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Eastern Enlargement of the EU and its Economic Impact: A CGE Approach

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The main objective of this study is to conduct a quantitative assessment of the potential economic effects of the 5th enlargement of the EU including Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, and Slovenia which joined the EU on 1 May 2004 as well as of additional accession of Bulgaria and Romania which is to take place on 1 January 2007 using a multi-region, multi-sector computable general equilibrium (CGE) model. In addition, a full membership of Croatia and Turkey is considered for quantification. Economic effects of eastern enlargements of the EU are expected to be significant for the enlarged Europe, as a bigger and more integrated market boosts economic growth for current and new members alike. On one hand, the wider Europe is to positively affect the economies of third countries such as the CIS (Commonwealth of Independent States) including Russia and the Republics of the former Soviet Union. On the other hand, it is to negatively influence the economies of most of the third countries such as China, Japan, Korea, and North American Free Trade Area (NAFTA).

Keywords: European Union, Enlargement, Central and Eastern European countries, Bulgaria, Romania, Croatia, Turkey, CGE model, Impact analysis

JEL Classification Numbers: F13, F15

1. Introduction

Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia (CEEC10) joined the EU on 1 May 2004. Bulgaria and Romania, which signed the Treaty of Accession on 25 April 2005 and have demonstrated their readiness to join the EU based on a combination of their substantial efforts with the strong encouragement and support of the Union, are to become member states of the EU on 1 January 2007. In addition, the EU opened accession negotiations with Turkey on 3 October 2005. Croatia, which applied for EU membership on 21 February 2003, started the real work on entry negotiations on

20 October 2005.

The economic effects of such enlargements of the EU are expected to be significant for the enlarged Europe, as a bigger and more integrated market boosts economic growth for current and new members alike. Although it is believed that the 5th and further enlargements of the EU[1)] will lead to economic growth of the incumbent and new members of the Union, it is not certain whether they will affect the economies of non-members positively or negatively. It is very important and necessary for third countries to know what impact EU enlargements will have on their economies.

When some domestic production in a member of the enlarged EU is replaced by lower-cost imports from another member nation, trade creation occurs and it leads to economic growth and increased welfare of its member states because it results in greater specialization in production based on comparative advantage. A trade-creating enlarged Union will also contribute to economic growth of third countries and increase their welfare because some of the increase in its real income spills over into increased imports from them.

When lower-cost imports of the enlarged Union from third countries are replaced by higher-cost imports from its member states, trade diversion occurs and it reduces the welfare of third countries because it shifts production from more efficient producers outside the Union to less efficient producers inside the Union. Thus, trade diversion worsens the international allocation of resources and shifts production away from comparative advantage.

As far as third countries such as the CIS, China, Japan and Korea are concerned, it is of great importance whether eastern enlargement of the EU will cause trade creation or trade diversion to them. EU enlargement can cause trade creation as well as trade diversion at the same time. Therefore, it is needed to assess its net effects numerically.

Against this backdrop, this study aims to conduct a quantitative assessment of the potential economic effects of the 5th enlargement of the EU and further step-wise accessions of Bulgaria, Romania, Croatia and Turkey on the enlarged Union and third countries such as the CIS, China, Japan and Korea, in particular. For calculation of their impacts, a multi-region, multi-sector computable general equilibrium (CGE) model is used.

The paper is organized as follows. Section 2 provides a brief description of some characteristics of the economies of EU15, CEEC10, Bulgaria, Romania, Croatia, and Turkey as well as trade relations among all of them including the third countries. Section 3 describes the CGE model used in this study. Section 4 examines scenarios of eastern enlargement of the EU and Section 5 discusses simulation results. Section 6 concludes with some remarks.

[1)] The first enlargement of the European Community (EC) occurred in 1973, when Denmark, Ireland and the United Kingdom joined the EC. Its second enlargement took place in 1981, when Greece joined the EC. In 1986 Portugal and Spain became its member, which is referred to as southern enlargement of the EC, the third one. In 1995 Austria, Finland and Sweden acceded to the EU in its fourth enlargement.

2. Overview of the Economies of the Enlarged Union and Trade Relations among EU15, CEEC10, Acceding Countries, and Third Countries

With the accession of CEEC10 into the EU on 1 May 2004, the EU underwent the biggest enlargement in its history. The population of the enlarged Union has risen from 381 million in 2003 to 461 million in 2005, which indicates that the population of the 10 new members combined has a share of 16% in the EU25 as a whole, as shown in Table 1. With an area of 739 thousand km^2, CEEC10 amount to 19% of the whole area of the EU25. By contrast, the GDP of CEEC10 represents only 5% of that of the EU25. GDP per capita of CEEC10, in Purchasing Power Standards (PPS), is equal to 60% of the 15 old members in 2005. The largest country among the 10 new members, in terms of area, population and GDP, is Poland, far ahead of Hungary and the Czech Republic. Cyprus and Slovenia show the highest values of GDP per head, whereas the Baltic countries, Estonia, Latvia and Lithuania, and Poland show the lowest ones.

Table 1 Main indicators of the incumbent members and acceding countries of the enlarged European Union in 2005

	Population (1000 person)	Area (km)	GDP (millions of euro)	GDP per capita (PPS EU15=100)
EU25	461,479	3,972,868	10,848,774.3	93
EU15	387,373	3,234,295	9,642,744.1	100
CEEC10	74,105	738,574	1,206,030.2	60
Cyprus	749	9,251	13,629.0	82
Czech Republic	10,221	78,865	99,733.4	68
Estonia	1,348	48,227	208,267.4	55
Hungary	10,098	93,034	88,799.7	58
Latvia	2,306	64,589	12,837.3	44
Lithuania	3,425	65,300	20,621.0	48
Malta	403	316	29,396.4	65
Poland	38,174	312,685	505,646.0	46
Slovakia	5,385	49,033	79,313.5	53
Slovenia	1,998	20,273	147,786.5	76
EU29	566,952	5,148,466	11,270,985.6	41
EU27	490,898	4,322,252	10,949,535.9	51
Bulgaria	7,761	110,993	21,448.1	30
Romania	21,659	238,391	79,313.5	31
Turkey	71,610	769,604	290,502.9	26
Croatia	4,444	56,610	30,946.8	44

Source: Eurostat and author's calculation

Table 2 Trade matrix in 2002 (US$ million)

