



**Preliminary
Publication**

BRAZIL AND INDIA: PECULIAR RELATIONSHIP WITH BIG POTENTIAL

Authors: Renato Baumann, Fernando J. Ribeiro, Flavio Lyrio Carneiro, Mateus de Azevedo Araújo
Editorial product: Discussion Paper
City: Brasília
Publishing company: Institute for Applied Economic Research (Ipea)
Year: 2021
Edition: 1

Ipea informs that this text has not been subject to standardization, textual revision or layout by the Editorial. It will be replaced by its final version once the publishing process is complete.

BRAZIL AND INDIA: PECULIAR RELATIONSHIP WITH BIG POTENTIAL

Renato Baumann¹

Fernando J. Ribeiro¹

Flavio Lyrio Carneiro¹

Mateus de Azevedo Araújo²

ABSTRACT

This article

Keywords: International trade; trade integration; trade agreements; foreign investment
Brazil; India.

JEL: F11; F14; F15; F16

¹ Senior Researchers at DINTE/IPEA. We thank Andre Pineli for data on investment flows; Marcelo Nonnenberg, Fernanda Araújo Pedrosa, Jessyka Goltara, Mateus de Azevedo Araujo and Michelle Marcia Viana Martins for trade data; and Andre Mello and Luis Kubota for information used in the technology section.

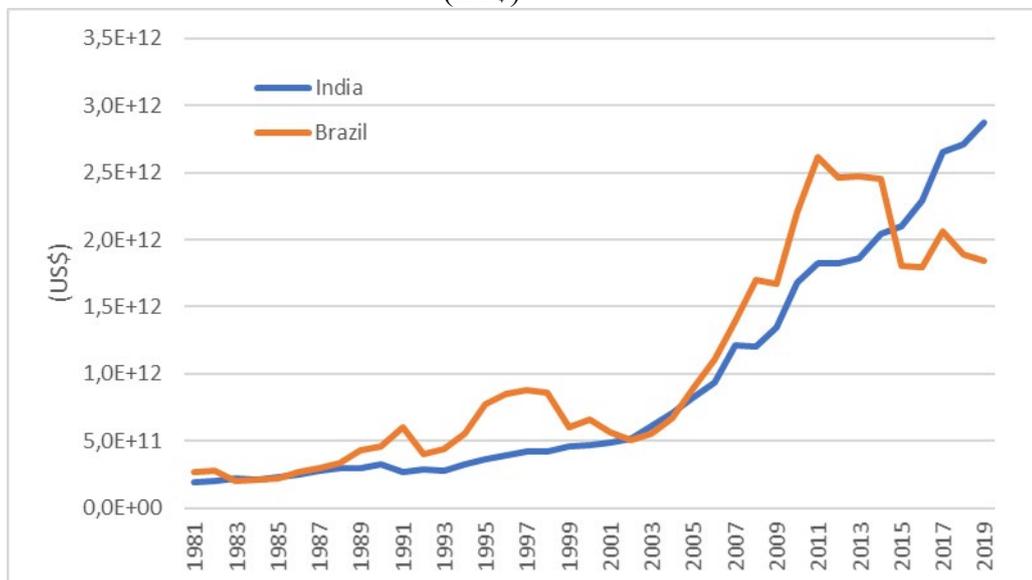
² Research Assistant at Dinte/IPEA.

1 AN OVERVIEW OF THE TWO ECONOMIES

Brazil and India have applied similar policies to develop their economies, in the context of import substitution regimes (1950/1990) characterized by high average tariff to imports and heavy incentives aiming to develop local industry.

The value of total production in the two economies experienced an increasing distance in recent years, thanks to a much better performance by India (figure 1.1). Brazilian GDP was worth US\$ 574 billion on average in 2000-2002, and India's GDP a not too smaller US\$ 489 billion. In 2017-2019 Brazil's GDP went up to US\$ 1.9 trillion, whereas in India this value reached US\$ 2.7 trillion³.

