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The Impact of the Association Agreement Concluded with the EC
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INDUSTRIAL COUNTRIES' PROTECTIONISM WITH RESPECT TO EASTERN EUROPE: THE IMPACT OF THE ASSOCIATION AGREEMENT CONCLUDED WITH EC ON THE EXPORTS OF POLAND, CZECHOSLOVAKIA AND HUNGARY

Cristina Mastropasqua and Valeria Rolli(*)

ABSTRACT

The paper assesses industrial countries' protectionism with respect to Eastern Europe until 1990 and simulates the impact of EC tariff liberalization (following the implementation of the Association Agreement between the EC and Poland, Czechoslovakia and Hungary) on imports from the three East European countries. During the last decade, OECD tariffs on imports from Central and East European countries (CEECs) were higher than those applied to developing countries. Since 1990 industrial countries' trade policies with respect to Eastern Europe have been relaxed. In December 1991 an Association Agreement between the EC and Poland, Czechoslovakia and Hungary was concluded, laying down the creation of a free trade area for non-agricultural goods. A simulation of the effects of the Association Agreement on Polish, Czechoslovak and Hungarian exports was performed using a partial equilibrium model of international trade flows. The increase in the three countries' total export revenues due to tariff reductions is between 8 and 12 per cent, depending whether CEECs export supply elasticities are respectively finite or infinite. In the finite case, the present value of additional annual export flows ranges between 10 and 17 per cent of the three countries' external debt in 1991.

(*) Banca d'Italia, Servizio Studi

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1. Introduction[1]

The purpose of this paper is twofold. It assesses industrial countries' protectionism with respect to Eastern Europe[2] until 1990 and quantifies the impact of EC tariff liberalization (following the implementation of the Association Agreement between the EC and Poland, Czechoslovakia and Hungary) on imports from the three East European countries.

It is well known that, far from diminishing, industrial countries' protectionism has made more intensive use of non-tariff measures (NTMs), the incidence of which on imports rose steeply between the seventies and the eighties.

During the last twenty years, industrial countries responded to Eastern Europe's planned controls on trade by subjecting their exports to quantitative restrictions and tariffs which were on the average higher than those applied to developing countries. Moreover, non-tariff measures on East European exports were concentrated in those sectors where these countries had the largest comparative advantages (agriculture, textiles and clothing, iron and steel).

Since 1990, following the political and economic changes that have occurred in Eastern Europe, industrial countries have been relaxing their trade barriers towards the area. At the end of 1991, Poland, Czechoslovakia and Hungary concluded an Association Agreement with the EC, which was aimed at creating a free trade area for non-agricultural products and at lowering tariffs on agricultural goods over a

2. Throughout the paper, East European countries include Poland, Czechoslovakia, Hungary, Bulgaria, Romania and former GDR.

ten-year period.

The present work is organized as follows: section 2 discusses industrial markets' protection trends during the last decade; section 3 is focused on protection measures against imports from Eastern Europe until 1990; section 4 describes the Association Agreement; section 5 shows the increase in Polish, Czechoslovak and Hungarian exports derived from simulating the application of the Association Agreement; section 6 presents some concluding remarks.

2. Industrial countries' tariff and non-tariff protectionism during the eighties.

Over the last twenty years, the process of lowering tariffs has been paralleled by more frequent adoption of NTMs by industrial countries, in open contrast with GATT rules regarding: a) non discrimination b) use of tariff protection only and trade liberalization.[3]

After the conclusion of the Tokyo Round in 1979, tariffs have lost much of their importance as trade policy tools. Average "most favorite nation" (MFN) tariffs are now very low on agricultural and non-agricultural raw materials, they are above 6 per cent on agricultural processed goods and 7 per cent on manufactures (Table 1). In some sectors, such as clothing, textiles and footwear, MFN tariffs are higher than 10 per cent.[4] Average GSP tariffs (towards the countries

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3. Whereas tariff liberalization has generally been carried out without discrimination, non-tariff measures, which can be authorized by the GATT under extraordinary circumstances (Dam, 1970), have been widely employed by single countries, sometimes discriminating among exporters.

4. Tariff reductions following the Tokyo Round have been globally smaller on developing countries' exports; therefore, these countries have benefited less than developed ones by multilateral negotiations (World Bank, 1987).

Average tariffs applied by industrial countries

Sectors	MFN(1)	GSP(2)
Food	6.4	5.5
Agricultural	.8	.5
Ores and metals	2.3	.9
Fuel	1.1	.6
Chemical	5.8	3.7
Manufactures (3)	7.0	6.7
of which:		
textile	11.7	8.4
clothing	17.5	14.6
TOTAL	5.0	2.7

Source: IMF (1991).

(1) "Most Favorite Nation" tariffs. - (2) "General System of Preferences" tariffs. - (3) Excluding the chemical sector.

Table 2

Percent of industrial countries' imports covered by non-tariff measures (1966-1986) (1)

Sectors	Industrial countries(2) '66	'86(3)	EC '66	'86(3)	USA '66	'86(3)	JAPAN '66	'86(3)
Food	56	36	61	39	52	42	73	26
Agricultural	4	37	24	24	14	31	0	59
Ores and metals	1	28	0	40	0	16	2	29
Fuel	27	0	11	26	92	-92	33	-5
Manufactures	19	39	21	46	39	32	48	2
TOTAL	25	23	21	33	36	9	31	12

Source: Laird and Yeats (1990b).

(1) Non-tariff measures are both "hard-core" (quantitative, para-tariff measures), and "soft-core" (health and technical standards, customs and packing regulations).
(2) The ten members of the EC in 1986, Finland, Japan, Norway, Switzerland, USA.
(3) 1966-1986 changes.

to which they are extended)[5] are less than 3 per cent and near to zero on raw materials. Finally, MFN and GSP tariffs on manufactures do not seem to differ substantially.

On the contrary, the incidence of NTMs on industrial countries' imports increased considerably during the past twenty years. According to commonly accepted criteria, NTMs are defined as government or private actions aimed at modifying the volume, composition or direction of trade. However, because of problems in determining the specific purposes of such actions (health or technical standards, for example), in this work NTMs include only actions aimed primarily at restricting imports, such as: quantitative measures (quotas, licenses, prohibitions, voluntary export restrictions (VER), embargoes, minimum prices, variable duties[6]), seasonal tariffs and antidumping actions. In the literature this large group is commonly referred to as "hard-core" measures.

Quantifying NTM effects on trade is difficult. Attempts to measure them by calculating "tariff equivalents" (TEs) face many methodological problems.[7] NTMs are therefore usually measured by computing frequency[8] and import

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5. GSP stands for Generalized System of Preferences, under which lower tariffs on limited amounts and ranges of imports are granted, usually for no longer than five years.