	EU15	CEEC10	BUL	ROM	CRO	TUR	CIS	CHN	JPN	KOR	NAFTA	ROW	Total
1 EU15	1,269,202	109,638	3,709	10,332	5,515	22,012	35,733	49,781	39,838	16,924	240,363	325,652	2,128,699
2 CEEC10	95,043	18,646	389	1,555	1,603	1,123	6,339	1,544	876	362	7,171	10,573	145,224
3 BUL	3,066	198	0	117	12	361	228	27	21	13	393	376	4,812
4 ROM	9,112	705	139	0	43	561	221	472	34	57	600	1,395	13,339
5 CRO	2,437	574	10	7	0	11	103	4	57	3	144	1,211	4,561
6 TUR	19,297	1,331	377	538	48	0	2,111	385	123	133	3,720	6,251	34,314
7 CIS	43,116	17,984	817	1,862	503	4,627	30,555	8,973	3,455	2,469	7,384	18,661	140,406
8 CHN	73,181	5,802	99	423	234	1,246	4,828	96,639	55,230	16,819	139,555	75,982	470,038
9 JPN	58,707	3,527	11	120	84	1,138	1,195	63,868	0	28,139	132,634	121,642	411,065
10 KOR	22,036	2,172	29	197	94	863	1,453	33,436	12,622	0	38,961	48,009	159,872
11 NAFTA	156,764	4,522	102	395	258	3,404	4,257	38,077	57,032	24,979	551,362	163,081	1,004,233
12 ROW	334,198	13,468	501	981	833	9,732	8,334	124,614	134,167	51,596	301,570	382,815	1,362,809
Total	2,086,159	178,567	6,183	16,527	9,227	45,078	95,357	417,820	303,455	141,494	1,423,857	1,155,648	5,879,372

Source: GTAP DB interim release 6.2 (May 2006)

Table 3 Matrix of export shares in 2002 (%)

	EU15	*CEEC*	*BUL*	*ROM*	*CRO*	*TUR*	*CIS*	*CHN*	*JPN*	*KOR*	*NAFTA*	*ROW*	*Total*
1 EU15	59.6	5.2	0.2	0.5	0.3	1.0	1.7	2.3	1.9	0.8	11.3	15.3	100
2 CEEC10	65.4	12.8	0.3	1.1	1.1	0.8	4.4	1.1	0.6	0.2	4.9	7.3	100
3 BUL	63.7	4.1	0.0	2.4	0.2	7.5	4.7	0.6	0.4	0.3	8.2	7.8	100
4 ROM	68.3	5.3	1.0	0.0	0.3	4.2	1.7	3.5	0.3	0.4	4.5	10.5	100
5 CRO	53.4	12.6	0.2	0.2	0.0	0.2	2.3	0.1	1.2	0.1	3.2	26.6	100
6 TUR	56.2	3.9	1.1	1.6	0.1	0.0	6.2	1.1	0.4	0.4	10.8	18.2	100
7 CIS	30.7	12.8	0.6	1.3	0.4	3.3	21.8	6.4	2.5	1.8	5.3	13.3	100
8 CHN	15.6	1.2	0.0	0.1	0.0	0.3	1.0	20.6	11.8	3.6	29.7	16.2	100
9 JPN	14.3	0.9	0.0	0.0	0.0	0.3	0.3	15.5	0.0	6.8	32.3	29.6	100
10 KOR	13.8	1.4	0.0	0.1	0.1	0.5	0.9	20.9	7.9	0.0	24.4	30.0	100
11 NFTA	15.6	0.5	0.0	0.0	0.0	0.3	0.4	3.8	5.7	2.5	54.9	16.2	100
12 ROW	24.5	1.0	0.0	0.1	0.1	0.7	0.6	9.1	9.8	3.8	22.1	28.1	100

Source: Calculated based on GTAP DB interim release 6.2 (May 2006)

With the accession of Bulgaria and Romania, and Croatia and Turkey, the population of EU27 and EU29 would rise to 491 million and 567 million, respectively, while per capita GDP of these prospective future members is about 30 percent of the average of the EU15, with the exception of Croatia with 44 percent. It is also to be noted that Turkey is much larger than any of CEEC10, Bulgaria, Romania and Croatia in population and area and that Turkey is the poorest among them in term of per capita GDP, which has been one of the factors hindering its joining the EU, in addition to political factors, even if it applied for membership in 1987, much earlier than CEEC10, other acceding and candidate countries did.

Tables 2, 3 and 4 provide information about trade relations in US$ million and percentage shares among EU15, CEEC10, Bulgaria, Romania, Croatia, Turkey, and the third countries[2)] including the CIS, China, Japan, Korea, NAFTA, and the rest of the world (ROW) in 2002.

Table 3 shows that the single market of EU15 is a very important market for exports of the acceding and candidate countries. More than 60 percent of total exports of CEEC10, Bulgaria and Romania went to EU15 and more than 50 percent of total exports of Croatia and Turkey were sold on the single market of EU15 in 2002. In addition, more than 30 percent of total exports of the CIS and more than 10 percent of total exports of China (15.6%), Japan (14.3%), Korea (13.8%), and NAFTA (15.6%) went to EU15. NAFTA and the CIS are more important markets for exports from the acceding countries than China, Japan and Korea are.

It can also be seen from Table 4 that EU15 is the most significant sources of imports of the acceding countries. Dependence of CEEC10, Bulgaria and Romania

2) See Table 5 for region classification used in this study.

Table 4 Matrix of import shares in 2002 (%)

	EU15	*CEEC*	*BUL*	*ROM*	*CRO*	*TUR*	*CIS*	*CHN*	*JPN*	*KOR*	*NAFTA*	*ROW*
1 EU15	60.8	61.4	60.0	62.5	59.8	48.8	37.5	11.9	13.1	12.0	16.9	28.2
2 CEEC10	4.6	10.4	6.3	9.4	17.4	2.5	6.6	0.4	0.3	0.3	0.5	0.9
3 BUL	0.1	0.1	0.0	0.7	0.1	0.8	0.2	0.0	0.0	0.0	0.0	0.0
4 ROM	0.4	0.4	2.2	0.0	0.5	1.2	0.2	0.1	0.0	0.0	0.0	0.1
5 CRO	0.1	0.3	0.2	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1
6 TUR	0.9	0.7	6.1	3.3	0.5	0.0	2.2	0.1	0.0	0.1	0.3	0.5
7 CIS	2.1	10.1	13.2	11.3	5.5	10.3	32.0	2.1	1.1	1.7	0.5	1.6
8 CHN	3.5	3.2	1.6	2.6	2.5	2.8	5.1	23.1	18.2	11.9	9.8	6.6
9 JPN	2.8	2.0	0.2	0.7	0.9	2.5	1.3	15.3	0.0	19.9	9.3	10.5
10 KOR	1.1	1.2	0.5	1.2	1.0	1.9	1.5	8.0	4.2	0.0	2.7	4.2
11 NAFTA	7.5	2.5	1.6	2.4	2.8	7.6	4.5	9.1	18.8	17.7	38.7	14.1
12 ROW	16.0	7.5	8.1	5.9	9.0	21.6	8.7	29.8	44.2	36.5	21.2	33.1
Total	100	100	100	100	100	100	100	100	100	100	100	100

Source: Calculated based on GTAP DB interim release 6.2 (May 2006)

on EU15 is more than 60 percent and that of Croatia and Turkey on it is as much as 60 and 50 percent, respectively.

