

THE FREE TRADE AREA OF AMERICAS AND THE REGIONAL DEVELOPMENT IN BRAZIL

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1 Introduction

The globalization process underway has generated important changes in the economies throughout the world. In the less developed countries, especially in those who have chosen to isolate relatively its economy from the rest of the world in the past, these changes have been dramatic.

The number of Regional Trade Agreements has increased markedly in the last decades. Among many others, the North American Free Trade Area (NAFTA) and the South Cone Common Market (MERCOSUR) are two of the most important initiatives in the Americas. Yet in this region the next challenge facing the countries is the Free Trade Area of Americas – FTAA formation, whose negotiation process was launched in 1994, and is currently in progress. The FTAA is expected to have important impacts upon the economies of the integrating countries.

2 Objectives

This paper analyzes the impacts upon different regions inside Brazil of the FTAA formation, developing the quantitative basis for systematic regional impact of economic policies in Brazil. The problem will be approached through an applied general equilibrium model of the Brazilian economy. The simulations will comprise three different scenarios, to be discussed in what follows.

3 Methodology

This paper uses a new methodology developed by Horridge and Ferreira Fo (2003) that try to overcome some limitations of previous approaches to the problem. In this section an synthesis of this new methodology is presented. The analysis will be conducted with the aid of two different applied general equilibrium models: the GTAP model (version 5 database) and the ORANIGFR model, calibrated with Brazilian 1996 data. The ORANIGFR model is an inter-regional model (HORRIDGE, 2001) derived from the ORANI model, which uses a “top-down” technology for the inter-regional economy modeling.

The GTAP model is specifically projected for international trade analysis. For many situations or type of policy analysis, however, more detailed specifications of the national economies are required. This is the case, for example, of questions demanding inter-regional analysis inside the countries. Detailed national models, on the other hand, generally do not have enough details to generate results consistent at global level. This is the case of most of the single country models, which have in general only one aggregated external sector that demands exports and supply imports. Even when exports and imports

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are differentiated by source, these models can't take into account the inter-relations between the other countries in the world, what makes the results not consistent globally.

The ideal solution for the above problem would be, naturally, the building of a global model with great detail of the national economies. This, however, would hardly be feasible, due to data availability. The solution here adopted for the problem, then, was to develop a methodology to allow the linking of a detailed national model, as is the case of ORANIGFR, with a global model, like GTAP.

The development of this new methodology encompasses a series of theoretical and technical questions, and was treated in details in Horridge and Ferreira Fo. (2003). Generally speaking, what the new method does is to integrate the two models, the global and the inter-regional single country models, in only one model. The process allows the "turn off" the part of the country under focus in GTAP and "plug in" the detailed single country model in its place. This is done through a series of special slack variables in both models, strategically placed in the computational code, which have the function of allowing the abovementioned linkage. The creation and use of these variables involves changes in the closure of both models, changing the original endogenous/exogenous sets.

From an empirical standpoint what is done is to sum the computational code of both models, with the adaptations required, in such a way that the models behave like one. The changes must be done in every stage of model resolution, that's to say, including the condensation stage and the creation of the command files. With this process, the matrices of the national single country model are inverted together with the GTAP ones, and results take into account the information proceeding from both models, being consistent one to each other. It should be noted that this process allows the linkage of models that are not identical both in terms of its theoretical conception or databases. This is actually one of the positive aspects of the methodology, since the difference between models is the motivation for the linkage.

Regarding the databases differences, it is possible to link models whose databases are not identical, or are calibrated for different years, as is the case in this study. In this case, however, the adequacy of the methodology is restricted to linearized models, as is the case of GTAP and ORANIGFR, since it is the fact of the variables being expressed in percent change form what allows the linkage.

4 The ORANIGFR model: calibration and database

The ORANIGFR was calibrated with data from the Brazilian economy for 1996, obtained from two main sources: the 1996 Brazilian Input-Output Matrix (IBGE. <http://ibge.gov.br>), and the Brazilian Agricultural Census (IBGE, 1996). Other sources of data were also used, and this chapter describes briefly the procedure.

The ORANIGFR database was aggregated to 43 products and 34 activities. One of the activities (Agriculture) uses a multi-production technology, and produces 11 commodities. The GTAP 5 database, on the other hand, was aggregated to 43 activities and products. The Table 1 shows the correspondence between commodities in both sectors.

Table 1. Correspondence between the 43 commodities in GTAP and in ORANIGFR in the aggregated database.

