Trade Liberalization, the Mercosur Integration Process and the Agriculture-Industry Transfers: a General Equilibrium Analysis*

Joaquim Bento de Souza Ferreira Filho**

Key words: Mercosur; agricultural policy; agricultural trade; agricultural transfers; applied general equilibrium.
JEL Code: F47.

This paper deals with the effects of trade liberalization and Mercosur integration process upon the Brazilian economy, with emphasis on the agricultural and agroindustrial production sectors, under the hypothesis that those phenomena could be another step in the rural-urban transfer process in Brazil. The analysis is conducted through an applied general equilibrium model. Results suggest that trade liberalization would hardly generate a widespread process of rural-urban transfers, although Brazilian agriculture shows up as a loser in the process. Notwithstanding that fact, there are transfers inside the agricultural sectors, where, besides the losses in the value added of the grain production sectors, there would be gains for the livestock and for the "other crops" sectors. The agroindustry, in contrast, seems to gain both in Brazil and Argentina. Model results suggest yet that the Brazilian society would be benefitted as a whole by the integration, despite the losses in the agricultural sector.

Este artigo analisa os efeitos do processo de liberalização comercial e de constituição do Mercosul sobre a economia brasileira, com ênfase nos setores produtivos da agricultura e da agroindústria, sob a hipótese de que aqueles fenômenos seriam mais uma etapa no processo de transferências rurais-urbanas no Brasil. Para tanto, a análise é conduzida através do uso de um modelo de equilíbrio geral aplicado. Os resultados sugerem que a integração comercial não irá gerar um processo amplo de transferências rurais-urbanas no Brasil, embora a agricultura brasileira apareça, no agregado, como o setor perdedor na integração, em benefício da agricultura argentina. Há, entretanto, transferências dentro dos setores da agropecuária brasileira, onde, ao lado das perdas no valor adicionado do setor produtor de grãos, haveria ganhos para a pecuária e para o setor "outras culturas". A agroindústria, em contraste, parece ganhar tanto no Brasil quanto na

Paper received in Mar. 1999 and approved in Aug. 1999.

**Associate professor at Escola Superior de Agricultura Luiz de Queiroz (University of São Paulo, Department of Economics, Administration and Sociology). *The author thanks Fapesp for financing the research.* *e-mail: jbsferre@carpa.ciagri.usp.br.*

Argentina. Em termos agregados, entretanto, os resultados do modelo sugerem que haveria ganhos globais para a sociedade brasileira, derivados da liberalização comercial.

1. Introduction

Transfers from agriculture to industry (from the rural to the urban sectors) is a well known phenomenon in the economics of development. In Brazil, this process was one of the main mechanisms used for industrialization, mainly in the early (import substitution) stages. The role of the agricultural sector in Brazil has changed by the time, but it has always been subordinated to the industrialization goals, inflation controls, or balance of payments targets.

The trade liberalization process initiated in the late 80's and 90's and, more recently, the strategic economic integration process in the South Cone put new challenges to the Brazilian agriculture, since an important share of its production is made of tradable products. Moreover, the economies of the countries to be integrated surely have some complementary features that will benefit a couple of economic sectors involved. But they also have a common economic characteristic: all of them have very important agricultural sectors when compared to each GDP, and at least some of them have an important natural resource economic basis.

2. Objective

The objective of this paper is to analyze the intersectoral transfers arising from the trade liberalization and the Mercosur integration process. Special emphasis will be put on the agriculture-industry transfers in Brazil, under the hypothesis that this can be another chapter in the story of transfers from the rural to the urban sectors in the region. The problem will be analyzed with the aid of an applied general equilibrium (AGE) model, the GTAP model (Hertel, 1997).

3. The Database

The GTAP (global trade analysis project) is an AGE model designed for global trade analysis. It was developed by the Center for Global Trade

Analysis, by the GTAP Consortium, in the University of Purdue. The Center has also developed the databases for the model.