The CIS as sources of imports of all the acceding countries is much more important than other third countries such as China, Japan, Korea and NAFTA: more than 10 percent of total imports of the acceding countries come from the CIS, whereas less than 3 percent of their imports are from the other third countries.

3. The Model

The CGE Model used in this study[3)] can be defined as a system of non-linear simultaneous equations describing the constrained optimization of behaviors of economic agents, such as producers, consumers, exporters, importers, savers, investors, the government, etc.

The CGE model is neoclassical in spirit and is part of a long tradition of models that have been widely used to analyze the impact of global trade liberalization and structural adjustment programs. The earliest world CGE models were developed by Whalley (1985) and Deardorff and Stern (1986) to analyze the impact of GATT multilateral trade negotiations.

The model applies Whalley (1985) to endogenize all regions including the rest of the world and incorporates macroeconomic specifications from Devarajan, Lewis and Robinson (1991) and Ko (1993). The model also includes an international shipping sector and a global banking sector, according to the global trade analysis

[3)] See Ko (2001) for a detailed description of the mathematical structure of the model.

project (GTAP) model (Hertel, 1997).

The CGE model used in this study is an extended one of traditional static CGE models[4)], which incorporates the interaction between trade liberalization and capital accumulation, based on classic growth theory (Baldwin, 1989 and 1992). According to the growth theory, a medium-run growth or accumulation effect induces additional savings and investment, which yields more output. In other words, the initial increase in income, as a result of trade liberalization, is to increase savings and investment. The induced savings and investment, thus larger capital stock, lead to larger production capacity and cause a further increase in income.

The model comprises 12 regions and 16 sectors. The classification of regions and sectors are presented in Tables 5 and 6, respectively. The model includes four primary factors of production: land, labor, capital, and natural resources. Labor and capital are employed by all sectors, but land is used only in the production of crops, and meat and dairy products and natural resources are used in forestry, fishery, and mining.

Each regional economy includes economic actors such as producers, a representative household and the government. Producers are assumed to minimize costs by purchasing inputs (intermediate inputs and primary factors of production) and supplying output to both domestic and world markets (exports) in response to market prices in commodity and factor markets. It is assumed that a representative private household receives income from firms, collects taxes, demands goods and services, and saves in order to maximize its utility according to a Cobb-Douglas utility function. The government purchases domestic and imported goods and services based on a Cobb-Douglas aggregation function.

The model solves for commodity and factor prices that equate demand and supply in all commodity and factor markets. The model also solves for world prices, equating demand and supply for sectoral exports and imports across the world economy.

Perfect competition, therefore, constant returns to scale, are assumed in production, while imperfect substitution in goods and services between home and abroad, and imperfect substitution among different origins of economies are assumed by Armington-approach (Armington, 1969), which is one explanation of two-way trade in the same product category, but originating from different nations. Since traded and non-tradable goods are assumed to be distinct and imperfect substitutes by sector, changes in relative world market prices are only partially transmitted to domestic markets. Thus, the model incorporates a realistic degree of insulation of domestic commodity markets from world markets.

[4)] Static CGE models are divided into three categories. The first class of the models emphasizes the static effects of policy-related general equilibrium resource allocation, based on perfect competition and constant returns to scale. The second class that incorporates imperfect competition and scale economies underlines not only reallocation effects, but also pro-competitive effects. The third class involves extensions to include capital accumulation effects based on classic growth theory. The third class includes two options for determination of savings: a) saving rate can be assumed to be constant; b) saving rate can be endogenized (Francois, McDonald and Nordström, 1996).

Table 5 Classification of regions

Region	Description	Countries included
EU15	European Union	Austria, Belgium, Denmark, Finland, France, Germany, United Kingdom, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden
CEEC10	Central and Eastern European Union	Cyprus, Czech Republic, Hungary, Malta, Poland, Slovakia, Slovenia, Estonia, Latvia, Lithuania
BUL	Bulgaria	Bulgaria
ROM	Romania	Romania
CRO	Croatia	Croatia
TUR	Turkey	Turkey
CIS	The Commonwealth of Interdependent States	Russian Federation, Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Tajikistan, Turkmenistan, Ukraine, Uzbekistan
CHN	China	China, Hong Kong
JPN	Japan	Japan
KOR	Korea	Korea
NAFTA	North American Free Trade Area	Canada, United States of America, Mexico
ROW	Rest of the World	Australia, New Zealand, Rest of Oceania, Taiwan, Rest of East Asia, Cambodia, Indonesia, Malaysia, Philippines, Singapore, Thailand, Viet Nam, Rest of Southeast Asia, Bangladesh, India, Pakistan, Sri Lanka, Rest of South Asia, Rest of North America, Bolivia, Colombia, Ecuador, Peru, Venezuela, Argentina, Brazil, Chile, Paraguay, Uruguay, Rest of South America, Central America, Rest of Free Trade Area of Ame, Rest of the Caribbean, Switzerland, Rest of EFTA, Rest of Europe, Albania, Iran, Islamic Republic of, Rest of Middle East, Egypt, Morocco, Tunisia, Rest of North Africa, Botswana, South Africa, Rest of South African Customs, Malawi, Mauritius, Mozambique, Tanzania, Zambia, Zimbabwe, Rest of Southern African Devel, Madagascar, Nigeria, Senegal, Uganda, Rest of Sub-Saharan Africa

Source: GTAP DB interim release 6.2 (May 2006)

The model is of comparative statics in nature: given the pattern of world output and trade at one moment of time, it generates what the pattern of output and trade would be after the world economy adjusted to the eastern enlargements of the EU to be specified in the following section.

Table 6 Classification of sectors

Sector	Description	Sectors included
Crops	Crops	Paddy rice; Wheat; Cereal grains nec; Vegetables, fruit, nuts; Oil seeds; Sugar cane, sugar beet; Plant-based fibers; Crops nec; Processed rice; Sugar.
MeatDairy	Meat and dairy products	Cattle, sheep, goats, horses; Animal products nec; Raw milk; Wool, silk-worm cocoons; Meat: cattle, sheep, goats, horse; Meat products nec; Vegetable oils and fats; Dairy products.
Forestry	Forestry	Forestry.
Fishery	Fishery	Fishing.
Mining	Mining	Coal; Oil; Gas; Minerals nec.
PrcFood	Processed food	Food products nec; Beverages and tobacco products.
TextApp	Textiles and apparel	Textiles; Wearing apparel; Leather products.
WoodPap	Wood and paper products	Wood products; Paper products, publishing.
Chemicals	Chemicals	Petroleum, coal products; Chemical, rubber, plastic products; Mineral products nec.
Metals	Metal products	Ferrous metals; Metals nec; Metal products.
Autos	Automobiles	Motor vehicles and parts.
OthTrnsp	Other transport equipment	Transport equipment nec.
Electronics	Electronics	Electronic equipment.
Machinery	Machinery	Machinery and equipment nec.
OthMnf	Other manufactures	Manufactures nec.
Services	Services	Electricity; Gas manufacture, distribution; Water; Construction; Trade; Transport nec; Sea transport; Air transport; Communication; Financial services nec; Insurance; Business services nec; Recreation and other services; PubAdmin/Defence/Health/Educat; Dwellings.