FIGURE 1.1
Gross Domestic Product – Brazil and India
(US\$)

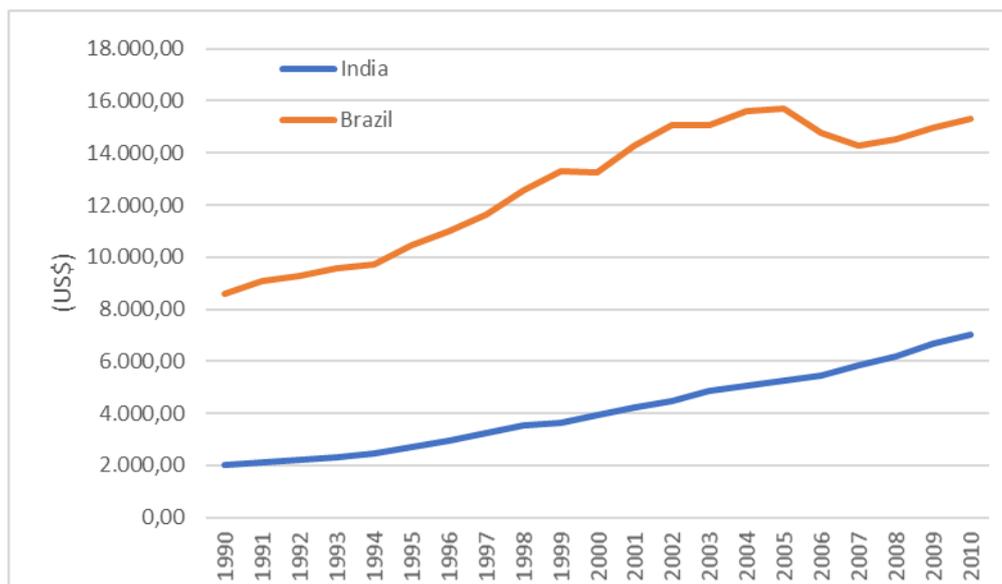


Source: World Development Indicators, World Bank

Since there are five times as many Indians as Brazilians, this affects the comparison in per capita terms, with significant differences in demand patterns in the two cases. According to Figure 1.2, where per capita GDP is measured in PPP (purchasing power parity) terms, even though the level in the Brazilian case is much higher, this indicator for India has increased twice as faster in recent years, showing a clear catch-up process.

FIGURE 1.2
GDP per capita – Brazil and India
(US\$)

³ Data from the World Bank's World Development Indicator (<https://databank.worldbank.org/source/world-development-indicators>)



Source: World Development Indicators, World Bank

This is mirrored, among other things, in the productive structure of the two economies. Value added in agriculture, forestry, and fishing industries (Table 1) was, in 2017-2019, three times more important as a share of GDP in India (15%) than in Brazil (5%).

TABLE 1.1
Productive Structure in Brazil and India
 (% of GDP at factor cost)

Sector	2003-2005		2010-2012		2017-2019	
	Brazil	India	Brazil	India	Brazil	India
Agriculture, forestry, and fishing, value added (% of GDP)	6.4	21.6	4.9	15.7	5.2	15.0
Industry (including construction), value added (% of GDP)	17.4	25.9	26.8	28.2	21.5	31.3
Manufacturing, value added (% of GDP)	14.8	15.2	13.7	15.9	12.2	18.1
Services, value added (% of GDP)	65.5	52.3	68.2	56.1	73.3	53.7

Sources: IBGE, Central Statistics organization of India (CSO)

Three other features are worth stressing from Table 1.1. There has been an increase in the share of industry in both countries in these two decades. However, as far as only manufacturing activities are concerned, this sector gained weight in India's GDP, whereas there has been a significant decrease in its relative importance in Brazil. A different trajectory is presented by the services sector: its share of GDP remained rather constant in India but had a strong increase in Brazil. This will be considered again further on.

As per the involvement with international trade, the two countries have also experienced different trajectories. Merchandise trade as a share of GDP was, on average in 1999-2001, very similar in the two economies: 18% in Brazil and 19% in India. In 2019 those shares had evolved to 22% in Brazil and no less than 28% in India, mirroring quite different approaches towards the external sector.

The net balance in merchandise trade also differs in the two cases. Brazil systematically presents overall surplus on trade in goods, whereas the merchandise balance is historically negative in India. In 2015-2019 Brazil obtained an average yearly trade surplus worth US\$ 41 billion whereas in India the average yearly trade deficit was worth US\$ 145 billion.

This leads to another peculiar feature that differentiates the two economies. In India the deficit in merchandise trade is systematically compensated by the export of services.