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 an 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. Tables 1 and 2 show the aggregation strategy chosen for the study.

Table 1
Commodities aggregation strategy

Code	Aggregated commodities
Grains	*Grain production*: rice, wheat, corn, and 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, lumber, pulp paper, 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 (government), ownership of dwellings.

Agricultural primary activities were aggregated in Grains (rice, wheat, other grains, corn), Othcrops (other crops, including soybeans and tree crops, like coffee and oranges), and 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), and 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 in table 2.

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
EU	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 2006. Nevertheless, this is a reasonable approximation for the problem, due to the importance of these two countries in the bloc.

The calculations of the GTAP tariff matrices are based on the GATT integrated database (IDB), which contains the basic records of the outcome of the Uruguay Round tariff negotiations (Reincke, 1997). Countries that participated in the IDB calculated *ad valorem* equivalents for most specific, compound and mixed duties on manufactures, based on import value and quantity data. For Brazil, the reference year for the calculations is 1989, as stated before. The GTAP version 3 database, then, refers to the pre-Uruguay round tariff structure, with trade restrictions converted to *ad valorem* equivalents.

The values of tariffs obtained at the tariff line level are aggregated up to the GTAP concordance using trade-weights, generating tariff matrices that provide averages of most-favored-nations (MFN) customs tariff rates. This

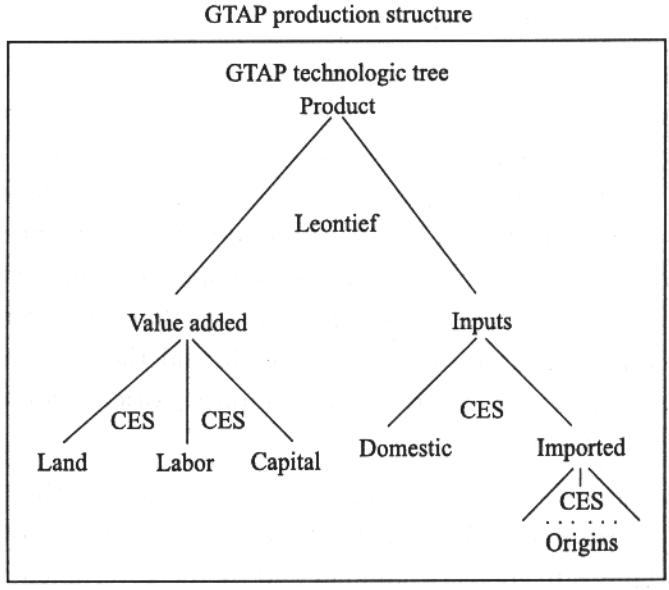
procedure can generate differences in tariffs for the same product category from different regions, according to the varying mix of products from different origins.

For the agricultural sectors, non-tariff distortions have also been converted to tariff equivalents (Ingco, 1997). Agricultural export subsidies were also gathered from the GATT/WTO information system. Agricultural output subsidies are based on producer subsidy equivalent (PSE) calculations, done primarily at the OECD and the USDA.

4. The Model

A full description of the GTAP model can be found in Hertel (1997). The central aspects of the model, however, will be presented here, in order to give an overview of its main mechanisms.

In the production side, the model uses a "technological tree" that has widespread use in AGE models, and can be seen in figure. It is basically a separable technology with constant returns to scale.



Beginning at the highest level of the technological tree, it can be seen that the firms' production is made through a Leontief production function

that combines an aggregate of primary factors (value added) and a composite intermediate input, in fixed proportions, which means a null elasticity of substitution between them. Being the function separable between those two arguments, the mix of primary factors is independent from the input prices. Yet, the elasticity of substitution between each primary factor and the intermediate input is the same.

