Technical Note

ECONOMIC IMPACTS OF A FREE TRADE AGREEMENT BETWEEN MERCOSUR AND THE US: A GENERAL EQUILIBRIUM APPROACH

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1 INTRODUCTION

The United States and Brazil developed a profound trade relationship since World War II, not just because they are the two biggest economies in the American continent, but also because of the geographical proximity (at least in comparison to other huge economies in Europe or Asia) and due to a reasonable political and diplomatic alignment between the countries. For decades the US has been the most important export and import market for Brazil, and until the 2000's they have a share between 20 and 25% of the Brazilian trade bill, rivalled only by the European Union and the neighbors in South America. Brazil's share in total US trade flows has obviously been much lower, but the country has always played a relevant role for the US economy, not only in trade, but also in terms of foreign investment of US firms.

Another remarkable feature of US-Brazil trade is the product diversification. Brazilian exports to the US include many different kinds of products, with a relatively low share of primary commodities, in contrast to exports for other developed economies. The export bill to the US ranged from vehicles and parts, airplanes, oil derivatives, electronic equipment, machinery and tractors to basic metals, shoes, food, beverages, wood, pulp and textiles. The profile of US exports to Brazil is more similar to other supplying countries, but also diversified, with machinery and equipment, electronic equipment, vehicles and parts, oil derivatives, chemicals, electric appliance and pharmaceuticals. In fact, there has always been a great deal of intra-industry trade between the countries.

The landscape changed somewhat in the last 20 years. China took the place as the most important destiny of Brazilian exports, with sales that, in 2020, were three times larger than the ones going to the US, and imports that are 50% higher than the ones coming from the US. In fact, the bilateral trade flows have been virtually stagnated since 2008, although with significant fluctuations. In this period, Brazil's market-share on US imports decreased from 1.5% to 1.0%, and the share of the US in Brazilian export bill fell from 15% to 10%.

The pattern of bilateral trade has also passed through some changes. The share of agricultural, food and mining products in Brazilian exports increased from less than 10% in the beginning of the 2000's to 25% in 2019-2020, mainly because of crude oil exports, that represented 9% of total bill in 2019-2020. In US exports, the increase of crude oil and refined petroleum products was remarkable in the last 20 years, going from 1% to 34% of the total bill, taking space from other products, like machinery and equipment, vehicles and parts, chemicals, medical and surgery equipment etc.

The low dynamism that was seen in recent, beside the size of the economies and their degree of productive diversification, make clear that there is potential for streamlining the bilateral economic relationship. One possible path, and, in a sense, an obvious one, is to negotiate a free trade agreement. This paper is dedicated to analyze the economic effects of an FTA between the US and Brazil – in fact, the US and Mercosur, as it's a customs union – using a general equilibrium model. Section 2 presents the model used and the features of the simulations, that involves tariffs and non-tariff barriers reductions. Section 3 shows the results, concerning the main macroeconomic variables in both countries, the welfare effects, the sectoral effects in terms of production levels and foreign trade and the bilateral trade flows. Section 4 discuss the main conclusions of the exercise.

2 FEATURES OF THE SIMULATIONS[1]

The simulations of the effects of a trade agreement between Brazil and the US are made with the computable general equilibrium model GTAP (Global Trade Analysis Project), in its 10th version, calibrated with data for 2014, encompassing 141 countries/regions and 65 sectors. The complete documentation of this model is presented in Hertel (1997) and all the information about databases and the characteristics of GTAP version 10 can be found in Aguiar et al. (2019). The theoretical structure of the dynamic GTAP model is described in detail in Ianchovichina and McDougall (2000) and Ianchovichina and Walmsley (2012).

For the present purposes, the regions are aggregated in four – Brazil, USA, other Mercosur countries (Argentina, Paraguay and Uruguay) and Rest of the World – and the sectors are aggregated in 24, as shown in table 1.

The simulation considers two different scenarios:

- scenario 1: 100% reduction in tariffs for all sectors, uniformly distributed in a 10-year timeframe (2021 to 2030); and

- scenario 2: 100% reduction in tariffs for all sectors and also a non-tariff barrier reduction of 25% for all sectors, uniformly distributed in the same timeframe.

The inclusion of non-tariff barriers (NTBs) on the simulations is an essential feature once an array of studies have been showing that non-tariff barriers are becoming a more important restriction to trade flows than tariffs (Marks and Rahardja, 2012; Kee, Nicita and Olarreaga, 2009; Niu et al., 2018). Alhourgh tariffs had been reduced in recent decades, non-tariff barriers are rising in almost all countries, mostly after the 2008 financial crises, as shown by some estimates of ad valorem equivalent (Kee, Nicita and Olarreaga, 2009; Niu et al., 2018). Hence, almost all free trade agreements have clauses aimed at reducing non-tariff barriers between the parties, especially the ones related to the reduction or elimination of quantitative restrictions, the simplification of customs procedures, the harmonization of rules and technical requirements etc.

In the GTAP model, tariff reductions are modelled directly, by applying reduction shocks in the variable *tms*, the power of tariff in sector *i*, calculated as $[1 + t_i/100]$, where *i* is the sector and *t* is the initial tariff level in percentage points. The initial tariff used in the simulations are the effectively applied tariffs by country A on imports from country B in the base year of GTAP version 10 (2014). These are calculated from the input-output tables available in GTAP database, and are calculated by dividing the amount of import tariffs effectively charged by country A on imported products of sector *i* came from country B by the total amount of imports by country A of products of sector *i* came from country B. Table 1 shows the initial tariffs applied by Brazil and the US on each sectors' products.