In the two countries the service sector plays an important role in the productive structure, accounting on average, in 2015-2019, for 63% of GDP in Brazil and 48% of GDP in India. However, since at least the year 2000 the share of external trade (exports and imports) in services on GDP has been systematically 2 to 3 times higher in India in comparison to Brazil.

A possible reason for that is the type of services produced in Brazil: mostly focused on final consumption in the domestic market. In India, differently, a good deal of services provide support to productive activities, hence are more easily exported.

India has also been more active in signing preferential trade agreements. Brazil is a member of Mercosur; hence trade negotiations must be made together with its partners. This is only one of the reasons why there is a low number of preferential agreements with third parties (India being one of the few exceptions). I

India has not only signed preferential agreements with a much bigger number of more countries or groups of countries; it has agreements, and ones with countries that are more relevant in terms of its share in world trade and GDP, as discussed in section 3. According to the World Trade Organization (<file:///Volumes/NO%20NAME/Global/AgreementsList.htm>), the number of regional trade agreements notified to that institution by both countries indicates that Brazil has 9 agreements, whereas India has 16, almost twice as much.

There are also differences in the number of investment agreements signed by the two countries. According to UNCTAD (<https://investmentpolicy.unctad.org/international-investment-agreements>) India has not only signed a total of 49 investment agreements, of which 13 are in force. Brazil has signed 19 agreements, of which 6 are in force, being two intra-Mercosur, one between Mercosur and other South American countries, one with US ATEC (Army Test and Evaluation Command) and only two (with Mexico and Angola) as bilateral agreements. The bilateral investment treaty between Brazil and India was signed in January 2020 but is not in force yet.

These differences in demographic dimension, in productive pattern as well as in the intensity of involvement with external trade, coupled to different historical trajectories (even in terms of actual military engagement in conflicts with neighbor countries) and to the geographical distance between the two countries, might suggest that the margins for bilateral relationship are too limited.

Yet there are potential complementarities between the two economies, as well as some similarities in their diplomatic performance.

In generic terms, with over one billion mouths to feed, India should not disregard the

Brazilian capacity to offer primary goods. Brazil, with low overall competitiveness, could in principle benefit from the access to capacity building in services as well as in specific manufacturing sectors. Exchange of technologies is always an issue to be considered.

The bilateral Brazilian export bill is far more concentrated than the Indian. In 1999-2001 the one hundred most important products⁴ accounted for some 95,6% of bilateral exports from Brazil, whereas the one hundred most important bilateral imports accounted for 87,1%. There are, furthermore, significant differences in the trajectory in recent years: in 2017-2019 these figures were 93,9% for Brazilian bilateral exports and only 71,9% for its bilateral imports: there has been a remarkable diversification of the Indian bill, whereas the Brazilian export composition remained rather constant. This is discussed in section 2.

A similar outcome is found in bilateral trade in services. In 2019 the three most important services exported from Brazil accounted for 97.7% of total bilateral transactions in services, whereas in the import side this share did not surpass 54,1% (see Section 4).

These figures are bound to influence further negotiations.

Apart from bilateral negotiations, the two economies have other mechanisms to foster their approximation. Over time, both countries have systematically been active vocals in multilateral fora, defending the interests of the set of developing economies.

First and foremost, both countries are members of the IBSA initiative, established in 2003. This group was formed few years before the BRICS and has (at least) two important positive dimensions.

It is a more homogeneous set of economies than the BRICS, with rather approximate degrees of industrialization. Also, the IBSA agenda comprises a few mechanisms to foster complementarity that are more easily identifiable than in the BRICS agenda. The margins for convergence of interests seem to be wider than in other groups.

The formation of the BRICS group in 2009 has affected the dynamism of IBSA, as indicated by the several years without a Summit. A recovery of the mechanism could provide new channels to facilitate complementarity between the two economies.

There is little doubt about the importance to be a member of the BRICS, if seen from the viewpoint of potential opportunities. This group has, from its very beginning, systematically met a good deal of skepticism. But no one questions the potential of complementarity among its members, to be achieved from the moment the group is able to focus its common agenda more clearly and put into practice concrete actions that correspond to the interest of the five partners. A Brazil-India alignment in this group could be a major contribution in this regard.