The primary factors in the model are agricultural land, labor and capital. Land is used only in the agricultural activities (Grains, Othcrops, Livestock), and has imperfect mobility between them. The degree of mobility of this factor can be adjusted through the parameter choice, more precisely the value of the elasticity of transformation in a CET (constant elasticity of transformation) function that defines the supply of agricultural land for each activity. In the case of imperfect mobility of factors, different prices will be possible across uses, according to the relative profitability of each sector.

The second level of the "tree" shows the way that the aggregated primary factor and inputs are produced. The aggregated primary factor is produced through a CES (constant elasticity of substitution) function, that assembles land, labor and capital. Land, however, is utilized just in the agricultural activities, as noted before. The elasticity of substitution is the same between each two factors, a restrictive formulation.

The technology for intermediate inputs is similar to that explained above, *mutatis mutandis*. The intermediate aggregated input is produced combining domestic intermediate inputs and imported ones, through a CES function. The optimal combination of those two types of inputs is independent of the prices of the primary factors. Domestic and imported inputs are then separable in production. The imported input is a composite of imports from many sources. Separability in production, then, means that producers decide first the optimal composition between the domestic and the composite imported input, and then, based on the resulting composite price, the quantity to be imported from each source.

The economic behavior of the agents in each region of the model is governed by an aggregated utility function that distinguishes between the consumption of composite goods by families and by the government, and savings. The final regional income is thus distributed according to a *per capita* Cobb-Douglas utility function, defined in terms of the three possible forms of final demand: private consumption, government consumption, and savings.

This makes constant the share of each item of final demand in the total income, a well known property of the Cobb-Douglas function. Once specified the share of income to be spent with each item of final demand, the next step consists in allocating this share to each composite good. Here, the treatment given to the private sector and to the government is different.

For the government, the Cobb-Douglas hypothesis is again used, making the share of each good constant in the government budget. For the private sector the hypothesis of non-homotheticity in consumption is developed. Private consumption is allocated to each good through a CDE (constant difference of elasticities) formulation. This formulation allows model calibration according to chosen values of price and income elasticities of demand. In the CDE model, those elasticities are not constant, varying with relative prices and expense shares. The model, then, recalculates the value of the elasticities at each iteration of the process solving the equations.

And, finally, in terms of its macroeconomic closure, the model is neoclassical, with investment adjusting to equate savings. Instead of imposing the neoclassical closure at regional level, however, the GTAP model has a "global bank mechanism" that equates savings and investment all over the world, and distributes savings according to its rates of return in each region.

5. The Economies under Study in the Base Year

Before proceeding directly to the simulations, it is interesting to verify the tariff structure that is going to be modified. Tables 3 and 4 show the tariff structure in 1989 respectively for Argentina and Brazil.

The values in tables 3 and 4 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 mean a subsidy.

Two important differences arise from tables 3 and 4. 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 notice 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 dairy products. And, finally, Argentina showed, in general, a greater protection for the natural resources intensive manufactures (NRMANUF) than Brazil.

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

	ROW	CAN	USA	MEX	LAM	ARG	BRA	CHI	EU	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 import prices/external prices, by origin

	ROW	CAN	USA	MEX	LAM	ARG	BRA	CHI	EU	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.

The common external tariff settlement process generated a tariff structure that is larger, in some cases, and smaller, in others, than in the previous situation. So, the CET full implementation, by the year 2006, will cause a differentiated impact among countries/commodities, depending on the initial structure. Tables 5 and 6 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	EU	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	EU	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.

Table 7 shows that 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	EU	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	EU	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.

As it can be seen on tables 7 and 8, the Argentinean and Brazilian import structures are very similar, concentrated basically in natural resources intensive manufactures (NRMANUF), manufactures (Manufact) and services. In

both countries, these three groups of products are responsible for about 80% of the total imports in 1989.[1] In terms of bilateral trade, nevertheless, things are different. Argentina used to import 18.7% of its needs from Brazil, of which 10.2 points were manufactures, and 4.3 points were natural resources manufactures. Brazil used to import about 6.6% of its total imports from Argentina, of which 1.8 points were manufactures, 0.8 points were natural resources manufactures, and 1.7 points were grains. As it can be seen, Argentina was already, in 1989, the main source of grain imports for Brazil.