6. Variable duties are quantitative measures since they prevent world demand and supply shifts from being transmitted to domestic prices.

7. First of all, knowledge of market size and demand and supply elasticities is needed in order to determine TEs corresponding to quantitative restrictions; secondly, computing TEs with reference to percentage changes in domestic prices' (or quantities') after imposing NTMs is not always feasible (Laird and Yeats, 1990a).

8. Frequency indices are computed as the percentage ratio of the number of imported products subject to NTMs to the total number of imported goods in the industry.

coverage[9] indices. However, they do not enable us to verify the degree of restriction of NTMs on import flows. Difficulties in measuring NTM effects on prices and quantities contribute to their poor transparency.

Trade distortion effects of NTMs are well known. Quantitative NTMs usually cause domestic prices to rise more than tariffs, for given levels of imports (Deardorff, 1987). NTMs often discriminate against low-cost exporters (however, that does not occur under global NTMs, which restrict all imports in proportion to exporters' market shares). Consequently, NTMs may not only reduce total trade volumes, but also "divert" them to less efficient exporters (Jones, 1984). Above all, they discriminate against exporters whose threats of retaliation are less credible.

Table 2 (source: Laird and Yeats, 1990b) compares NTM coverage ratios on imports of 15 industrial countries in 1966 and 1986. Overall, NTM incidence went up from 25 to 48 per cent. All sectors but fuels, where the degree of protection diminished (in the US and Japan), were increasingly targeted by NTMs. Among leading countries and areas, NTMs were most intensively erected by the EC, especially in the manufacturing and iron and steel industries. On the other hand, the largest increases in NTMs on US and Japanese imports occurred respectively in agriculture and for agricultural raw materials.

3. Industrial countries' protectionism with respect to Eastern Europe until 1990.

Until 1990, industrial countries' tariff and non-tariff protectionism with respect to Eastern Europe was

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9. Import coverage indices are computed as the percentage ratio of import values subject to NTMs to total import values in each sector. They are downward biased since numerators are smaller than they would be in the absence of NTMs.

higher than with respect to other areas, especially in those sectors where East European comparative advantages and market penetration were larger.

Poland, Czechoslovakia, Hungary and Rumania are GATT members[10]. However, because of their centrally planned trade regimes, it was only at the end of the eighties that the EC[11] and the US granted them MFN tariffs. Consequently, tariffs on their exports were higher on average than those on developing countries' exports during the past decade.

Unlike exports of other developed and developing countries, on which the incidence of NTMs increased during last twenty years, NTMs on East European exports were kept high and stable.[12] That occurred because former Comecon countries' regimes of planned foreign trade and currency inconvertibility prevented economic agents from carrying out foreign transactions reacting to price signals and profit incentives, thus making import tariff protection useless. The most commonly used measures were quantitative barriers; minimum prices (below which there is a presumption of unfair competition) and antidumping and countervailing investigations[13] were frequently used.

According to 1990 data (the last year for which they are available), quantitative NTMs were imposed on 24 per cent of OECD imports from Eastern Europe and the former USSR,

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10. Czechoslovakia obtained GATT membership in 1948, Poland in 1967, Hungary and Rumania in 1971. Bulgaria and the former USSR are presently "observers".

11. For a detailed examination of trade relations between the former Comecon countries and the EC until the mid-eighties, see Chapman (1985).

12. Olechowski and Yeats (1982) show that in 1976 quantitative, paratariff and antidumping NTMs covered 30 per cent of East European and Soviet exports towards industrialized markets, the same percentage as in 1990 (UNCTAD, 1991).

13. Investigations aimed at ascertaining whether exporting firms were being directly subsidized by their government.

compared respectively with 17 and 10 per cent of imports from developing and industrial countries (Table 3). Quantitative barriers to East European and Soviet exports were primarily concentrated in the textile and clothing industries (60-70 per cent),[14] processed agricultural goods (55 per cent) and the iron and steel industries (44 per cent).

Comparing EC and US non-tariff protection towards Poland, Czechoslovakia and Hungary in 1990, it turns out that the EC introduced NTMs against East European exports more frequently than the US.[15] NTMs covered respectively 25, 33 and 39 per cent of EC imports from Poland, Czechoslovakia and Hungary (Table 4). The most intensively targeted sectors were textiles and clothing, where quantitative NTMs covered over 90 per cent of imports, and, especially for Czechoslovakia, iron and steel, where NTMs consisted almost entirely in VERs. NTMs in agriculture, mostly quantitative ones, covered over 60 per cent of imports from the three countries. The incidence of EC NTMs on non-agricultural raw materials (largely paratariff measures) and on chemicals and machinery (largely antidumping and countervailing actions) was much lower.

US NTMs targeted 20 per cent of imports from the three East European countries and were largely found in

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14. The Multi-Fiber Agreement between developed and developing countries imposes bilateral restrictions on international trade of textile products. Among developing countries, Taiwan, Eastern Europe and the USSR did not take part in the agreement. Nevertheless, industrial countries impose quantitative restrictions against their textile and clothing exports (Cline, 1990).

15. The EC NTMs in Table 4 do not include those imposed by individual member countries. Unlike tariffs, which are the same for all members, some NTMs can be applied only by those countries requesting them and under particular circumstances. Those disparities should disappear in 1993 with the completion of the single market. The data on the EC in Table 4 are thus likely to underestimate the incidence of NTMs on member countries' imports from Poland, Czechoslovakia and Hungary.

Table 3

Percent of industrial countries' imports covered by quantitative non-tariff measures with respect to selected groups of exporting countries in 1990 (1)

Sectors	Industrial countries	LDCs	USSR and Eastern Europe	World	VERs and OMAs(2)
Food	35.4	26.6	54.9	31.8	1.5
Agricultural	2.5	3.9	2.1	2.9	-
Ores and metals	14.2	5.6	15.9	11.6	10.3
of which:					
iron and steel	40.7	19.7	44.0	35.3	32.5
Fuel	17.2	9.3	36.9	13.5	-
Chemical	7.0	4.3	6.4	6.6	-
Manufactures (3)	7.2	21.2	14.6	11.0	8.8
of which:					
textile	11.8	58.1	61.2	34.3	24.6
clothing	6.8	68.5	72.9	56.6	53.0
vehicles	31.6	0.7	10.7	29.6	28.0
TOTAL	9.9	16.8	24.4	12.6	6.2

Sources: UNCTAD (1991); IMF (1991).

(1) Referred to the 22 most industrialized OECD countries.
(2) "Voluntary export restraints" and "Orderly market arrangements", including those stipulated under the Multi-Fiber Agreement.
(3) Excluding the chemical sector.