Source: GTAP DB interim release 6.2 (May 2006)

4. Scenarios of Eastern Enlargement of the EU

In this study, three different scenarios of eastern enlargement of the EU are carried out as follows:

Table 7 Post UR average tariff rates by region and by sector (%)

	EU15	*CEEC*	*BUL*	*ROM*	*CRO*	*TUR*	*CIS*	*CHN*	*JPN*	*KOR*	*NAFTA*	*ROW*
1 Crops	6.3	9.2	18.8	10.1	7.8	18.9	11.8	46.1	46.6	158.9	3.6	10.7
2 MeatDairy	4.0	14.8	24.4	25.2	32.4	9.8	12.0	6.0	37.0	16.8	8.3	16.1
3 Forestry	0.0	0.4	0.0	0.0	0.0	0.1	2.8	0.3	0.1	1.7	0.1	4.0
4 Fishery	1.1	4.8	0.0	5.6	4.9	9.2	7.9	2.2	3.3	14.1	0.2	4.3
5 Mining	0.0	0.2	0.0	0.7	0.0	0.0	0.2	0.2	0.0	3.3	0.0	4.4
6 PrcFood	2.3	16.4	20.6	24.1	15.3	13.2	11.5	9.7	9.4	22.7	3.1	16.6
7 TextApp	2.3	4.6	13.3	7.3	3.5	3.4	12.9	8.8	8.8	8.6	8.7	14.2
8 WoodPap	0.1	2.7	5.5	3.7	1.1	0.7	8.9	6.2	1.0	3.6	0.4	6.0
9 Chemicals	0.5	2.7	5.6	3.3	0.9	1.1	6.5	9.4	1.0	6.0	1.7	6.2
10 Metals	0.6	2.7	5.4	5.4	1.1	2.9	4.2	5.4	0.5	3.4	1.3	6.4
11 Autos	0.8	4.4	7.7	10.6	1.6	0.9	8.9	26.0	0.0	7.1	1.4	14.0
12 OthTrnsp	0.6	3.1	1.4	5.0	0.9	0.5	4.0	3.2	0.0	1.1	0.5	5.7
13 Electronics	0.4	1.4	1.3	1.1	0.1	1.0	6.5	6.2	0.0	1.0	0.5	2.2
14 Machinery	0.3	2.3	4.3	3.2	1.2	0.5	4.7	9.6	0.1	5.5	1.1	5.4
15 OthMnf	0.7	3.8	7.2	6.5	2.0	2.1	11.8	5.6	1.1	8.6	1.4	12.6
16 Services	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0

Source: Calculated based on GTAP DB interim release 6.2 (May 2006)

Scenario 1: the accession of CEEC10 to the EU;
Scenario 2: Scenario 1 + the accession of Bulgaria and Romania to the EU;
Scenario 3: Scenario 2 + the accession of Croatia and Turkey to the EU

Since acceding countries have to apply the EU's Common Commercial Policy which includes all EU bilateral free trade agreements (FTA), the common external tariffs (CET) and EU trade defense measures, they have to reduce or increase their tariffs on imports from third countries in compliance with the CET of the EU.

Each scenario assumes: a) the elimination of tariffs between the old and new members of the enlarged Union; b) the abolition of tariffs among new members; c) the imposition of the CET by new members on imports from third countries in line with the EU's Common Commercial Policy; and d) an increase in total factor productivity (TFP)[5)] of the old and new members, which is assumed to occur by one percent, when 10 percent of their total import volumes rise as a result of their accession.

Since the base year of the data is 2001 but the accession of CEEC10 occurred

[5)] The assumption of an increase in TFP is to measure dynamic effects of enlargement of the EU, which could possibly result from: a) increased productive capacity due to better exploitation of economies of scale to be made possible by the increased size of the market of the enlarged Union; b) enforced changed in efficiency to be brought about by intensified competition between firms; c) changes affecting both the amount and quality of factors of production due to technological advances.

in 2004, tariff rates of the base year were adjusted to take into account the completion of the UR agreement. Table 7 shows average ad valorem tariff rates of all regions by sector, after completion of the UR agreement and before the 5th eastern enlargement of the EU. Yet these tariff data are not used for simulations, but bilateral tariffs[6] of each region on imports from all other regions are used. It is to be noted that there are no tariffs on intra-trade of EU15 and that there are no tariffs levied by EU15 on most of the imports from CEEC10 except for fishery, processed food, and metal products because of the Europe Agreements which came into force before the enlargement. Before the accession, however, CEEC10 levied tariffs on imports from EU15 and CEEC10.

In order to get the common external tariffs to be imposed by the acceding countries such as CEEC10, Bulgaria, Romania, Croatia and Turkey on imports from third countries, their import tariffs should be changed in compliance with those of EU15. Tables 8 to 12 in the appendix show tariff rates by which CEEC10, Bulgaria, Romania, Croatia and Turkey have to change to get the CET in line with the common trade policy of EU15.

For example, CEEC10 should reduce tariffs on imported crops from the CIS and NAFTA by 1.15% and 3.45%, respectively, but raise them from China, Japan and Korea by 23.9%, 7.22% and 19.57%, respectively. Bulgaria, Romania and Croatia should increase tariffs on imported crops from Japan and Korea, whereas Turkey should reduce them. In general, CEEC10 and all acceding countries should cut down tariffs on most imports from third countries, with some exceptions. The potential impacts of their accessions on trade between the enlarged Union and third countries depend on the changes in tariff rates in Tables 8–12.

5. Economic Effects of Eastern Enlargement of the EU

As a result of step-wise enlargements of the EU by CEEC10 (Scenario 1), Bulgaria and Romania (Scenario 2), and Croatia and Turkey (Scenario 3), EU15 gains a relatively small additional increase in real GDP of 0.027%, 0.041%, and 0.042%, respectively, whereas the real GDP of CEEC10 increases additionally by 2.78%, 2.81%, and 2.91%, respectively, as shown in Table 13.

When Bulgaria and Romania don't join the EU, they face a loss of real GDP of 0.03% and 0.08%, respectively, while their membership brings them an additional gain in real GDP of 5.21% and 6.04%, respectively, as in the case of Scenario 2.

The EU membership of Croatia and Turkey (Scenario 3) results in an additional increase in real GDP of old and new members, but much smaller compared to the additional accession of Bulgaria and Romania (Scenario 2). Real GDP of Croatia and Turkey rises by 1.55% and 1.38%, respectively.