The Argentinean and Brazilian export structures can be seen in tables 9 and 10, where important differences in the export structures of these countries can be noticed. First, agricultural activities (Grains and Othcrops) showed a share of 21.3% of the Argentinean exports in 1989, while processed food accounted for 27% of the total exports. This shows that the agricultural external trade for the country, processed or not, is very important, being considerably more important than manufactures exports.

Table 9
Argentina
Export structure: 1989

	ROW	CAN	USA	MEX	LAM	ARG	BRA	CHI	EU	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.

The grain exports from Argentina to Brazil (Argentina's main grain market) accounted for 3.4% in the total exports. Brazil was also responsible for 13.4% of the total Argentinean exports, being the second market in importance, behind the European Union. Exports of manufactures (natural resources or not) accounted for 31.3% of total Argentinean exports. It can be

[1] *Total import values for those countries were, in 1989, US$19,756 millions for Argentina (8.8% of GDP) and US$30,213 millions for Brazil (7.4% of GDP).*

seen that Brazil is the main export market for the Argentinean manufactures, with 3.7 points in total.

Table 10
Brazil
Export structure: 1989

	ROW	CAN	USA	MEX	LAM	ARG	BRA	CHI	EU	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.

From the standpoint of the export tariff structure, GTAP data show a neutral policy for Argentina in relation to Brazil, but the reciprocal is not true. Brazil had an active tax structure in its exports to Argentina, with a number of products with non-zero rates.

Manufactures are Brazil's main export products, with 62.5% of the total exported. Raw agricultural exports are mainly in the aggregate Othcrops, that accounted for about 6.6% of Brazil's exports in 1989. Processed food exports accounted for 14.2% of total exports in 1989.

Notice that, in the same way as for manufactures exports from Argentina, 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.

6. The Experiment: Brazil-Argentina Trade Liberalization

This experiment will simulate the effects of a trade liberalization and the 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, with the values 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 should be noticed, then, that the experiment encompasses both the unilateral trade liberalization of the late 80's and early 90's and the Mercosur agreements. In what follows, the main results are presented.

Initially, table 11 shows the results observed in the experiment for the variation in each sector's production in the regions of the model. Notice that, being the final product made out of value added and a composite input in fixed proportions, the variation in the amount produced is identical to that for the value added. 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
Experiment 1
Percent variation in production

	ROW	CAN	USA	MEX	LAM	ARG	BRA	CHI	EU	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.

The sector that shows greater variation in production (and in value added) is 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, 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 the Argentinean grain production sector, and a lack of 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 high-

est 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 & Nonnonberg, 1997) as 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 the grain production sector in Brazil.

It is interesting to note, however, that, according to the GTAP database, the alleged Argentinean comparative advantage in relation to Brazil is not confirmed, at least at this level of aggregation.[2] 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 only US$0.24 for Argentina. This result agrees with that found by Montoya (1998), who identified Rasmussen-Hirshmann linkage indices for the agricultural activities higher in Brazil than in Argentina.

But it should be noted that the situation changes when the payment to primary factors of production are also considered. 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.

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, as a result of the relative availability of that factor in both countries. In fact, the share of labor in costs is smaller for all production activities in Brazil, although this is more evident in agriculture (livestock production included).[3]

---

[2] *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.*

[3] *Here a point should be made about a possible limitation in the GTAP data. As showed in Tsigas and Hertel (1997), the returns of the primary factors in agriculture are 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.*

Table 12
Cost composition for each US$ of production value
Brazil and Argentina: 1989

Country/ input	Grains	Othcrops	Livestock	Food	Meatprod	Milkprod	Forestry	NRMANUF	Manufact	Services
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
Exc. Oper.	0.44	0.44	0.44	0.12	0.09	0.12	0.22	0.18	0.15	0.30
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
Exc. Oper.	0.40	0.42	0.38	0.24	0.13	0.29	0.22	0.29	0.16	0.37
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.

