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Trade Effects From The Integration Of The Central And East European Countries Into The European Union

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TRADE EFFECTS FROM THE INTEGRATION OF THE CENTRAL AND EAST EUROPEAN COUNTRIES INTO THE EUROPEAN UNION

1. INTRODUCTION

The integration of the Central and East European countries (CEECs) into the European Union poses challenges that, in many ways, are far greater than those posed by the earlier expansions of the European Community. The gap between the income levels of the current members of the EU and the CEECs is greater than that with Spain and Portugal at the time of their accession, for example, while the agricultural sectors of the CEECs will be far more problematic for European agricultural policy than was the case with earlier expansions. In addition, the economic policy reach of the EU is greater than the EC, with consequences for the legal and regulatory environment of prospective new members. For these reasons, the process of accession will force (and in important areas already has forced) force substantial change within the CEEC economies. If managed properly, these changes offer important opportunities for the region.

At the same time, the prospect of enlargement is also forcing change on the current EU Member States. The actual probability and timing of membership for individual candidates depends, of course, on the relatively complicated pseudo-calculus of the costs and benefits of eastern enlargement, as understood by the powers-that-be in Brussels. [1] It also hinges on the ability of current Members to improve the unwieldy decision-making

[1] As Baldwin et al (1997) have argued from behind a raft of econometric estimates of budget costs and computable general equilibrium estimates of macroeconomic effects, the direct economic consequences of Eastern enlargement for the current 15 EU Members are likely to be rather slight, at most. Of course, reaching such a conclusion does not require the complexities of a computable general equilibrium model. The CEEC economies amount, together, to roughly 5 percent of the size of the EU, measured in terms of GDP. Hence, even if the EU were to make massive net transfers to the CEECs (say on the order of 10% of annual CEEC GDP), this would still amount to below one half of one cent of EU GDP. Recent experience,

mechanics of the EU before new Members are taken in. Beyond institutional restructuring, elements that will determine the pattern of accession include the economic consequences for the East, the political consequences for Europe's slowly emerging post-Cold War policy architecture, the economic consequences for individual sectors (like agriculture and textiles), and the interaction of economic and political consequences outside the EU for labor markets (through migration from the East) and investor confidence (through heightened or reduced political uncertainties). At this point, for example, proposals are being floated for a waiting period of perhaps five years between initial membership and the actual extension to new member populations of the right to work in current EU states.

While the invitation list and schedule from Brussels for the Eastern enlargement party will depend in large part on political considerations, economic analysis still has an important role left to play. This involves assessment of the mechanics of EU enlargement. This if true for 2 reasons. The first is that, while enlargement may not loom large in the macroeconomy of Western Europe, it does loom large for individual sectors. In agriculture, for example, the potential scale of CEEC agricultural production (especially under the current regime) renders current agricultural policy in the EU unsustainable. (Then again, mad cows may have already rendered EU agricultural policy a fatal blow.) The second reason relates to the CEEC economies themselves. They may be small relative to the economic weight of the EU15. By the same measure, however, membership promises strong pressures to restructure the pattern of production within the CEEC economies.

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including Ireland and Portugal, suggests that for institutional reasons, 5 % of GDP is the effective upper bound for absorption of income transfers from the EU.

Viewed in the context of the big questions surrounding enlargement, the purpose of this paper is rather modest. It is concerned with the trade consequences of enlargement. While this is only one of many issues for current and new Members, it is one of the more important ones for third countries. Objections to enlargement from outside the EU are likely to hinge on worries about trade diversion effects. Other concerns relate to the implications of a partial enlargement, where some countries are taken in and others are not. We therefore focus on two issues: the impact on third countries of a full enlargement; and the implications for CEEC countries left out of enlargement if the process is (at least initially) only a partial enlargement. To this aim, we employ a computable general equilibrium model of the world economy.

This paper is organized as follows. As a starting point, emphasis is placed in the next section on the trade aspects of the economic and policy environment in which enlargement is likely to take place. In part, this relates to differences in export and protection structures. The model itself is then described in Section 3. This is followed by actual experiments in Section 4. Conclusions are offered in Section 5.

2. TRADE AND PROTECTION

Trade flows

According to the most recent WTO figures, the EU15 sold about $111 billion to the CEECs and CIS states in 1999. It bought slightly less from them, for a slight surplus of $1.3 billion. This trade covers a broad range of goods and includes a great deal of two-way trade in similar products. Reflecting the steps taken so far toward full membership in the EU, there have been some noticeable trends in recent years. For example, in the

three years from 1997 to 1999, the EU-CEEC trade in automotive products has shifted from one of EU surplus to rough parity. In 1997, the EU exported $11.34 billion to the CEECs, and imported $6.04 billion. By 1999, the EU exported $10.4 billion, and imported $11.9 billion. A similar patter holds for office equipment, telecommunications equipment, and other electrical machinery. As a result, for all machinery and transport equipment we have seen a dramatic shift. In 1997 the EU exported $48.91 billion in machinery and transport equipment to the region, and imported $19.28. In only three years, this had shifted to $46.58 billion in exports and $32.66 billion in imports. This reflects the ongoing integration process, with reductions in trade barriers, signals to investors that integration will continue, and the movement of European corporations into the region seeking lower-cost production platforms.

For the EU, the commercial relationship with the East is still a minor share of total exports. The EU sends about 5 percent of its exports to the region. For the CEECs however, this trade relationship represented 55.6 percent of 1999 exports. This is up substantially in a few short years, from a 45.9 percent share of total exports in 1997. (Note that these data are from the WTO, and lump the CEES together with the CIS states).

On a Member-state basis, the EU15's trade with the CEECs is distributed in a very disproportionate manner, with Germany alone accounting for 42% of EU15 exports to the CEECs. No other member state accounts for more than 10% of the EU15 total. Austria, Belgium, Finland, Britain, Italy, the Netherlands and France each account for 5% or more of the total. On the other extreme, the exports of Portugal and Ireland to the CEECs account for less than 2% of the EU total.