No.	ORANIGFR	GTAP	Description
1	Sugarcane	c b	Sugar cane

2	PaddyRice	Pdr	Paddy rice
3	Wheat	Wht	Wheat
4	Soybean	Osd	Soybean
5	Cotton	Pfb	Cotton
6	Corn	Gro	Corn
7	Livestock	Ctl	Livestock
8	NaturMilk	Rmk	Raw milk
9	Poultry	Oap	Poultry
10	OtherAgric	Ocr	Other agricultural products
11	MineralExtr	Omn	Mineral extraction
12	PetrGasExtr	Oil	Petroleum, gas and charcoal
13	MinNonMet	Nmm	Non-metalic minerals
14	IronProduc	i_s	Iron products
15	MetalNonFerr	Nfm	Non-ferrous metals
16	OtherMetal	Fmp	Other metals
17	MachTractor	Otn	Machines, tractors and parts
18	EletricMat	Ome	Electric material
19	EletronEquip	Ele	Electronic equipment
20	Automobiles	Mvh	Automobiles
21	WoodFurnit	Lum	Wood and furniture
22	PaperGraph	Ppp	Paper and graphics
23	ChemicElem	Crp	Chemical elements
24	PetrolRefin	p_c	Refined petroleum products
25	Textiles	Tex	Textiles
26	Apparel	Wap	Apparel
27	ShoesInd	Lea	Shoes and leather products
28	CoffeeInd	b_t	Industrialized coffee
29	Slaughter	cmt	Meats
30	Dairy	Mil	Dairy products
31	SugarInd	Sgr	Sugar
32	VegetOils	Vol	Vegetable oils
33	OthFood	Ofd	Other food and feed
34	VariousInd	omf	Other industrial products
35	CivilConst	cns	Civil construction
36	Trade	Trd	Trade
37	Transport	Otp	Transport
38	Comunic	cmn	Communication services
39	FinancInst	Ofi	Financial services
40	FamServic	Ros	Household services
41	EnterpServ	obs	Enterprises services
42	BuildRentals	dwe	Dwellings
43	PublAdm	Osg	Public administration

The activities follow the same nomenclature of the products, with the exception that in ORANIGFR agricultural products (commodities 1 to 10 in the above table) are produced by a unique activity, named Agriculture, while in GTAP each commodity is produced by

the correspondent industry. One of the advantages of the new method, then, can be seen here: the models need not have the same number of activities.

In terms of regions in the world the database aggregation used distinguishes 7 regions, namely: ASI (Asia), NAFTA (United States, Canada and Mexico), RMSUL (Argentina, Uruguay and Paraguay), BRA (Brazil), OAL (remaining countries in Latin America), EUR (European Union) and the ROW (rest of the world). For the regions inside Brazil the model distinguishes 27 different regions (26 states plus the federal district): Rondônia, Acre, Amazonas, Roraima, Pará, Amapá, Tocantins, Maranhão, Piauí, Ceará, RGNorte (Rio Grande do Norte), Paraíba, Pernambuco, Alagoas, Sergipe, Bahia, MinasG (Minas Gerais), EspSanto (Espírito Santo), RioJaneiro, SãoPaulo, Paraná, StaCatari (Santa Catarina), RGSul (Rio Grande do Sul), MtGrSul (Mato Grosso do Sul), MtGrosso (Mato Grosso), Goiás, DF (Distrito Federal).

5 The simulations

Three scenarios were analyzed in the simulations:

- Experiment 1: “NAFTA like” trade liberalization;
- Experiment 2: a linear elimination of tariffs of every product in trade for the integrating countries;
- Experiment 3: a linear elimination of tariffs of every product in trade between the European Union and the Mercosur countries (Brazil and RMSUL).

The experiment 1 (EXP1) assumes that the integration would be done following the NAFTA patterns, liberalizing the trade between most manufactured products, but keeping unchanged the original protection level in the GTAP database for many agricultural products. It is a scenario where trade liberalization is done more in the industrial sector products than in agriculture. The products to be included here are presented in Table 2.

Table 2. Commodities to be liberalized in trade in Experiment 1: "NAFTA like" liberalization.

No.	MOSAICO	GTAP	DESCRIÇÃO
1	NaturMilk	Rmk	Raw milk
2	MineralExtr	Omn	Minerals
3	PetrGasExtr	Oil	Petroleum, gas and charcoal
4	MinNonMet	Nmm	Non-metalic minerals
5	IronProduc	i_s	Iron products
6	MetalNonFerr	Nfm	Non-ferrous metals
7	OtherMetal	Fmp	Other metals
8	MachTractor	Otn	Machines, tractors and parts
9	EletricMat	Ome	Electric material
10	EletronEquip	Ele	Electronic equipment
11	Automobiles	Mvh	Automobiles
12	WoodFurnit	lum	Wood and furniture
13	PaperGraph	ppp	Paper and graphics
14	ChemicElem	crp	Chemical elements
15	PetrolRefin	p_c	Refined petroleum products
16	Textiles	tex	Textiles
17	Apparel	wap	Apparel
18	ShoesInd	lea	Shoes and leather products

19	VariousInd	omf	Other industrial products
20	CivilConst	cns	Civil construction
21	Trade	trd	Trade
22	Transport	otp	Transport
23	Comunic	cmn	Communications
24	FinancInst	ofi	Financial services
25	FamServic	Ros	Household services
26	EnterpServ	Obs	Enterprises services
27	BuildRentals	Dwe	Dwellings
28	PublAdm	Osg	Public administration

As it can be seen in the above table, just raw milk (NaturMilk), paper products (Papergraph), Textiles, Apparel and leather products (ShoesInd) would be the agricultural products included in the liberalization process in this experiment.