The agroindustrial sectors (foods, meats, milk products, forestry) show positive variations in general, exception made to the forestry sector in Argentina, whose production would decrease 1.8%. 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 Brazil's total exports, and 27% of Argentina's in the base year, the main exporting sector of that country. Yet, the meat agroindustry would tend to elevate its production in Argentina, and the dairy 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: 1.2% in Argentina and 3.8% in Brazil.

In those sectors, some important differences appear in the tariff adjustment required for the simulation. First, there was a strong reduction in the NRMANUF sector's tariffs in Argentina in relation to all the other regions in the world, on the contrary of Brazil, where an increase in those tariffs was 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. On the other hand, although a great importer of those products, Brazil did not buy much from Argentina. Brazil's main seller was ROW, a region in relation to which tariff elevation 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 strongly benefitted sector, in terms of production, by the duty reorganization proposed here. This is the Manufact sector (+6.8%), which grows basically due to the elevation of its exports to Argentina (+181.1%). This happens due to strong tariff reduction in that country for the imports from Chile.

A central topic related to the discussions about the creation of economic blocs is the controversy about trade creation/trade diversion. 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 grow respectively 17.6% and 33.5%, while total imports of those same countries grow respectively 21.9% and 23%. In the other countries, only 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, the rows show the variation of exports (in value) of each region in relation to each import region, located in the columns. As an example, the results show a 155.7% increase in Argentina's total exports to Brazil, while Brazil's exports to Argentina increase 96.8%.

Table 13 also shows that changes in trade outside the Mercosur regions are marginal. The exception is Chile, that 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.[4]

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

	Imports									
Exports	ROW	CAN	USA	MEX	LAM	ARG	BRA	CHI	EU	REU
ROW	0.1	0.3	0.1	0.4	0.2	0.7	-0.6	0.4	0.1	0.3
CAN	-0.0	0.4	-0.0	0.3	0.2	0.1	2.6	0.4	0.1	0.3
USA	0.1	0.1	0.4	0.1	0.0	-0.7	2.2	0.4	0.1	0.3
MEX	0.3	0.4	0.1	0.4	0.2	-0.1	-0.4	0.4	0.3	0.4
LAM	0.2	0.4	0.1	0.4	-0.1	1.0	1.0	0.5	0.1	0.3
ARG	9.0	4.0	13.3	7.4	13.9	0.4	155.7	13.2	9.5	6.6
BRA	5.3	2.1	6.5	5.2	6.5	96.8	0.4	4.6	5.3	2.7
CHI	-3.3	-0.1	-2.5	-0.0	-2.0	47.8	8.5	0.4	-3.2	-1.0
EU	-0.0	0.3	0.0	0.3	0.1	-0.9	4.5	0.4	0.4	0.1
REU	0.1	0.4	0.2	0.4	0.3	-0.2	1.3	0.4	0.0	0.2

Source: model results.

[4] *But only 3.7% of Argentinean total imports in 1989 came from Chile.*

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 tables 14 and 15. 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. Notice that the export tax structure in relation to the other countries outside Mercosur was not modified here.