The active role played by Brazil and India in the GATT and more recently in the WTO as representatives of the interests of the developing economies is widely recognized. It is inevitable that some specific differences remain in the negotiating positions, but when the very existence of such an important institution is being questioned, an explicit axis

⁴ According to the Harmonized System (HS) classification at 6-digit level.

of resistance might contribute to the survival of the existing tools to discipline trade relations.

There are, hence, several arguments to motivate a more proactive identification of common interests and their conversion into effective action. The next seventy years of relationship could be far more intense in terms of stronger and easily identifiable economic links between Brazil and India.

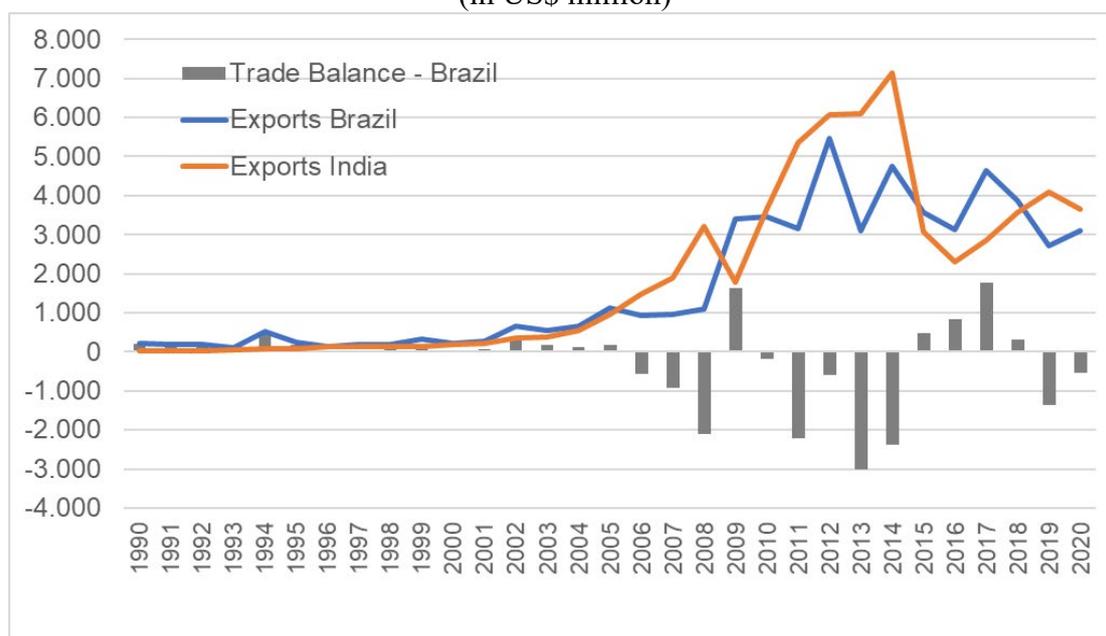
This Note aims at bringing together a set of indicators and features regarding the bilateral economic relations and suggesting areas for potential complementarity. The next section presents the recent evolution and features of bilateral trade in goods. Section 3 discusses some aspects related to trade policy in both countries, comprising tariffs, non-tariff measures, trade agreements and trade defence. Section 4 explores some the bilateral trade in services. Section 5 deals with the bilateral flows of direct investment, and Section 6 discusses potential areas for cooperation in technology. Section 7 presents some proposals to foster bilateral relations.

2 BILATERAL TRADE

Trade flows between Brazil and India were tiny by the beginning of the 1990's, with total flows amounting to only US\$ 200 million a year. The bulk of the flows were Brazilian exports to India, since Indian exports were below US\$ 20 million. As a consequence, Brazil had an annual surplus of more than US\$ 150 million.

Bilateral flows have gone through significant changes since then. First, India exports to Brazil grew rapidly through the decade, so that in the year 2000 it was 13 times higher than in 1990. The same was not true for Brazil, which exports to India hovered around US\$ 200 million throughout the decade. Brazil's surplus decreased to only US\$ 28,3 million in 2000. It can be argued that India was able to benefit from Brazilian import liberalization put in place in the 1990's, but Brazil did not take advantage of the same liberalization in India (see section 3).