Experiment 2 (EXP2) is a scenario where the FTAA formation would involve a 100% cut in the import tariffs of every product in trade, for every country in the integrating block. It comprises a broader trade liberalization than what was seen in EXP1, mainly due to a deeper agricultural trade liberalization. And finally the Experiment 3 (EXP3) is similar to EXP2, except that now the trade liberalization agreement is between the European Union and Mercosur.

It should be noted that in all the above experiments tariffs inside Mercosur were not changed. This was done in order to isolate the effects of trade liberalization with the other countries, and not of a deepening of the process inside Mercosur. Due to the importance of bilateral trade between Brazil and the other Mercosur countries, mainly Argentina, their inclusion in the experiments generates great impacts on the results, masking the more general effects of FTAA. The results, then, should be interpreted as for a given situation of tariffs inside Mercosur.

6 The macroeconomic closure used in the ORANIGFR

A long run closure was used in ORANIGFR. The main characteristics of this closure are:

- The sectoral rates of returns on capital are exogenous, with capital stock in each industry being determined endogenously;
- The level of aggregated employment is fixed, with the real wage endogenous.
- The Trade Balance/GDP ratio is exogenous, with consumption adjusting endogenously to satisfy the Trade Balance constraint.
- Government consumption varies endogenously linked to the household consumption (real) to accommodate a given trade deficit (as a proportion of GDP). Government expenditure composition is exogenous.
- Aggregate investment is linked to the capital stock variation, that's to say, the ratio investment/capital stock is exogenous, with aggregate real investment endogenous. This choice makes aggregate consumption more stable than investment, what is consistent with the stylized facts in the Brazilian economy.
- The stock variation is linked to the domestic production variation;
- The nominal exchange rate is the "numéraire" of the model.

7 Results

Results presentation starts with some aggregate results in order to establish a benchmark for the regional analysis. In results interpretation one should bear in mind that the model has a “top-down” inter-regional specification, meaning that the national model is solved before the inter-regional one, being exogenous to it. Table 3 brings some selected results.

Table 3. Selected macroeconomic results. % variations.

Macros	Exp1	Exp2	Exp3
Investment/consumption ratio	0.67	0.69	0.33
Consumption/GDP ratio	-0.17	-0.19	-0.08
Per capita utility index	0.86	0.98	0.47
Import CIF prices in local currency	0.02	0.05	0.05
GDP deflator	0.71	1.14	0.11
Import prices index, basic values.	-2.23	-2.39	-1.61
Real devaluation	-0.70	-1.10	-0.06
Terms of trade	0.62	0.97	0.20
Capital price index	0.17	0.53	-0.24
Average nominal wage	1.68	2.15	0.61
Land prices	1.15	4.39	5.63
Aggregate investment price index	0.17	0.53	-0.24
Consumer price index	0.61	1.01	0.08
Export price index, local currency	0.64	1.02	0.25
Government expenditure index	1.33	1.77	0.42
Average real wage	1.06	1.13	0.54
Nominal GDP (expenditure)	1.26	1.74	0.42
Real GDP	0.54	0.60	0.31
Import “quantum” index	5.38	6.33	3.68
Aggregate capital stock	1.14	1.23	0.59
Aggregate real investment expenditure	1.14	1.23	0.59
Real household expenditure	0.47	0.54	0.26
Export “quantum” index	5.91	6.64	4.41
Real government expenditure	0.47	0.54	0.26

Several points can be raised based on the above table. First of all, it can be seen that the tariff structure change in the integrating country’s economies have considerable different impacts on the Brazilian economy, when one consider the liberalization in the FTAA or with the EUR. The real GDP increase is twice as big in experiment 2 (EXP2) when compared with EXP3. This would point to the fact that the integration in the FTAA would have, for Brazil, a positive aggregated impact greater than in the case o a bilateral agreement Mercosur/European Union.

Actually, the integration in FTAA is a trade liberalization process far deeper than a possible Mercosur/EUR agreement, due to the greater number of countries involved in the process. From a volume of trade standpoint, the GTAP 5 database shows that the EUR and the NAFTA, the two most important Brazilian trade partners, absorb respectively 28.3%

and 26.6% of Brazilian total exports, and supply 26% and 21% of that country total imports. The remaining Mercosur and Latin American countries account for a significant share of Brazilian external trade, both from the imports and exports side. Although the tariff structure between Brazil and the other Mercosur countries haven't been modified in the experiments, the remaining Latin American countries (OAL) are responsible for an extra share of 10% of the Brazilian exports and another 5.3% of the Brazilian imports. Moreover, Brazil faces high import tariffs in these country's economies, according the GTAPdatabase.

