities between the two regions (Table 1). Omitting non-agriculture from the integration causes one to miss this important point and underestimate its significance. Table 4 reports aggregate bilateral trade volumes between the three regions. Intra-regional trade within the enlarged EU -- CEEC-7 to EU-15 and EU-15 to CEEC-7 -- is stimulated by integration. This increase is much smaller in E2, underscoring the importance

Table 2. Impact of Integration on Output (percent change)

Commodity	CEEC-7		EU-15		ROW	
	E1	E2	E1	E2	E1	E2
WHEAT	22.43	23.41	-0.61	-0.61	-0.40	-0.40
CEREAL	33.03	34.21	-1.82	-1.87	-0.31	-0.31
OCROPS	10.35	10.70	-0.65	-0.67	-0.20	-0.19
MILKPR	72.64	73.71	-2.18	-2.21	-1.51	-1.55
LIVSTK	53.54	53.70	-3.46	-3.50	-0.68	-0.68
ENERGY	-3.44	-3.57	0.02	0.06	0.05	0.03
PRFOOD	-1.47	-0.79	-0.12	-0.21	-0.05	-0.03
BEVRAG	-17.64	-6.53	0.76	0.24	0.08	0.07
CLTEXTL	0.50	-14.32	0.91	0.88	-0.21	0.11
AUTOME	-23.82	-17.32	0.44	0.36	0.06	0.02
BASMNF	-3.54	-7.37	0.17	0.22	0.01	0.05
FINSRE	-5.17	-4.98	0.08	0.09	0.03	0.01
OTHERS	-1.96	-1.12	0.03	0.03	0.02	0.02

Table 3. Impact on World Export Volumes by Commodity and Region (percent change)

Commodity	Scenario		Region	Scenario	
	E1	E2		E1	E2
WHEAT	0.69	0.74	CEEC-7	20.27	4.81
CEREAL	0.63	0.67	E_U	1.38	0.62
OCROPS	1.23	1.18	EU3	0.29	0.19
MILKPR	7.53	7.75	FSU	-0.32	-0.25
LIVSTK	14.24	14.38	USA	0.02	0.02
ENERGY	0.19	0.01	MEA	0.05	0.09
PRFOOD	1.36	0.28	EFT	-0.01	0.06
BEVRAG	3.81	0.24	HIC	-0.05	-0.01
CLTEXTL	1.17	-0.02	LIC	-0.06	0.04
AUTOME	0.58	0.07			
BASMNF	0.48	-0.05			
FINSRE	-0.02	0.00			
OTHERS	0.26	0.10			
ALL	0.71	0.27			

Table 4. Impact of Integration on Bilateral Trade Volumes (percent change)

Source	Experiment	Destination		
		CEEC-7	EU-15	ROW
CEEC-7	E1	-2.16	33.37	-1.77
	E2	-0.20	7.77	-0.32
EU-15	E1	32.09	-0.13	0.02
	E2	10.40	-0.08	0.32
ROW	E1	2.44	-0.35	-0.01
	E2	3.91	-0.06	-0.01

Source: Authors' simulation results.