FIGURE 2.1
Brazil-India bilateral trade – 1990-2020
(in US\$ million)



Source: Comtrade/UNCTAD.

This figure changed in the following years, that witnessed a very rapid growth of trade in both directions, as can be seen in Figure 2.1. Between 2000 and 2012 Brazilian exports to India grew by 14,5 times, reaching the all-time record of US\$ 5,5 billion. Indian exports to Brazil reached its peak in 2014, amounting to US\$ 7,1 billion, what is more than 37 times higher than in 2000. In this period, trade balance shifted towards India, that had a surplus in most of the years, especially between 2011 and 2014.

It's important to say that the period from the end of the 1990's to the middle of the 2010's was marked by a very fast growth of world trade, and was very favorable to Brazil and India not only in trade, but also on GDP growth. Brazilian imports increased by 500% between 2000 and 2012, pulled by a GDP growth of 3,8% a year. India was one the fastest-growing economies in the world throughout the las two decades, with an annual rate of 6,8% between 2000 and 2018. Imports increased by almost 12 times during this period.

Unfortunately, bilateral flows lost momentum in recent years. Brazilian exports to India were cut by half between 2012 and 2019, and flows in the other direction were reduced by 42%⁵. India's exports were harmed by the profound recession in Brazil in 2015-2016 and by the slow growth in the following years. In the case of Brazilian exports, the decrease happened in a period of virtual stagnation of total India imports between 2014 and 2019. Differently from Brazil, this happened while GDP growth remained high. The main reason relates to falling commodities prices during this period, especially oil, that accounts for almost ¼ of India's imports. This had a direct effect on Brazilian exports,

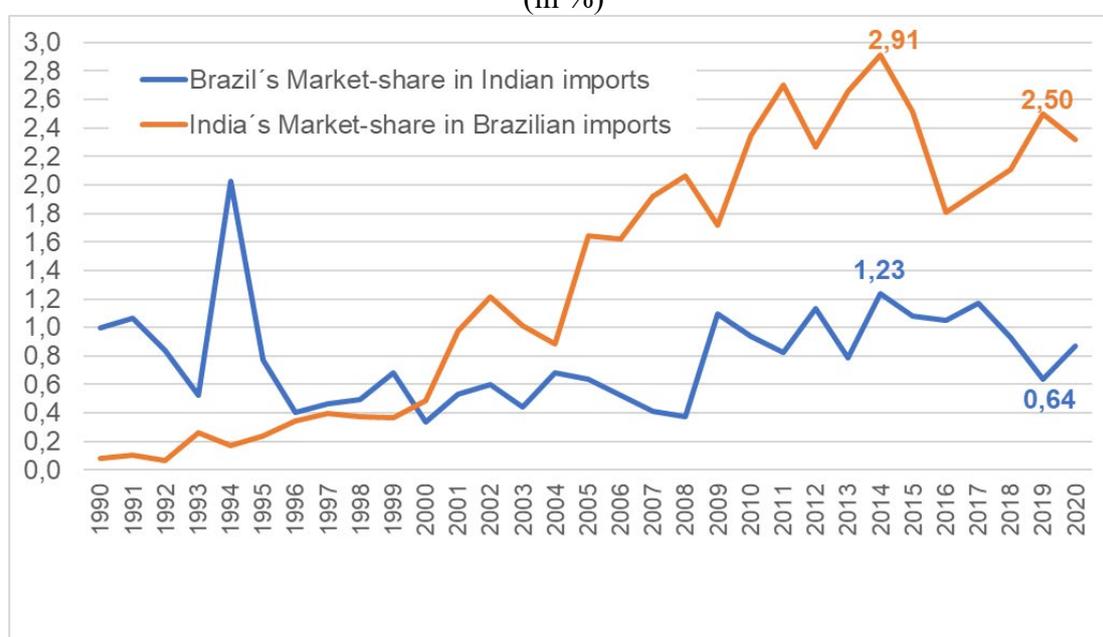
⁵ It must be remarked that in the atypical year of 2020 Brazilian exports to India achieved a 14% growth, while India exports to the partner were reduced by 10%.

since they are very concentrated in this product, as will be shown in Table 2.1.