Table 4

Percent of the European Community's imports from some East European countries
covered by non-tariff measures in 1990 (1)

	Poland				Czechoslovakia				Hungary			
	All	Quant.	VER	A.D.	All	Quant.	VER	A.D.	All	Quant.	VER	A.D.
All sectors	25.1	17.8	4.2	0.9	32.7	23.2	11.0	1.8	38.9	31.2	8.4	1.7
Food and agricultural	59.1	48.7	4.2	0	63.6	49.6	2.1	0	69.7	64.1	9.6	0
Crude materials excp. fuel	2.6	0	0	0	7.8	0.2	0	0	9.3	0.2	0	0
Fuel	0	0	0	0	0	0	0	0	0	0	0	0
Manufactures	28.3	17.9	7.5	2.0	38.7	28.1	15.4	2.6	30.5	21.4	10.4	3.3
of which:												
textile, clothing	95.7	65.4	0	0	91.2	71.4	0	0	95.3	75.7	0	0
iron and steel	76.2	70.4	70.4	0	90.8	81.4	81.4	0	83.8	78.1	78.1	0
chemical	9.2	0.1	0	9.2	10.5	0	0	9.8	7.0	0.1	0	7.0
machinery, transport eq.	4.0	0	0	2.7	8.2	0	0	4.6	8.6	0	0	7.1

Percent of the United States' imports from some East European countries
covered by non-tariff measures in 1990 (1)

	Poland				Czechoslovakia				Hungary			
	All	Quant.	VER	A.D.	All	Quant.	VER	A.D.	All	Quant.	VER	A.D.
All sectors	23.8	22.8	7.6	0.7	19.1	17.2	11.5	0	20.2	15.5	2.9	1.9
Food and agricultural	4.4	3.7	0	0	19.4	1.0	0	0	12.4	7.9	0	0
Crude materials excp. fuel	.9	.9	0	0	2.8	2.8	0	0	13.8	13.8	0	0
Fuel	0	0	0	0	100.0	0	0	0	0	0	0	0
Manufactures	39.4	38.0	13.4	1.3	19.5	19.4	13.0	0	23.5	18.2	4.1	2.7
of which:												
textile, clothing	84.2	84.2	0	0	21.4	21.4	0	0	41.3	41.3	0	0
iron and steel	98.9	98.9	98.9	0	100.0	100.0	100.0	0	100.0	100.0	100.0	0
chemical	1.2	0	0	0	0	0	0	0	8.9	0	0	0
machinery, transport eq.	4.8	0	0	4.8	0.1	0	0	0	12.5	0	0	7.6

Sources: UNCTAD, GATT.
(1) "All" non-tariff measures include para-tariff measures, antidumping and countervailing actions,
quantitative, restrictions, import surveillance, automatic licenses. "Quantitative" measures include
voluntary export restrictions (VERs). "A.D." includes antidumping and countervailing actions.

manufactures (between 20 and 40 per cent). In the iron and steel industry, all products were subject to VERs; quantitative barriers were also high for textiles and clothing, especially with respect to Polish exports.

As regards tariffs, in 1990 the EC extended its preferential tariff schemes under the General System of Preferences (GSP) to Poland and Hungary. The GSP was extended to Czechoslovakia in 1991.[16] Consequently, EC tariff protection with respect to these countries was lowered. However, its 1990 level was still very high for agricultural products (10-13 per cent), especially when compared to US tariffs of around 8 per cent on imports from the same three countries (Table 5). On the other hand, the EC had lower tariffs than the US on imports of raw materials and manufactures. In these sectors, average US tariffs applied to East European countries in 1990 were higher than those applied to developing countries (benefiting from GSP treatment) and the World as a whole.[17]

GSP tariffs suffer from several limitations. They cover only limited amounts and ranges of products and are usually granted for no longer than five years. The existence of tariff quotas within which GSP rates are applied and the frequent presence of binding quantitative barriers to imports of the same products severely hamper the potential impact of granting GSP tariffs on exports of beneficiary countries.

Tariff and non-tariff protection by OECD countries towards East Europe was concentrated in sectors where Eastern comparative advantages were the largest. Table 6 shows

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16. Following EC tariff liberalization, in 1991 US granted GSP treatment to the three East European countries.

17. GSP granted by the US to the three countries after 1990 have not yet been included in the data base used in this study.

Table 5

Average tariffs applied by the European Community towards some East European
countries, LDCs and the World in 1990 (1)

	Poland	Czechoslovakia	Hungary	LDCs	World
All sectors	1.3	7.3	1.2	2.9	3.8
Food and agricultural	11.1	13.1	10.1	9.1	11.0
Crude materials except fuel	2.0	2.7	1.1	1.2	1.7
Fuel	1.0	5.0	0.1	0.7	1.7
Manufactures	0.1	7.3	0.1	2.0	2.8
of which:					
textile, clothing	0	10.9	0.1	3.0	3.1
iron and steel	0.1	5.6	0	1.4	1.4
chemical	0.5	8.1	0.3	1.6	3.5
machinery, vehicles	0	5.5	0	1.7	2.6

Average tariffs applied by the United States towards some East European
countries, LDCs and the World in 1990 (1)

	Poland	Czechoslovakia	Hungary	LDCs	World
All sectors	7.5	7.5	8.2	5.1	5.9
Food and agricultural	7.5	6.0	7.5	4.1	4.9
Crude materials except fuel	2.0	2.0	2.6	1.3	2.0
Fuel	0	0.5	0	0.9	1.3
Manufactures	7.7	7.7	8.6	5.7	6.5
of which:					
textile, clothing	14.8	12.7	14.3	13.0	13.3
iron and steel	5.3	5.2	5.5	4.6	4.9
chemical	8.6	6.3	5.6	4.0	6.2
machinery, vehicles	3.5	4.1	3.7	2.6	3.2

Sources: UNCTAD, GATT.

(1) Unweighted averages. Applied EC rates are combined MFN and GSP for all
countries, except the Czechoslovakia where they are only MFN. Applied US
rates are MFN and GSP for LDCs and the World and MFN for the three East
European countries.

Table 6

Revealed comparative advantages towards OECD (1)

Sectors	Poland	Czechoslovakia	Hungary
Raw materials	2.5	1.6	2.1
Food and agricultural	2.4	1.0	2.9
Non fuel	2.1	1.8	1.6
Fuel	3.4	2.4	1.5
Manufactures	0.6	0.8	0.7
of which:			
textiles and clothing	2.0	2.3	2.8
iron and steel	1.5	3.4	1.6
chemicals	0.7	1.1	1.1
machinery and vehicles	0.3	0.3	0.3

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Source: OECD.