In order to simulate the effects of changes in other factors that affect imports, like non-tariff barriers or trade costs in general, the variable *ams* is commonly used, which is defined as "Iceberg Trade Costs import-augmenting 'tech change' variable" that can be used to consider "efficiency-enhancing measures that serve to reduce the effective price of goods and services imports".[2] In the simulations made in this article, the shocks on *ams* were calculated by taking the ad valorem equivalent (AVE) of non-tariff barriers for each of the sectors considered and applying a moderate (albeit arbitrary) reduction of them, in an uniform manner throughout ten years (as with tariffs). Once the reduction of non-tariffs barriers brings an increase in the efficiency of imports (and/or a reduction in prices of goods and services), the percentage change of *ams* for each sector in each year has the opposite sign of the corresponding AVE reduction.

The initial AVE's for the sectors are obtained from the estimations made by Niu et al. (2018), that uses the methodology first developed by Kee, Nicita and Olarreaga (2009). The authors calculate AVE's for a large sample of countries, for products at 6-digit level of the Harmonized system (HS) international classification, and for some years between 1997 and 2015. For this article, the most recent estimations were used, referred to Brazil, USA and Argentina (as a proxy for AVE's for the other Mercosur countries). The average AVE for each GTAP sector considered in the simulations is obtained by using a table of concordance that links each HS-6 item to one of the GTAP sectors, provided in GTAP website.[3] The initial average AVE's for the sectors considered in the simulations in Brazil and the US are shown in table 1.

TABLE 1

Initial tariffs and ad valorem **equivalent of non-tariff barriers in Brazil and the US, by GTAP sectors**

(In %)

Sectors	Brazil		USA	
	Tariffs	NTBs	Tariffs	NTBs
Cereals	0.00	7.26	0.15	29.16
Other agropecuary	7.38	54.49	0.27	59.13
Oil seeds	4.00	28.34	0.13	18.48
Oil and gas	0.00	0.00	0.00	95.19
Minerals	3.57	83.42	0.11	69.02
Meat	0.00	48.67	2.29	48.43
Food and beverages	11.20	63.85	5.58	54.79
Textiles and apparel	24.39	70.44	2.43	59.16

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2. Available at: <https://bit.ly/3qMqYz1>.

3. Available at: <https://bit.ly/30wnXYA>.

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Sectors	Brazil		USA	
	Tariffs	NTBs	Tariffs	NTBs
Leather and shoes	25.04	57.69	0.52	61.84
Wood products	12.67	45.45	0.02	51.01
Paper	6.50	97.88	0.92	62.71
Oil products	0.82	69.95	2.16	56.86
Chemicals	8.31	59.08	0.04	62.77
Pharmaceuticals	7.53	35.35	2.28	64.25
Rubber and plastics	13.69	112.23	0.94	60.13
Mineral and metals products	13.81	66.58	0.88	49.11
Electronic equipment	11.92	120.94	1.43	66.83
Electric equipment	13.75	82.03	0.68	83.19
Machinery and equipment	12.97	101.12	0.92	50.43
Vehicles and parts	13.22	72.29	0.47	94.78
Other transport equipment	11.55	67.32	0.18	63.66
Other manufactures	13.29	79.92	0.00	61.21
General services	0.00	n.d.	0.00	n.d.
Business services	0.00	n.d.	0.00	n.d.

Sources: GTAP and Niu et al. (2018).

Choosing the magnitude of the reduction on AVE's is quite an arbitrary decision, but it seems reasonable to apply just a moderate reduction, in order to not overestimate the effects, and considering that there are many non--tariff barriers that are not (or cannot be) reduced by the agreement's provisions. In this article, it has been applied a 25% reduction on AVE's over ten years. It's important to keep in mind that a larger (smaller) reduction would imply a greater (smaller) impact on growth of bilateral trade.

The reductions in AVE's are calculated by the same way as tariffs, by first obtaining the initial power of tariffs (defined as $1 + t_i/100$, where i is the sector and t is the initial level of AVE in percentage points) and the final power of tariffs (that is $1 + (t_i \times 0,75)/100$ in the case of AVEs). Then the percentage change between final and initial power of tariffs are obtained and this change is uniformly distributed throughout ten years.

The simulations are made for the period 2021 to 2035, so as to consider the ten years in which the policy shocks are applied (2021 to 2030) and some years ahead, to capture some important lagged effects of the shocks. The simulations were made using the software RunDynam and all the results are presented as deviations from the baseline simulation, say, the evolution for all the variables that would prevail if there were no policy shocks.

3 RESULTS

3.1 Macroeconomic variables

The effects of a trade agreement between Mercosur and the US on selected macroeconomic variables for Brazil and the United States are shown in table 2. The results for the two scenarios are presented as deviations from the baseline scenario, showing the cumulative change until 2035.

For Brazil, the GDP growth is narrowly positive in scenario 1, but there are non-negligible gains in investment, real wages, exports and imports. Trade balance would have a negative change, as well as terms of trade. The results are much more significant in scenario 2, including GDP growth (0.41%), but also investment, real wages and foreign trade, with a more negative trade balance effect (of US$ 14.3 billion). Contrarily to scenario 1, the terms of trade effect is positive.