As a result of EU enlargements, the CIS gains an additional increase in real GDP of up to 0.1 percent, whereas China, Japan, Korea and NAFTA experience

[6] Due to limited space of this paper, bilateral tariffs are not presented here. Upon request, they are available from the author.

Table 13 Impact on real GDP (% change)

Region	Scenario 1	Scenario 2	Scenario 3
EU15	0.027	0.041	0.042
CEEC10	2.776	2.806	2.910
BUL	−0.031	5.209	5.267
ROM	−0.080	6.040	6.324
CRO	−0.062	−0.062	1.552
TUR	−0.053	−0.094	1.377
CIS	0.060	0.068	0.095
CHN	−0.014	−0.015	−0.013
JPN	−0.015	−0.016	−0.016
KOR	−0.025	−0.024	−0.024
NAFTA	−0.013	−0.014	−0.014
ROW	−0.017	−0.020	−0.019

Source: Author's calculation

Table 14 Impact on welfare (US$ million)

Region	Scenario 1	Scenario 2	Scenario 3
EU15	2655.4	3902.4	3882.8
CEEC10	6765.2	6819.4	7102.5
BUL	−5.7	362.3	368.7
ROM	−26.3	1344.7	1402.5
CRO	−13.4	−13.8	218.1
TUR	−77.4	−137.9	1755.2
CIS	420.6	490.7	647.2
CHN	−40.5	−23.3	28.2
JPN	−355.6	−368.4	−386.1
KOR	−62.8	−48.7	−48.2
NAFTA	−924.1	−892.8	−883.1
ROW	−390.5	−427.9	−302.7

Source: Author's calculation

a reduction in real GDP of up to 0.02 percent[7)]. As far as the CIS is concerned, positive trade-creating effects of EU enlargements more offset their negative trade-diverting effects. In the case of Scenario 3, real GDP of the CIS rises by 0.1%, but

[7)] Most of the third countries rather than EFTA (European Free Trade Association) consisting of Iceland, Norway, Switzerland and Liechtenstein, Russia and the Republics of former Soviet Union are to experience negative impacts of eastern enlargement of the EU in terms of real GDP, welfare and industry output. See Ko (2001, 2002, 2004, 2005a, 2005b).

that of China, Japan, Korea and NAFTA goes down by 0.013% to 0.024%.

The equivalent variation (EV) of EU15, which is used as a measure of welfare, increases by $2.7 billion to $3.9 billion and that of CEEC10 rises by $6.8 billion to $7.1 billion, as the number of new membership increases, as shown in Table 14. Bulgaria, Romania, Croatia and Turkey gain an additional increase in welfare of $362 million, $1.3 billion, $218 million and $1.8 billion, respectively, when they join the EU.

While Bulgaria, Romania, Croatia and Turkey get a loss in welfare when they don't join the EU, the CIS gets an additional gain in welfare even in such cases. The CIS's welfare goes up by $421 million, $491 million and $647 million, respectively, as step-wise enlargements of the EU occur. By contrast, the welfare of China, Japan, Korea and NAFTA is negatively affected by the enlargements.

Therefore, it can be said that EU membership causes positive net trade creation effects which increase the real GDP and welfare of old and new members of the Union as well as the CIS and that it also incurs positive net trade diversion effects which reduce the economic growth and welfare of the third countries such as China, Japan, Korea and NAFTA.

Tables 15 and 16 show potential impacts of EU eastern enlargements on total export and import volumes, respectively, and their effects on trade balance and the terms of trade are presented in Tables 17 and 18.

Although increased total import volumes of EU15 exceed its increased total export volumes, EU15 runs trade surpluses due to its improved terms of trade. However, all the acceding countries run trade deficits owing to their deteriorated terms of trade, even if their increased total export volumes surpass their increased total import volumes as a result of their EU membership.

As far as the third countries are concerned, there are some different changes in trade volumes and the terms of trade, even though all of them acquire trade surpluses. For instance, the CIS and China run trade surpluses due to their improved terms of trade, even though their total import volumes rise more than their total export volumes do.

Japan and NAFTA display quite a similar change in total export and import volumes: their export volumes grow up, import volumes drop and both of them run trade surpluses. However, there is a difference: NAFTA's improved terms of trade contribute to its ever rising trade surpluses, but Japan's slightly deteriorated terms of trade slow down its trade surpluses, as EU membership expands.

Korea shows a unique case. Korea's total export and import volumes decline and Korea runs trade surpluses, because the latter outdoes the former and its terms of trade improves as a result of EU enlargements.

Table 19 shows potential effects on bilateral trade in the case of Scenario 3. Some distinguishing patterns of bilateral trade can be identified. First, intra-regional trade of EU15 declines, whereas exports from EU15 to all the acceding countries, with the exception of Turkey, and to all the third countries rise. Increased exports from EU15 to all the acceding countries more than compensate for its reduced intra-regional trade. Second, EU15 changes sources of its imports from itself and

Table 15 Impact on export volumes (% change)

Region	Scenario 1	Scenario 2	Scenario 3
EU15	0.136	0.183	0.195
CEEC10	8.671	8.773	9.011
BUL	−0.129	19.514	19.681
ROM	−0.142	18.041	18.837
CRO	−0.158	−0.184	6.242
TUR	−0.115	−0.198	4.074
CIS	0.276	0.319	0.424
CHN	0.029	0.039	0.048
JPN	0.008	0.011	0.007
KOR	−0.019	−0.013	−0.014
NAFTA	0.014	0.021	0.020
ROW	0.003	0.003	0.003

Source: Author's calculation

Table 16 Impact on import volumes (% change)

Region	Scenario 1	Scenario 2	Scenario 3
EU15	0.158	0.218	0.226
CEEC10	7.744	7.819	8.027
BUL	−0.165	17.032	17.201
ROM	−0.171	13.804	14.366
CRO	−0.156	−0.183	5.311
TUR	−0.164	−0.281	4.302
CIS	0.49	0.573	0.758
CHN	0.03	0.046	0.059
JPN	−0.021	−0.018	−0.026
KOR	−0.027	−0.016	−0.017
NAFTA	−0.012	−0.005	−0.006
ROW	0.009	0.011	0.016

Source: Author's calculation

the third countries to the acceding countries. As a result, trade creating effects occur to the enlarged Union as a whole and trade diverting effects affect the third countries.