The observed GDP increase is the result of an increase in the overall activity level in Brazil, where the volume of exports increases more than that of imports. The reduction of tariffs generates an exchange rate revaluation (or, according with the table results, a negative devaluation). As it can be seen in the table, the real revaluation of the exchange rate with the associated gain in the international Terms of Trade is greater in EXP1 and EXP2 than in EXP3. The elimination of tariffs on the Brazilian imports in the other countries, however, also increases the demand for Brazilian exports, generating that aggregated result upon the exchange rate. This is the kind of effect that a single country model wouldn't be able to capture.

This result, of course, is a consequence of that mentioned earlier, or the fact that in the two first experiments the trade liberalization process is greater than in EXP3. Due to that, in the first two experiments the fall in the aggregated import prices is greater than in the third one. Besides that, note that the CIF import prices index increases in every experiment, but less in EXP1. This is a consequence of the international price increase in every experiment, caused by the increase in the volume of trade and positively sloped supply curves.

In terms of the results upon the factor markets we note an elevation in the real wage in all experiments, with the higher values in EXP2. Being labor a perfectly mobile factor between activities in the model, the labor market must clear at national level. With total employment fixed exogenously in the long run closure, the nominal wage will vary, being the real wage defined as the difference between the nominal wage variation and the consumer price index variation. With the increase in the real consumption in the economy the Consumer Price Index also grows, offsetting part of the wage nominal gains.

Regarding the capital formation we note a result in line with the real GDP variation. The long run closure used here fixes the rates of return on capital (rentals) in relation to the cost of one capital unit, in each industry. In this way the capital stock (and its price) in each industry must adjust to meet the closure condition that the percent variation in the price of a unit of capital be identical to the variation in its cost.

As it can be seen in Table 3, the Aggregated Investment Price Index (the average cost of a unit of capital) varies by -0.24% in EXP3, and is positive in the first two experiments. To understand this result one must depart from the closure, which states that the Trade Balance is exogenous, as well as the employment level, what will require an increase in exports in order to keep the trade balance unchanged. This increase implies positive variations both in prices and quantities, what raises the domestic prices indexes, like the Consumer Price Index. The required exchange rate revaluation is accompanied by the gains in the international terms of trade of the country, and by increases in all the aggregated items of GDP from the expenditure side, what raises the real GDP. This is done through an increase in capital utilization, since aggregated employment is fixed.

This increase in capital use reduces its marginal productivity, since the capital/labor ratio in the economy has increased. Due to that the price of capital has to be reduced in

relation to the price of the output and, in aggregated terms, must be reduced in relation to an aggregated price index, like the GDP deflator or the Consumer Price Index (CPI).

Considering that the CPI increases more in the first two experiments, this relative fall in capital prices is accommodated in the model through a smaller increase in its prices in relation to CPI. In EXP3, however, CPI almost doesn't change, so a fall in capital prices is required. Note that the aggregated capital stock increases in every experiment, due to the relative fall in this factor's prices. It remains to understand, then, why the CPI increases more in the first two experiments. This can be explained by the fact that for the main Brazilian import items the fall in tariffs is greater in the experiments relating to the FTAA than in EXP3. There is a correspondent higher increase in imports and exports in these cases, with higher increases also in the prices indexes (and in real GDP).

One should note the small difference in aggregated terms between the results of EXP1 and EXP2. This difference, as seen before, is due to a greater agricultural liberalization in EXP2 in the FTAA. These results are illustrative of the kind of problem the agricultural sector can expect during the discussions about the block formation, namely the differences between sector and aggregated results. As one can see, the aggregated results of a deeper agricultural liberalization process are small, if evaluated by the real GDP variation. The sectoral results, however, are markedly different in both cases, as it can be seen by the increase in land prices. This is an agricultural sector specific factor, not utilized by the other activities. The observed increase in its prices, then, is an indication of the increase in the level of activity in the sector.

This will be clearly a difficult argument to be raised during the discussions about the FTAA formation process, when the Brazilian society will have to weight the aggregated results against the sectoral ones. The other countries involved in the process are competitors of the Brazilian exports, mainly in the agricultural markets, in such a way that this sector's liberalization has a relatively lower impact for the Brazilian economy. Let's take the example of the Vegetable Oils (VegetOils). EXP2 would imply a tariff reduction in NAFTA (the economically most important region in the block) of 5.65% for products originating in Brazil, and 13.32% for those originating in RMSUL. It is well known that Argentina (the most important country in RMSUL) is an important country in the soybean oil markets. Due to that, the Brazilian exports of Vegetable Oils in the model are reduced in both EXP1 (1.82%) and EXP2 (1.48%).

