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## TRADE CREATION X TRADE DIVERSION: EVIDENCES FROM THE GTAP MODEL IN THE MERCOSUR INTEGRATION PROCESS

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### **ABSTRACT**

The paper examines the insights of an applied general equilibrium model of trade, the GTAP model, for the discussion about the “trade creation x trade diversion” problem in the Mercosur integration process. A simulation of the integration is performed, and the results analyzed. The evidence arising from model results favors the trade creation hypothesis. A strong pro-competitive effect that increases exports in the region is argued to occur, due to the fall in the price of intermediate inputs. This result is found to be consistent with several studies in the literature, both with those that agree with the trade creation hypothesis and those that have identified the fall in input prices as an important mechanism for economic growth in the period.

### **Introduction**

The dissemination of Regional Trade Agreements (RTA) in the last decade is a central topic in the research agenda all over the world. As noted by YEATS (1997), the important question is whether RTA's are a stimulus to growth and investment, or just diverts trade in other directions, damaging the multilateral trade system. Actually, the “trade creation versus trade diversion” problem is pervasive in the discussions about trade blocs creation.

### **Objective**

The objective of the paper is to analyze the evidences about the “trade creation versus trade diversion” controversy arising in the Mercosur integration process, with the aid of an applied general equilibrium model of trade, the GTAP model (HERTEL, 1997). The literature will be first reviewed, and checked against model insights.

### **The trade creation x trade diversion controversy in the Mercosur integration process**

The evidence about trade creation x trade diversion controversy in the Mercosur integration process is mixed. YEATS (1997), in an analysis for the 1988-1994 period, concluded that the Mercosur implementation distorted the trade patterns expected in the basis of efficiency and comparative advantages concepts. The author noted that, besides the growth in the commerce between the member countries, the share of manufactures in total exports has grown compared to the 1979-81 period, being Brazil a major player in the process. Although the same was observed for the food and feeding products, the manufacturing sector is found to be the dynamic sector in the process. In the conclusions, the author points out that the regional agreement affected strongly the trade pattern in a negative way, for the member countries as well as for the other countries, considering that the trade has grown in sectors where Mercosur was not competitive before.

A divergent point of view can be found in OLARREAGA and SOLOAGA (1997). According to these authors, the rate of integration of Mercosur member

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countries to the world was 10 times greater in the 1991-1995 period than in the preceding decade, what would confirm that Mercosur was a success in terms of volume of trade. Moreover, the growth of the rate of regional integration was twice the rate of integration to the world, what could be explained by the fact that Mercosur member countries would be “natural partners” in the commerce (OLARREAGA AND SOLOAGA, 1997).

A similar point of view is expressed by LAIRD (1997), who argues that the rapid growth in the intra-Mercosur trade in the 1990-1995 period cannot be attributed to trade diversion only, since the trade with countries outside the bloc have also grown, with imports originating from countries outside the regions growing faster than the intra-regional trade. BAUMANN (1997) shows a similar argument.

And, finally, BARTHOLOMEW (1998) also shows evidences that favors the trade creation point of view. In a study about the Argentinean economy, the author shows that the share of total imports in GNP in that country were 0.6% from Mercosur and 2% from the Rest of the World in 1990, increasing respectively to 2% and 6% in 1996. This means that Argentinean imports from Mercosur and from the Rest of the World has increased at similar rates in the period, a result hardly consistent with the trade diversion hypothesis.

It is important to note that all these studies were conducted at empirical level, and for a time period that does not comprises the full implementation of the Mercosur agreements, that are expected to happen in 2006. Moreover, YEATS (1997) has pointed out in its study that it is possible that Mercosur integration process has both created and diverted trade, what could improve the welfare in the region, if the customs unions generates a decline in prices to producers and consumers. These aspects of the problem will be here analyzed with the aid of the GTAP model.

### **The database**

The GTAP database used is the version 3, that distinguishes 30 countries/regions and 37 commodities (MCDOUGALL, 1997). The data is basically bilateral trade, transport and protection data covering those regions. Regional data are derived from input-output matrix. The version 3 database refers to 1992, and graphs all values in 1992 million dollars. The tariff structure considered, however, is based in 1989. For this study, regions and commodities were aggregated in 10 regions/countries and 10 commodities, and the model was solved by the software GEMPACK. The tables bellow show the aggregation strategy chosen for the study.

Agricultural primary activities were aggregated in GRAINS (rice, wheat, other grains, corn), OTHCROPS (other crops, including soybeans and tree crops, like coffee and oranges), LIVESTOCK (primary animal production). The agroindustry sectors are FOOD (food industry, excluding meats and milk products), MEATPROD (meats and meat products), MILKPROD (milk and milk products), FORESTRY (forestry, including pulp and paper). The other sectors are NRMANUF (natural resources intensive manufactures), MANUFACT (all other manufactures), and SERVICES. The regional aggregation chosen is showed bellow, in Table 2.

**Table 1. Commodities aggregation strategy.**

Code	Aggregated commodities
GRAINS	Grains production: rice, wheat, corn, other grains.
OTHCROPS	Other crops: non-grain crops, including coffee, oranges, soybeans, vegetables, etc.
LIVESTOCK	Livestock production and wool.
FOOD	Processed food: fisheries, processed rice, other food products, beverages and tobacco.
MEATPROD	Processed meat.
MILKPROD	Processed milk and milk products.
FORESTRY	Forestry: forestry, lumber, pulp paper etc.
NRMANUF	Natural resources intensive manufactures: coal, oil, gas, other minerals, textiles, wearing apparels, leather, etc, lumber, pulp paper, etc, petroleum and coal, nonmetallic minerals, primary ferrous metals, nonferrous metals, fabricated metal products.
MANUFACT	Manufactures: chemicals, rubbers and plastics, transport industries, machinery and equipment, other manufacturing.
SERVICES	Services: electricity water and gas, construction, trade and transport, other services (private), other services (govt), ownership of dwellings.

**Table 2. Regional aggregation.**

Code	Aggregated countries/regions
ROW	Rest of the World: Australia, New Zealand, Japan, Republic of Korea, Indonesia, Malaysia, Philippines, Singapore, Thailand, China, Hong Kong, Taiwan, India, Rest of South Asia.
CAN	Canada
USA	United States of America
MEX	Mexico
LAM	Central America and Caribbean, Rest of South America
ARG	Argentina
BRA	Brazil
CHI	Chile
E_U	European Union 12
REU	Austria Finland and Sweden, CEA, European Free Trade Area (rest of Europe)

Source: GTAP

The GTAP version 3 database does not show separately the data for Paraguay and Uruguay, the two other countries in Mercosur. This experiment, thus, will be conducted simulating the effects of establishing a customs union between Brazil and Argentina only, settling the targets for the year 2.006. Nevertheless, this is a reasonable approximation for the problem, due to the importance of these two countries in the bloc.

### The economies of Brazil and Argentina in the base year

Before proceeding directly to the simulations, it is interesting to verify the tariff structure that is going to be modified in the simulation. Tables 3 and 4 bellow show the tariff structure in 1989 respectively for Argentina and Brazil. The values in these tables are the power of the tariffs, or the relation between import values at domestic prices and the same values at world prices, CIF. Thus, values greater than 1 mean an import tariff, while values less than 1 means a subsidy.