Third, increased exports of all the acceding countries, with the exception of Croatia, are mainly destined to EU15 and CEEC10. Increased trade among Bulgaria, Romania, Croatia and Turkey are insignificant and exports from Romania and Turkey to Bulgaria drop somewhat. Fourth, exports from all the third countries to EU15 decline and their exports to all the acceding countries, with the exception

Table 17 Impact on trade balance (US$ million)

Region	Scenario 1	Scenario 2	Scenario 3
EU15	129.8	113.6	96.6
CEEC10	−1067.5	−1071.3	−1096.3
BUL	0.1	−8.3	−8.4
ROM	5.6	−54.7	−55.7
CRO	2.1	2.3	−30.3
TUR	0.4	−0.9	−5.3
CIS	91	105.4	137.9
CHN	91.5	106.7	120.4
JPN	111	119.3	116.6
KOR	14.1	16.8	15.4
NAFTA	500.3	544.8	567.4
ROW	121.6	126.3	141.8

Source: Author's calculation

Table 18 Impact on the terms of trade (% change)

Region	Scenario 1	Scenario 2	Scenario 3
EU15	0.025	0.038	0.033
CEEC10	−0.725	−0.747	−0.768
BUL	−0.036	−2.126	−2.122
ROM	−0.035	−1.852	−1.967
CRO	−0.016	−0.021	−0.492
TUR	−0.038	−0.067	−0.009
CIS	0.167	0.200	0.258
CHN	0.015	0.022	0.027
JPN	−0.002	0.000	−0.003
KOR	0.005	0.011	0.010
NAFTA	0.003	0.007	0.007
ROW	0.015	0.017	0.023

Source: Author's calculation

of Croatia, rise. Increased exports from all the third countries to all the acceding countries surpass their reduced exports to EU15. Fifth, trade among all the third countries goes down, with the exception of exports from all the third countries to the CIS. Sixth, as far as the third countries are concerned, total exports of the CIS and China increase, whereas those of China, Japan, Korea and NAFTA decrease.

Table 20 shows that eastern enlargement of the EU, in the case of Scenario 3, leads to an increase in industry output of all sectors of EU15 by less than 0.5 percent, with the exception of meat and dairy products, metal products and elec-

Table 19 Impact on bilateral trade in the case of Scenario 3 (US$ million)

	1 EU15	2 CEEC10	3 BUL	4 ROM	5 CRO	6 TUR
1 EU15	−5,775.5	5,626.5	1,088.9	993.3	341.7	−162.7
2 CEEC10	9,170.3	2,547.9	21.1	9.1	152.4	222.6
3 BUL	949.9	106.2	0.0	5.2	0.7	60.6
4 ROM	1,694.2	381.6	−14.6	0.0	21.8	25.3
5 CRO	169.3	218.6	0.0	3.6	0.0	8.5
6 TUR	1,150.9	497.7	−52.0	175.0	13.2	0.0
7 CIS	−846.0	1,597.0	72.1	226.1	0.1	674.3
8 CHN	−589.7	833.9	79.0	343.5	4.1	306.2
9 JPN	−309.0	281.1	0.3	48.1	−5.4	3.4
10 KOR	−131.9	60.9	0.0	77.0	−4.5	24.1
11 NAFTA	−779.9	745.2	41.0	292.3	2.7	82.8
12 ROW	−1,647.6	1,124.2	88.7	133.0	−43.0	520.9
Total	3,055.0	14,020.9	1,324.4	2,306.2	483.7	1,766.2

Source: Author's calculation

Table 19 (cont'd) Impact on bilateral trade in the case of Scenario 3 (US$ million)

	7 CIS	8 CHN	9 JPN	10 KOR	11 NAFTA	12 ROW	Total
1 EU15	308.7	139.1	52.3	22.3	200.6	222.0	3,057.2
2 CEEC10	325.4	61.6	66.3	29.1	526.6	606.2	13,738.7
3 BUL	41.3	9.2	10.1	3.4	85.0	102.7	1,374.4
4 ROM	24.4	14.6	6.8	6.0	73.6	128.3	2,362.0
5 CRO	7.7	3.4	6.7	1.6	22.4	54.3	496.1
6 TUR	25.3	1.0	−5.7	−1.2	5.3	37.8	1,847.2
7 CIS	−71.7	−129.4	−54.4	−23.2	−142.1	−317.8	985.0
8 CHN	17.4	−59.2	−120.1	−29.9	−368.1	−222.3	194.9
9 JPN	11.7	33.7	0.0	−15.4	−144.4	−168.1	−263.8
10 KOR	8.1	−1.1	−17.5	0.0	−72.9	−98.7	−156.5
11 NAFTA	74.0	33.4	−39.4	−18.8	−412.7	−226.0	−205.3
12 ROW	98.7	61.4	−71.1	−25.8	−339.7	−394.9	−495.4
Total	871.0	167.7	−165.9	−51.9	−566.4	−276.5	22,934.4

Source: Author's calculation

tronics whose domestic production falls, and that industry output of all sectors of all the acceding countries rises with the exception of meat and dairy products of Croatia and mining of Turkey. The sectors which exhibit relatively big expansions are meat and dairy products (9.42%), electronics (9.09%), automobiles and parts (7.29%) and metal products (7.06%) in CEEC10, metal products (10.64%)

Table 20 Impact on industry output in the case of Scenario 3 (% change)

Sector	EU15	CEEC10	BUL	ROM	CRO	TUR
Crops	0.40	1.43	5.49	2.57	0.77	1.08
MeatDairy	−0.57	9.42	5.44	4.60	−4.53	7.78
Forestry	0.01	3.10	5.53	4.95	1.36	3.18
Fishery	0.02	2.62	5.09	4.34	1.16	1.08
Mining	0.21	1.88	10.16	4.49	3.38	−0.10
PrcFood	0.16	1.75	6.14	3.89	2.63	3.80
TextApp	0.14	2.67	7.38	21.31	8.27	0.43
WoodPap	0.05	3.60	6.20	8.14	3.68	0.71
Chemicals	0.14	3.16	6.79	5.33	2.82	1.12
Metals	−0.16	7.06	10.64	12.54	3.91	5.66
Autos	0.05	7.29	5.54	3.45	6.50	1.51
OthTrnsp	0.13	5.08	7.15	5.90	2.11	1.98
Electronics	−0.09	9.09	7.01	10.67	3.99	2.97
Machinery	0.12	5.60	6.36	5.14	3.33	2.03
OthMnf	0.08	2.51	6.57	4.96	2.43	2.31
Services	0.05	2.75	6.18	6.02	1.08	1.15

Source: Author's calculation

Table 20 (cont'd) Impact on industry output in the case of Scenario 3 (% change)