Still in the Vegetable Oils case, one can see that the results for EXP3 are quite different. The tariff reduction is identical for products originating both in Brazil and Argentina, (a 10.24% reduction), such that the Brazilian exports increase markedly (10.66%). And the same happens with other agricultural products, like Paper and Graphic (Papergraph), where the tariff reduction in NAFTA would be 0.3% for products originating in Brazil and 1.28% for products originating in RMSUL. This result, an apparent paradox, can be explained by trade diversion caused by the elimination of tariffs in uneven proportions, and can just be captured by global models. With the industrial products this effect is not so important, since the remaining Mercosur or Latin American countries are not important exporters of these products, which account for about 41% of the Brazilian total exports (value) in the Brazilian 1996 input-output tables.

This trade diversion effect arises due to two conditions: the reduction in tariffs to be higher in a third country, and this country to be an important exporter of that product in the reference year. So, in the textile case where the tariff reduction in NAFTA would be 6.91% for products originating in Brazil, 8.54% for products originating in RMSUL and 10.81%

for those originating in OAL, the reduction in the Brazilian exports is not observed. This is due to the fact that these other regions export just a small amount of the product in the base year, compared with Brazil.

This trade deviation effect seems to be potentially important, and has been absent in the discussions of the FTAA formation in Brazil. The model results suggest that more attention should be paid to this aspect of the question, in order not to overestimate the benefits of economic integration on the agriculture sphere. A linear reduction in the import tariffs on agricultural products between the participating countries may not bring, for Brazil or other specific country, the effects that would arise in bilateral agreements.

In what follows, Table 4 shows the contribution of each GDP constituent for its total variation.

Table 4. Contribution of each GDP constituent to the total % variation.

Aggregates	Exp1	Exp2	Exp3
Consumption	0.30	0.34	0.16
Investment	0.22	0.24	0.11
Government	0.09	0.10	0.05
Stocks	0.01	0.02	0.01
Exports	0.41	0.46	0.31
Imports	-0.48	-0.57	-0.33

The values in the above table are the percent variation in each GDP component weighted by the respective share in the base year GDP. As it can be seen, the share of external trade in GDP is higher in EXP1 and EXP2 than in EXP3, ratifying the idea that the first two experiments encompasses a broader integration process than the third one. The Table 5 allows the analysis of how the different scenarios affect each industry in the model.

Table 5. Variation (%) in activity level, by industry.

Atividade	exp1	exp2	exp3
Agriculture	0.01	0.56	1.05
MineralExtr	-0.98	-1.86	-0.53
PetrGasExtr	-1.28	-1.85	-0.00
MinNonMet	0.97	0.85	0.14
IronProduc	2.31	1.40	-1.30
MetalNonFerr	0.06	-0.84	0.23
OtherMetal	1.13	0.69	-1.36
MachTractor	4.13	3.15	-0.61
EletricMat	-0.70	-1.08	-2.55
EletronEquip	-1.51	-1.71	-0.18
Automobiles	-0.48	-0.71	-4.13
WoodFurnit	0.37	0.04	0.71
PaperGraph	-0.18	-0.33	-0.00
ChemicInd	0.02	-0.12	-0.31
PetrolRefin	-0.20	-0.35	0.09
Textiles	0.26	0.12	0.20
Apparel	0.32	0.30	0.21
ShoesInd	15.02	13.50	4.15
CoffeeInd	0.31	15.05	-1.13
Slaughter	0.13	0.15	2.62
Dairy	0.01	0.05	0.11
SugarInd	-0.46	1.11	1.54

VegetOils	-0.55	-0.56	3.39
OthFood	-0.18	0.23	2.18
VariousInd	-0.59	-0.92	-1.36
CivilConst	1.10	1.18	0.57
Trade	0.40	0.47	0.28
Transport	0.06	-0.03	0.20
Comunic	0.53	0.52	0.22
FinancInst	0.27	0.21	0.04
FamServic	0.28	0.29	0.15
EnterpServ	0.15	0.10	0.11
BuildRentals	0.55	0.61	0.31
PublAdm	0.41	0.45	0.22

In the above table it is interesting to observe that although some industries gain more in one scenario than in other, it doesn't seem to arise the kind of pattern identified by Haddad et alii (2002), who attribute to the integration in the FTAA a greater benefit to the industrial sectors, while the integration with the European Union would benefit more the agriculture and agriculture related industries. The higher value added industries in the model (EletricMat, EletronEquip, and Automobiles) tend to reduce the activity level in the three experiments, although the reduction is actually higher for EXP3.

In the same way, some agricultural sectors show increases in the activity level in EXP3: Slaughter, VegetOils and OthFood. But there are also other sectors which show a strong increase in EXP2: ShoesInd and CoffeeInd.