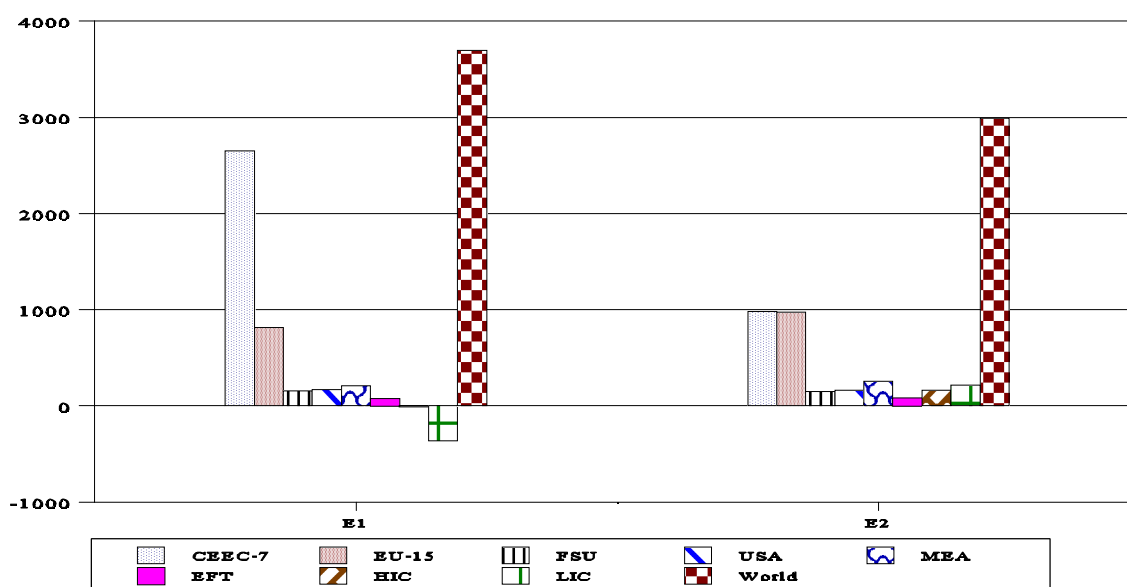


Figure 3: Impact on Regional Welfare (change in millions of 1992 ECU per year)

Source: Authors' simulation results.

of non-agricultural sectors in the overall integration process. In E2, ROW displaces to some extent, trade within the enlarged EU.

Impact on Regional Welfare

Figure 4 presents the welfare implications of the two regional integration experiments conducted in this paper. In the base case, the clear winner from integration is the CEEC-7 region, with a welfare gain of 2,650 million ECU. This region gains largely from its improved terms of trade in the world market and from the net transfer it receives from the integrated EU budget. (This does not include any structural aid funds which might be forthcoming in the wake of accession to the EU.) The EU-15 also gains from integration to the tune of 816 million ECU. This gain represents the combination of losses due to the transfer of funds to the CEEC-7 and deteriorating terms of trade on the one hand, and gains from improved

efficiencies as output falls in the heavily protected/subsidized agricultural sectors on the other. The positive total indicates that the latter effect dominates. The welfare effects in the non-integrating regions are more modest. The low income countries lose in this scenario⁵. In sum, leaving non-agriculture out results in smaller global gains. CEEC-7 gains are also much smaller at only 37% of the base case levels⁶. EU-15 gains are slightly overestimated at 973 million ECU.

5. Implications

This paper has sought to bring an empirical, multiregion, general equilibrium framework to bear in an analysis of the likely effect of expanding the European Union to the east. In particular, we have employed an extension to the GTAP model to view two different integration scenarios. In both cases, we begin from the post-Uruguay Round protection levels. For the agricultural commodities, we take the latest protection estimates from the European Commission and OECD sources. Integration is simulated by a harmonization of agricultural export subsidies and border protection for all commodities, and the complete elimination of all bilateral trade barriers between the CEEC-7 and EU-15 regions.

We find that agricultural production in the CEEC-7 increases greatly following integration accommodated by falling outputs in the other sectors. This paper indicates that there is both good news and bad news for the partial equilibrium agricultural trade modelers.

⁵ In our earlier work (Hertel, Brockmeier, and Swaminathan) we have shown that LIC loss turns into a gain when integration is combined with CAP reform.

⁶ In E2, we control for the transfer effects by keeping net transfer from the EU budget to the CEEC-7 region due to agriculture constant.

Focusing only on agriculture does remarkably well in estimating agriculture-specific production and trade changes. If this is the main focus of an analysis, the partial equilibrium models are surely preferable, since they permit greater disaggregation of commodities and regions. However, omitting non-agriculture from the integration scenario does result in a serious underestimation of aggregate world and CEEC-7 trade volumes. Changes in bilateral trade between the two integrating regions -- CEEC-7 and EU-15 -- are also considerably downplayed. Finally, we find that the CEEC-7 region is the largest gainer from the integration. However this point is missed when we focus only on agriculture in the integration analysis, since the CEEC-7 welfare gains are greatly understated in that case.

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