In both scenarios, import quantities and values grows at a higher pace than exports. That is due to the higher import tariffs currently applied by Brazil, while in the US almost all sectors have import tariffs of 2% or lower (except for Food and beverages). The ad valorem equivalents (AVEs) of NTBs are also higher in Brazil in a majority of sectors.

For the US, changes in macroeconomic variables in Scenario 1 are generally modest, and GDP growth is practically zero. The effects are most significant in scenario 2, but still low in comparison to Brazilian numbers. GDP would grow by 0.05%, investment would have a 0.22% gain and total exports and imports would change by a little more than 1%. The result would be negative for overall trade balance and positive on terms of trade.

This result is not surprising for 2 reasons. First, the US economy is around 10 times bigger that Brazil's, so the effects of bilateral trade tend to be lower in the US. Second, the initial level of import tariffs in the US is yet very low, so the country doesn't obtain significant gains from opening its economy to Brazilian imports. In fact, the simulations show that a trade agreement with Mercosur focused on tariff reductions would not be interesting for the US, and also of low interest for Brazil. Hence, it's necessary that any agreement include provisions aimed at reducing non-tariff barriers.

TABLE 2

Macroeconomic effects on Brazil and the US of a Mercosur-USA FTA

(% deviation from the baseline, cumulative until 2035)

Variables	Brazil		USA	
	Scenario 1	Scenario 2	Scenario 1	Scenario 2
GDP (%)	0.01	0.41	0.002	0.05
GDP deflator (%)	-0.14	1.30	0.12	0.34
Investment (%)	1.27	5.87	0.06	0.22
Real wages (%)	0.12	0.76	0.03	0.11
Export quantitiy (%)	0.93	3.30	0.25	1.03
Export value (%)	0.80	4.51	0.35	1.30
Import quantitiy (%)	2.17	10.09	0.32	1.16
Import value (%)	2.23	10.41	0.31	1.18
Trade balance (US$ million)	-3,901.1	-14,306.6	-473.2	-2,619.6
Terms of trade	-0.19	0.88	0.11	0.25

Authors' elaboration.

3.2 Welfare analysis

Traditional trade theory predicts that a reduction in import tariffs lowers the domestic price of goods, what raises the so-called "consumer surplus", and this gain is commonly higher than the reduction of "producer surplus" and of the government revenue. On general equilibrium analysis, Hanslow (2000) argues that welfare effects of a trade policy change depend on what the change does to its national income and on the effect of the policy change on prices, and hence the purchasing power of that income.

In general, welfare changes depend mainly on four factors (Hanslow, 2000): i) endowment contributions related to changes in the availability of primary factors, such as the stock of machinery, buildings and agricultural land; ii) technical efficiency contributions from changes in the use of available inputs in production, such as improvements in labor productivity; iii) allocative efficiency contributions relative to pre-existing distortions; and iv) terms of trade effects, once an increase in these means an increase in purchasing power.

Table 3 shows, in scenario 1, that the Mercosur-USA FTA would bring negative welfare effects for Brazil of -US$ 631 million. The positive technical change effect, induced by the usage of lower cost imported goods, would be counteracted by negative endowment, allocative and terms of trade effects. The main explanation to these results relies on two factors. First, the tariff reduction on the US would be very low, bringing small positive effects from exports. Second, the reduction of terms of trade would imply a real income loss for the country, corresponding to a negative effect of almost US$ 800 million (table 3). A third factor could possibly be relevant, say, the fact that the US may not be

the most efficient global supplier of many manufacturing goods. The FTA could induce Brazil to substitute US imported goods for ones that are currently imported from other countries – China and other Asian countries, for example –, implying a negative effect on total welfare, especially concerning to allocative effects.

The results change dramatically in scenario 2, so that Brazil would have a huge welfare gain, of US$ 21.6 billion. The bulk of this gain would come from technical change, but there would be also positive results for allocative and terms of trade effects.

For the US, there would be welfare gains in both scenarios, but they would be four times higher in scenario 2 than in scenario 1. The bulk of the gains would come from technical change and terms of trade effects.

Once more, it seems clear that a FTA focused on NTB reductions would be much more interesting for both countries than one focused only on tariffs.

TABLE 3
Welfare changes and decomposition for Brazil and the US, resulting from a Mercosur-USA FTA
(Deviation from the *baseline* in US$ million, cumulative until 2035)

Variables	Brazil		USA	
	Scenario 1	Scenario 2	Scenario 1	Scenario 2
Total	**-631.0**	**21,693.9**	**7,587.4**	**30,227.9**
Endowment effects	-195.3	-3,614.5	192.0	636.7
Allocative effects	-232.9	1,043.2	710.8	2,552.1
Technical change	341.5	17,127.4	4,372.5	22,853.4
Terms of trade	-780.6	3,791.7	3,239.2	7,348.7
Other effects	236.4	3,346.1	-927.1	-3,163.0

Authors' elaboration.