**Table 3. Argentina. Relation domestic import prices/external prices, by origin. 1989.**

	ROW	CAN	USA	MEX	LAM	ARG	BRA	CHI	E_U	REU
GRAINS	1,00	0,99	0,88	0,99	1,12	-	0,99	1,01	0,99	-
OTHCROPS	1,17	1,10	1,12	1,22	1,20	-	1,18	1,19	1,15	1,09
LIVESTOCK	1,14	1,06	1,10	1,15	1,16	-	1,08	1,21	1,21	1,21
FOOD	1,20	1,17	1,22	1,32	1,17	-	1,20	1,28	1,18	1,15
MEATPROD	1,12	1,12	1,12	1,12	1,12	-	1,12	1,12	1,12	1,12
MILKPROD	1,21	1,10	1,10	1,21	1,24	-	1,21	1,21	1,10	1,21
FORESTRY	1,25	1,20	1,20	1,06	1,35	-	1,20	1,26	1,19	1,25
NRMANUF	1,31	1,21	1,30	1,36	1,25	-	1,27	1,23	1,28	1,27
MANUFACT	1,33	1,28	1,27	1,27	1,33	-	1,31	1,39	1,27	1,18
SERVICES	1,00	1,00	1,00	1,00	1,00	-	1,00	1,00	1,00	1,00

Source: GTAP version 3 database.

**Table 4. Brazil. Relation domestic prices/external prices, by origin. 1989.**

	ROW	CAN	USA	MEX	LAM	ARG	BRA	CHI	E_U	REU
GRAINS	0,85	1,55	1,37	-	0,84	1,43	-	-	0,85	0,85
OTHCROPS	0,84	0,84	0,84	0,84	0,84	0,84	-	0,84	0,84	0,84
LIVESTOCK	1,10	1,00	1,03	1,07	1,16	1,17	-	1,04	1,04	1,05
FOOD	1,18	1,26	1,05	1,47	1,11	1,16	-	1,31	1,11	1,10
MEATPROD	1,56	1,56	1,56	-	1,56	1,56	-	-	1,56	1,56
MILKPROD	0,79	0,79	0,79	-	0,79	0,79	-	0,79	0,79	0,79
FORESTRY	1,15	1,01	1,16	1,03	1,23	1,05	-	1,02	1,17	1,15
NRMANUF	1,03	1,05	1,12	1,06	1,11	1,29	-	1,05	1,34	1,14
MANUFACT	1,38	1,22	1,33	1,30	1,43	1,40	-	1,15	1,36	1,37
SERVICES	1,00	1,00	1,00	1,00	1,00	1,00	-	1,00	1,00	1,00

Source: GTAP version 3 database.

A couple of important differences arise from the above tables. First, it can be seen that Brazil used to protect relatively more the grain production sector, while Argentina had greater tariffs for the “other crops” sector. This, of course, shows the greater comparative advantage in grain production in Argentina, an important grain exporter.

Second, it pays to note that Argentina used to protect more, in relative terms, its milk production sector, with a 21% tariff rate in imports from Brazil, than Brazil, that shows a 21% subsidy rate in its imports of milk products. And, finally, Argentina showed, in general, a greater protection for the natural resources intensive manufactures (NRMANUF) than Brazil.

The Common External Tariff (CET) settlement process generated a tariff structure greater, in some cases, and smaller, in others, than in the previous situation. So, the CET full implementation, by the year of 2.006, will cause a differentiated impact among countries/commodities, depending on the initial structure. The next tables show the “shocks” (variations) needed in the 1989 tariff structure to reach the CET values, as well as, in the last column, the values of the CET itself.

**Table 5. Argentina. Variations (%) in the 1989 tariff structure needed to reach trade liberalization between Brazil and Argentina and the value of the CET for the other regions.**

	ROW	CAN	USA	MEX	LAM	ARG	BRA	CHI	E_U	REU	CET
GRAINS	7,5	8,1	22,2	8,1	-4,3	0,0	1,0	-0,7	8,4	7,0	7,0
OTHCROPS	-8,2	-2,4	-4,6	-12,5	-10,8	0,0	-15,4	-16,2	-6,9	-1,9	7,0
LIVESTOCK	-5,9	1,3	-2,5	-6,6	-7,6	0,0	-7,8	-17,2	-11,3	-11,7	7,0
FOOD	-7,0	-4,4	-8,3	-15,4	-4,6	0,0	-16,3	-21,8	-5,3	-2,9	12,0
MEATPROD	0,0	0,0	-0,1	0,0	-0,1	0,0	-10,7	-10,7	0,0	0,0	12,0
MILKPROD	-4,1	5,5	5,5	-4,1	-6,7	0,0	-17,4	-17,4	5,5	-4,1	16,0
FORESTRY	-14,9	-11,7	-11,8	-0,4	-21,4	0,0	-16,5	-20,5	-11,1	-15,4	6,0
NRMANUF	-13,2	-5,8	-12,5	-16,1	-8,4	0,0	-21,1	-19,0	-10,9	-10,6	14,0
MANUFACT	-15,5	-12,4	-12,0	-12,1	-15,5	0,0	-23,9	-28,0	-11,5	-5,5	12,0
SERVICES	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

Source: GTAP version 3 database.

As one can see, the tariff changes needed to adjust the Mercosur's tariff structure to the CET values will be markedly different between products/regions, as stated before. As an example, while Argentina would need a 22.2% increase in its grains import tariff from the USA, Brazil would need to **reduce** that tariff by 21.9%.

**Table 6. Brazil. Variations (%) in the 1989 tariff structure needed to reach trade liberalization between Brazil and Argentina and the value of the CET for the other regions.**

	ROW	CAN	USA	MEX	LAM	ARG	BRA	CHI	E_U	REU	CET
GRAINS	25,9	-31,2	-21,9	7,0	27,5	-30,1	0,0	0,0	26,0	25,9	7,0
OTHCROPS	26,9	26,9	26,9	26,9	26,9	18,6	0,0	18,6	26,9	26,9	7,0
LIVESTOCK	-2,4	7,0	4,3	0,4	-7,9	-14,8	0,0	-4,3	3,1	2,4	7,0
FOOD	-5,4	-11,1	6,9	-23,8	0,8	-13,8	0,0	-23,8	0,5	2,2	12,0
MEATPROD	-28,2	-28,2	-28,2	12,0	-28,2	-35,9	0,0	0,0	-28,2	-28,2	12,0
MILKPROD	46,8	46,8	46,8	16,0	46,8	26,6	0,0	26,6	46,8	46,8	16,0
FORESTRY	-7,6	5,1	-8,6	3,2	-14,2	-4,6	0,0	-1,7	-9,7	-7,6	6,0
NRMANUF	10,2	8,6	1,3	7,1	2,6	-22,6	0,0	-4,4	-14,7	-0,4	14,0
MANUFACT	-18,8	-8,5	-15,7	-13,9	-21,8	-28,5	0,0	-13,2	-17,5	-18,1	12,0
SERVICES	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

Source: GTAP version 3 database.

The trade structure of Brazil and Argentina in the base year is shown in the next tables. As it can be seen from Table 7, the share of manufactures in total Argentinean imports in value was about 54,2% in 1989. From this total, 13,3 percent points were imports from the USA, and 10,2 percent points were imports from Brazil.