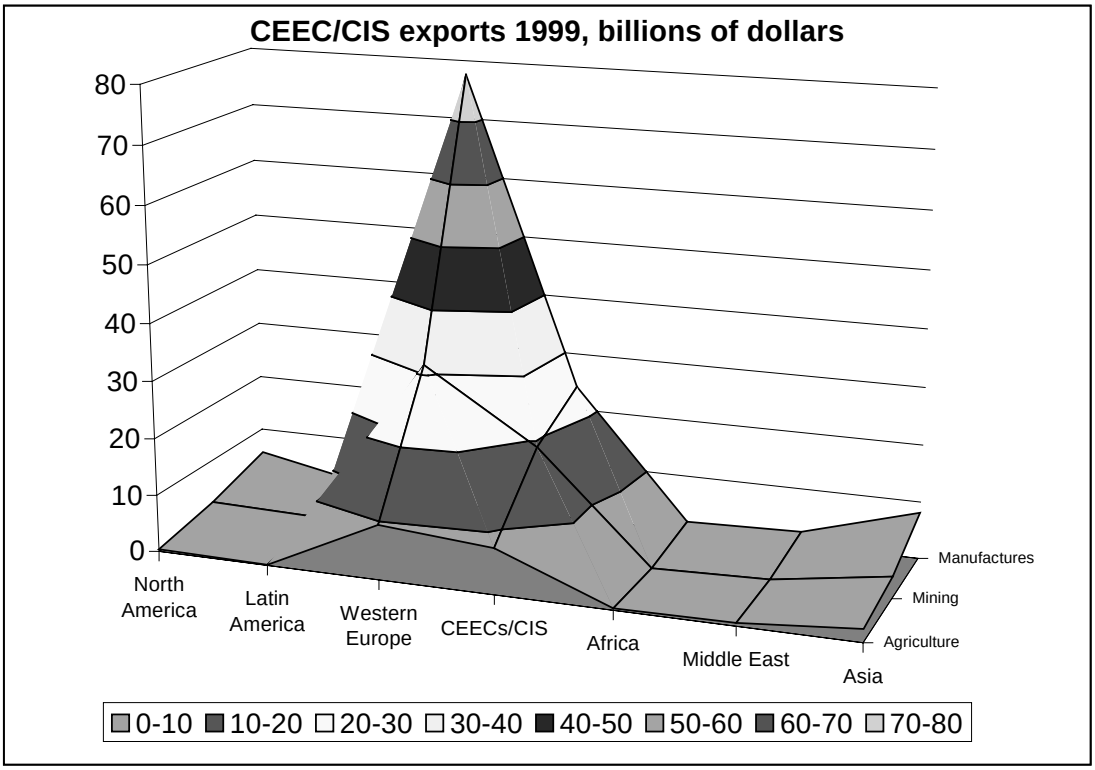
The importance of the EU for CEEC exports is illustrated in Figure 1. The figure shows that the EU market effectively dominates the landscape for CEEC exports. It amounts to between 50 and 60% of all exports across sectors (approximately the importance of the EU market for EU nations themselves). However, while the CEEC market is fairly unimportant to the EU exporters in aggregate, it is useful to note that the average EU figure hides a good deal of dispersion. For Germany, Austria, Greece and Finland the figure is at least double average. Roughly 9 percent of German manufacturing exports went to the region in 1999, while only 3 percent of France's manufacturing exports went to the region. For Portugal, Ireland, Spain and the UK, the CEEC markets are only half as important as the EU average.

Import Protection

Due to the Europe Agreements, the EU has phased out all statutory tariffs on CEEC industrial goods, and the CEECs are in the process of phasing out the same on imports from the EU. However, it is important to remember that duty-free treatment of industrial goods is not really preferential treatment in a European context since about 80% of EU imports are accorded such status. In other words, zero statutory tariffs merely level the playing field for Europe's major suppliers.

Table 1 presents nominal measures of protection. For industrial goods, these are the MFN applied tariff rates for the EU and the CEECs for 1997. For agriculture, these are tariff equivalents based on OECD and USDA estimates (and derived from the GTAP

Figure 1



CEECs/CIS exports in billions of dollars

	destination						
sector	North America	Latin America	Western Europe	CEECs/CIS	Africa	Middle East	Asia
1999							
Agriculture	0.37	0.12	9.53	8.02	0.36	0.56	2.27
Mining	2.38	1.93	31.38	19.06	0.15	0.72	3.79
Manufactures	5.57	1.76	77.61	24.1	1.73	2.31	8.08
1998							
Agriculture	0.36	0.11	9.35	10.04	0.39	0.6	2.06
Mining	1.93	1.4	28.84	21.25	0.14	0.77	2.97
Manufactures	6.66	1.61	73.82	29.97	1.65	2.84	7.07
1997							
Agriculture	0.32	0.2	9.67	12.72	0.43	0.7	2.32
Mining	1.57	1.3	34.18	26.79	0.15	0.9	3.45
Manufactures	5.51	1.46	59.76	32.76	1.65	2.45	9.28

source: WTO, *International Trade Statistics*, 2000.

database).[2] There are three main points to be highlighted. First the CEECs are on average much more protectionist than the EU, although both are quite open when compared to developing countries in Asia, Africa and Latin America. Based on MFN rates, Poland and Hungary have average protection of 7.3 and 4,6 percent, while remaining CEEC economies have an average of 7.5 percent. The overall CEECs' average applied tariff is 6.5 percent, while the EU's is 2.7 percent.