The abovementioned study, however, uses a different methodology compared to ours, what make the results not strictly comparable. In particular, in the Haddad (2002) study the economies of the Brazilian's trade partners are not explicitly modeled, and there is no feedback between these economies and the Brazilian economy.

The aggregated results showed so far have differentiated impacts at inter-regional level. The Table 6 shows model results upon activity level for 27 Brazilian states in the three scenarios.

Table 6. Variation (%) in inter-regional economic activity, 27 states. Brazil.

Activity level	Macro-region	exp1	Exp2	exp3
Rondônia	North	0.23	0.85	0.93
Acre	North	0.42	0.59	1.09
Amazonas	North	-0.17	-0.41	0.05
Roraima	North	0.31	0.26	1.08
Para	North	0.02	-0.14	0.45
Amapá	North	-0.01	-0.45	0.03
Tocantins	North	0.27	0.62	1.69
Maranhão	North	-0.15	-0.22	0.84
Piauí	Northeast	0.48	0.78	1.47
Ceara	Northeast	1.13	1.60	0.93
RGNorte	Northeast	0.56	1.09	0.45
Paraíba	Northeast	1.93	4.37	0.83
Pernambuco	Northeast	0.24	1.04	0.31
Alagoas	Northeast	-0.10	0.65	1.09
Sergipe	Northeast	1.02	2.54	0.87
Bahia	Northeast	-0.03	0.08	0.22
MinasG	Southeast	0.59	0.75	-0.14
EspSanto	Southeast	0.30	1.25	-0.19

RioJaneiro	Southeast	0.14	0.11	0.02
SaoPaulo	Southeast	0.57	0.82	-0.14
Paraná	South	0.32	2.07	0.39
StaCatari	South	0.09	0.18	0.47
RGSul	South	2.82	2.55	1.11
MtGrSul	Center-West	0.14	0.55	1.41
MtGrosso	Center-West	0.08	0.24	1.46
Goiás	Center-West	0.49	0.79	0.75
DF	Center-West	0.32	0.67	0.14

As it can be seen, the three integrating strategies analyzed have different impacts at the inter-regional level. Contrary to the results at aggregated level, here a pattern seems to emerge. The integration in the FTAA would tend to reduce the activity level of industries located in the Northern region of the country, while the integration with the European Union would tend to reduce the activity level in the Southeast region states, except Rio de Janeiro. As seen before, the reduction in the high value added industries activity level, although present in the three experiments, is actually more important in EXP3. These industries are concentrated in the Southeast region, mainly in São Paulo state, what generates the result.

Another aspect that should be noted is the activity level increase in the Northeast (one of the poorest regions in the country) in EXP2 compared to EXP1. We saw before that the inclusion of agriculture in the trade liberalization would not have a great impact in terms of real GDP gains. These results, however, indicate that the intra-regional impacts can be significant, with potentially important distributive effects across the Brazilian regions.

Of the three simulations, EXP3 seems to be the one that would generate the less concentrating regional development pattern, due to the reduction in the economic activity in the most developed states (São Paulo e Minas Gerais, in the Southeast) and its increase in other peripheral states. The relative reduction in the activity level in these states is explained by the kind of economic specialization of each one, and by the way the activity of each industry is affected by the integration. In this way, São Paulo and Minas Gerais are, in the 1996 Brazilian input-output matrix, the two main automobile producers in Brazil, with shares of respectively 84% and 14.1%. EXP3 is the simulation where car imports increase the most (34%, against 21% and 22.3% respectively for EXP1 and EXP2). Due to the twist in consumption in direction to imports the Automobile industry activity level falls markedly in EXP3, as can be seen in Table 5. Then, for given fall in the level of economic activity of an industry at national level the more affected states will be those responsible for the greater shares in that activity. The same kind of result is found for the activity EletricMat.

The same can be said for the MinExtr (Mineral Extraction) industry in Minas Gerais, for example, and for the IronProd industry in Espírito Santo. It should be noted that the contribution of total imports for the GDP reduction is smaller in EXP3 than in the other experiments. The above regional result is determined by the differential impact of import composition in the different experiments, as well as by in the differential reduction in tariffs. Although the aggregated imports contribute less for the GDP fall in EXP3 than in EXP2, these imports are particularly concentrated in products of industries in that specific regions.

The states of Paraná and Rio Grande do Sul seem to be ones that will gather the greater benefits from the FTAA formation. This result is strongly determined by the increase in the activity level of CoffeeInd, in the case of Paraná, and of the ShoesInd and MachTractor industries in the case of Rio Grande do Sul. These industries show a strong increase in its activity level, being those states responsible for a great share of them.

The model results for the variation in employment level and wage bill, at macro-regional level, can be seen in Table 7, below.