**Table 7. Argentina. Import structure, by product and origin, 1989. Share of each origin in the value of total imports, at consumer prices.**

	ROW	CAN	USA	MEX	LAM	ARG	BRA	CHI	E_U	REU	Total
GRAINS	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
OTHCROPS	0,3	0,0	0,2	0,0	0,3	0,0	0,3	0,1	0,1	0,0	1,4
LIVESTOCK	0,0	0,0	0,0	0,0	0,1	0,0	0,1	0,0	0,0	0,0	0,3
FOOD	0,1	0,0	0,4	0,0	0,2	0,0	0,5	0,3	0,6	0,1	2,3
MEATPROD	0,0	0,0	0,0	0,0	0,2	0,0	0,4	0,0	0,0	0,0	0,6
MILKPROD	0,2	0,0	0,0	0,0	0,1	0,0	0,0	0,0	0,2	0,1	0,7
FORESTRY	0,3	0,1	0,4	0,0	0,5	0,0	1,0	0,5	0,8	0,2	3,8
NRMANUF	2,3	0,1	1,5	0,2	1,6	0,0	4,3	0,9	2,2	0,3	13,5
MANUFACT	9,5	0,3	13,3	0,8	1,7	0,0	10,2	1,3	15,3	1,8	54,2
SERVICES	3,5	0,2	5,9	1,9	0,2	0,0	1,9	0,5	7,5	1,4	23,0
Total	16,2	0,8	21,8	3,0	5,0	0,0	18,7	3,7	26,9	4,0	100,0

Source: GTAP version 3 database.

**Table 8. Brazil. Import structure, by product and origin, 1989. Share of each origin in the value of total imports, at consumer prices.**

	ROW	CAN	USA	MEX	LAM	ARG	BRA	CHI	E_U	REU	Total
GRAINS	0,0	0,7	0,1	0,0	0,1	1,7	0,0	0,0	0,0	0,0	2,7
OTHCROPS	0,7	0,0	0,3	0,0	0,6	0,7	0,0	0,1	0,2	0,0	2,7
LIVESTOCK	0,0	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,2
FOOD	0,3	0,6	0,1	0,0	0,7	0,6	0,0	0,1	0,7	0,3	3,3
MEATPROD	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,0	0,1	0,0	0,2
MILKPROD	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,3
FORESTRY	0,1	0,3	0,4	0,0	0,1	0,0	0,0	0,1	0,3	0,2	1,5
NRMANUF	12,4	0,4	3,1	0,6	2,5	0,8	0,0	1,2	2,0	0,6	23,7
MANUFACT	7,2	0,5	17,1	0,8	1,0	1,8	0,0	0,1	13,3	2,4	44,2
SERVICES	5,4	0,5	6,2	0,4	0,4	0,9	0,0	0,5	5,3	1,6	21,3
Total	26,2	3,0	27,4	1,9	5,5	6,6	0,0	2,1	22,2	5,2	100,0

Source: GTAP version 3 database.

The above tables show that the Argentinean and Brazilian import structure was very similar, concentrated basically in natural resources intensive manufactures (NRMANUF), manufactures (MANUFACT) and SERVICES. In both countries, these three groups of products were responsible for about 80% of total imports in 1989<sup>2</sup>. In terms of bilateral trade, nevertheless, things are different. Argentina used to import 18,7% of its needs from Brazil, where 10,2 points were manufactures, and 4,6 points were natural resources manufactures. Brazil used to import about 6,6% of its total imports from Argentina, where 1,8 points were manufactures, 0,8 points where natural resources manufactures, and 1,7 points where grains. As it can be seen, Argentina was already, in 1989, the main source of grain imports to Brazil.

<sup>2</sup> Total import values for those countries was, in 1989, US\$ 19,756.00 millions for Argentina (8,8% of GDP) and US\$30.213,00 for Brazil, (7,4% of GDP).

The Argentinean and Brazilian export structure can be seen in table 9 and table 10. It can be noted in these tables important differences in the export structure of the countries. First, agricultural activities (GRAINS and OTHCROPS) showed a share of 21% of the Argentinean exports in 1989, while processed food accounted for 27% of total exports. This shows the agricultural external trade for the country, processed or not, is very important, being considerably more important than manufactured exports.

**Table 9. Argentina. Export structure. 1989.**

	ROW	CAN	USA	MEX	LAM	ARG	BRA	CHI	E_U	REU	Total
GRAINS	4,4	0,0	0,1	0,0	1,8	0,0	3,4	0,4	0,6	0,0	10,9
OTHCROPS	1,6	0,1	0,4	0,2	0,5	0,0	1,4	0,1	5,6	0,6	10,4
LIVESTOCK	0,2	0,0	0,0	0,0	0,1	0,0	0,0	0,0	0,6	0,0	0,9
FOOD	8,4	0,1	2,1	0,2	2,7	0,0	1,1	0,6	10,8	0,9	27,0
MEATPROD	0,3	0,0	1,0	0,0	0,2	0,0	0,1	0,2	3,5	0,1	5,5
MILKPROD	0,0	0,0	0,1	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,2
FORESTRY	0,1	0,0	0,1	0,1	0,3	0,0	0,1	0,1	0,5	0,3	1,6
NRMANUF	3,8	0,2	3,4	0,1	3,5	0,0	1,6	1,5	2,9	0,2	17,2
MANUFACT	1,3	0,1	1,9	0,4	3,2	0,0	3,7	1,3	2,1	0,2	14,1
SERVICES	3,5	0,1	1,4	0,4	0,6	0,0	1,9	0,9	3,0	0,4	12,2
Total	23,6	0,7	10,3	1,5	12,9	0,0	13,4	5,1	29,8	2,8	100,0

Source: GTAP version 3 database.

Argentina grains exports to Brazil accounted for 3,4% in total exports, its main grain export market. Brazil was responsible yet for 13,4% of total Argentinean exports, being the second market in importance, after the European Union. Exports of manufactures (natural resources or not) accounted for 31,3% of total Argentinean exports. It can be seen that Brazil is the main export market for the Argentinean manufactures, with 3,7 points in total. From the standpoint of the export tariff structure, GTAP data show a neutral policy for Argentina in relation to Brazil, but the reciprocal was not true. Brazil had an active tax structure in its exports to Argentina, with a number of products with non-zero rates.

Manufactures are the main Brazil's export products, with 62,5% of the total exported. Raw agricultural exports are mainly in the aggregate OTHCROPS that accounted for about 6% of Brazil's exports in 1989, while processed food exports accounted for 14% of total exports in the same year.

**Table 10. Brazil. Export structure.**

	ROW	CAN	USA	MEX	LAM	ARG	BRA	CHI	E_U	REU	Total
GRAINS	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
OTHCROPS	1,0	0,1	1,1	0,0	0,1	0,1	0,0	0,0	3,7	0,3	6,6
LIVESTOCK	0,2	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,4
FOOD	3,7	0,1	2,2	0,0	0,5	0,3	0,0	0,1	6,6	0,8	14,2
MEATPROD	1,2	0,0	0,1	0,0	0,0	0,2	0,0	0,0	1,5	0,1	3,2
MILKPROD	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
FORESTRY	1,4	0,0	1,1	0,0	0,5	0,4	0,0	0,1	2,4	0,2	6,2
NRMANUF	11,7	0,6	7,1	0,5	2,6	2,0	0,0	0,7	9,4	0,6	35,1
MANUFACT	3,9	0,3	5,6	1,9	4,1	4,9	0,0	1,5	4,9	0,3	27,4
SERVICES	2,4	0,1	0,6	0,1	0,2	0,9	0,0	0,1	2,3	0,2	6,9
Total	25,6	1,2	17,8	2,6	8,0	8,8	0,0	2,4	30,9	2,6	100,0

Source: GTAP version 3 database.

It should be noted that, in the same way as noted for Argentina's manufactures exports, Brazil also has in that country its main export market of manufactures, exporting to Argentina about the same amount exported to the European Union. Brazil and Argentina are, so, important reciprocal markets.