Table 14
Argentina
Percent variation in exports (quantity), by commodity and region of destination

	ROW	CAN	USA	MEX	LAM	ARG	BRA	CHI	EU	REU
Grains	0.8	1.5	1.3	0.9	0.5	0	75.3	3.5	0.9	0.8
Othcrops	6.8	7.1	6.8	6.9	6.4	0	-19.5	8.7	6.7	6.8
Livestock	7.3	7.7	7.7	7.3	7.1	0	141.6	9.7	7.4	7.5
Food	12.3	12.6	12.1	12.6	11.6	0	85.5	13.7	11.6	12.3
Meatprod	7.7	8.0	7.7	7.8	7.7	0	221.8	8.2	7.0	7.7
Milkprod	9.9	9.7	9.6	10.0	9.4	0	-11.8	11.5	9.7	0
Forestry	17.0	17.3	17.1	17.2	17.5	0	20.0	19.5	16.4	15.2
NRMANUF	19.6	20.1	20.0	19.8	19.8	0	424.3	20.7	20.3	20.1
Manufact	44.8	44.9	44.8	44.4	43.7	0	392.6	43.9	45.0	45.1
Services	10.6	10.6	10.6	10.5	10.6	4.5	9.4	13.1	10.6	10.6

Source: model results.

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.[5] This is an indirect effect, and 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.

Tables 14 and 15 show that both Brazil and Argentina would reciprocally increase their exports, but would also increase their exports to the other countries. This is due to a generalized reduction in the export prices in both countries, increasing export demands. There is a decrease 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 of 2.9% in Argentina and 1.9% in Brazil, and a relatively smaller fall in the index prices of imports, of

[5] *The increase in regional exports was observed by Bartholomew (1998).*

1.1% in Argentina and 0.3% in Brazil. The result upon the trade balance of both countries would be positive, showing an elevation of 5.5% in Brazil and 4.75% in Argentina.[6] These results, then, provide theoretical insights that favor the trade creation point of view in the integration process, as expressed in Olarreaga and Soloaga (1997), Laird (1997), and Bartholomew (1998).[7]

Table 15
Brazil
Percent variation in exports (quantity), by commodity and region of destination

	ROW	CAN	USA	MEX	LAM	ARG	BRA	CHI	EU	REU
Grains	6.6	0	6.9	7.1	6.1	24.7	0	9.4	6.5	6.4
Othcrops	2.3	2.5	2.3	2.3	1.8	37.9	0	4.1	2.1	2.2
Livestock	3.4	3.5	3.6	3.4	3.0	143.4	0	5.6	3.4	3.4
Food	8.6	8.8	8.5	8.7	7.9	79.7	0	10.0	8.1	8.6
Meatprod	3.6	3.8	3.5	0	3.5	32.1	0	4.0	2.9	3.6
Milkprod	2.6	0	2.9	0	2.4	96.6	0	4.4	2.6	2.6
Forestry	4.2	4.2	4.1	4.0	4.2	38.2	0	6.0	4.2	4.1
NRMANUF	5.8	5.9	5.9	5.9	5.3	148.3	0	6.2	6.0	6.1
Manufact	18.0	18.0	17.9	17.7	17.0	195.2	0	17.2	18.0	18.1
Services	2.5	2.5	2.5	2.4	2.5	-0.9	1.4	4.9	2.6	2.6

Source: model results.

As it can be seen, then, the grain producing sector in Brazil is the sector where it is supposed to appear the main losses in the process of integration with Argentina, with a strong reduction in production required in the model. However, this do not suffice to characterize what would be happening with the agricultural sector as a whole, since there are other sectors (like the Livestock sector) that shows an increase in production.

It is then interesting to perform the analysis at a more aggregated level, what will permit to infer about the intersectoral transfers. We have, then, defined three broad sectors, each of which aggregating a couple of activities. They are the agricultural sector (Grains, Othcrops, Livestock), agroindustry (Food, Meatprod, Milkprod, Forestry), and the urban industry (NRMANUF, Manufact, Services). The results are showed in table 16.

[6] *But note that the trade balance of Argentina, on the contrary of Brazil, was negative in 1989, in an amount of – US$5,420.2 millions.*

[7] *This issue is further analyzed in Ferreira F° (1999).*

Table 16
Experiment 1: aggregated results

	Argentina	Brazil
Value added (% variation)		
Agriculture	+1.9	-0.4
Agroindustry	+0.4	+0.9
Industry	-0.3	0.0
Producer surplus variation (agriculture)		
US$ (millions)	34,363.0	-2,539.7
%	460	-50
Primary factor prices and investment goods prices variation (%)		
Land	2.5	-0.8
Labor	-2.2	-0.1
Capital	-2.3	0.0
Investment	-5.2	-2.8

Source: model results.