3.3 Main sectoral variables

The FTA would have a negative effect on production levels of a majority of sectors in Brazil, as can be seen on table 4. In scenario 1, the changes would be small in almost all sectors, though some would have significant gains (like Leather and shoes and Other transport equipment) and others would suffer losses (especially Electric equipment, Machinery and Equipment, Cereals and Chemicals). In scenario 2 the changes would be much more significant, and there would be a higher number of losing sectors. Production losses would be higher on Chemicals, Cereals, Electronic equipment, Electric equipment and Machinery and Equipment, while only seven sectors would experiment gains: Other Transport Equipment, Wood Products, Leather and shoes, Oil and Gas, Vehicles and parts, General Services and Minerals and metals.

In the US, scenario 1 would bring very small effects on sectoral production levels, though a majority of them would experiment losses (mainly Other Transport Equipment and Leather and shoes). The gains would be significant on Chemicals, Cereals and Machinery and equipment. The results don't change much significantly in scenario 2, with the same pattern of winning and losing sectors and percentage changes that are a little higher than in scenario 1.

TABLE 4
Impacts on sectoral production of Brazil and the US of a Mercosur-USA FTA
(% deviation from the *baseline*, cumulative until 2035)

Sectors	Brazil		USA	
	Scenario 1	Scenario 2	Scenario 1	Scenario 2
Other transport equipment	0.7	14.3	-0.3	-0.8
Wood products	0.3	2.5	-0.0	-0.2
Leather and shoes	1.8	1.5	-0.3	-1.2
Oil and gas	0.0	1.1	-0.1	-0.5

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Sectors	Brazil		USA	
	Scenario 1	Scenario 2	Scenario 1	Scenario 2
Vehicles and parts	-0.0	0.6	-0.0	-0.1
General services	0.0	0.4	-0.0	0.0
Minerals and metals products	-0.1	0.3	-0.0	-0.3
Food and beverages	0.4	-0.2	-0.1	-0.2
Paper	-0.0	-0.2	-0.0	-0.2
Other agricultural and forestry	0.2	-0.6	-0.1	-0.4
Other manufactures	-0.4	-0.6	0.0	-0.1
Minerals	0.0	-0.9	-0.0	-0.1
Business services	0.0	-1.0	-0.0	-0.1
Oil seeds	0.3	-2.2	-0.4	-0.5
Meat	0.2	-2.4	-0.1	-0.3
Pharmaceuticals	-0.5	-2.4	-0.0	-0.3
Textiles and apparel	-0.2	-1.2	0.1	0.0
Rubber and plastics	-0.3	-1.5	0.1	0.1
Oil products	-0.0	-1.9	0.0	0.7
Chemicals	-0.9	-2.6	0.5	1.1
Cereals	-1.1	-3.0	0.5	0.3
Electronic equipment	-0.5	-3.2	0.1	0.7
Electric equipment	-1.7	-3.9	0.2	0.4
Machinery and equipment	-1.6	-5.1	0.4	0.8

Authors' elaboration.

Three main conclusions arise from these results. First, the sectoral effects in the US are a mirror image of the ones in Brazil, in terms of winning and losing sectors. Second, the effects are of little relevance in scenario 1, and more significant in scenario 2, especially for Brazil, revealing the importance of NTBs. And third, there's not a clear sectoral pattern of gains and losses, unlike other FTA simulations involving Brazil and countries like China, India and the European Union. In these, Brazilian gains are concentrated in commodity-producing sectors, mainly the ones related to agriculture, and losses would be associated to labor-intensive and technology-intensive sectors.

As the US is also an agricultural powerhouse, Brazilian gains in these sectors, and US losses, would be minor or non-existent (or even negative, as the case of Cereals). And as average wages are also much higher in the US, Brazil would attain gains in some labor-intensive sectors, like Wood products and Leather and shoes – probably taking space from other low-wage countries that do not have an FTA with the US. Concerning technology-intensive sectors, though, Brazilian producers would be harmed by US competitors, especially in Electronic equipment, Electric equipment and Machinery and Equipment.

Table 5 shows the results of the trade agreement on Brazilian total exports, imports and trade balance by sector. In scenario 1, almost all sectors would expand its exports, except for Other Manufactures and Machinery and Equipment. In scenario 2, export gains are also attained by almost all sectors, and the percentage changes are much higher than in scenario 1. A curious thing is that the sectors with negative changes are not the same as in scenario 1, and part of them are related to agribusiness, like Cereals, Oil Seeds and Meat.

Brazilian imports would grow in almost all sectors in scenario 1, except for Services, Minerals and Oil and gas. The highest changes would occur in Other Manufactures, Electric equipment, Machinery and Equipment, Chemicals and Cereals, what's in accordance with the sectors that would suffer the biggest production losses. In scenario 2 the changes are much more significant, as expected by the reduction of NTBs, with the same sectors registering the

highest changes. It's import to note that the Oil and gas sector would turn from a negative change in scenario 1 to a positive change of 15.0% in scenario 2.

In terms of trade balance, only the Food and beverages sectors would get a significant increase in surplus, while Chemicals and Machinery and Equipment would register a huge negative change. In scenario 2, trade balance changes are much more significant in almost all sectors. Three of them – Oil and Gas, Other Transport Equipment and Minerals and metals products – would have the highest positive changes, while a number of sectors would have a negative change of US$ 1 billion or more, notably Meat, General Services, Electronic equipment and Machinery and Equipment.