### **The experiment : Brazil-Argentina trade liberalization.**

In this experiment it will be simulated the effects of trade liberalization and settlement of a Common External Tariff (CET) between Brazil and Argentina. As noted before, this experiment seeks to approach the results for Mercosur as a whole. In this sense, what is going to be simulated here is the elimination of import tariffs between Brazil and Argentina and the settlement of the CET for the other countries, at value levels showed in Table 5. The experiment comprises both the elimination of import and export taxes (and subsidies). The tariff structure will be modified adequately, and a new equilibrium will be computed. It is important to note, then, that the experiment encompasses both the unilateral trade liberalization of the late eighties and early nineties and the Mercosur agreements, and that the results should be viewed as for the time horizon of the year 2.006. In what follows, the main results are presented.

Initially, Table 11 shows the results observed in the experiment for the variation in the production of the activities in the regions of the model. The elimination of trade barriers between Brazil and Argentina causes, in the model, different impacts among sectors, as can be seen in the table.

**Table 11. Simulation. Percent variation in production.**

	ROW	CAN	USA	MEX	LAM	ARG	BRA	CHI	E_U	REU
GRAINS	-0,0	2,0	-0,0	0,0	-0,4	10,3	-12,2	0,0	-0,1	-0,1
OTHCROPS	-0,1	-0,2	-0,1	-0,0	-0,2	0,6	1,5	-1,4	-0,1	-0,1
LIVESTOCK	-0,0	-0,1	-0,0	0,0	0,1	0,4	0,5	0,4	-0,0	-0,0
FOOD	-0,0	0,1	-0,1	0,0	-0,2	1,4	1,2	0,8	-0,1	-0,1
MEATPROD	-0,0	-0,1	-0,0	0,0	0,0	0,8	0,1	0,2	-0,0	-0,0
MILKPROD	0,0	-0,0	-0,0	0,0	-0,0	0,0	1,5	0,0	-0,1	-0,0
FORESTRY	0,0	-0,1	0,0	-0,0	0,8	-1,8	0,7	-0,5	-0,0	0,0
NRMANUF	-0,1	-0,1	-0,0	-0,1	-0,3	-0,2	1,6	-1,1	0,0	-0,0
MANUFACT	0,1	-0,1	0,0	0,0	0,8	-1,2	-3,8	8,5	-0,0	0,0
SERVICES	0,0	0,0	0,0	0,0	0,0	-0,1	0,3	-0,2	0,0	0,0

Source: model results.

It can be seen that the sector that shows greater variation in production (and in value added) is the grain production sector (GRAINS), whose production grows 10,3% in Argentina and decreases 12,2% in Brazil. As seen before, trade liberalization between Brazil and Argentina and the CET settlement will imply, for Brazil, in reductions in the import tariffs of grains, but the contrary happens for Argentina. The post-integration scenario, then, will result in a situation of greater protection for Argentinean grains production sector, and less protection for the same sector in Brazil. The other agricultural activities, OTHCROPS and LIVESTOCK, however, show positive variation in production, both in Brazil and Argentina, with the highest elevation happening in the OTHCROPS sector in Brazil, where a general elevation of tariffs will be required to reach the CET.

The grain production sector in Brazil is mentioned in several studies (see, for example, DAVID and NONNENBERG, 1997) as sensible sector in the integration, that's to say, one of the most negatively affected sectors in the Mercosur integration

process. The results of this simulation are consistent with this point of view. The reduction in trade barriers, mainly in relation to Argentina, is expected to cause a negative impact in grain production sector in Brazil.

It is interesting to note, however, that, according to the GTAP database, the alleged Argentinean cost advantage in relation to Brazil is not confirmed, at least at this level of aggregation<sup>3</sup>. As can be seen in Table 12, that shows the input-output coefficients for Brazil and Argentina, the Brazilian grain production sector uses more inputs by unit of product than Argentina: for each dollar of grain production Brazil uses US\$0,41 of inputs, while that figure is just US\$0,24 for Argentina. This result agree with that found by RODRIGUEZ (1998), that found Rasmussen-Hirshmann linkages indexes for the agricultural activities higher in Brazil than in Argentina. But it should be noted that the situation changes when one considers also the payment to primary factors of production. In this case, the expenses with inputs plus wages (an approximation for variable costs) in grain production results respectively in US\$0,55 for Brazil, and US\$0,60 for Argentina.

**Table 12. Cost composition for each US\$ of production value. Brazil and Argentina. 1989.**

	GRAINS	OTHCROPS	LIVESTOC	FOOD	MEATPROD	MILKPR	FORESTRY	NRMAN	MANUFAC	SERVICE
BRAZIL										
Land	0.09	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Capital	0.35	0.35	0.35	0.12	0.09	0.12	0.22	0.18	0.15	0.30
Operat.	0.44	0.44	0.44	0.12	0.09	0.12	0.22	0.18	0.15	0.30
Surplus										
Labor	0.14	0.14	0.14	0.08	0.06	0.07	0.15	0.11	0.14	0.28
Inputs	0.41	0.41	0.42	0.80	0.84	0.82	0.63	0.72	0.70	0.42
ARGENTINA										
Land	0.21	0.22	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Capital	0.19	0.20	0.18	0.24	0.13	0.29	0.22	0.29	0.16	0.37
Operat.	0.40	0.42	0.38	0.24	0.13	0.29	0.22	0.29	0.16	0.37
Surplus										
Labor	0.36	0.38	0.34	0.17	0.06	0.09	0.25	0.17	0.22	0.39
Inputs	0.24	0.20	0.27	0.59	0.80	0.62	0.53	0.53	0.62	0.24
Source: GTAP version 3 database.										

This aspect of the production process is also observable in all agricultural activities. In all those activities, the share of wages is greater in Argentina than in Brazil, a result due to the relative disposability of that factor in both countries. Actually,

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<sup>3</sup> The aggregation problem should be emphasized. In the GRAINS activity are included rice, wheat, and all the other grains. Moreover, an aggregated analysis like this one does not take into account important locational differences in the regions inside Brazil, an aspect that can modify the cost advantage scenario inside the country.

the share of labor in costs is smaller for all producing activities in Brazil, although this is more evident in agriculture (livestock production included)<sup>4</sup>.

The agroindustrial sectors (foods, meats, milk products, and forestry) show positive variations in general, exception made to the FORESTRY sector in Argentina, which production would decrease 18%. This sector's tariff adjustment in Argentina would imply a huge reduction in tariffs, far higher than that required in Brazil. It is interesting to note that the FOOD sector shows an expressive growth in both countries. This sector was responsible for 14.2% of total exports of Brazil, and 27% of Argentina in the base year, the main exporting sector of that country. Yet, the meat agroindustry would tend to increase its production in Argentina, and the milk one in Brazil.

From the standpoint of the industrial activities, results show that the NRMANUF sector would increase its production by 1.6% in Brazil, and would remain constant in Argentina. The MANUFACT sector, however, shows reduction in production in both countries, respectively 1.2% and 3.8% in Argentina and Brazil. In these sectors, some important differences appear in the tariff adjustment required for the simulation. First, it was noted a strong reduction in the NRMANUF sectors tariffs in Argentina in relation to all the other regions in the world, on the contrary of Brazil, where a increase in those tariffs were required in some cases, in order to reach the CET. The exceptions observed for Brazil were related to Argentina itself (-22.6%), Chile (-4.4%), European Union (-14.7%), and Rest of Europe (-0.4%). In the MANUFACT sector a general reduction in tariffs was observed in the model.

As seen before, Brazil was the main seller of NRMANUF to Argentina, participating with 4,3% of its total exports. Brazil, otherwise, although a great importer of those products, did not import much from Argentina. Brazil's main seller was ROW, a region in relation to which a tariff increase was observed. The integration with Argentina, thus, would benefit this sector in Brazil. It is also interesting to note that Chile, although maintained out of the integration in this experiment, would also have a sector strongly benefited, in terms of production, by the duty reorganization proposed here. This is the MANUFACT sector (+6,8%), that grows basically due to the enlargement of its exports to Argentina (+181,1%). This happens due to strong tariff reduction in that country for the imports from Chile.