Results in table 16 show that Brazilian agriculture would decrease its value added in 0.4%, while the same sector in Argentina would increase its value in 1.9%. Although small in percent terms, it should be remembered that the aggregation here employed hides the relatively greater variations in each specific sector. These results show that, actually, the integration with a strong natural resources based economy like Argentina can be another chapter in the long rural/urban resource transfers observed in Brazil's economic development.

This time, however, this is made in a more complex way. Agriculture in Brazil shall reduce, and agroindustry shall increase, its value added, while the Brazilian industry will keep approximately constant. In Argentina both agriculture and agroindustry shall increase its value added, while the industrial sector shall decrease about 0.3%. According to this experiment, the agroindustry would be the sector that would be benefitted in both countries.

The characterization of the agricultural sector in Brazil as a loser in the process can also be done analyzing the evolution of the producer surplus in the sector. According to MacLaren (1997), this can be done using as a proxy the change in the real value of the sector specific factor of production, agricultural land. The results, both in levels and in percent variations, are presented in table 16. As it can be seen, producer surplus in Argentinean agriculture

increases more than five times, while it drops significantly in Brazil. This is, of course, a price variation effect, since the supply of the factor is fixed. Land prices would increase 2.5% in Argentina, and decrease in Brazil, as a result of the derived demand in both countries, that would increase in Argentina and decrease in Brazil. This is a Stolper-Samuelson type result.

In the GTAP model, labor is treated as perfectly mobile between sectors, and will present, then, only one price in the economy,[8] as opposed to land, which is a factor that shows imperfect mobility. Model results show that the price of labor would be reduced in 2.2% in Argentina, and would remain practically constant in Brazil.

And, finally, the results of this simulation upon a number of welfare indicators can be seen in table 17. One can see that the main result of the integration here is on prices, since with flexible wages the economy will be operating at full employment, that is to say, producing the potential level of product. The GDP real variation observed is a purely allocative effect, a shift of the possibility production frontier of the economy due to the improvement in the allocative efficiency in factor use, generated by the reduction in trade barriers. And, as it can be noted here, the allocative effect is greater in Brazil than in Argentina.

Table 17
Variations in selected welfare indicators

	Argentina	Brazil
% variations		
Nominal GDP	-3.4	-0.7
GDP quantum index	0.3	1.0
GDP deflator	-3.7	-1.6
US$ millions		
Hicksian equivalent variation	121.6	2,390.9
Contribution of allocative effects to Hicksian equivalent variation	597.3	3,890.7
Contribution of the terms of exchange to Hicksian equivalent variation	-475.7	-1,498.9

Source: model results.

[8] *Notice that labor supply is given for each country. The integration simulation in this experiment does not comprise free mobility of factors between countries.*

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. 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 it can be seen in table 17, the EV is positive in both countries, and considerably greater in Brazil than in Argentina, due to the greater size of the Brazilian economy.

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 of export prices. The summing up of the effects result in a positive total EV, indicating an increase in aggregated welfare.

The society, then, gains as a whole with the integration, in both countries. This, however, happens at the expense of the agricultural income, and, more specifically, of the grain production sector inside it. But it should be noted that the Manufact sector also shows, inside de industrial sector, a reduction in its production.

7. Conclusions

Before referring to the main conclusions of the study, a note about the method may prove useful. Applied general equilibrium models are today of pervasive use in a number of economic problems, being trade issues one of the main areas where it has developed. Due to its very nature, however, AGE results are not adequate for forecasting, since no statistical measurement of its quality is generated. The directions of change of the variables should be regarded as more important than just their size, and this is the way the results should be interpreted.