TABLE 5
Impacts on sectoral trade in Brazil of a Mercosur-USA FTA
(% deviation from the *baseline*, cumulative until 2035)

Sectors	Exports		Imports		Trade balance (US$ million)	
	Scenario 1	Scenario 2	Scenario 1	Scenario 2	Scenario 1	Scenario 2
Oil and gas	0.2	27.7	-0.1	15.0	68.0	4,909.5
Other transport equipment	1.5	42.5	1.0	16.1	37.7	2,455.7
Minerals and metals products	1.8	9.0	4.3	13.8	4.0	1,832.4
Wood products	2.3	15.5	2.1	11.1	77.8	549.1
Leather and shoes	4.6	5.6	0.6	6.7	450.1	464.7
Paper	0.7	3.8	3.8	15.0	-27.4	180.8
Other agricultural and forestry	0.2	2.6	0.4	3.3	-1.7	92.6
Minerals	0.1	-0.3	-0.6	-1.3	32.0	-194.6
Food and beverages	2.4	0.3	1.5	5.4	1,062.9	-321.8
Cereals	0.6	-4.5	7.7	11.1	-260.2	-460.1
Oil seeds	0.2	-3.0	0.6	2.3	21.7	-463.4
Oil products	0.8	3.7	0.1	4.5	118.8	-582.5
Textiles and apparel	4.0	8.1	3.5	12.2	-211.3	-892.9
Vehicles and parts	0.4	1.9	1.9	6.4	-424.8	-966.5
Rubber and plastics	2.1	6.0	4.7	16.6	-272.4	-994.7
Pharmaceuticals	0.7	-1.4	3.2	9.7	-266.2	-1,002.5
Other manufactures	-0.8	2.9	8.9	30.2	-363.4	-1,004.5
Business services	0.2	0.1	-0.0	3.4	56.5	-1,131.4
Electric equipment	0.5	7.7	6.6	20.7	-613.5	-1,406.7
Chemicals	2.6	10.8	4.4	11.3	-1,305.1	-1,854.8
Meat	0.5	-7.6	0.9	5.9	99.7	-1,999.9
General services	0.1	0.9	-0.1	5.7	132.1	-3,207.0
Electronic equipment	0.5	1.4	3.1	15.4	-756.4	-3,678.9
Machinery and equipment	-0.3	2.3	7.5	25.2	-1,560.0	-4,629.3

Authors' elaboration.

Table 6 shows what would happen to sectoral trade in the US. Exports would grow in a majority of sectors in scenario 1, though with small percentage changes – with the notable exceptions of Cereals, Textiles and apparel, Chemicals, Machinery and Equipment, Electric equipment and Rubber and plastics. In scenario 2 the changes are generally higher, with the same sectors attaining the highest changes.

US imports would grow in all sectors in response to the FTA, but with low percentage changes in scenario 1, in line with the fact that the import tariffs are also low. The effects are much more significant in scenario 2, with a number of sectors having changes between 1% and 3% – notably Meat, Wood products, Paper and Chemicals.

The trade balance would have significant increases in scenario 1 only in two sectors: Chemicals and Machinery and Equipment. Other Transport Equipment, Oil and gas and Services would register high negative changes. In scenario 2 the absolute changes are much higher, both in the positive side – in sectors like Chemicals, Machinery and Equipment, Oil Products, Electronic equipment and Electric equipment – and in the negative side – notably Oil and Gas, General services, Minerals and metals products, Other Transport Equipment, Food and beverages, Vehicles and parts and Business Services.

TABLE 6
Impacts on sectoral trade in USA of a Mercosur-USA FTA
(% deviation from the *baseline*, cumulative until 2035)

Sectors	Exports		Imports		Trade balance (US$ million)	
	Scenario 1	Scenario 2	Scenario 1	Scenario 2	Scenario 1	Scenario 2
Chemicals	1.6	4.0	0.6	1.9	3,949.8	9,081.0
Machinery and equipment	1.9	4.6	0.4	1.4	2,916.4	6,088.6
Oil products	0.0	2.1	0.2	0.6	-175.9	4,864.6
Electronic equipment	0.9	3.6	0.3	1.0	729.4	4,111.1
Electric equipment	1.4	3.6	0.3	1.1	824.8	1,615.8
Rubber and plastics	1.1	3.0	0.4	1.2	321.0	737.4
Cereals	4.0	4.8	0.3	0.9	347.2	379.5
Minerals	-0.1	0.0	0.2	0.1	-33.2	4.1
Oil seeds	-0.4	-0.2	0.1	0.8	-86.7	-69.6
Textiles and apparel	2.5	5.1	0.3	0.9	117.3	-358.0
Leather and shoes	0.2	0.5	0.3	0.8	-177.1	-510.4
Other manufactures	0.6	1.3	0.3	1.0	35,2	-521.6
Other agricultural and forestry	-0.3	-0.6	0.2	0.7	-167.7	-555.4
Pharmaceuticals	0.2	0.3	0.2	0.8	-24.5	-680.9
Paper	0.0	0.3	0.3	2.0	-132.7	-751.8
Wood products	-0.4	-1.3	0.5	2.2	-195.1	-802.1
Meat	-0.8	-1.4	0.8	3.0	-326.2	-866.8
Business services	-0.4	-0.2	0.2	1.0	-1,106.6	-1,745.4
Vehicles and parts	0.3	0.3	0.2	0.7	-178.2	-1,887.1
Food and beverages	0.1	0.1	0.6	1.4	-844.3	-1,904.2
Other transport equipment	-0.5	-0.6	0.2	1.6	-1,056.4	-2,505.0
Minerals and metals products	0.4	0.8	0.5	1.7	-288.1	-2,803.5
General services	-0.3	-0.2	0.2	0.9	-3,931.2	-6,568.8
Oil and gas	-0.4	0.6	0.2	1.5	-990.8	-6,971.2

Authors' elaboration.