(1) For the computation of comparative advantages see note 18 in the text.

revealed comparative advantage (RCA) indices[18] for Poland, Czechoslovakia and Hungary at the end of the eighties. They show a positive specialization in agricultural products (Hungary and Poland) and raw materials (Poland and Czechoslovakia). In the manufacturing sector, specialization exists only in labor intensive industries (such as textiles and clothing) and raw material intensive industries (iron and steel and chemicals).

4. Western markets' opening to East European exports and the Association Agreement between the EC and Poland, Czechoslovakia and Hungary.

Since 1990, industrial countries' trade policies with respect to Eastern Europe have been relaxed. Tariff and non-tariff barriers to imports have been lowered after East European countries progressively abandoned their centrally planned systems and liberalized prices and foreign trade, by dismantling licenses and multiple currency exchange regimes and introducing limited currency convertibility. Those measures led Eastern Europe to almost completely abolish state control over foreign trade transactions, which were released to firms' control (however, all but a few industrial enterprises are still state owned in these countries).

The EC canceled specific quantitative restrictions on imports from centrally planned economies and suspended other quantitative restrictions during 1991. However, quantitative restrictions were maintained in "strategic" EC sectors such as agriculture, textiles, clothing and iron and steel.

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18. RCA indices in each sector are measured as the ratio of the sector's share of the country's total exports towards the OECD to the sector's share of total intra-OECD exports.

In December 1991, an Association Agreement was concluded between the EC and Poland, Czechoslovakia and Hungary. Its trade provisions, which came into force on 1 March 1992, envisage the creation of a free trade area to be implemented during a transition period of a maximum of ten years, in harmony with GATT developments. Tariff liberalization would be extended to all sectors except agriculture. Three separate protocols of the Agreement regulate textile, steel and coal, and processed agricultural products.

With the exception of import and export quotas on textile and clothing products, which will not be dismantled, quantitative restrictions[19] and custom duties on EC imports of industrial raw materials and manufactures are in general to be abolished by 1996. Some of the EC's quantitative restrictions on imports of raw and processed agricultural products are to be canceled on the date of entry into force of the Agreement[20], whereas custom duties will be gradually reduced over a three-year period.

In general, East European countries have liberalized their non-agricultural raw material imports more than manufactured imports. Quantitative restrictions and customs duties on manufactures will be only partially canceled on the date of entry into force of the Agreement and they will be progressively reduced and then canceled in five-nine years. Quantitative restrictions on East European countries' textile and clothing imports will be maintained. Only a few quantitative restrictions on East European countries' imports of raw and processed agricultural products will be abolished, whereas customs duties will be progressively reduced.

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19. Quantitative restrictions include quotas, import licenses and other equivalent measures.

20. Those maintained by virtue of EC Council Regulation no. 3420/83.

The Agreement states that each party can start antidumping investigations and adopt restrictive measures in order to safeguard its own markets under exceptional circumstances. Moreover, during the next five years, the three East European countries are accorded the right to impose temporary import tariffs in order to protect infant industries or sectors undergoing restructuring.

5. The Association Agreement's effects: a simulation of the impact of EC tariff liberalization on the three East European countries' exports.

5.1 Simulation model

In the current literature the trade effects of tariff reductions have been simulated using different approaches.[21] Those range from partial equilibrium models - which, due to their simplicity, allow a very high degree of commodity and geographic disaggregation (Cline et al., 1978) - to general equilibrium models, which assure the simultaneous equilibrium solution in all markets, included the capital and labour ones, and, due to their complexity, only consider a few aggregated sectors and areas (Whalley, 1984). Some models take an intermediate approach, by assuming that the markets for goods clear in all countries and allowing for disequilibrium in the markets for the immobile factors of production (Deardorff and Stern, 1986).[22]

To simulate the effects of implementing the Association Agreement on Polish, Czechoslovak and Hungarian exports, we used a partial equilibrium short term model of

21. For a survey of the subject, see Deardorff and Stern (1986).

22. Nominal wages are assumed to be fixed and the stock of physical capital is assumed to be fixed and sector specific, making this model a short term one.

international trade flows, developed by the UNCTAD
Secretariat and the World Bank.[23]

This choice was made for the following reasons.
Firstly, the SMART model makes use of a very disaggregated
(up to the single tariff line and with respect to all
exporting countries) and reasonably updated (1988) data base
on import tariff levels and related trade flows. Secondly,
a general equilibrium model would have required us to
estimate the parameters of the East European economies from
data either unavailable or statistically unreliable. Thirdly,
the East European countries are currently undergoing dramatic
structural changes and the parameters of their economies
based on past data are not likely to hold in coming years.

For all these reasons, we preferred to assess the
indirect, long term effects of tariff reductions in broad
qualitative terms, discussing them in the last section of the
paper.

The effects of EC tariff reductions on the volumes
of EC imports from East European countries are obtained in
the SMART model as the sum of two components: i) trade
creation, which measures the increase in East European
exports towards the EC due to a decrease in their relative
prices vis-à-vis EC domestic substitutes; ii) trade
diversion, which measures the reallocation of EC imports
towards East European goods, due to a decrease in their
relative prices vis-à-vis EC imports from other exporting
countries.

The global effect on export revenues is obtained by
adding the "quantity effect" described above to a "price
effect", due to the increase in export prices which follow
the tariff reductions.

The formulas which have been used are shown in the

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23. Software for Market Analysis and Restrictions on Trade
    (SMART); for a description of the model see paragraph 1
    in the Appendix.

Appendix. The model makes use of estimated values for the price elasticities of EC import demand and East European countries' export supply, and for the substitution elasticity among EC imports from Eastern Europe and other exporting countries.

The import demand elasticities used in SMART software are sector estimates of the elasticities of EC imports from the Rest of the World during the fifties and sixties, extracted from Stern et al. (1976).[24] The substitution elasticities among imports from different exporting countries (necessary to calculate the trade diversion component) were set equal to -1.5, by analogy with previous simulations of tariff reductions (Laird and Yeats, 1987; Marchese et al., 1991; UNCTAD, 1991).

Since sector estimates of export supply elasticities for the three East European countries are not presently available, simulations were repeated under the three alternative assumptions of zero, finite and infinite export supply elasticity. In the finite elasticity case and for commodity goods, we made use of existing estimates of long-term export supply elasticities for developing countries (Bond, 1990; p. 222). That seemed opportune since East European exports, like those of developing countries, are concentrated in a small number of products; consequently, resource reallocation across sectors due to relative price changes is relatively costly.[25] Since we could not obtain sector estimates of export supply elasticities for manufacturing sectors, we set them equal to 2, by analogy with previous works in this field (Kirmani et al., 1984). The elasticities used in the simulations are shown in Table 7.

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24. For a survey of estimated sector elasticities, see also Cline et al.(1978) and Goldstein and Khan (1985).