The critics of the integration process argue that the CET will favor trade diversion, from regions outside the bloc to other less efficient ones inside it (see, for example, YEATS, 1997). The results here obtained, however, do not support that view, since they show a 0,39% increase in global trade, due to the Mercosur integration. The model shows, then, an effective trade creation at aggregate level. This effect, however, is strongly concentrated in the member countries: total exports of Brazil and Argentina increase respectively 17,6% and 33,5%, while total imports of those same countries increase 21,9% and 23%, respectively. In the other countries, just Chile shows significant variations in total exports and imports, respectively 2,5% and 2,2%.

There is, of course, a rearrangement in the trade flows, according to what can be seen in table 13. In this table, it can be seen in the rows the variation of exports (in value) of each region in relation to each import region, located in the column. As an example, the results show a 155,7% increase in Argentina total exports to Brazil, while Brazil's exports to Argentina increase 96,8%.

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<sup>4</sup> Here a point should be made about a possible limitation in the GTAP data. As showed in TSIGAS and HERTEL (1997), the returns to the primary factors in agriculture is based in independent studies, and from different sources. Moreover, that allocation is assumed to be the same for all activities in agriculture and livestock production, what could, in principle, distort the results in specific sectors.

It can be seen from the table that changes in trade outside the Mercosur regions are marginal. The exception is Chile, which improves considerably its trade relations with Argentina, increasing in 47,8% the value of its exports to that country, and in 13,2% the imports from it<sup>5</sup>.

**Table 13. Percent variation in total regional trade, by origin and destination.**

IMPORTS													
		ROW	CAN	USA	MEX	LAM	ARG	BRA	CHI	E_U	REU	Total	
	ROW	0,1	0,3	0,1	0,4	0,2	0,7	-0,6	0,4	0,1	0,3	0,00	
E	CAN	-0,0	0,4	-0,0	0,3	0,2	0,1	2,6	0,4	0,1	0,3	0,02	
X	USA	0,1	0,1	0,4	0,1	0,0	-0,7	2,2	0,4	0,1	0,3	0,06	
P	MEX	0,3	0,4	0,1	0,4	0,2	-0,1	-0,4	0,4	0,3	0,4	-0,01	
O	LAM	0,2	0,4	0,1	0,4	-0,1	1,0	1,0	0,5	0,1	0,3	0,14	
R	ARG	9,0	4,0	13,3	7,4	13,9	0,4	155,7	13,2	9,5	6,6	33,52	
T	BRA	5,3	2,1	6,5	5,2	6,5	96,8	0,4	4,6	5,3	2,7	17,56	
S	CHI	-3,3	-0,1	-2,5	-0,0	-2,0	47,8	8,5	0,4	-3,2	-1,0	2,52	
	E_U	-0,0	0,3	0,0	0,3	0,1	-0,9	4,5	0,4	0,4	0,1	0,13	
	REU	0,1	0,4	0,2	0,4	0,3	-0,2	1,3	0,4	0,0	0,2	0,04	
	Total	0,04	0,04	0,08	0,01	0,11	23,02	21,88	2,15	0,15	0,05		

Source: model results.

The results here obtained show that the trade liberalization process and the integration between Brazil and Argentina would also affect drastically the export profile in these countries, according to what can be seen in table 14 and table 15 bellow. This result cannot be attributed to the reduction in export taxes, since, as seen before, Argentina had a neutral policy in relation to Brazil, while Brazil, although taxing the exports of some products to Argentina, did it at moderate rates. It should be noted that the export tax structure in relation to the other countries outside Mercosur was not modified here.

The expressive increase in exports both in Brazil and Argentina, then, cannot be attributed to changes in the tariff structure, as in the import case<sup>6</sup>. This is an indirect effect, a pro-competitive effect that can be attributed to the reduction in prices of intermediate products, what generates a fall in production and export prices of both countries. It is a beneficial trade effect, then.

<sup>5</sup> But just 3,7% of Argentinean total imports in 1989 came from Chile.

<sup>6</sup> The increase in regional exports was observed by BARTHOLOMEW (1998).

**Table 14. Argentina. Percent variation in exports (quantity), by commodity and region of destination, and in average variable costs of production.**

	ROW	CAN	USA	MEX	LAM	ARG	BRA	CHI	E_U	REU	VC*
GRAINS	0,8	1,5	1,3	0,9	0,5	0	75,3	3,5	0,9	0,8	-1,5
OTHCROPS	6,8	7,1	6,8	6,9	6,4	0	-19,5	8,7	6,7	6,8	-2,4
LIVESTOCK	7,3	7,7	7,7	7,3	7,1	0	141,6	9,7	7,4	7,5	-1,9
FOOD	12,3	12,6	12,1	12,6	11,6	0	85,5	13,7	11,6	12,3	-2,5
MEATPROD	7,7	8,0	7,7	7,8	7,7	0	221,8	8,2	7,0	7,7	-1,8
MILKPROD	9,9	9,7	9,6	10,0	9,4	0	-11,8	11,5	9,7	0	-2,3
FORESTRY	17,0	17,3	17,1	17,2	17,5	0	20,0	19,5	16,4	15,2	-4,3
NRMANUF	19,6	20,1	20,0	19,8	19,8	0	424,3	20,7	20,3	20,1	-3,7
MANUFACT	44,8	44,9	44,8	44,4	43,7	0	392,6	43,9	45,0	45,1	-6,7
SERVICES	10,6	10,6	10,6	10,5	10,6	4,5	9,4	13,1	10,6	10,6	-2,8

(\*) VC = Average variable costs (inputs + labor) variation (%).

Source: model results.

**Table 15. Brazil. Percent variation in exports (quantity), by commodity and region of destination, and in average variable costs of production variation.**

	ROW	CAN	USA	MEX	LAM	ARG	BRA	CHI	E_U	REU	VC*
GRAINS	6,6	0	6,9	7,1	6,1	24,7	0	9,4	6,5	6,4	-1,3
OTHCROPS	2,3	2,5	2,3	2,3	1,8	37,9	0	4,1	2,1	2,2	-1,1
LIVESTOCK	3,4	3,5	3,6	3,4	3,0	143,4	0	5,6	3,4	3,4	-1,1
FOOD	8,6	8,8	8,5	8,7	7,9	79,7	0	10,0	8,1	8,6	-1,9
MEATPROD	3,6	3,8	3,5	0	3,5	32,1	0	4,0	2,9	3,6	-0,9
MILKPROD	2,6	0	2,9	0	2,4	96,6	0	4,4	2,6	2,6	-0,7
FORESTRY	4,2	4,2	4,1	4,0	4,2	38,2	0	6,0	4,2	4,1	-1,2
NRMANUF	5,8	5,9	5,9	5,9	5,3	148,3	0	6,2	6,0	6,1	-1,2
MANUFACT	18,0	18,0	17,9	17,7	17,0	195,2	0	17,2	18,0	18,1	-3,1
SERVICES	2,5	2,5	2,5	2,4	2,5	-0,9	1,4	4,9	2,6	2,6	-0,9

(\*) VC = Average variable costs (input + labor) variation(%).

Source: model results.