In sum, the FTA would have marked sectoral effects, that are not so significant in scenario 1 but very important in scenario 2, especially in the Brazilian side. The main winning sectors in Brazil, in terms of production but also of exports and trade balance, would be Other Transport Equipment, Wood Products, Leather and shoes, Oil and Gas and Minerals and metals products. The losing sectors includes some technology and capital-intensive sectors, like Electronic equipment, Electric equipment, Machinery and Equipment, Chemicals, Pharmaceuticals, Textiles and apparel, Rubber and plastics and Oil Products.

These ones are also the biggest winning sectors in the US economy, except for Pharmaceuticals and Textiles and apparel, while the losses are concentrated in Other Transport Equipment, Leather and shoes, Oil and Gas and Minerals and metals products.

3.4 Bilateral trade

Brazilian exports to the US (table 7) would grow 6.5% in scenario 1, with some sectors having double-digit growth rates, like Food and beverages, Chemicals, Leather and shoes, Rubber and plastics, Textiles and apparel and Meat. In absolute terms, though, the increase of US$ 3.6 billion would be concentrated in three sectors: Food and beverages (US$ 1 billion), Minerals and metals products (US$ 703 million) and Chemicals (US$ 673 million). These already have an important share of the export bill to the US, of about 30%.

In scenario 2, Brazilian exports would grow much more (89.8%, or US$ 50.2 billion), what reflects the huge effect of the reduction of non-tariff barriers. Almost all sectors would register 2- or 3-digit growth rates, and many of them would have an increase of more than US$ 1 billion in relation to the baseline projections. The most benefited sector in this scenario would be Oil and gas, with an increase of US$ 17.5 billion. The reduction of NTBs on US imports of this products (which ad valorem equivalent is more than 90%, according to table 1) would make Brazil able to increase its market-share in a country that is one of the biggest world importers. Some other sectors would also register a huge increase of exports, like Minerals and metals products, Chemicals, Other Transport Equipment, General Services and Food and beverages.

Considering US exports to Brazil (table 8), they would grow by 31,5% in scenario 1, with higher growth rates in sectors that are currently subject to high import tariffs, like Textiles and apparel, Leather and shoes, Electric equipment, Machinery and Equipment, Electronic equipment and Minerals and metals products. In absolute terms, though, the US$ 17.7 billion exports increase would be concentrated in six sectors, which combine high Brazilian tariffs with a clear competitive stance by the american industry: Chemicals (US$ 4.4 billion), Machinery and Equipment (US$ 3.2 billion), Electronic equipment (US$ 2.2 billion), Minerals and metals products (US$ 1.8 billion), Electric equipment (US$ 1.6 billion) and Vehicles and parts (US$ 1.1 billion).

In scenario 2, almost all sectors would register 2- or 3-digit growth rates, and many of them would have an increase of more than US$ 1 billion. The six sectors mentioned above would be among the most benefited, with a combined export gain of US$ 42.2 billion.

These numbers show that there's a group of sectors that would benefit most from a Mercosur-FTA in Brazil and in the US, in terms of the increase in bilateral trade. Not surprisingly, they are basically the same that were listed as the winners in the precious section. It's also important to say that, although a FTA focused on tariff reductions would not be of much interest for both countries as whole, there are some sectors that would attain great benefits from it, at least on the American side. Chemicals, Machinery and Equipment, Electronic equipment, Minerals and metals products, Electric equipment and Vehicles and parts could be advocates of this kind of "simple" FTA.

TABLE 7
Impacts on exports from Brazil to USA of a Mercosur-USA FTA
(% deviation from the *baseline*, cumulative until 2035)

Sectors	% change		Absolute change (US$ million)	
	Scenario 1	Scenario 2	Scenario 1	Scenario 2
Total	**6.5**	**89.8**	**3,645.9**	**50,222.5**
Oil and gas	0.3	286.5	16.3	17,550.9
Minerals and metals products	6.9	67.3	703.4	6,848.4
Chemicals	14.2	93.1	673.1	4,426.3
Other transport equipment	1.5	103.0	51.7	3,628.0
General services	0.3	39.6	17.9	2,322.9
Food and beverages	48.0	92.2	1,092.5	2,099.1
Oil products	2.9	29.2	169.1	1,693.9
Machinery and equipment	2.9	79.3	56.0	1,551.4
Business services	0.3	37.6	10.8	1,453.2
Vehicles and parts	3.6	81.2	56.1	1,258.0
Leather and shoes	51.3	177.4	358.4	1,239.3
Paper	1.0	53.7	21.4	1,201.7
Electric equipment	2.8	145.3	22.0	1,140.1

(Continues)

(Continued)

Sectors	% change		Absolute change (US$ million)	
	Scenario 1	Scenario 2	Scenario 1	Scenario 2
Wood products	6.1	61.0	74.2	736.3
Rubber and plastics	17.5	93.1	121.2	643.3
Textiles and apparel	41.4	144.5	131.3	458.3
Other agricultural and forestry	0.5	33.8	6.7	455.5
Other manufactures	1.3	78.7	7.1	426.4
Electronic equipment	3.0	125.2	9.0	372.1
Pharmaceuticals	1.2	67.1	5.8	334.2
Meat	11.4	84.1	39.4	290.9
Minerals	0.2	7.7	1.7	58.1
Oil seeds	0.0	10.9	0.9	33.7
Cereals	1.6	26.9	0.0	0.5

Authors' elaboration.