The second point is that the CEECs' average of 6.5% consists of somewhat higher-than-EU rates on heavy industrial goods but much lower-than-EU rates on agricultural goods. As a result, the enlargement is likely to lead to an important increase in CEEC agricultural protection against third-country suppliers. The same sort of pattern emerged with the Iberian accession, and in that instance third-countries, notably the US, demanded compensation for the hikes in farm protection. The last point is that the gap between the CEEC and EU rates varies widely among industrial goods. For instance, the average gap is almost 10 percent for motor vehicles but less than 2 percent (one average) in textiles and clothing. The overall asymmetry of protection rates is illustrated in Figure 2.

The pattern highlighted in Figure 2 has important implications for the welfare effects of enlargement. Since the EU is the major trading partner for the CEECs, (See Figure 1), and since this relationship will ultimately involve free trade, the ongoing process of joining the EU has implied a great deal of tariff cutting in the CEECs, but very little tariff cutting in the EU (especially since imports from the CEECs amount to only

[2] The Global Trade Analysis Project (GTAP) is an international consortium that assembles data of this type. Information on the most recent dataset version is available at www.agecon.purdue.edu/gtap. There is also an initiative involving national and international agricultural agencies to disseminate information on agricultural protection -- the Agricultural Market Access Database -- available at www.amad.org.

5% of EU15 imports). On the export side, the one sector where the CEECs account for a disproportionate share of EU exports is transport equipment. This is a direct result of CEEC protection in this sector against third markets, and is unlikely to be sustainable after full membership.

Because most estimated income effects from regional integration follow from own-liberalization (especially for small countries), the initial levels of protection suggest that enlargement will lead to much greater income effects in the CEECs than in the EU. At the same time, like the pattern of trade, the pattern of protection also suggests that negative restructuring in the CEECs will most likely be concentrated in heavy industry. This last point follows, again, from the asymmetry of tariff rates across the EU and CEEC economies. Given the relative size of the EU15 and CEECS, any tariff harmonisation will be at EU rates. Because EU protection is lower in heavy industry, and CEEC protection is much higher, this implies a second round of structural adjustment following harmonisation. Similarly, there has already been something of a land rush in anticipation of higher EU prices for CEEC agricultural production.

3. THE GENERAL EQUILIBRIUM MODEL

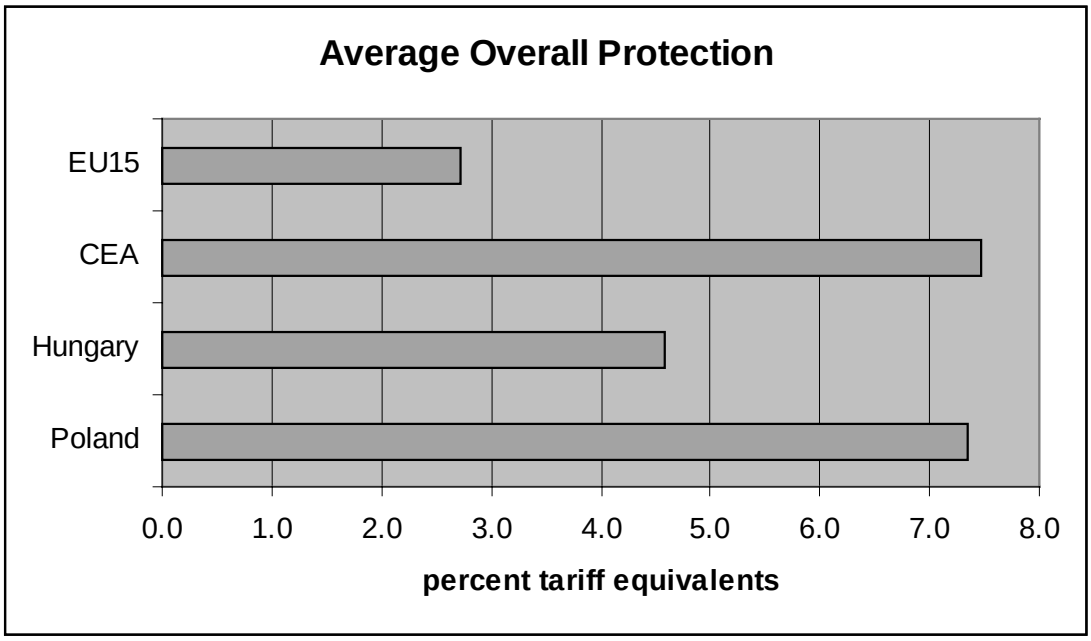
This section provides an overview of the global computable general equilibrium (CGE) model used in this study. The model is characterized by an input-output structure (based on regional and national input-output tables) that explicitly links industries in a value added chain from primary goods, over continuously higher stages of