25. Estimated supply elasticities are generally lower for developing countries' exports than for those of developed countries (Kumar, 1992).

5.2 Simulation results.

        We   simulated   the   scenario   resulting   from   the
implementation of the Association Agreement, which requires
EC tariffs on industrial and agricultural imports to be
canceled or substantially reduced by the end of 1996.
Moreover, the elimination of non-tariff barriers envisaged in
the Agreement should allow the three East European countries
to benefit fully from EC tariff liberalization, except for
clothing, textiles and some agricultural products.

        Problems in finding or computing tariff equivalents
of NTBs on East European exports and the poor reliability of
these calculations led us to limit our analysis to tariff
liberalization. Since EC NTBs to imports from the three
countries are numerous and, especially in some sectors,
likely to restrict their exports severely (see section 3),
our simulations of EC tariff liberalization would probably
underestimate the overall effects of the Agreement.

        Table 7 shows the simulation parameters for each of
the 13 commodity groups into which the three countries' 1988
exports towards the EC have been sorted:[26] average initial
tariffs (MFN tariffs applied until 1989);[27] average final
tariffs after the Agreement's full implementation; sector
price elasticities of EC import demand and of the three
countries' export supply. Final tariffs are zero, except in
agriculture.

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26. This is the most recent year in which data on EC trade
    disaggregated by single tariff lines are available.

27. In our simulations initial tariffs consisted of MFN rates
    also for those products to which GSP tariff treatment
    had been granted in 1990. Taking MFN rates as the initial
    tariffs seemed the correct choice because our simulations
    were based on 1988 export volumes, on which MFN rates
    were applied. Moreover, since GSP tariffs are usually
    granted within limited import quotas and NTMs were
    largely in place before 1991, granting GSP is not likely
    to have produced large effects on the three countries'
    exports.

Parameters in the simulations of EC tariff liberalization   Table 7

POLAND

Sectors	Initial average tariff	Final average tariff	EC imp. dem. elasticity	Exp. supply elasticity
Raw and processed agricultural	5.0	2.5	1.2	0.5
Mineral except fuel	0.5	0	1.6	0.3
Fuel	4.9	0	1.2	0.3
Basic chemical and pharmaceutical	8.4	0	1.6	2.0
Nonbasic chemical, rubber and plastic	4.3	0	2.3	2.0
Leather and footwear	5.8	0	4.1	2.0
Wood, paper, printing	2.8	0	1.5	1.7
Textile and clothing	13.0	0	3.0	2.0
Stone, ceramic, glass and gem products	5.2	0	2.4	2.0
Iron and steel	4.3	0	1.6	0.6
Nonferrous metal	0.1	0	1.1	0.6
Machinery, vehicles, precision instr.	6.3	0	2.0	2.0
Miscellaneous	5.6	0	5.9	2.0
TOTAL	**4.3**	**0.4**	**1.9**	**1.1**

CZECHOSLOVAKIA

Sectors	Initial average tariff	Final average tariff	EC imp. dem. elasticity	Exp. supply elasticity
Raw and processed agricultural	10.5	5.1	1.4	0.6
Mineral except fuel	0.4	0	1.6	0.3
Fuel	4.7	0	1.2	0.3
Basic chemical and pharmaceutical	4.7	0	1.6	2.0
Nonbasic chemical, rubber and plastic	8.4	0	2.8	2.0
Leather and footwear	9.4	0	4.2	2.0
Wood, paper, printing	1.1	0	1.5	1.6
Textile and clothing	12.4	0	2.1	1.8
Stone, ceramic, glass and gem products	9.1	0	2.1	2.0
Iron and steel	4.8	0	2.0	0.6
Nonferrous metal	·	·	·	·
Machinery, vehicles, precision instr.	6.8	0	1.9	2.0
Miscellaneous	6	0	5.3	2.0
TOTAL	**5.3**	**0.2**	**2.2**	**1.4**

HUNGARY

Sectors	Initial average tariff	Final average tariff	EC imp. dem. elasticity	Exp. supply elasticity
Raw and processed agricultural	6.1	3.1	1.0	0.5
Mineral except fuel	3.2	0	1.6	0.3
Fuel	4.0	0	1.3	0.3
Basic chemical and pharmaceutical	2.2	0	1.6	2.0
Nonbasic chemical, rubber and plastic	8.6	0	2.7	2.0
Leather and footwear	5.5	0	3.8	2.0
Wood, paper, printing	2.1	0	1.4	2.0
Textile and clothing	11.3	0	2.3	2.0
Stone, ceramic, glass and gem products	9.4	0	2.3	2.0
Iron and steel	3.9	0	1.9	0.6
Nonferrous metal	4.4	0	1.1	0.6
Machinery, vehicles, precision instr.	5.9	0	2.2	2.0
Miscellaneous	5.6	0	5.9	2.0
TOTAL	**5.4**	**1.2**	**1.9**	**1.2**

Simulations were carried out by single tariff lines and were then summed to obtain sector figures. Only those products where MFN tariffs were different from zero and 1988 export values were not under $ 3 million were selected (they make up respectively 75, 60, and 56 per cent of Polish, Czechoslovak and Hungarian total exports).[28]

5.2.1. The three East European countries' additional export revenues from EC tariff liberalization.

Table 8 summarizes the simulation results for each one of the three countries under the hypothesis of finite and infinite export supply elasticities.[29] Total increases in export revenues, computed as the sum of trade creation and diversion plus a price effect, are shown in the second and fifth columns of the table.[30] Percentage changes in export revenues are shown in the third and sixth columns. All figures refer to exports yielding revenues above $ 3 million in 1988.

The increase in the three countries' total revenues due to tariff reductions are between $ 164 million at 1988 prices (3-4 per cent of export revenues in 1988), under zero export supply elasticities, and $ 533 million (11-14 per cent of export revenues) under infinite export supply elasticities. In the finite elasticity case, revenue

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28. We selected respectively 113, 142 and 132 products for Poland, Czechoslovakia and Hungary.

29. Results under the hypothesis of zero export supply elasticities are not shown in Table 8, since percentage revenue increases are equal to tariff (t) reductions: $-dt/(1+t)$. They can therefore be easily computed from the values for initial and final average tariffs in Table 7.

30. Under infinite supply elasticities, price effects are zero and quantity expansion is maximum. Increases in total revenues get larger (smaller), the larger the supply elasticities, depending whether the absolute value of import demand elasticities is greater (less) than one.