TABLE 8

Impacts on exports from USA to Brazil of a Mercosur-USA FTA

(% deviation from the *baseline*, cumulative until 2035)

Sectors	% change		Absolute change (US$ million)	
	Scenario 1	Scenario 2	Scenario 1	Scenario 2
Total	**31.5**	**109.9**	**17,707.5**	**61,837.5**
Chemicals	38.2	103.6	4,356.9	11,807.6
Machinery and equipment	98.8	301.5	3,151.7	9,616.6
Electronic equipment	80.4	340.9	2,163.6	9,176.0
Minerals and metals products	95.0	247.7	1,768.6	4,608.6
General services	-0.4	42.3	-45.9	4,459.3
Electric equipment	135.5	374.0	1,558.7	4,301.8
Oil products	0.8	26.8	100.5	3,237.4
Vehicles and parts	82.0	193.3	1,135.4	2,678.2
Rubber and plastics	78.1	249.3	735.8	2,348.8
Business services	-0.4	40.5	-15.8	1,703.5
Other manufactures	70.5	216.2	530.0	1,625.3
Pharmaceuticals	35.1	85.3	652.1	1,587.6
Textiles and apparel	239.2	563.1	668.9	1,575.1
Other transport equipment	13.5	148.3	100.0	1,095.8
Paper	39.8	143.9	179.4	648.4
Cereals	42.6	56.5	386.6	512.5
Food and beverages	53.2	118.0	222.4	493.4
Oil and gas	0.0	0.0	-5.0	146.5
Other agricultural and forestry	15.9	61.5	19.4	74.9
Leather and shoes	304.4	717.7	26.8	63.2
Wood products	37.7	120.1	10.1	32.3
Meat	77.2	247.8	7.2	23.1
Minerals	-0.0	8.2	-0.1	21.3
Oil seeds	15.5	47.6	0.1	0.4

Authors' elaboration.

TABLE 9

Impacts on trade balance between Brazil and the US of a Mercosur-USA FTA

(% deviation from the *baseline*, cumulative until 2035)

Sectors	Absolute change (US$ million)	
	Scenario 1	Scenario 2
Total	**–14,061.6**	**–11,364.7**
Cereals	-386.6	–512.0
Other agricultural and forestry	-12.7	380.6
Oil seeds	0.8	33.3
Oil and gas	21.3	17,404.5
Minerals	1.8	36.8
Meat	32.2	267.8
Food and beverages	870.2	1,605.7
Textiles and apparel	-537.7	–1,116.8
Leather and shoes	331.6	1,176.0
Wood products	64.1	704.0
Paper	-158.0	553.3
Oil products	68.6	–1,543.4
Chemicals	-3,683.8	–7,381.3
Pharmaceuticals	-646.4	–1,253.3
Rubber and plastics	-614.7	–1,705.5
Minerals and metals products	-1,065.2	2,239.8
Electronic equipment	-2,154.6	–8,804.0
Electric equipment	-1,536.7	–3,161.7
Machinery and equipment	-3,095.7	–8,065.2
Vehicles and parts	-1,079.4	–1,420.2
Other transport equipment	-48.4	2,532.2
Other manufactures	-522.9	–1,198.9
General services	63.7	–2,136.4
Business services	26.6	0.0

Authors' elaboration.

4 CONCLUSIONS

This paper aimed to analyze the economic effects of an FTA between the US and Brazil – in fact, the US and Mercosur, as it's a customs union – using the computable general equilibrium model GTAP (Global Trade Analysis Project). The simulation considers two different scenarios, one with a 100% reduction in tariffs for all sectors in both countries, uniformly distributed in a 10-year timeframe (2021 to 2030); and a second one, with the same tariff reduction and also a non-tariff barrier reduction of 25% for all sectors, uniformly distributed in the same timeframe. The simulations were made for the period 2021 to 2035, so as to consider the ten years in which the policy shocks are applied (2021 to 2030) and some years ahead, to capture some important lagged effects of the shocks.

In terms of the main macroeconomic variables, the results are generally positive for both countries, but the gains are much more significant in scenario 2. For the US, the results of scenario 1 simulations are very modest, and GDP growth is practically zero, showing that a trade agreement with Mercosur focused on tariff reductions would not be interesting for the US, and also of low interest for Brazil. Hence, it's necessary that any agreement include provisions aimed at reducing non-tariff barriers.

The FTA would bring negative welfare effects for Brazil of -US$ 631 million, probably because the tariff reduction on the US would be very low, bringing small positive effects from exports, and because the reduction of terms of trade would imply a real income loss for the country, corresponding to a negative effect of almost US$ 800 million. The results change dramatically in scenario 2, so that Brazil would have a huge welfare gain, of US$ 21.6 billion. The bulk of this gain would come from technical change, but there would be also positive results for allocative and terms of trade effects.