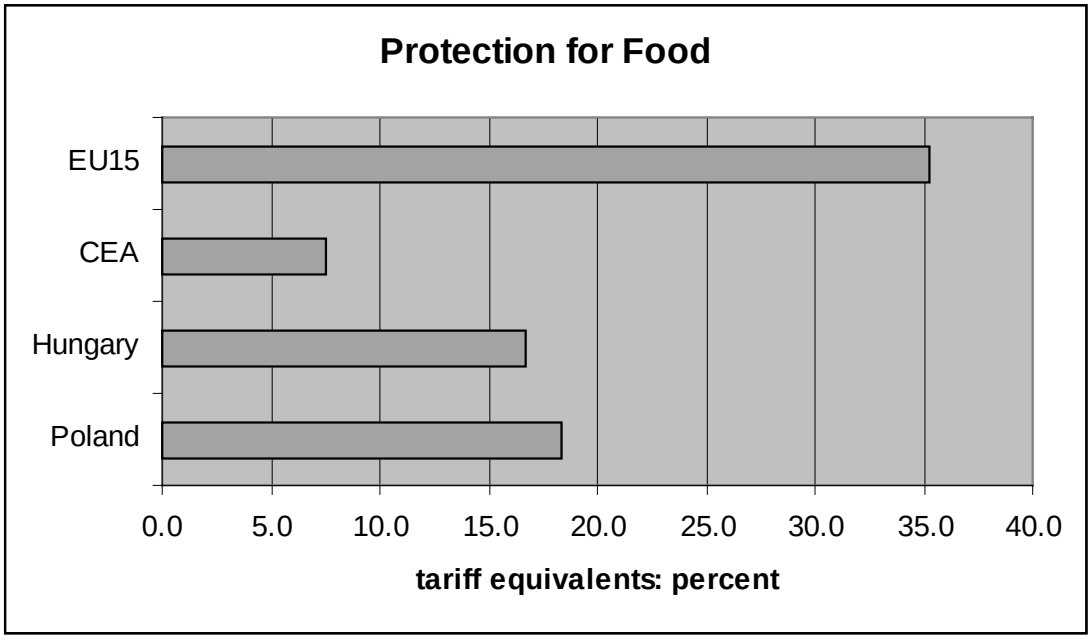
Table 1

A Comparison of Protection Rates on Imports

		Import Taxes by Region			
name	label	Poland	Hungary	CEA	EU15
Wheat	1 WHT	20.3	0.0	-3.9	49.0
Other Grains	2 OGR	24.4	-22.8	-5.8	13.7
Vegetables, Fruit, Nuts	3 VEG	10.7	9.4	11.1	4.2
Oilseeds	4 OSD	1.6	13.2	-6.0	0.0
Beet and Cane Sugar	5 SUG	0.0	0.0	0.0	45.5
Other Crops	6 OCR	6.2	12.8	11.3	2.1
Bovine Animals	7 CTL	3.5	4.1	2.1	63.8
Other Animal Products	8 OAP	33.5	12.8	3.4	3.5
Raw Milk	9 MLK	50.0	33.3	33.3	93.6
Bovine Meat	10 CMT	3.5	3.4	2.6	63.8
Other Meat	11 OMT	35.2	13.4	4.4	4.9
Dairy	12 DRY	10.1	58.8	29.0	93.1
Processed Sugar	13 SGR	49.7	81.0	14.1	50.5
Other Processed Food	14 OFD	8.4	14.4	10.2	6.5
Extraction	15 EXT	1.5	1.5	1.4	0.1
Tobacco and Beverages	16 TBV	1.2	45.2	43.7	14.7
Textiles	17 TEX	5.8	7.3	11.6	6.3
Clothing & Leather	18 CLO	3.5	11.3	13.0	7.3
Furniture and Lumber	19 FUR	11.6	0.4	7.4	1.3
Petroleum Products	20 PET	11.5	0.2	7.9	0.5
Chemicals	21 CHM	10.5	2.9	8.1	2.7
Iron and Steel	22 STL	0.1	0.0	7.0	1.9
Non-Ferrous Metals	23 NFM	9.9	0.8	3.8	0.8
Motor Vehicles	24 MVH	13.0	15.1	14.4	6.7
Other Manufctures	25 OMF	8.5	0.5	8.7	1.9
Electrical Machinery	26 ELE	5.2	8.6	8.4	3.4
Utilities	27 UTY	*	*	*	*
Construction	28 CNS	*	*	*	*
Trade and Transport	29 TRD	*	*	*	*
Business Services	30 BUS	*	*	*	*
Other Services	31 OSR	*	*	*	*
Average		7.3	4.6	7.5	2.7

Figure 2
Import Protection





intermediate processing, to the final assembling of goods and services for consumption. Inter-sectoral linkages are direct, like the input of steel in the production of transport equipment, and indirect, via intermediate use in other sectors. The model captures these linkages by modeling firms' use of factors and intermediate inputs. The most important aspects of the model can be summarized as follows: (i) it covers all world trade and production; (ii) it includes intermediate linkages between sectors; (iii) it includes linkages between household incomes, firm incomes, and demand for industry output; (iv) it allows for two way trade, within product categories, on a bilateral basis.

In recent years, the use of computable general equilibrium (CGE) models to estimate the impact of trade liberalization has made the move from academic research organizations to those policy institutions dealing specifically with trade policies. (See for example Francois and Shiells 1994 and Francois et al 1996a). While the results of these exercises are hampered both by the assumptions and the quality of the data available, their relevance in estimating the possible overall pattern of impact – i.e. both of direct and indirect nature – has proved to be helpful in policy formulation and the assessment of existing economic policies. In this section we describe briefly model and data considerations for the study. The next Section is then devoted to actual simulation results.

Model Data

The data come from a number of sources. Data on production and trade are based on national social accounting data linked through trade flows (see Reinert and Roland-Holst 1997). These social accounting data are drawn directly from the Global Trade Analysis

Project (GTAP) version 5 (pre-release) dataset. (GTAP 2000). The GTAP version 5 dataset is benchmarked to 1997, and includes detailed national input-output, trade, and final demand structures. The basic social accounting and trade data are supplemented with trade policy data, including additional data on tariffs and non-tariff barriers.

The data on post-Uruguay Round tariffs are taken from recent estimates reported by Francois and Strutt (1999). These are taken primarily from the WTO's integrated database, with supplemental information from the World Bank's recent assessment of detailed pre- and post-Uruguay Round tariff schedules. All of this tariff information has been concorded to GTAP model sectors. Services trade barriers are based on the estimates described in the annex to this paper.

While the basic GTAP dataset is benchmarked to 1997, and reflects applied tariffs actually in place in 1997, we of course want to work with a representation of a post-Uruguay Round world. To accomplish this, before conducting any policy experiments we first run a "pre-experiment" in which we implement the rest of the Uruguay Round. As such, the dataset we work with for actual experiments is a representation of a notional world economy (with values in 1997 dollars) wherein we have full Uruguay Round implementation.

The social accounting data have been aggregated to 31 sectors and 8 regions. The sectors and regions for the 31x8 aggregation of the data are detailed in Table 2.