Sector	CIS	CHN	JPN	KOR	NAFTA	ROW
Crops	0.05	−0.02	−0.01	−0.01	−0.01	−0.02
MeatDairy	0.15	0.03	−0.02	−0.03	0.04	−0.26
Forestry	−0.21	−0.01	0.00	−0.03	−0.02	−0.03
Fishery	0.07	0.01	−0.02	−0.01	−0.02	−0.05
Mining	0.03	0.02	0.13	0.07	0.05	0.06
PrcFood	0.03	0.12	−0.01	−0.01	0.00	−0.06
TextApp	−0.25	−0.05	0.02	−0.22	−0.04	−0.04
WoodPap	0.04	−0.04	−0.02	−0.03	−0.02	−0.03
Chemicals	0.42	−0.01	−0.02	−0.05	−0.02	−0.01
Metals	0.58	−0.03	−0.03	−0.01	−0.04	−0.17
Autos	0.00	−0.04	−0.04	0.11	−0.04	−0.07
OthTrnsp	0.33	0.10	−0.51	−0.99	−0.06	0.37
Electronics	0.02	0.01	−0.04	−0.06	−0.07	0.02
Machinery	0.03	0.05	0.00	−0.03	−0.02	0.05
OthMnf	0.09	−0.02	−0.02	0.05	0.03	0.00
Services	0.14	−0.02	−0.02	0.00	−0.01	−0.01

Source: Author's calculation

and mining (10.16%) in Bulgaria, textiles and apparel (21.31%), metal products (12.54%) and electronics (10.67%) in Romania, textiles and apparel (8.27%) and automobiles and parts (6.5%) in Croatia, and meat and dairy products (7.78%) and metal products (5.66%) in Turkey.

As far as the third countries are concerned, industry output of all sectors in the CIS augments slightly with the exceptions of forestry and textiles and apparel. Metal products, chemicals and other transport equipment are more positively affected by EU enlargement in comparison with other sectors. By contrast, domestic production of most sectors in China, Japan, Korea and NAFTA is negatively influenced by it with some exceptions.

6. Conclusions

This study is dedicated to the quantification of potential economic effects of step-wise enlargement of the EU by CEEC10 which joined the Union on 1 May 2004, Bulgaria and Romania which are to become new members on 1 January 2007, and Croatia and Turkey which are in the course of entry negotiation.

EU15 is expected to gain a slight additional increase in real GDP and welfare, whereas real GDP of CEEC10, Bulgaria and Romania is to rise by up to 2.91%, 5.21% and 6.04%, respectively, as they join the EU. The EU membership of Croatia and Turkey is to result in an additional increase in real GDP by 1.55% and 1.38%, respectively. Accordingly, all the acceding countries can enjoy a higher level of welfare.

On the other hand, third countries such as China, Japan, Korea and NAFTA are to face a loss in economic growth and welfare as a result of EU enlargement, whereas the CIS gains. As far as the CIS is concerned, positive trade-creating effects of EU enlargements more offset their negative trade-diverting effects. Therefore, it can be said that EU membership causes positive net trade creation effects which increase the real GDP and welfare of old and new members of the Union as well as the CIS and that it also incurs positive net trade diversion effects which reduce the economic growth and welfare of the third countries such as China, Japan, Korea and NAFTA.

EU15 is to run trade surpluses due to its improved terms of trade, even though its increased total import volumes surpass its increased total export volumes. However, all the acceding countries are to acquire trade deficits owing to their deteriorated terms of trade, although their increased total export volumes exceed their increased total import volumes as a result of their EU membership.

As far as third countries such as the CIS, China, Japan, Korea and NAFTA are concerned, there are some different changes in trade volumes and the terms of trade, even though all of them are to acquire trade surpluses.

Some distinguishing patterns of bilateral trade can be identified. First, intra-regional trade of EU15 declines, whereas exports from EU15 to all the acceding countries, with the exception of Turkey, and to all the third countries rise. An increase in exports from EU15 to all the acceding countries more than compensates

for its reduced intra-regional trade. Second, EU15 changes sources of its imports from itself and the third countries to the acceding countries. As a result, trade creating effects occur to the enlarged Union as a whole and trade diverting effects affect the third countries. Third, increased exports of all the acceding countries, with the exception of Croatia, are mainly destined to EU15 and CEEC10. Increased trade among Bulgaria, Romania, Croatia and Turkey are insignificant and exports from Romania and Turkey to Bulgaria fall somewhat. Fourth, exports from all the third countries to EU15 decline and their exports to all the acceding countries, with the exception of Croatia, rise. Increased exports from all the third countries to all the acceding countries surpass their reduced exports to EU15. Fifth, trade among all the third countries goes down, with the exception of exports from all the third countries to the CIS. Sixth, as far as the third countries are concerned, total exports of the CIS and China increase, whereas those of China, Japan, Korea and NAFTA drop.

Eastern enlargement of the EU is to lead to an increase in industry output of all sectors in old members of the EU and all the acceding countries except for just a few sectors. By contrast, domestic production of most sectors in all the third countries diminishes with the exception of the CIS where output of all sectors expands with the exceptions of forestry and textiles and apparel.

The following factors are not considered in this study: transfer payments from Brussels to new members of the enlarged Union, emigration of labor between EU15 and the acceding countries, reduction of risk premium, border-cost reduction, and reduction of technical barriers to trade.

Therefore, the potential effects of eastern enlargement of the EU might have been underestimated in this study. Old and new members of the enlarged Union could get higher positive effects on their real GDP, welfare, and trade. It is also believed that the third countries such as China, Japan, Korea and NAFTA could face more severe negative effects on their real GDP, welfare and trade and incur much lower industry output, but it is not certain to what extent they would be affected. On the other hand, it is not certain whether the CIS would be affected positively or negatively, if the factors not considered in this study were taken into account. And to what extent? Further research could include them in order to fully quantify the potential effects of the EU membership of Bulgaria, Romania, Croatia and Turkey on old and new members of the EU as well as the third countries.

Appendix

Table 8 Tariff rates of CEEC10 to be changed in line with the CET of the EU (%)

Sector	CIS	CHN	JPN	KOR	NAFTA	ROW
1 Crops	−1.15	23.90	7.22	19.57	−3.45	6.18
2 MeatDairy	−8.00	−9.86	5.46	4.70	−13.22	8.29
3 Forestry	−0.47	0.34	0.01	0.00	−1.39	−0.85
4 Fishery	7.97	−2.07	2.71	0.12	−0.50	0.40
5 Mining	−0.13	−0.98	0.06	−0.03	−0.91	−0.29
6 PrcFood	−7.08	−7.43	−3.31	−19.01	−14.00	−8.18
7 TextApp	−4.14	−2.42	−2.38	0.19	−0.89	−4.48
8 WoodPap	−3.47	−5.92	−4.80	−5.04	−2.11	−3.38
9 Chemicals	−6.47	−2.99	−1.69	−1.16	−1.90	−2.54
10 Metals	−4.14	−2.96	−2.33	−1.69	−2.75	−2.84
11 Autos	−3.50	−5.95	−4.84	−6.79	−5.46	−3.01
12 OthTrnsp	−6.72	−4.58	2.39	−0.08	−1.13	−5.35
13 Electronics	−4.07	−2.79	−1.95	−2.45	−1.69	−1.86
14 Machinery	−3.95	−6.28	−3.85	−4.31	−3.38	−3.56
15 OthMnf	−16.59	−5.19	−4.43	−4.66	−5.56	−4.82
16 Services	0.00	0.00	0.00	0.00	0.00	0.00