As a consequence, Brazil's market-share on Indian imports has fallen from a peak of 1,23% in 2014 (the highest excluding 1994, clearly an outlier) to only 0,64% in 2019, the lowest since 2008 and lower than what prevailed in the first half of the 1990's (Figure 2.2). It's not clear, for now, if Brazil will be able to recover a higher market-share, at least above 1%, in the following years

India's market-share in Brazilian imports also decreased from the peak of 2,91% in 2014 to 2,5% in 2019. This share, though, is still one of the highest in historical series, and it's not sure if the recent numbers represent a reversal or just a punctual stalling on the historical trend of increasing market-share since the 1990's.

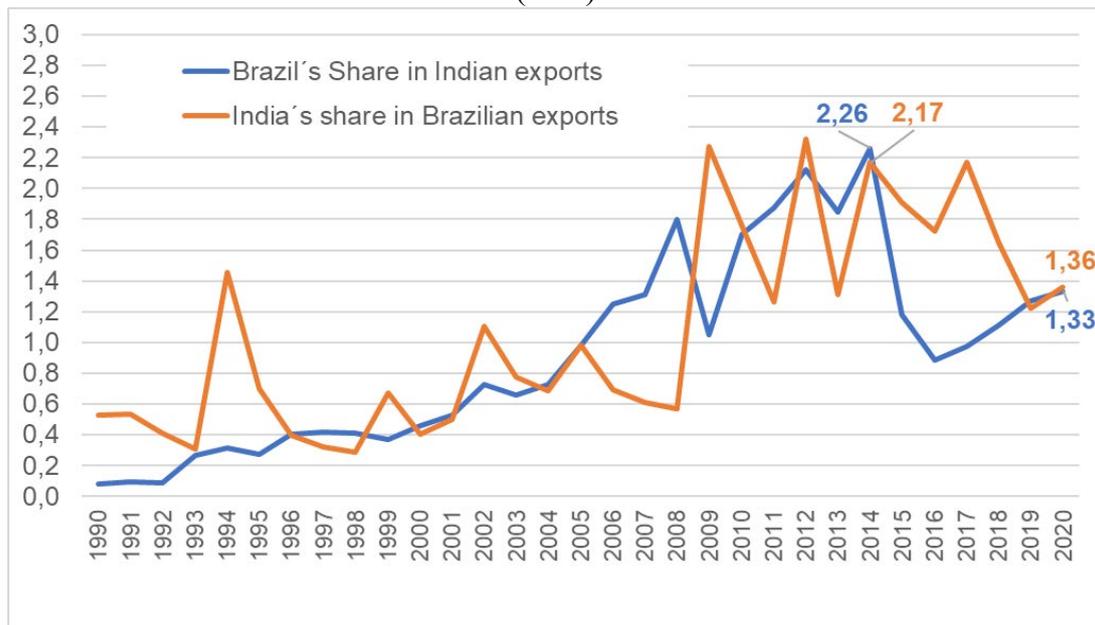
FIGURE 2.2
Brazil and India market-share on partner's imports– 1990-2020
(in %)



Source: Comtrade/UNCTAD.

The growth of bilateral trade implied that the share of both countries in each other's total exports increased steadily since the end of the 1990's to 2014. Curiously, the shares are very similar in both cases. Brazilian share in India's exports was about 0,4% in the second half of the 1990's and increased to 2,26% in 2014. Indian share in Brazil's exports grew from 0,3% to 2,17% in the same period. In 2020, both shares decreased to approximately 1,3%.

FIGURE 2.3
Brazil and India share on partner's exports– 1990-2020
 (in %)



Source: Comtrade/UNCTAD.

2.1 Main Products

Bilateral trade flows show two remarkable features. First is the degree of concentration, that's is high especially in Brazilian exports. Actually, in 2017-19 the one hundred most important products⁶ accounted for more than 90% of Brazilian exports to India. In India's exports, this share is about 70%. Second is the low level of intra-industry trade, with a profile that's typical of Brazilian trade with most of the countries in the world: exports of mineral and agri-food commodities and imports of manufactures.