Table 2
Sectoring Scheme

Regions:	Sectors:	
NAM: North America	Wheat	Tobacco and Beverages
EUN: European Union	Other Grains	Textiles
HUN: Hungary	Vegetables, Fruit, Nuts	Clothing & Leather
POL: Poland	Oilseeds	Furniture and Lumber
CEA: Other Central European Associates	Beet and Cane Sugar	Petroleum Products
FSU: Former Soviet Union	Other Crops	Chemicals
OCD: Other OECD	Bovine Animals	Iron and Steel
ROW: Rest of World	Other Animal Products	Non-Ferrous Metals
	Raw Milk	Motor Vehicles
	Bovine Meat	Other Manufctures
	Other Meat	Electrical Machinery
	Dairy	Utilities

We turn next to the basic theoretical features of the model. The algebraic features if the theoretical structure are described in Hertel (1996). In all regions there is a single representative, composite household in each region, with expenditures allocated over personal consumption and savings (future consumption). The composite household owns endowments of the factors of production and receives income by selling them to firms. It also receives income from tariff revenue and rents accruing from import/export quota licenses (when applicable). Part of the income is distributed as subsidy payments to some sectors, primarily in agriculture.

On the production side, in all sectors, firms employ domestic production factors (capital, labor and land) and intermediate inputs from domestic and foreign sources to produce outputs in the most cost-efficient way that technology allow. Perfect competition is assumed in all sectors, with products from different regions assumed to be imperfect substitutes in accordance with the so-called "Armington" assumption.

Prices on goods and factors adjust until all markets are simultaneously in (general) equilibrium. This means that we solve for equilibria in which all markets clear. While we model changes in gross trade flows, we do not model changes in net international capital flows. Rather our capital market closure involves fixed net capital inflows and outflows. (This does not preclude changes in gross capital flows). To summarize, factor markets are competitive, and labour and capital are mobile between sectors but not between regions.

4. EXPERIMENTS AND RESULTS

The Experiments

We turn now to a description of the experiments. The experiments are described in Table 3. These involve a selective enlargement, limited to Poland and Hungary, and an ambitious enlargement including all 10 candidates. The first scenario is meant to illustrate the impact of a limited enlargement on outside countries. Our decision to include only Poland and Hungary in this group is pragmatic. It reflects data limitations. The GTAP dataset does not break out the other candidate countries separately, though it does break them out collectively.

It is important to keep in mind what is not included in our experiments. Broadly defined, enlargement will involve integration of labor and capital markets, further political and legal integration, extension of the Euro zone, and adoption of European social directives.

We are not going to pretend that these are included in the present analysis. Our scenario simply involves reduction of trading barriers, and harmonization of those barriers to current EU-15 levels.

Table 3

Model Features

Base Model:
(1) 1997 base year
(2) Agriculture protection based on OECD/USDA estimates
(3) Basic model is GTAP

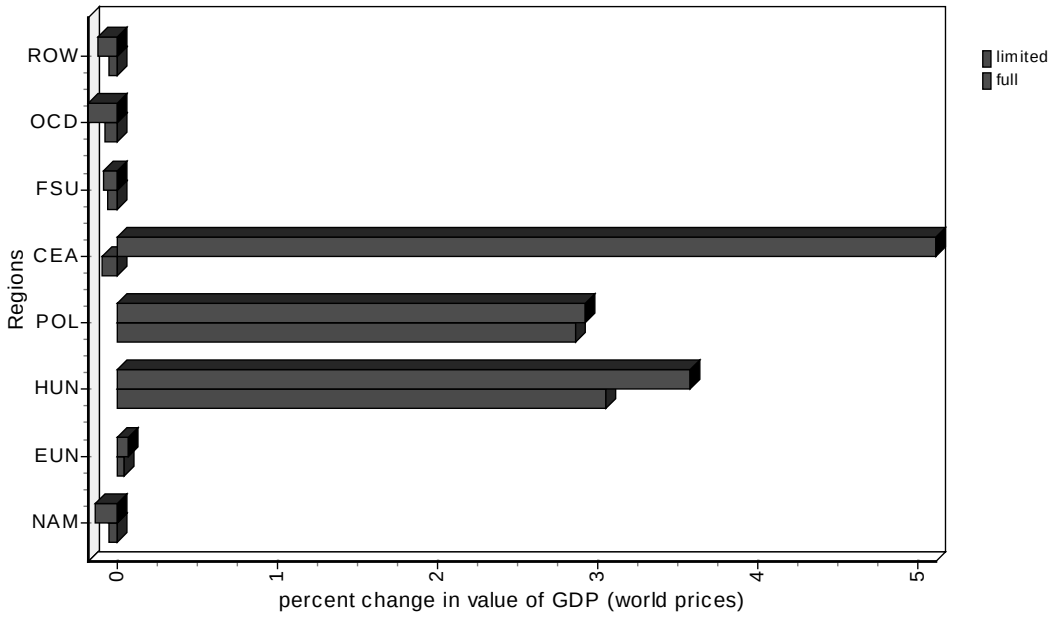
Experiment Features

(1) Border Measures are harmonized to EU levels
(2) CAP
- extension of EU prices to CEECs
- Eastern farmers get EU15 prices, but not subsidy

(3) Service barriers are "frictional"
(4) In First experiment, only Poland and Hungary join
(5) In Second experiment, all CEA countries join

technology transfer, or general improvements in the economic climate that may come with the anchoring of Western-style economic rules in the region.

Figure 3
Change in value of GDP (world prices, in percent)



	NAM	EUN	HUN	POL	CEA	FSU	OCD	ROW
limited enlargement	-0.1	0.0	3.1	2.9	-0.1	-0.1	-0.1	0.0
full enlargement	-0.1	0.1	3.6	2.9	5.1	-0.1	-0.2	-0.1

The changes in national output for third countries in the tables follow from terms of trade effects. These are summarized in Figure 4. Again, the greatest effects are on the candidate countries themselves, though there is also a slight impact on outside countries. For example, in Figure 3 we saw a slight drop in U.S. GDP. This follows from the slight change in terms of trade shown in Figure 4.