The results here obtained, then, suggest that the trade liberalization process and the economic integration in the Mercosur would hardly generate a widespread mechanism of rural/urban transfers in Brazil. Although this effectively seems to occur for some sectors, model results also show an intra-sector

transfer, since the sectors Othcrops and Livestock inside the agricultural sector would be benefitted by the integration. But the possibility of losses in specific sectors, markedly the grain production sector in Brazil, is clearly pointed out. These losses, however, are enough to generate a fall in agricultural aggregated value added, since the gains in the Othcrops and Livestock sectors would not be enough to compensate the losses of the grain sector. This would imply a fall in the agricultural producer surplus in Brazil and an improvement in Argentina due to the integration process, followed by an improvement of in the agroindustrial sectors in both countries.

But it is also clear that those losses are largely compensated by the welfare gains in the country as a whole. Every such widespread process of change generates winners and losers, a phenomenon that is inherent to the economic development process. And, in this sense, the agroindustry sector appears here as the only one that would be benefitted both in Brazil and in Argentina, since even inside the Brazilian industrial sector one can find the Manufact sector as a loser in the process.

And, finally, results found here provide theoretical insights that favor the trade creation point of view in the integration process. Although a rearrangement of trade is observed in model results, this is consistent with an increase in world volume of trade. The strong pro-competitive effect generated by the integration 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 benefitted.

References

Bartholomew, A. An Analysis of the impact of Argentina membership of Mercosur. *Economia Aplicada, 2*(2), São Paulo, 1998.

David, M. B. A. & Nonnemberg, M. F. B. *Mercosul: integração regional e comércio de produtos agrícolas.* Rio de Janeiro, Ipea, 1997. (Texto para Discussão, 494.)

Ferreira, F^{o}, J. B. S. Trade creation x trade divertion: evidences from the GTAP model in the Mercosur integration process. In: Annual Conference on Global Trade Analysis, 2. *Proceedings.* Odense, Denmark, 1999. (http://www.sjfi.dk/).

Hertel, T. W. (ed.). *Global trade analysis: modeling and applications.* Cambridge University Press, 1997.

Ingco, M. Agricultural protection. In: McDougall, R. A. (ed). *Global trade, assistance and protection: the GTAP 3 database. Center for Global Trade Analysis.* Purdue University, 1997.

Laird, S. *Mercosur: objectives and achievements.* World Trade Organization, 1997. (Staff Working Paper, TPRD-97-002.)

MacLaren, D. An evaluation of the Cairns Group strategies for agriculture in the Uruguai round. In: Hertel, T. W. (ed.). *Global trade analysis: modeling and applications.* Cambridge University Press, 1997. cap. 8.

McDougall, R. (ed.). *The GTAP 3 database. Center for Global Trade Analysis.* Purdue University, 1997.

Montoya, M. A. R. A matriz insumo-produto internacional do Mercosul em 1990: a desigualdade regional e o impacto intersetorial do comércio inter-regional. USP, Escola Superior de Agricultura Luiz de Queiroz, 1998. (Tese de Doutorado.)

Olarreaga, M. & Soloaga, I. *Endogenous tariff formation: the case of Mercosur.* World Trade Organization, 1997. (Staff Working Paper, ERAD-97-003.)

Reincke, U. Import tariffs on merchandise trade. In: McDougall, R. A. (ed.). *Global trade, assistance and protection: the GTAP 3 database Center for Global Trade Analysis.* Purdue University, 1997.

Tsigas, M; Hertel, T. Primary factor shares for agriculture. In: McDougall, R. A. (ed.). *Global trade, assistance and protection: the GTAP 3 database Center for Global Trade Analysis.* Purdue University, 1997.

Yeats, A. *Does Mercosur's trade performance raise concerns about the effects of regional trade arrangements?* World Bank, 1997. (Policy Research Working Paper, 1.729.)