The Association Agreement's effects on East European countries' exports   Table 8
(mln of US $ and percentage values)

POLAND

Sectors	Exports US $	Finite exp. sup. elasticity			Infinite exp. sup. elasticity		
		Total effect US $	effect %	Price effect %	Total effect US $	effect %	Price effect %
Raw and processed agricultural	397757	14142	3.56	2.31	12746	3.20	0
Mineral except fuel	154305	1210	0.78	0.60	1773	1.15	0
Fuel	415593	42933	10.33	7.95	49669	11.95	0
Basic chemical and pharmaceutical	27353	3866	14.13	4.71	4672	17.08	0
Nonbasic chemical, rubber and plastic	76342	7236	9.48	3.16	11355	14.87	0
Leather and footwear	73716	10407	14.12	4.71	21284	28.87	0
Wood, paper, printing	178257	10800	6.06	2.33	13105	7.35	0
Textile and clothing*	47282	-	-	-	-	-	-
Stone, ceramic, glass and gem products	63915	6425	10.05	3.35	9622	15.05	0
Iron and steel	177238	14547	8.21	5.13	20235	11.42	0
Nonferrous metal	274723	717	0.26	0.16	766	0.28	0
Machinery, vehicles, precision instr.	354587	51128	14.42	4.81	71883	20.27	0
Miscellaneous	72121	10489	14.54	4.85	27718	38.43	0
TOTAL	2313189	173900	7.52	3.75	244828	10.58	0
Textile and clothing	47282	13701	28.98	9.66	23995	50.75	0

CZECHOSLOVAKIA

Sectors	Exports US $	Finite exp. sup. elasticity			Infinite exp. sup. elasticity		
		Total effect US $	effect %	Price effect %	Total effect US $	effect %	Price effect %
Raw and processed agricultural	43917	3927	8.94	5.14	4086	9.30	0
Mineral except fuel	32604	246	0.75	0.58	362	1.11	0
Fuel	100223	10266	10.24	7.88	11996	11.97	0
Basic chemical and pharmaceutical	61852	5988	9.68	3.23	7233	11.69	0
Nonbasic chemical, rubber and plastic	68928	13202	19.15	6.38	19676	28.55	0
Leather and footwear	27011	5986	22.16	7.39	12403	45.92	0
Wood, paper, printing	287471	6394	2.22	0.92	7872	2.74	0
Textile and clothing*	61811	-	-	-	-	-	-
Stone, ceramic, glass and gem products	84165	15788	18.76	6.25	22799	27.09	0
Iron and steel	253585	22442	8.85	5.53	36374	14.34	0
Nonferrous metal	-	-	-	-	-	-	-
Machinery, vehicles, precision instr.	165237	24991	15.12	5.04	33719	20.41	0
Miscellaneous	47238	7089	15.01	5.00	17013	36.02	0
TOTAL	1234042	116319	9.43	4.16	173533	14.06	0
Textile and clothing	61811	15932	25.78	9.22	22985	37.19	0

HUNGARY

Sectors	Exports US $	Finite exp. sup. elasticity			Infinite exp. sup. elasticity		
		Total effect US $	effect %	Price effect %	Total effect US $	effect %	Price effect %
Raw and processed agricultural	359395	18886	5.25	3.38	18237	5.07	0
Mineral except fuel	3072	178	5.79	4.46	262	8.53	0
Fuel	57736	4944	8.56	6.59	6015	10.42	0
Basic chemical and pharmaceutical	66283	3397	5.12	1.71	4107	6.20	0
Nonbasic chemical, rubber and plastic	77651	15269	19.66	6.55	22779	29.34	0
Leather and footwear	21769	3026	13.90	4.64	5894	27.08	0
Wood, paper, printing	66597	2703	4.06	1.35	3091	4.64	0
Textile and clothing*	17146	-	-	-	-	-	-
Stone, ceramic, glass and gem products	19493	3678	18.87	6.29	5609	28.77	0
Iron and steel	107587	7320	6.80	4.25	11741	10.91	0
Nonferrous metal	19844	1907	9.61	6.01	2091	10.54	0
Machinery, vehicles, precision instr.	109445	14768	13.49	4.50	22204	20.29	0
Miscellaneous	33468	4865	14.54	4.84	12853	38.40	0
TOTAL	959486	80941	8.44	3.93	114883	11.97	0
Textile and clothing	17146	4075	23.77	7.92	6119	35.69	0

* Its contribution to the total effect is nil because quantitative restrictions will not be abolished (see section 5); however, as a separate exercise, the simulation results for this sector are reported below the totals.

increases are about $ 371 million, equal to 7-9 per cent of 1988 export revenues. The largest benefits accrue to Poland, followed by Czechoslovakia and Hungary.[31]

The sectors that benefited the most are: leather and footwear for Czechoslovakia; machinery and miscellaneous goods (such as furniture, lamps, toys) for Hungary and Poland; basic chemicals for Poland; non-basic chemicals and stone and ceramic goods for Czechoslovakia and Hungary; fuels for Poland and Czechoslovakia. In those sectors, except for fuels, average levels of MFN tariffs and/or EC import demand elasticities are remarkably high (Table 7).

Consequently, the industries most advantaged by EC import liberalization will not be those in which the three countries' 1988 export flows towards the EC were largest. In agriculture, an important exporting sector for Hungary and Poland, increases in export revenues will amount respectively to 3 and 5 per cent (under the assumption of finite export supply elasticities). A similar argument applies to wooden and paper products, which in our sample represent 23 per cent of Czechoslovak exports, and to metals (12 per cent of Polish exports). The relatively small expansion effect in agriculture is due to the partial nature of EC tariff liberalization (see section 4).[32] In the wooden and paper sectors, as well as in minerals and nonferrous metals (for Poland), the results reflect the low values of MFN tariffs and EC import demand elasticities.

On the contrary, the important sector of iron and steel should benefit from revenue increases in the range

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31. Dollar figures severely underestimate flows of additional revenues, since they only include exports yielding revenues not below $ 3 million in 1988.

32. Moreover, non-tariff barriers to agricultural products are likely to be only partially eliminated under the Agreement; consequently, the impact of tariff reductions on agricultural exports could turn out to be less than that obtained in our simulations.

of 8-10 per cent under finite supply elasticity (4-5 per cent of which is due to the price effect) and of 10-12 per cent, under infinite export supply elasticity. In the fuel industry, which is a significant exporting sector for Poland and Czechoslovakia, global benefits would be equal to 10 per cent of 1988 revenues under finite export supply elasticities, of which more than two third are accounted for by price effects. The significance of price effects is due to the low values of export supply elasticities.

Besides textiles, EC non-tariff barriers are most numerous in sectors such as iron and steel and chemicals (see Table 5). The impact of trade liberalization on those industries could therefore turn out to be much larger than the one obtained in our simulations, which were carried out taking into account only tariff levels.