Tables 14 and 15 above show that both Brazil and Argentina would reciprocally increase its exports, but would also increase its exports to the other countries/regions. This is due to a generalized reduction in the export prices in Brazil and Argentina, what increases export demands. There is a fall in the external terms of trade both in Brazil (-2.1%) and Argentina (-2.3%), generated by a fall in the index of export prices by an amount respectively of 2.9% in Argentina and 1.9% in Brazil, and a relatively smaller fall in the index prices of imports, of 1.1% in Argentina and 0.3% in Brazil. It can be noted, then, that the bulk of the fall in the country's terms of trade is due to the fall in export prices. The result upon the trade balance of both countries would be positive,

showing an increase of 5.5% in Brazil and 4.75% in Argentina<sup>7</sup>. These results, then, provide insights that favors the trade creation point of view in the integration process, as expressed in OLARREAGA and SOLEAGA (1997), LAIRD (1997), and BARTHOLOMEW (1998).

Model results, then, is consistent with the possibility raised by YEATS (1997) about the fall in prices to producers and consumers and the related increase in welfare, due to the liberalization process comprised by the integration. As for production prices, Tables 14 and 15 show, in the last column, the variation in average variable costs (inputs + labor) of production in both countries, dues solely to the trade liberalization process. It can be seen that there is, actually, a general fall in the costs of production, generated by the tariff structure rearrangement. The fall is even greater if one considers just the cost of inputs. This fall in the costs of production, then, is what causes the fall in export prices noted before, and the corresponding increase in exports.

It is important to note that this effect is increasingly being recognized in the literature. Specifically, FERREIRA Fo (1998) showed that the Brazilian agricultural growth in the late eighties and the beginning of the nineties is strongly related to the fall of production costs in the period, an important part of what is generated by the fall in input prices. Moreover, the fall in land rental prices and in labor wages noted by that author for the period in the same study is also observed in this simulation, causing total costs of production (cost of inputs + labor + land + capital) to show the same pattern observed above for variable costs.

The model also calculates an index of welfare derived directly from the utility function, the Hicksian Equivalent Variation (EV), as well as shows its decomposition into parts. This variable, graphed in millions of 1992 US\$, is obtained through the product of the initial income times the percent variation in the “per capita” utility, and can be decomposed in two effects: an allocative effect (AE) and a terms of trade effect (TTE). This variable expresses the size of the Hicksian compensation of a price variation. As can be seen in Table 16, the EV is positive in both countries, and considerably greater in Brazil than in Argentina, due to the greater size of the Brazilian economy. Again, the welfare effect of falling production prices hypothesized by YEATS (1997) as a possible limitation to his own conclusions is here found.

**Table 16. Variations in selected welfare indicators.**

	Variations %		
	Nominal GDP	GDP “Quantum” index	GDP deflator
Argentina	-3,4	0,3	-3,7
Brazil	-0,7	1,0	-1,6
Millions of US\$			
	Hicksian Equivalent Variation	Contribution of allocative effects to Hicksian Eq. Variation	Contribution of the terms of exchange to Hicksian Eq. Variation
Argentina	121,6	597,3	-475,7
Brazil	2.390,9	3.890,7	-1.498,9
World	4.418,47	-	-

Source: model results.

<sup>7</sup> But note that the Trade Balance in of Argentina, on the contrary of Brazil, was negative in 1989, in an amount of - US\$ 5.420,2 millions.

Analyzing the decomposition, it can be seen that the size of the allocative effect is greater than total EV: US\$597,3 millions for Argentina and US\$3.890,7 millions for Brazil. The terms of trade contribution to EV, however, is negative: -US\$475,7 for Argentina and -US\$1.489,9 for Brazil. As noted before, there is a worsening in the terms of trade in both countries after the integration, due to the fall in export prices. The summing up of the effects result in a positive total EV for the region, indicating an increase in aggregated welfare due to the trade liberalization process. The world EV also increases by an amount of US\$4.418 millions. Brazil, then, would appropriate more than half of total EV generated by the integration.

Indeed, the trade diversion hypothesis in the Mercosur integration process as the main effect arising from the integration seems to be difficult to sustain both at theoretical and empirical levels. At theoretical level because, as seen in Tables 5 and 6 above, the settlement of the Common External Tariff in Mercosur will imply a strong reduction in tariffs for several groups of products, specially in the manufacturing sector, where the bulk of Mercosur countries imports is concentrated. Trade diversion would certainly occur if the CET was settled in a free trade environment, a first best situation, but this is not the case. The pro-competitive effect generated by the fall in prices of intermediate products, here pointed out, is a logical consequence of trade liberalization. And, at empirical level, besides the evidence found earlier in the literature, the AGE results, that permits to put together all the pieces of information, also favors the trade creation hypothesis.

Going a step further on the problem of trade diversion, Tables 17 and 18 bellow bring a direct measure of trade diversion in Brazil and Argentina in the simulation. The values in them are the difference between the simulation and the base year import values in Brazil and Argentina, by commodity and region. The last column of each table shows the total variation in imports less the amount due to the Mercosur member countries.

**Table 17 . Brazil. Variation in import values. Millions of US\$ (1992).**

	ROW	CAN	USA	MEX	LAM	ARG	BRA	CHI	E_U	REU	Total	Total less Argentina
GRAINS	-9.3	188.5	1.4	0	-21.4	389.1	0	0	-2.3	-1.5	544.7	155.6
OTHCROPS	-97.3	-1.3	-42.2	-0.4	-73.4	-45.2	0	-9.6	-24.9	-2.3	-296.5	-251.3
LIVESTOCK	0.2	-1.4	-5	0	5.7	5.6	0	0.1	-4.7	-0.2	0.3	-5.3
FOOD	2.5	69.9	-15.2	5.4	-49.1	139.8	0	74.8	-50	-26.3	152	12.2
MEATPROD	0.2	0.2	0.7	0	8.2	42.4	0	0	29.7	0.1	81.4	39
MILKPROD	-4.5	-1	-2.8	0	-5.9	-0.6	0	0	-25.8	-4.7	-45.3	-44.7
FORESTRY	3.7	-29.7	29.9	-0.4	21.1	2.3	0	-4.3	26.8	10.4	59.8	57.5
RECMANUF	-1749.8	-49.4	-113.3	-67.1	-139.1	1015.5	0	67.2	887.4	-5	-153.7	-1169.2
MANUFACT	1141.7	-42.7	1071.8	15.9	288.9	1972.6	0	-1.4	1552.2	323.7	6322.4	4349.8
SERVICES	-16.9	-1.5	-19.8	-1.3	-1.4	17.4	0	-6.9	-18.3	-5.1	-53.8	-71.2
Total	-729.6	131.6	905.6	-48	33.4	3538.9	0	120	2370.2	289.1	6611.3	3072.4

**Table 18. Argentina. Variation in import values. Millions of US\$ (1992).**

	ROW	CAN	USA	MEX	LAM	ARG	BRA	CHI	E_U	REU	Total	Total less Brazil
GRAINS	0	0	-1.8	0	0.1	0	0	0.2	0	0	-1.4	-1.4

OTHCROPS	1.9	-0.5	-5.5	0.3	10.9	0	26.3	12	-0.6	-2.2	42.8	16.5
LIVESTOCK	-0.1	-0.5	-1.5	0	0.2	0	17.4	4.4	1.6	0.1	21.5	4.1
FOOD	-1.4	-0.5	1	4	-6.1	0	82.5	68.6	-17.5	-3.6	127	44.5
MEATPROD	0	-0.1	-0.4	0	-5.8	0	24.6	2.3	-1.9	0	18.7	-5.9
MILKPROD	2.6	-0.4	-0.5	0	5.6	0	6.1	0.4	-14.4	0.8	0.4	-5.7
FORESTRY	9.8	0	0.9	-4	68.5	0	68.9	58.8	-4.6	9.8	208	139.1
RECMANUF	66.1	-5.7	25.7	19	-53.4	0	1182.2	118.6	-9.9	-3	1339.8	157.6
MANUFACT	152.7	-8.6	-437.5	-23.5	27.3	0	3616.8	454.3	-584.8	-167.9	3028.8	-588
SERVICES	-36.9	-2.4	-62.9	-20.3	-2.6	0	-7.6	-7.9	-81.4	-15.3	-237.6	-230
Total	194.8	-18.6	-482.8	-24.4	44.9	0	5017.4	711.9	-713.5	-181.4	4548.2	-469.2

As it can be seen, these tables show a different situation for Brazil and Argentina. Although the import values of both countries increase in the simulation, the growth of Argentinean imports is strongly based in Brazilian products. There is actually a fall in import values from regions outside Mercosur, what could be seen as trade diversion. Though the increase in imports from Brazil more than compensate that fall, the aggregate imports in Argentina from the countries outside Mercosur would fall by an amount of US\$469 millions.