Figure 4

Terms of trade effects

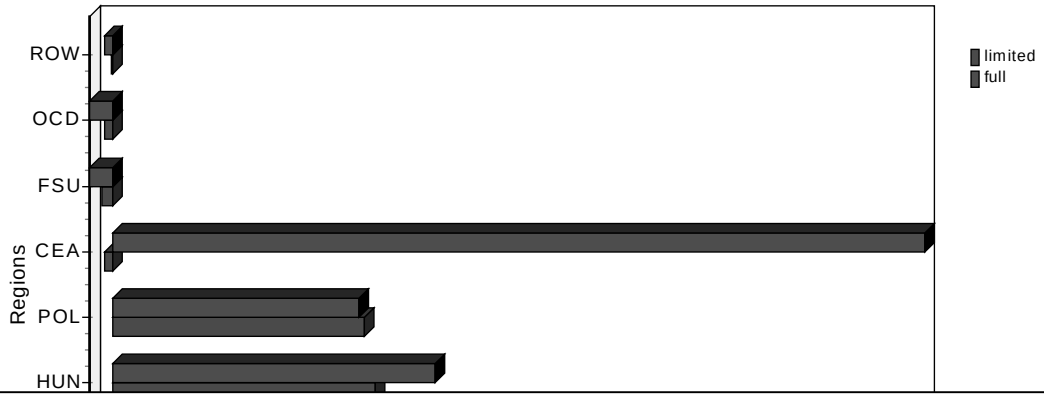


Table 4

Changes in exports

Limited enlargement

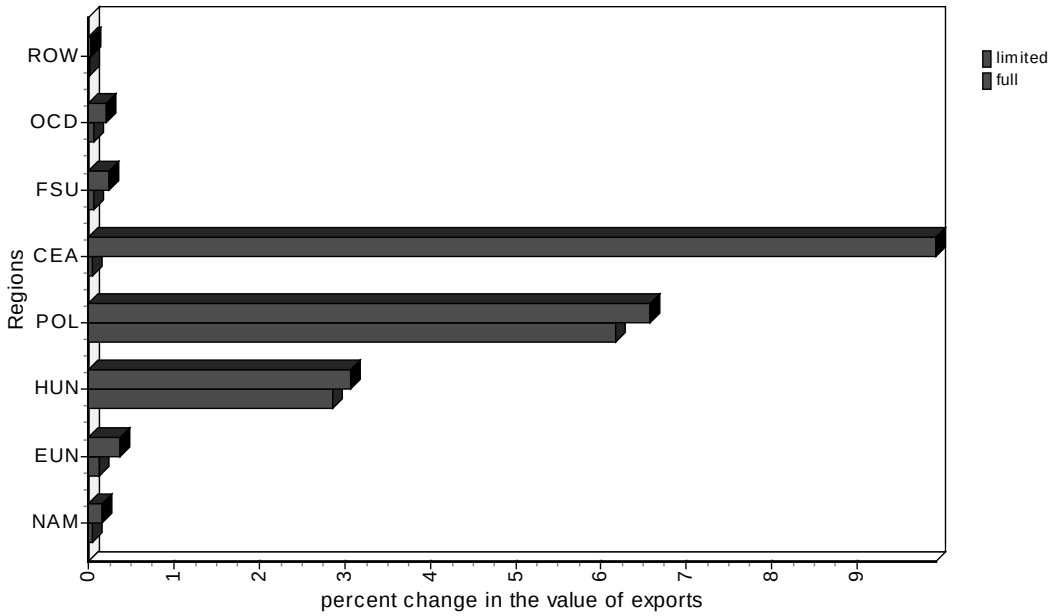
	North America	European Union	Hungary	Poland	Other CEECs	FSU	other OECD	ROW
Wheat	0.0	0.6	4.7	-74.8	0.5	1.0	0.1	0.3
Other Grains	-0.3	-0.8	104.2	-59.2	-2.4	-3.6	-0.3	-0.6
Vegetables, Fruit, Nuts	0.1	0.6	-14.2	-30.4	1.2	0.6	0.2	0.1
Oilseeds	0.2	0.9	-47.4	-45.8	3.9	0.7	0.3	0.3
Beet and Cane Sugar	3.0	2.4	-62.4	-36.0	2.9	6.1	6.0	19.7
Other Crops	0.1	0.9	-18.1	-35.2	1.0	0.9	0.1	0.2
Bovine Animals	-2.6	-15.7	234.8	405.2	-13.2	-11.3	-4.6	-10.0
Other Animal Products	1.0	3.0	-50.2	-81.7	7.1	4.1	1.1	1.6
Raw Milk	-1.5	1.1	-34.8	541.4	-0.3	-0.5	-1.2	-1.3
Bovine Meat	-1.0	-1.5	295.9	486.1	-2.1	-6.0	-1.1	-1.8
Other Meat	3.1	2.2	-37.1	-70.9	5.9	5.4	1.0	1.1
Dairy	-3.1	-3.5	48.2	745.5	-9.4	-8.4	-3.6	-3.9
Processed Sugar	0.2	0.2	-65.7	-13.2	0.5	1.1	0.2	0.3
Other Processed Food	0.0	0.2	-1.5	9.4	0.3	0.2	0.1	0.0
Extraction	0.0	0.0	-3.4	1.3	-0.2	-0.1	0.1	0.0
Tobacco and Beverages	-0.1	0.3	-3.7	49.1	-1.1	0.3	0.2	0.0
Textiles	0.0	0.3	6.9	10.0	-0.9	-0.6	0.0	-0.1
Clothing & Leather	0.0	0.6	0.7	4.2	0.1	-0.6	0.2	-0.1
Furniture and Lumber	0.1	0.4	-1.3	-7.5	0.6	0.8	0.1	0.2
Petroleum Products	0.1	0.3	-5.6	-0.8	0.3	0.5	0.1	0.1
Chemicals	0.1	0.2	-3.8	-0.3	-0.1	0.1	0.1	0.1
Iron and Steel	0.1	0.0	-6.8	-8.9	-0.2	0.2	0.2	0.1
Non-Ferrous Metals	0.1	0.1	-4.0	-4.1	0.3	0.3	0.2	0.1
Motor Vehicles	0.0	0.4	21.9	50.8	-1.3	-1.0	-0.1	-0.2
Other Manufctures	0.2	0.2	-2.8	-6.6	0.6	0.4	0.2	0.1
Electrical Machinery	0.0	-0.1	11.5	-6.3	0.1	0.1	0.1	0.0
Utilities	0.2	0.1	-9.9	-14.7	0.4	0.5	0.4	0.4
Construction	0.3	0.1	-10.8	-8.8	0.4	0.4	0.5	0.3
Trade and Transport	0.1	-0.1	-7.3	-4.7	0.1	0.1	0.2	0.1
Business Services	0.3	0.0	-14.5	-13.8	0.3	0.3	0.4	0.3
Other Services	0.2	-0.1	-13.6	-15.5	0.2	0.2	0.3	0.1