Table 7. Model results for employment and wage bill, by macro-regions. % variations.

Macro-region	Employment			Wage bill		
	exp1	exp2	exp3	Exp1	Exp2	exp3
N (North)	-0.035	-0.116	0.233	1.642	2.031	0.848
NDE (Northeast)	-0.055	-0.069	0.139	1.622	2.077	0.754
CO (Center-west)	-0.039	-0.034	0.367	1.638	2.113	0.982
SE (Southeast)	-0.009	-0.031	-0.15	1.668	2.116	0.465
S (South)	0.094	0.202	0.336	1.771	2.348	0.951

At this point one should bear in mind that the long run closure used fixes the aggregated level of employment. At regional level, however, employment varies, according the variations in industry activity levels. In this way, the positive employment result associated to the South region is determined by the relative smaller fall in the activity level of PetrGasExt industry, as well as by the greater increase in the OthFood industry in EXP3. The three states in the South region (Paraná, Santa Catarina and Rio Grande do Sul) are responsible for 31.8% of the national wage bill in the Othfood industry in Brazil. Moreover, this industry accounts for 7.1% of the wage bill in the South region, what gives it a great importance in the region. Similar result can be observed for the WoodFurnit industry.

It is interesting to note that the three experiments generate negative results for employment in the Southeast region of Brazil, with the worse result appearing in EXP3. According to what was discussed above, this fact is related to the evolution of the activity level of the industries concentrated in that region. The Automobile industry, for example, concentrates 84% of its production in the São Paulo state, and 98.4% in the Southeast region. The aggregated activity level of this industry falls by 0.48% in EXP1, 0.71% in EXP2, and 4.13% in EXP3, contributing for a greater fall in employment in the Southeast region than in the others.

Following the mechanism discussed, the South region would be the one most benefited in terms of employment in the first two experiments, that's to say, in the FTAA formation. The North region, on the other hand, would loose the most in EXP2. It is worthwhile to remember, however, that these results are percent variations, with a very different meaning in terms of absolute number of jobs (or worked hours). The results for the North region are dictated by the fall in the activity level of the mineral extraction industry (MineralExtr), important in the states there located, mainly Pará.

In the same way the integration with the European Union would affect negatively the employment level only in the Southeast region, benefiting all the other regions, mainly South and the Center-West region. The Southern states concentrate some economic activities like the ShoeInd, Textiles and Apparel whose activity level increases in the three experiments. Besides that, these activities are important in the employment composition in these regions. The apparel industry, for example, accounts for about 5% of total wage bill in Rio Grande do Sul state.

The results described above are interesting, and have important implications for regional development policies. Being the economic activity concentrated differently in different regions, the increase in the protection level of this industry generates an income and employment transfer from the other regions for the region under focus. The reduction in the protection level of this activity generates substitution in favor of imported products, now cheaper, reducing that industry's activity level. At the same time, the fall in input prices, reducing the production cost of some industries tend to reduce the price of their output, increasing its consumption.

This discussion was present in the Brazilian literature about economic development during the import substitution period, when the high protection mechanism was extensively used to protect industry, mainly in the intermediate consumption and capital goods sectors. Model results here found point to the fact that the trade liberalization scenarios here analyzed in EXP3 would act to reduce employment concentration in the country.

It should be noted also that these results partially diverge with those obtained by Haddad et alii (2002), cited before. According to those authors the three integrating strategies analyzed (FTAA, free trade area with the European Union, and a general trade liberalization between Brazil and all its trade partners) would concentrate the economic activity. The model used by those authors, however, differs from ours in three main aspects.

In first place, the authors consider a short run closure, where the capital stocks are fixed, and domestic absorption is given. Secondly, the authors use a methodology that take into account the inter-regional trade flows, through a split of national results. This procedure is also "top-down", like the one here used. And finally, though those authors aggregate the external sector in 5 different regions, just the bilateral effects are analyzed, with no feedback between the economies and third countries. These latter effects can be important for the results, as we showed here.

Regarding wages, model results showed an increase in the average real wage, greater in EXP1 and EXP2 than in EXP3. The consequences of this increase upon the wage bill can also be seen in Table 7. Again, we can see here the more favorable effect of EXP2, in line with the greater increase in GDP. But it should also be noted that although the wage bill increases in every region, in EXP3 it tends to increase less in the Southeast region of the country. This effect, of course, is associated to that previously found for the regional employment, that also falls in the Southeast region in EXP3.

The evolution of the share of each region in the national production depends not only on the output variation in that region, but also in the variation in the other regions of the country. The ORANIGFR calculates a variable named "Regional Comparative Advantage" which takes into account all those factors. These results, by industry and region, can be seen in Table 8 bellow.

Table 8. Regional Comparative Advantage Evolution . % variation.