For Brazil, on the other hand, even if one do not consider the increase in imports from Argentina there is a increase in imports of US\$3,072.4 millions. This is due mainly to the increase in imports of manufactures from the USA and the European Union (E\_U). The interesting point here is that these are exactly the regions (and products) that are more seriously “diverted” in the trade with Argentina. This suggests a modification in the route of trade inside Mercosur after the integration, with import flows of manufactures being reoriented through Brazil, and then to Argentina. This phenomenon may be accompanied by a change in the composition of the aggregate MANUFACT, but an analysis with lower level of aggregation would be necessary to go further on this subject.

The effect of trade creation of the integration observed before, then, seems to be strongly concentrated in Brazil. But it is important to note that this does not modify our earlier conclusions about trade creation in Mercosur. The result for Brazil must be viewed as an effect arising in Mercosur, since, as discussed above, it is possible that the increase observed in Brazilian imports is closely tied to the increase in Argentinean imports from Brazil. Note that the increase in Brazilian imports of manufactures (MANUFACT) outside Mercosur amounts US\$4,349.8, while the increase in Argentinean imports of the same product from Brazil amounts US\$3,616.8. The important point here, then, is how much of the increase in the Brazilian imports from outside Mercosur in being induced by the Argentinean imports from Brazil.

### The inclusion of Chile

Due to the size of its economy in relation to Brazil and Argentina<sup>8</sup>, the inclusion of Chile in the simulation does not change significantly the figures discussed above. It will be shown here, then, just the main results related to the Chilean economy, as well as the main varying results in relation to the first simulation.

There are two sectors in Chile that show an expressive increase in production in the experiment: the GRAINS (5.0%) and MANUFACT (6.5%) sectors. The GRAINS

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<sup>8</sup> The Chilean GDP accounted for about one tenth of the Brazilian GDP in 1992, and about one fifth of the Argentinean one in the same year.

production sector showed no variation in production in the first simulation. The increase here observed is due to a reduction in import subsidies from Argentina and Canada, what would generate price increases and supply improvement in Chile.

The MANUFACT sector, however, shows a production increase that is smaller than in the first experiment (8.5%). This happens because in the Brazil-Argentina integration case, there is a reduction in 13% and 28% respectively in tariffs in imports from Chile in order to achieve the 12% CET, while Chile still levies a 20% import tariff in imports from those countries. In the second experiment, the liberalization will further reduce the tariff levels in imports from Chile, but will also eliminate the 20% tariff wedge in the Chilean imports from Brazil and Argentina, what generates the mentioned result due to the correspondent increase in imports. The terms of trade effect observed earlier for Brazil and Argentina can also be observed here. While the terms of trade for Chile improved in the first experiment (1.21%), it showed a fall in this one (-0.84%), mainly due to the fall in export prices.

It is interesting to note that the fall in the external terms of trade for Brazil and Argentina is smaller in this experiment (-1.75% against -2.1% for Brazil and -1.8% against 1.28% for Argentina) than in the first one. Due to the fall in the import barriers in Chile the required fall in export prices of the other countries needed to match the new balance of payments equilibrium conditions are smaller, since the import prices profile has already been reduced due to liberalization. This suggests that the terms of trade of countries involved in integration processes would tend to fall the lesser the greater the number of integrating members, if the integration means tariff reduction between them, as is the general case. EL-AGRAA (1994), cited by BARTHOLOMEW (1998) found the same result, although that author has attributed that effect to the improvement of a country's international bargaining power. This result is consistent with the efforts of both Mercosur and NAFTA to amplify the number of member countries in the blocs. More than a strictly geopolitics reason, it seems to be consistent with external terms of trade improvements.

And finally, Chile shows a negative EV in the experiment, mainly due to the negative terms of trade contribution, that dominates the positive allocative effect contribution. Again, this is consistent with the cautious position of the country in joining the Mercosur process, since it would gain little with allocative improvement, but would lose relatively more with the fall in its external terms of trade.

### Exchange rate devaluation in Brazil

Due to the importance of these input price relations, a simulation with exchange rate devaluation in Brazil was performed. This was done through a shock that generated a 50% improvement in the Brazilian trade balance in the situation after the integration. This means a real devaluation of 2.5%, if one takes labor wages as a "proxy" for a index of the price of non-tradable goods. The next table brings some general results of the experiment.

**Table 19. Selected results.**

	Argentina	Brazil	Chile
Private agents expenses	-0,4	-4,9	-0,1
Aggregate savings	-0,4	13,4	-0,1
Imports (value)	0,0	-4,0	-0,0

Import price index	-0,7	-0,0	-0,4
Exports (value)	0,1	8,1	-0,1
Export price index	-0,4	-2,1	-0,2
Terms of trade	0,4	-2,0	0,1
Equivalent variation - EV (US\$)	33,9	-2317,1	-5,3
Terms of trade contribution to EV (US\$)	83,6	-1584,0	14,1
Allocative effect contribution to EV (US\$)	-49,7	-729,7	-19,4

As it can be seen in Table 19, the impact of the simulation upon Argentina and Chile are small, and concentrated in relative prices. Total exports of Argentina and Chile would remain roughly constant, while Brazilian total exports would grow about 8% in value. The fall in the Brazilian export prices would generate a fall in the import price index in Argentina, that would improve its terms of trade. Again, the fall in Brazilian export prices would suffice to generate a fall in Argentina export price index, due to the reduction in intermediate inputs prices imported, what would contribute to maintain Argentinean total exports constant.

But the bilateral trade Brazil/Argentina would be strongly affected. Table 20 bellow shows the model results in this experiment upon Mercosur intra-regional trade. As it can be seen, the exchange rate devaluation would affect the intra-regional trade significantly. Brazilian exports to Argentina and Chile would increase respectively by 4.9% and 4.7%, while imports from those countries would fall respectively by 2.2% and 4.7%<sup>9</sup>. Total Argentinean exports would remain constant, however, indicating that its exports to other regions would increase. The index of merchandise imports prices in Argentina falls by 0.7%, while the CIF world prices of commodities imported from Brazil would fall by 2%. There seems to be in Argentina, then, a compensation in terms of improved exports to the other regions for the fall in exports for Brazil, due to an exchange rate devaluation in Brazil.