	North America	European Union	Hungary	Poland	Other CEECs	FSU	other OECD	ROW
Wheat	0.1	0.7	8.2	-34.0	-31.8	1.7	0.3	0.5

	NAM	EUN	HUN	POL	CEA	FSU	OCD	ROW
limited enlargement	-0.1	0.1	7.9	13.1	-0.1	-0.1	-0.1	-0.1
full enlargement	-0.2	0.2	8.3	13.3	23.9	-0.1	-0.3	-0.2

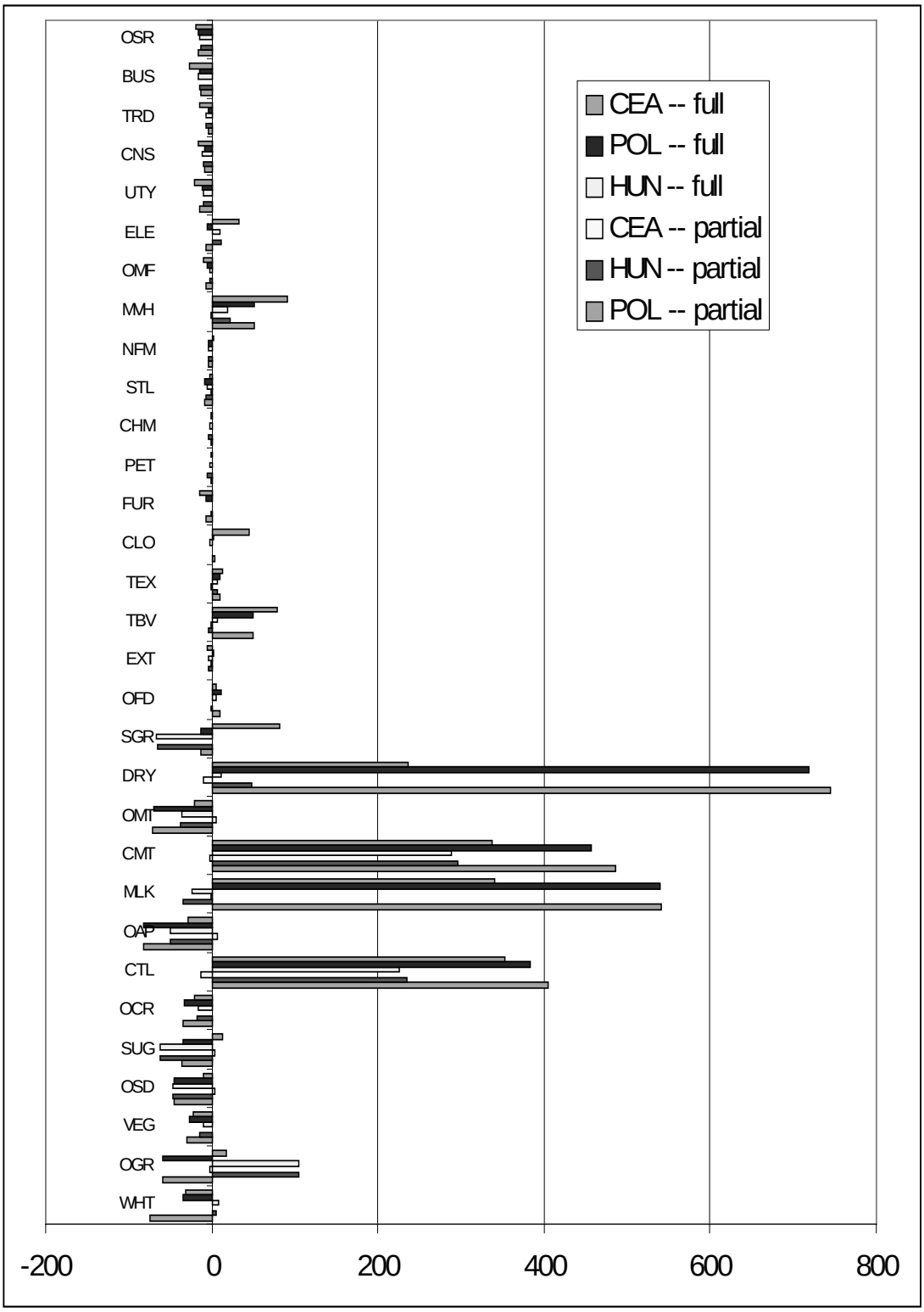
Figure 5

Percent change in the value of exports



	NAM	EUN	HUN	POL	CEA	FSU	OCD	ROW
limited enlargement	0.1	0.1	2.9	6.2	0.0	0.1	0.1	0.0
full enlargement	0.2	0.4	3.1	6.6	9.9	0.2	0.2	0.0