Although the impact of tariff liberalization on clothing and textiles, on which existing quantitative measures are not to be abolished under the Association Agreement, was not included in the simulation results, it was computed as a separate exercise. Since import quotas on East European exports are almost fully utilized (Erzan and Holmes, 1991), the results of our exercise are not realistic. The impact of EC tariff liberalization under the assumption that existing quotas will be eliminated would increase the three countries' export revenues in clothing and textiles respectively by 34 and 53 million dollars (at 1988 prices), under finite and infinite export supply elasticities.[33] Because of the high values of EC initial tariffs and import demand elasticities, the global impact on textiles and clothing would be almost equal to 30 per cent of the three countries' export revenues in those sectors (1 per cent of total 1988 export revenues).

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33. These dollar figures underestimate the likely impact on the whole textile sector, since they only include export values not below $ 3 million in 1988.

5.2.2 A comparison between the present value of the three countries' additional future export revenues and the amount of their external debt.

Previous attempts to simulate the effects of EC tariff reductions granted to East European countries obtained quantitative results comparable with ours. In simulating the impact of granting GSP to Poland (under the assumption of none of existing NTMs being in place and infinite export supply elasticities), Marchese et al. (1991) derived an increase equal to 11 per cent of 1988 Polish export revenues. Leaving out the products on which NTMs were imposed, the revenue increase dropped to 8.6 per cent. A similar simulation by UNCTAD (1991) (under the same assumption of no NTMs and infinite export supply elasticities), gave increases in export revenues of respectively 6 and 8 per cent for Poland and Hungary.[34]

Laird and Yeats (1987) simulated the removal of industrial countries' tariffs and NTMs and obtained an increase in developing countries' export revenues equal to 10 per cent of 1980 export proceeds from the EC, US and Japanese markets. Non-tariff barriers were included in the simulations through their estimated tariff equivalents. The present value of additional future revenues accruing to developing countries from tariff and non-tariff liberalization was about two thirds of their external debt in 1983.

In our calculations, assuming finite export supply elasticities, and including all exported products, the three East European countries' additional export revenue flows from the implementation of the Association Agreement are equal to

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34. The simulation by Marchese et al. covers more than 300 tariff items for Poland only; that by UNCTAD the 60 most important products in each country's exports.

$ 577.2 million at 1988 prices.[35] The present value of the additional annual flows from 1997 onwards is between respectively $ 8 and 13 billion at real interest rates of 6 and 4 per cent, respectively (Table 9).[36] This is about 10-17 per cent of the three countries' external debt in 1991 ($ 77 billion). This shows that the contribution of lower tariff and non-tariff barriers to solving East European (especially Polish and Hungarian) foreign currency debt problems can indeed be a major one.

6. Conclusions

The structural adjustments undertaken by East European economies in recent years make industrial countries' protectionism against them no longer justified. The opening of markets in developed countries is an important opportunity to enhance growth in Eastern Europe and promote its integration into the world economy by exploiting comparative advantages in international trade and providing new outlets for its exports after the collapse of Comecon trade.

Our simulation results must be considered as being only indicative of the benefits which are likely to accrue to the three East European countries from implementing the Association Agreement between them and the EC. The reasons are the following:

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35. This figure was computed by summing each country's additional export revenues from the simulations, divided by the respective shares of export revenues not below $ 3 million in 1988.

36. The present value has been computed as follows:

$$\frac{A}{r(1 + r)^6}$$

where A = $ 660.6 million is the additional revenue flow at 1991 prices and r is the real interest rate, which has been set equal to 6 and 4 per cent.

Table 9

**External debt of the three East European countries and present value of additional export flows
from the Association Agreement**
(billions of US $)

	Debt stock in 1991	Additional export flows to EC (1)	Present value of additional export flows from the Agreement (2)		Present value in % of debt stock	
			r=6%	r=4%	r=6%	r=4%
Poland	46200	232.2	3122.2	5250.5	6.8	11.4
Czechoslovakia	9931	200.0	2689.3	4522.4	27.1	45.5
Hungary	20436	145.0	1949.7	3278.7	9.5	16.0
TOTAL	**76567**	**577.2**	**7761.2**	**13051.6**	**10.1**	**17.0**

Sources: IMF, UNCTAD, GATT.

(1) Computed under finite export elasticities and including all exports. - (2) "r" is the real interest rate; see note 36 in the text for the computation of the present value.

(i) As it has been already pointed out, they do not take full account of the constraints of previous binding non-tariff barriers (measured by tariff equivalents); had it been possible to measure tariff equivalents on East European exports properly, they would probably have shown a much greater impact in some sectors.

(ii) The simulation results only represent the first-round effects of tariff reductions on the exports of the three countries. Such results could be magnified in the long run, depending on the following factors. Firstly, expansion of production capacity, exploitation of economies of scale and industrial restructuring should take place in the long run and enhance factor productivity. Provided that real wage increases do not completely offset productivity gains, export goods could be supplied at more competitive prices. In order to maximise export growth, domestic demand increases should be checked through fiscal and monetary policies. Secondly, the long run effects crucially depend on the three countries' exchange rate policies. Since the Agreement with the EC represents a commitment for them to open their domestic markets, they will not allow large real appreciations of their currencies, in order to contain import penetration and allow tariff reductions to increase their exports.

(iii) The results do not take account of changes in the geographical or commodity distribution of East European trade. In the next few years, the end of the Comecon and the dissolution of the former USSR will reorient previous Comecon trade flows towards industrial countries, especially Europe (Collins and Rodrik, 1991), thereby increasing the positive impact of EC trade liberalization. On the other hand, the relative importance of different exporting sectors may change, thus affecting the global impact of tariff reductions.

(iv) As it has been argued (Messerlin, 1992), the Association Agreement could be implemented by EC in a very restrictive way by resorting to the safeguard clauses it provides (see

section   4), in order to slow down the opening of EC markets.
Should   that   occur,   our   results   could   overestimate   the
first-round   benefits of the Agreement. This outcome does not
look   totally unlikely on account of the unequal distribution
among   EC   member   countries   of   the   costs   and benefits   of
East-West   trade   integration,   which   could   produce   strong
opposition to the   removal of EC trade restrictions (Guerrieri
and Mastropasqua, 1992).

Appendix

1. The SMART model.

SMART is a partial equilibrium model. Markets for the competing products are not included in the analysis; similarly, equilibria in the other foreign markets to which the selected product is exported are ignored. The limits of the partial equilibrium approach are discussed in paragraph 2 below.

The SMART model assumes that goods produced by firms of different nationalities are imperfect substitutes, whereas those produced by firms of the same country are perfect substitutes. Therefore, the assumption of price taking behaviour by firms holds.

The effects of tariff reductions granted to country f1's exports towards the selected market are decomposed in two parts:

i) Trade creation component

This measures demand changes for country f1's exports due to relative price changes between country f1's and domestic firms'(d) goods, for given relative prices between f1's and other exporting countries' (fi; i=2,...,n) goods.