Source: Calculated based on GTAP DB interim release 6.2 (May 2006)

Table 9 Tariff rates of Bulgaria to be changed in line with the CET of the EU (%)

Sector	CIS	CHN	JPN	KOR	NAFTA	ROW
1 Crops	−3.38	7.35	7.22	20.26	−8.17	−13.72
2 MeatDairy	−29.24	−32.63	5.71	−17.36	−24.99	11.98
3 Forestry	0.00	0.36	0.01	0.00	−0.47	0.02
4 Fishery	3.67	0.85	2.71	0.12	0.98	−1.09
5 Mining	0.00	−0.04	0.15	0.01	−0.01	0.00
6 PrcFood	−21.46	−8.47	−17.31	−15.43	−8.36	−10.93
7 TextApp	−3.74	−10.38	−6.19	−5.86	−6.90	−9.29
8 WoodPap	−1.52	−4.19	−2.99	−3.37	−1.78	−8.15
9 Chemicals	−2.10	−3.83	−3.10	−1.94	−1.04	−3.28
10 Metals	−3.44	−6.04	−5.45	−2.04	−6.48	−3.14
11 Autos	−3.18	−3.48	−0.19	0.93	−1.36	−4.41
12 OthTrnsp	−1.23	−9.77	−1.80	−2.17	−0.12	0.15
13 Electronics	−0.09	−1.40	−0.34	−2.07	−0.43	−1.97
14 Machinery	−4.92	−7.08	−2.23	−3.46	−1.85	−3.71
15 OthMnf	−17.27	−3.31	−11.30	−2.63	−6.81	−4.32
16 Services	0.00	0.00	0.00	0.00	0.00	0.00

Source: Calculated based on GTAP DB interim release 6.2 (May 2006)

Table 10 Tariff rates of Romania to be changed in line with the CET of the EU (%)

Sector	CIS	CHN	JPN	KOR	NAFTA	ROW
1 Crops	−8.72	15.68	7.10	20.26	−12.94	9.22
2 MeatDairy	3.35	−18.33	−25.48	6.53	−28.09	−3.89
3 Forestry	−2.73	0.36	0.01	0.00	−1.68	−2.27
4 Fishery	8.81	0.85	2.71	0.12	−5.03	−2.60
5 Mining	−0.85	−1.18	0.15	−4.48	−0.52	−0.34
6 PrcFood	−8.98	−25.87	−11.00	−7.75	−19.47	−13.67
7 TextApp	0.65	−15.80	−15.74	−9.29	−13.16	−13.58
8 WoodPap	−8.66	−13.01	−9.14	−13.83	−9.11	−6.43
9 Chemicals	−3.22	−6.59	−7.88	−4.70	−7.31	−5.07
10 Metals	−7.31	−10.17	−8.36	−10.38	−12.03	−5.78
11 Autos	−10.44	−25.13	−16.79	−11.28	−17.69	−15.56
12 OthTrnsp	−11.32	−28.55	−19.17	−9.79	−3.51	−3.71
13 Electronics	−1.79	−1.42	−0.60	−1.23	−0.84	−2.16
14 Machinery	−9.21	−8.88	−7.98	−5.44	−8.30	−4.72
15 OthMnf	−13.15	−10.44	−11.55	−10.85	−18.31	−9.65
16 Services	0.00	0.00	0.00	0.00	0.00	−0.17

Source: Calculated based on GTAP DB interim release 6.2 (May 2006)

Table 11 Tariff rates of Croatia to be changed in line with the CET of the EU (%)

Sector	CIS	CHN	JPN	KOR	NAFTA	ROW
1 Crops	0.19	24.61	2.67	20.26	−2.50	8.67
2 MeatDairy	−12.37	0.62	2.47	6.53	−24.79	11.41
3 Forestry	0.00	0.36	0.01	0.00	0.25	0.01
4 Fishery	8.81	−5.16	2.71	0.12	7.32	−2.73
5 Mining	0.00	0.00	0.15	0.01	−0.16	−0.09
6 PrcFood	−0.78	−5.90	−5.67	−2.24	−1.77	−5.65
7 TextApp	2.10	−3.08	−1.14	0.41	−1.02	−2.94
8 WoodPap	−0.80	−4.86	−0.11	−0.98	−1.24	−0.41
9 Chemicals	−2.37	−0.84	0.20	3.03	0.82	−0.25
10 Metals	0.66	−3.85	0.68	0.33	−2.02	0.25
11 Autos	−3.86	−5.59	0.46	1.78	−0.63	−1.38
12 OthTrnsp	0.06	−0.68	−1.05	−1.98	−1.39	−0.04
13 Electronics	0.73	0.81	1.85	1.27	−0.02	0.26
14 Machinery	−4.37	−3.57	0.85	−0.73	−0.04	−2.30
15 OthMnf	−0.76	−0.29	−2.45	−4.14	−1.66	−2.87
16 Services	0.00	0.00	0.00	0.00	0.00	0.00

Source: Calculated based on GTAP DB interim release 6.2 (May 2006)

Table 12 Tariff rates of Turkey to be changed in line with the CET of the EU (%)

Sector	CIS	CHN	JPN	KOR	NAFTA	ROW
1 Crops	−8.19	20.05	−10.24	−1.89	−6.47	−17.11
2 MeatDairy	−8.24	−7.07	−46.88	2.40	0.29	12.89
3 Forestry	0.00	0.36	−4.68	0.00	0.15	0
4 Fishery	−28.87	0.85	2.71	0.12	7.32	−11.82
5 Mining	0.00	−0.06	0.15	0.01	−0.07	−0.03
6 PrcFood	−15.20	−41.08	−14.49	−7.74	−7.91	−6.61
7 TextApp	−0.27	−3.73	−1.78	0.01	−3.99	−3.15
8 WoodPap	−1.72	−3.65	−1.70	−2.64	−1.73	−1.59
9 Chemicals	−2.01	−2.34	−0.13	−1.01	−1.22	−1.2
10 Metals	−6.65	−3.24	−2.37	−4.97	−1.19	−0.66
11 Autos	−8.47	−7.55	−1.05	−2.02	−1.01	−1.47
12 OthTrnsp	−0.78	−7.22	3.14	0.45	0.35	0.44
13 Electronics	−0.59	−4.13	0.44	−2.04	−0.66	−0.93
14 Machinery	−2.12	−1.96	−0.01	0.11	−0.41	−0.48
15 OthMnf	−0.80	−1.43	−2.37	−5.97	−5.18	−2.76
16 Services	0.00	0.00	0.00	0.00	0.00	0

Source: Calculated based on GTAP DB interim release 6.2 (May 2006)

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