**Table 20 . Variations in intra-Mercosur and total trade (value).**

		IMPORTS			
EXPORT S		ARGENTINA	BRASIL	CHILE	TOTAL
	ARGENTINA	-	-2.2	-0.1	0.1
	BRASIL	4.9	-	4.7	8.1
	CHILE	-1.8	-2.0	-	-0.1
	TOTAL	0.0	-4.0	0.0	-0.1

An interesting result is the fall in Chilean exports both to Brazil and Argentina, a “crowding out” type effect generated by the expansion in Brazilian exports, particularly to Argentina. Another interesting aspect related to this fact is that this “crowding out”

<sup>9</sup> Remember that the simulation comprises a 2.5% real devaluation of the Brazilian currency.

effect is greater if the devaluation is performed in a scenario “after” the integration (the experiment here performed) than “before” de integration (in this case, the exports of Chile to Argentina due to a devaluation in Brazil would fall by 0.8%. These results are not shown in this paper).

The accuracy of these results are still to be seen. The recent (Jan-99) Brazilian currency devaluation has been far larger then that was here simulated (an approximated 30% real devaluation until the moment). Brazilian exports have just began to recover, but imports have already faced a deep decrease. The interesting aspect to be checked in the near future is the behavior of Argentinean exports to other countries but Brazil, that, according to the results here found, are expected to grow up.

### The economic evidence from observed data

At this point, it seems interesting to analyze the evolution of some selected indicators in the Brazilian economy to infer about the accuracy of the model results. As mentioned before, the study of BARTHOLOMEW (1998) concluded in favor of trade creation, in basis of the evolution of imports and exports shares in the country's GDP. These figures for Brazil are shown in Table 21, bellow. As it can be seen, the share of exports to Mercosur and Rest of the World (ROW) countries as a percentage of GDP, that was respectively 0.3% and 6.5% in 1990 were, in 1997, 1.1% and 5.5%. The share of Brazilian total exports to Mercosur countries, then, has increased, while the share of exports to ROW has decreased. That is not to say, however, that Brazilian exports have decreased in absolute values. Actually, the annual average rate of growth of Brazilian exports to the ROW was 2.4%, while that figure for the Mercosur countries was 9.4%. This is consistent with model results.

Brazilian imports have also grown faster in imports from Mercosur (9.6% per year in the average in the 1990/1998 period) than from ROW (6.8% per year in average). According to that fact, the share of imports from Mercosur as a fraction of GDP has increased, from 0.5% in 1990 to 1.2% in 1997, while those figures for imports from outside Mercosur were 4.0% and 6.8%. These results are also consistent to what was generated by the model.

**Table 21 . Brazil. Share of exports and imports in GDP and percent annual average rate of growth of imports and exports, by region.**

Year	EXPORTS		IMPORTS	
	MERCOSUR	ROW	MERCOSUR	ROW
1990	0.3	6.5	0.5	4.0
1991	0.6	7.2	0.6	4.6
1992	1.0	7.9	0.6	4.6
1993	1.2	7.6	0.8	5.0
1994	1.1	6.9	0.8	5.2
1995	0.9	5.7	1.0	6.1
1996	0.9	5.2	1.1	5.8
1997	1.1	5.5	1.2	6.4
% annual aver. rate of growth (1990/1998)*	9.4	2.4	9.6	6.8

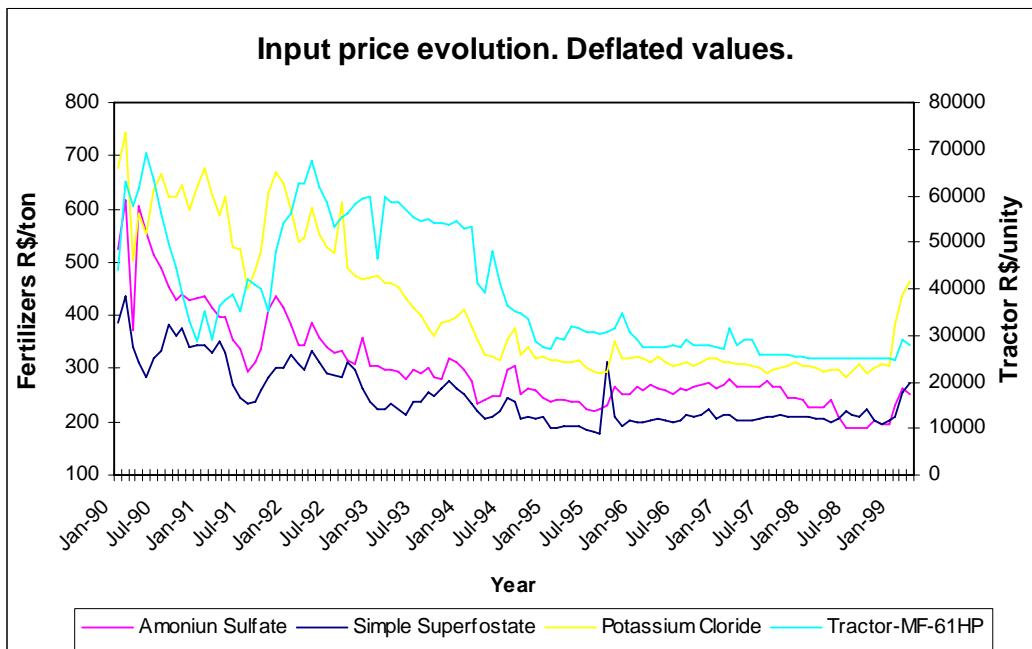
\* Estimated by linear regression.

Following the trade pattern observed for Brazil, total trade inside the Mercosur area has grown faster in the period 1993-1997 than trade with countries outside the region. Total trade inside Mercosur has grown at 8.3% per year in the average<sup>10</sup> of the period, while trade with countries outside the region had grown at 6% per year. This is a change in the pattern observed by LAIRD (1997) for the period 1990-1995<sup>11</sup>. But it should be noted that the increase in the region's trade outside Mercosur is near the pattern observed for the world trade growth in the 1990/1997 period (7% per year), and above the values observed for the years of 1996 (5%) and 1997 (3%).

### The evidence for the agricultural sector

It was argued that the reduction in the costs of production due to trade liberalization is one important aspect related to the improvement of Brazil's export performance in the model. This also matches what happened in Brazil in the decade of 90 in the Brazilian agriculture. As seen before, FERREIRA Fo (1998) showed that the agricultural sector faced a strong fall in production costs in the beginning of the nineties. This fall in production costs are related to the fall in input prices as well as in fall of prices of primary factor of production, land and labor. Figure 1 bellow shows the evolution of prices of fertilizers and tractors in Brazil for the whole decade of 90. As it can be seen, there has been a important fall in these prices, what is in part responsible for the fall in costs of production in agriculture.

**Figure 1 . Brazil. Input price evolution.**



<sup>10</sup> Average year rate of growth estimated by linear regression. This calculation does not covers the bilateral trade between Paraguay and Uruguay.

<sup>11</sup> Remember that the CET structure was settled in 1994.

## Conclusions

The results here found do not support the hypothesis that the Mercosur integration process would favor trade diversion benefiting the member countries. Although a rearrangement of trade is observed in model results, this is consistent with a increase in world volume of trade. The strong pro-competitive effect generated by the fall in intermediate input prices is a stimulus for the export performance of the integrating countries, as well as a stimulus for imports in the region. Global trade, so, is benefited. Model results here obtained are found to be consistent with observed data, at least for agriculture.

And, finally, a note of caution should be made about the presented data. Brazil has faced a systematic revaluation of its currency all over the decade of 90, what certainly have contributed for the fall in the price of imports in the period. The results shown for the price of the inputs, then, and all other variables closed related to the foreign exchange price are influenced by that fact, and not only by the tariff rearrangement simulated in the model, what turns the comparison of real data with model results a more complex task. But it is important to note that, despite that fact, model results seems to be consistent with what has been observed in the Brazilian economy.

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