For the US, there would be welfare gains in both scenarios, but they would be four times higher in scenario 2 than in scenario 1. The bulk of the gains would come from technical change and terms of trade effects. These numbers reinforces the idea that a FTA focused on NTB reductions would be much more interesting for both countries than one focused only on tariffs.

Concerning the sectoral effects of the FTA in Brazil, the most relevant results of the simulations are the following:

- production levels would decrease in a majority of sectors in Brazil. In scenario 1, the changes would be small in almost all sectors, but in scenario 2 the changes would be much more significant, and there would be a higher number of losing sectors;

- production losses would be higher on Chemicals, Cereals, Electronic equipment, Electric equipment and Machinery and Equipment, while only seven sectors would experiment gains: Other Transport Equipment, Wood Products, Leather and shoes, Oil and Gas, Vehicles and parts, General Services and Minerals and metals;

- in scenario 1, almost all sectors would expand its exports in Brazil, except for Other Manufactures and Machinery and Equipment. In scenario 2, export gains are also attained by almost all sectors, and the percentage changes are much higher than in scenario 1;

- Brazilian imports would grow in almost all sectors in scenario 1, and the highest changes would occur in Other Manufactures, Electric equipment, Machinery and Equipment, Chemicals and Cereals, what's in accordance with the sectors that would suffer the biggest production losses. In scenario 2 the changes are much more significant, as expected by the reduction of NTBs; and

- in terms of trade balance, only the Food and beverages sectors would get a significant increase in surplus, while Chemicals and Machinery and Equipment would register a huge negative change. In scenario 2, trade balance changes are much more significant in almost all sectors.

For the US, the main sectoral effects are the following:

- scenario 1 would bring very small effects on sectoral production levels, though a majority of them would experiment losses. The gains would be significant on Chemicals, Cereals and Machinery and equipment. The results don't change much significantly in scenario 2, with percentage changes that are a little higher than in scenario 1;

- exports would grow in a majority of sectors in scenario 1, though with small percentage changes – with the notable exceptions of Cereals, Textiles and apparel, Chemicals, Machinery and Equipment, Electric equipment and Rubber and plastics. In scenario 2 the changes are generally higher, with the same sectors attaining the highest changes;

- US imports would grow in all sectors in response to the FTA, but with low percentage changes in scenario 1, as the current import tariffs are also low. Ths effects are much more significant in scenario 2;

- the trade balance would have significant increases in scenario 1 only in two sectors, Chemicals and Machinery and Equipment, while Other Transport Equipment, Oil and gas and Services would register high negative changes; and

- in scenario 2 the absolute changes are much higher, both in the positive side – in sectors like Chemicals, Machinery and Equipment, Oil Products, Electronic equipment and Electric equipment – and in the negative side.

The bilateral trade would experiment a significant growth, with the following highlights:

- Brazilian exports to the US (table 7) would grow 6.5% in scenario 1, equivalent to US$ 3.6 billion. In absolute terms, though, the increase of would be concentrated in three sectors: Food and beverages (US$ 1 billion), Minerals and metals products (US$ 703 million) and Chemicals;

- in scenario 2, Brazilian exports would grow much more (89.8%, or US$ 50.2 billion), and almost all sectors would register 2- or 3-digit growth rates. The most benefited sector in this scenario would be Oil and gas, with an increase of US$ 17.5 billion, butother sectors would also register a huge increase of exports, like Minerals and metals products, Chemicals, Other Transport Equipment, General Services and Food and beverages;

- US exports to Brazil would grow by 31.5% in scenario 1, with higher growth rates in sectors that are currently subject to high import tariffs, like Textiles and apparel, Leather and shoes, Electric equipment, Machinery and Equipment, Electronic equipment and Minerals and metals products. In absolute terms, there would be a US$ 17.7 billion increase; and

- in scenario 2, almost all sectors would register 2- or 3-digit growth rates, and many of them would have an increase of more than US$ 1 billion. Six sectors would be among the most benefited: Chemicals, Machinery and Equipment, Electronic equipment, Minerals and metals products, Electric equipment and Vehicles and parts.

Three main conclusions arise from these results. First, the sectoral effects in the US are a mirror image of the ones in Brazil, in terms of winning and losing sectors. Second, the effects are of little relevance in scenario 1, and more significant in scenario 2, especially for Brazil, revealing the importance of NTBs. And third, there's not a clear sectoral pattern of gains and losses, unlike other FTA simulations involving Brazil and countries like China, India and the European Union. In these, Brazilian gains are concentrated in commodity-producing sectors, mainly the ones related to agriculture, and losses would be associated to labor-intensive and technology-intensive sectors.

The main winning sectors in Brazil, in terms of production but also of exports and trade balance, would be Other Transport Equipment, Wood Products, Leather and shoes, Oil and Gas and Minerals and metals products. The losing sectors includes some technology and capital-intensive sectors, like Electronic equipment, Electric equipment, Machinery and Equipment, Chemicals, Pharmaceuticals, Textiles and apparel, Rubber and plastics and Oil Products. These last ones are also the biggest winning sectors in the US economy, except for Pharmaceuticals and Textiles and apparel, while the losses are concentrated in Other Transport Equipment, Leather and shoes, Oil and Gas and Minerals and metals products.

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