Region	exp1	exp2	exp3
Rondônia	-0.01	-0.02	0.05
Acre	0.01	0.01	0.04
Amazonas	-0.02	-0.02	-0.01
Roraima	-0.01	-0.04	0.05
Para	-0.01	-0.03	0.01
Amapá	-0.01	-0.03	-0.01
Tocantins	-0.03	-0.04	0.26
Maranhão	-0.05	-0.14	0.09

Piauí	-0.00	-0.01	0.04
Ceara	0.00	-0.00	0.02
RGNorte	0.00	-0.00	-0.00
Paraíba	0.00	0.02	0.00
Pernambuco	-0.00	0.00	0.00
Alagoas	-0.01	-0.01	0.01
Sergipe	0.02	0.03	0.02
Bahia	-0.01	-0.03	-0.00
MinasG	-0.00	0.01	-0.01
EspSanto	-0.00	0.09	-0.02
RioJaneiro	-0.01	-0.02	-0.00
SaoPaulo	0.01	0.00	-0.01
Paraná	-0.01	0.04	0.01
StaCatari	-0.06	-0.04	0.12
RGSul	0.01	0.00	0.03
MtGrSul	-0.06	-0.10	0.25
MtGrosso	-0.07	-0.10	0.22
Goiás	-0.01	-0.02	0.05
DF	-0.01	-0.01	-0.00

As it can be seen, only in EXP3 is possible to identify some regions (Tocantins, StaCatari, MtGrSul and MtGrosso) where a specific pattern arises. This happens because being the Regional Comparative Advantage (RCA) indicator originally defined by each industry in each region, the regional aggregation tend to homogenize the results, with negative and positive values compensating each other. In this aggregated form, then, when a pattern arises it is important enough to be highlighted.

Analyzing the industries results (not showed here) it is possible to verify that, in these states, some industries where the activity level is strongly elevated are important industries in the state, although the state itself may not be important in the national production of that industry. These results are mainly related to the agriculture and agricultural based industries. In this way, the RCA of Agriculture grows in the states, as well as of VegetOils and Slaughter. These industries export much more for the EUR than for NAFTA, what causes its activity level to increase more in EXP3 than in EXP2.

8 Final remarks

Model results here found raise a series of questions for the debate underway. One aspect to be noted is that the inclusion or not of agricultural sectors in the integration process brings aggregated differential impacts relatively small for the national economy. This happens due to two main reasons. The first of them is the fact that agriculture exports represent 1.6% of the national output of those industries, although this accounts for about 40% of Brazilian total exports in 1996.

In second place, and maybe more important like a model insight, is the trade diversion phenomenon in the integration, due to a greater reduction in import tariffs for our competitors in the international market. This result is important from a conceptual point of view, since it has been absent in the about the impacts of economic integration in Brazil.

From a practical standpoint the question to be raised is that in the trade negotiating process the country must take into account not just its position in trade, but also the position of their competitors. The clear identification of these cases can be very important, since the negotiating mechanism will necessarily involve exchanges, with gains and losses. The

results suggest that a careful analyzes of the tariff levels in the other countries and products in which markets Brazil competes is necessary, since a linear reduction in tariffs that imply a greater liberalization for other countries may have a result contrary to what is expected.

Trading block formation with FTAA will have a greater impact over GDP than with EUR, since it represents a broader arrangement. In terms of sectors, the results here found do not identify any scenario as being particularly favorable for any industry or group of industries. In this way, no obvious inter-industry transfer mechanism arises in the analysis.

At regional level, however, a pattern seems to emerge more clearly. The integration with the EUR is the scenario that shows up like being the one that will generate the less concentrating regional development process. The integration in the FTAA, on the contrary, seems to be the most concentrating scenario, in terms of regional economic growth, since it reduces mainly the activity in the states of the North region of Brazil. But it should also be noted that in EXP2 the activity level increases in some Northeast's states, like Alagoas, Ceará, Pernanbuco and Sergipe. This is then a good example of the trade offs associated to the process. The states of Paraná and Rio Grande do Sul are the most benefited in EXP2.

This indication can be confirmed with the analysis of the employment evolution in the three scenarios, although here the results are slightly different. EXP2 would tend to increase employment in the South region, reducing it in every other region inside the country. EXP3, on the contrary, reduces employment in the Southeast region, increasing it in the other regions, including the South.

These results are determined by the concentration of the higher value added industries in the Southeast of the country, and by the tariff reduction. Being the Southeast region the main supplier of industrialized consumption and intermediate consumption products for the other regions, a fall in the protection level of these industries would generate substitution towards imports, reducing the activity level there. As it can be seen, then, the commercial policy can also be an important element in the regional economies configuration.

In short, model results show that the many scenarios analyzed can have differentiated and complex regional impacts. There is no simple pattern emerging from the analysis. On the contrary, results here found suggest that the process will imply losses and gains, differentiated both between regions and activities.

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