Figure 6
Export effects for the candidates



5. Conclusions

This paper has been concerned with the trade implications of integrating the CEEC economies into the European Union. CGE estimates presented here, like others in the literature, indicate that the costs and benefits for the EU will be relatively small, at least in economic terms. The decision made by EU15 Member governments regarding membership will, therefore, be determined in the end by political considerations, which should dominate the small contribution made to the total decision calculus by economic factors. The same does not hold true for the CEEC economies. Given the relative size of the two regions, we can expect some substantial trade effects related to enlargement. In particular, depending on what happens with CAP reform, extension of EU agricultural policy to the CEEC economies could lead to potentially dramatic increases in CEEC agricultural exports. Other surges may occur in textiles, clothing, and motor vehicles. (Indeed we have seen a surge in motor vehicle exports since 1997).

For third countries, trade diversion effects have no discernable macroeconomic impact -- including national income and the terms of trade. There is, however, the potential in individual sectors for adverse effects. In particular, CGE estimates point to noticeable trade diversion effects, with adverse effects for third country suppliers, in agriculture and in textiles and clothing. What do these third country effects imply for external trade relations? The agricultural losses are felt by the North American and other OECD economies. These countries are GATT/WTO Members, and can be expected to demand compensation though the GATT. This follows the Iberian expansion pattern. The trade diversion in textiles and clothing is mostly felt in the FSU states. These are

either new GATT/WTO Members, or are not yet part of the trading club. As such, demand for compensation is likely to be minimal in this area.

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Annex

Tariff equivalents of trading costs for business and construction services trade:

This annex describes the estimation of tariff equivalents for cross-border services trade. The basic methodology involves the estimation of sector-specific gravity equations vis-à-vis the United States, which reports detailed bilateral trading patterns in services. In this case, these equations have been estimated at the level of aggregation corresponding to the GTAP sectors "business sevices" and "construction services."

The gravity equations are estimated using ordinary least squares with the following variables:

$$(1) \qquad X_i = a_1 \cdot \ln(PCY_i) + a_2 \cdot GDP_i + a_3 \cdot WHD_i + \varepsilon_i$$

where X_i represents U.S. exports, PCY_i represents per-capita income in the exporting country, WHD_i is a dummy for western hemisphere countries, and ε is an error term.

In the regressions, we break out Hong Kong and Singapore as free trade "benchmarks" in the regressions. Deviations from predicted imports, relative to this free trade benchmark, are taken as an indication of barriers to trade. These tariff equivalent rates are then backed out from a constant elasticity import demand function as follows:

$$(2) \qquad \frac{T_1}{T_0} = \left[\frac{M_1}{M_0}\right]^{\frac{1}{e}}$$

Here, T_1 is the power of the tariff equivalent $(1+t_1)$ such that in free trade $T_0 = 1$, and $[M_1/M_0]$ is the ratio of actual to predicted imports (normalized relative to the free trade benchmark ratio for Hong Kong and Singapore, as discussed above). This is a reduced form, where actual prices and constant terms drop out because we take ratios. The term e is the demand elasticity (taken to be -4).

Data are as reported on trade in services by the U.S. Bureau of Economic Analysis, for 1997. Adjustments have been made to construction services, on the observation (reported by the USITC in its *The Year In Trade: Operation Of The Trade Agreements Program During*) that roughly 80% of exports with affiliates involves construction and related services.

Regression results from this approach are reported in Annex Table A.1, while the relevant estimates of tariff equivalents for the model sectors and regions are reported in Table A.2. Note that, for reasons of data availability and comparability, and because of the nature of trade in the sector, these estimates have not been extended to cover international transport and trade services.

Table A.1

SUMMARY OUTPUT: construction service exports

Regression Statistics	
Multiple R	0.891091335
R Square	0.794043767
Adjusted R Square	0.69991627
Standard Error	1232.345397
Observations	18

ANOVA

	df	*SS*	*MS*	*F*
Regression	3	87826516.15	29275505.38	19.27700261
Residual	15	22780127.68	1518675.179	
Total	18	110606643.8		

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	0	#N/A	#N/A	#N/A
log per capita Y	4.903911138	106.7484956	0.045938925	0.963964954
GDP	1.105489719	0.155176366	7.124085639	3.48293E-06
WH	1029.921296	784.7930289	1.312347662	0.209130473

SUMMARY OUTPUT: Business services

Regression Statistics	
Multiple R	0.890216861
R Square	0.79248606
Adjusted R Square	0.698150867
Standard Error	1993.514206
Observations	18

ANOVA

	df	*SS*	*MS*	*F*
Regression	3	227653474.5	75884491.5	19.09476678
Residual	15	59611483.37	3974098.891	
Total	18	287264957.9		

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	0	#N/A	#N/A	#N/A
log per capita Y	55.85635939	172.6826286	0.323462527	0.750810694
GDP	1.677832014	0.251022392	6.683993409	7.30282E-06
WH	4063.153035	1269.527241	3.200524497	0.005957448

Table A.2
Estimated Tariff Equivalents

	finance and business services	construction services
European Union	0.085	0.183
Japan	0.197	0.297
ASEAN	0.021	0.103
India	0.131	0.616
United States	0.082	0.098
Brazil	0.357	0.572
Central and South America	0.047	0.260
Africa	0.040	0.095
Rest of World	0.204	0.463
Central and East European Associates	0.184	0.519
Former Soviet Union	0.184	0.519
Sub-Saharan Africa	0.157	0.421

+ U.S. estimates involve assigning North America (i.e. Canadian) values.

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