The trade creation component was derived from a demand function where the substitutability between the domestic good and imports from different exporting countries was taken to be equal:

(1) $\quad dlnM_{f1} = \varepsilon_{f,d} \cdot dlnp_{f1}$

$\quad\quad \varepsilon_{f,d} = dlnM/dln(p_f/p_d)$

where:

M_{f1} = demand for f1's exports,

M = imports from all over the World

p_{f1} = price of f1's exports faced by domestic consumers (gross of tariff t_{f1}),

p_f = price index for imports from all over the World,

p_d = price of the domestically produced substitute good,

$\varepsilon_{f,d}$ = price elasticity of demand for imports from all over the World.

Equation (1) is made equal to the following equation, which is derived from differentiating the supply function around the equilibrium point:

$$(2) \qquad dlnX_{f1} = \eta_{f1} \cdot dlnp_{f1}^{W}$$

where:

X_{f1} = supply of f1's exports,

p_{f1}^{W} = net of tariff price of f1's exports

η_{f1} = price elasticity of f1's export supply

$$(3) \qquad dlnM_{f1} = dlnX_{f1}$$

With simple algebraic steps we obtain changes in f1's exports and prices (net and gross of tariff) as a function of the tariff reduction dt_{f1} and elasticity parameters:

$$(4) \qquad TC_{f1} = dM_{f1} = M_{f1} \cdot \frac{dt_{f1}}{1+t_{f1}} \cdot \frac{\varepsilon_{f,d} \cdot \eta_{f1}}{\eta_{f1} - \varepsilon_{f,d}}$$

$$(5) \qquad dlnp_{f1}^{W} = \frac{dt_{f1}}{1+t_{f1}} \cdot \frac{\varepsilon_{f,d}}{\eta_{f1} - \varepsilon_{f,d}}$$

$$(6) \qquad dlnp_{f1} = \frac{dt_{f1}}{1+t_{f1}} \cdot \frac{\eta_{f1}}{\eta_{f1} - \varepsilon_{f,d}}$$

Equation (4) shows the trade creation component; equation (5) the increase in exporter prices; equation (6) the reduction in the price faced by domestic consumers.

If we simulate multilateral tariff reductions (i.e., granted to imports from all over the World), and if all exporting countries have equal export supply elasticities, equation (4) measures the overall effect on f1's exports due to tariff reductions. Equations (5) and (6) give the related price changes.

ii) Trade diversion component

This measures changes in demand for f1's exports due to relative price changes between f1's and other exporting countries' goods, at constant volumes of total imports. If we simulate unilateral tariff reductions (or multilateral ones under export supply elasticities which differ among countries) the trade diversion component is different from zero.

Let us consider the elasticity of substitution between f1's export demand and other exporting countries':[37]

$$(7) \qquad E_s = \frac{d\ln M_{f1} - d\ln M_{-f1}}{d\ln p_{f1} - d\ln p_{-f1}}$$

where $d\ln p_{f1}$ is defined by equation (6) and

$$(8) \qquad d\ln p_{-f1} = \sum_{i \neq 1} \frac{dt_{fi}}{1+t_{fi}} \cdot \frac{M_{fi}}{M_{-f1}} \cdot \frac{\eta_{fi}}{\eta_{fi} - \varepsilon_{f,d}}$$

and where:

M_{-f1} = imports from all over the World minus f1's exports,

p_{-f1} = weighted average price of imports from all over the World except from f1,

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37. Substitution elasticities are taken to be the same for all exporting countries, implicitly assuming symmetrical substitutability among goods produced by different exporters.

E_s = substitution elasticity between fl's and the Rest of the World's exports.

Equation (6) gives the price change corresponding to trade creation. Equation (8) gives the average price change across all exporting countries except fl, weighted on the initial volumes of exports and corresponding to each country's trade creation component.

The trade diversion component for fl is computed from equations (7), (6) and (8) after imposing the condition that trade diversion effects sum up zero across all exporting countries:[38]

$$(9) \qquad TD_{f1} = \frac{M_{f1} \cdot M_{-f1} \cdot E_s \cdot \dfrac{dlnp_{f1} - dlnp_{-f1}}{1+dlnp_{-f1}}}{M_{f1} + M_{-f1} + M_{f1} \cdot E_s \cdot \dfrac{dlnp_{f1} - dlnp_{-f1}}{1+dlnp_{-f1}}}$$

iii) **Price and total effects on exporter revenues.**

the trade creation and diversion effects obtained from equations (4) and (9) enter into the computation of the change in exporter price p^w_{f1} :[39]

$$(10) \qquad dlnp^w_{f1} = \frac{TC_{f1} + TD_{f1}}{\eta_{f1} \cdot M_{f1}}$$

The total effect on fl's export revenues is obtained by adding the increase in exporter prices multiplied by the initial volume of exports (price effect), to the sum

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38. See Cline et al. (1978).

39. Equation (5) represents changes in exporter prices corresponding to the trade creation component only. Changes due to the trade diversion component have to be added in order to obtain the overall changes in prices.

of the trade creation and diversion components evaluated at initial prices (quantity effect):

$$(11) \quad dR_{f1} = dM_{f1} \cdot p_{f1}^{W} + dp_{f1}^{W} \cdot M_{f1} = (TC_{f1} + TD_{f1}) \cdot p_{f1}^{W} \cdot (\eta_{f1} + 1)/\eta_{f1}$$

2. Limits of the partial equilibrium approach

In the above model, equilibrium in the selected market for f1's exports was derived under the assumptions that (i) prices of domestic and foreign goods (p_d, p_{fi}; i=2,..,n) to which tariff reductions are not granted were not going to be lowered following the decrease in p_{f1} and that (ii) f1's export supply to other foreign markets would not be reduced, due to the tariff reduction in the selected market. Dropping assumption (i) implies that, if supply functions in the markets for substitute goods are less than infinitely elastic (the infinite elasticity hypothesis is realistic only when f1's exports are a small share of total market sales), their prices will be lowered, therefore making the demand function for f1's exports more rigid. By ignoring these repercussions, the partial equilibrium analysis is likely to overestimate the effects on f1's exports and revenues due to tariff reductions.

Dropping assumption (ii) implies a more elastic supply function for f1's exports towards the selected market. As a result, the producer price would rise less and the volume of f1's exports to the selected market increase more. F1's revenues from exports to the selected market would be larger or smaller than those which we calculated, depending on the elasticity of the demand curve. Changes in f1's revenues from exports to the other foreign markets would have to be considered as well.

GLOSSARY

TE - tariff equivalent
NTM - non-tariff measure
MFN - most favorite nation
GSP - generalized system of preferences

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