Table 2.1 shows that, in the years between 2000 and 2002, the export bill was basically composed by two products, Crude oil and Soybean oil, which responded for more than 70% of the total (54,3% for Crude oil and 19,5% for Soybean oil). In the following years until 2012-2014 there was an important diversification of the bill. Sugar had a remarkable growth and took the second place, representing 11,4% of the exports. Other products also had a huge growth, e.g., Copper ores, Gold, Iron and steel, Basic chemicals, Iron ores and Aircraft and spacecraft. Anyway, Crude oil continued to be predominant, being responsible for more than 50% of the total increase between 2000-2002 and 2012-2014, and Soybean oil sales also increased, though its share of export bill fell to 7,1%.

In the most recent years (2017-2019), Crude oil exports were cut by half, much because of falling international prices, and its share in the export bill decreased to 32%. In the opposite direction, some products have gained ground, like Sugar, Soybean oil, Basic chemicals, Beans, Other agricultural and forestry products and Rough wood in the rough. These movements brought some diversification to sales, though mineral and

⁶ From more than 5.000 items, according to the Harmonized System (HS) classification at 6-digit level.

agricultural commodities continued to have a dominant position.

In terms of the market-share of Brazilian products in total Indian imports, the country has a dominant position on Sugar, with more than 90% in the last decades, and a solid position on Soybean oil, whereas the share decreased somewhat in recent years (to 16,1%, from 26,3% in 2000-2002), and Iron ores (22,7%). The Brazilian share has been increasing substantially in Copper ores, Beans and Rough wood. On the other main products, the market-share is around 1% or less, including Crude oil – remembering that this product represents 20% to 25% of total Indian imports, with amounts higher than US\$ 100 billion annually.

TABLE 2.1
Brazilian exports to India, according to main products – selected periods
(in US\$ Million and %)

Products	US\$ Million			Contribution to growth (%)		Market-share in Indian imports		
	2000-02(A)	2012-14(B)	2017-19(C)	(B)/(A)	(C)/(B)	2000-02	2012-14	2017-19
Crude Oil	333,4	2.451,3	1.213,3	54,1	-169,8	2,3	1,8	1,3
Sugar	7,8	517,5	566,0	13,0	6,6	93,7	98,4	95,9
Soybean oil	120,0	321,0	391,9	5,1	9,7	26,3	18,3	16,1
Minign of copper ores	0,1	278,9	217,8	7,1	-8,4	0,0	6,1	16,2
Gold	3,3	138,8	53,2	3,5	-11,7	0,0	0,3	1,1
Iron and steel	7,6	102,6	97,2	2,4	-0,7	0,2	0,2	0,8
Basic chemicals	17,0	97,4	161,8	2,1	8,8	0,5	0,5	0,7
Mining of iron ores	9,5	87,4	81,1	2,0	-0,9	26,0	21,3	22,7
Aircraft and spacecraft	-	79,9	41,0	2,0	-5,3	0,0	1,0	0,2
Beans	-	15,0	43,6	0,4	3,9	-	2,8	9,1
Other agricultural and forestry products	16,3	23,8	104,8	0,2	11,1	1,1	0,3	1,0
Rough wood	-	2,7	36,1	0,1	4,6	0,2	1,7	13,8
Other products	98,2	408,3	787,5	7,9	52,0	0,4	0,3	0,3
Total	613,3	4.524,5	3.795,2	100,0	100,0	0,4	0,3	0,3

Source: Comtrade/UNCTAD.

India's exports to Brazil in the years 2000 to 2002 were concentrated in Basic chemicals, Refined petroleum, Pharmaceuticals and Machinery and equipment, which responded for almost two thirds of the total bill (Table 2.2). In the following years until 2014, more than 50% of the export growth were related to refined petroleum, that came to dominate the bill, representing 55% of the total. In spite of this, there was a clear diversification, once many products saw their exports grow fastly, some of them coming from almost nothing in 2000-2002 to more than US\$ 100 million a year in 2012-2014. The more impressive cases are Pesticides and agrochemical products, Synthetic filament yarn, Parts and accessories for motor vehicles, Wearing apparel, Textiles and Iron and steel. Exports also grew significantly In Basic chemicals, Pharmaceuticals and Machinery and equipment, but their share in the total fell, losing ground to Refined petroleum.

Yet, the years between 2017-2019 witnessed a reversal in this product's trend. Its exports to Brazil fell more than 90% and were the sole responsible for the reduction of

total exports, since they grew in almost all of the other products. As a consequence, the products ranking in exports changed somewhat, compared to previous years. Now, Pesticides and agrochemical products is the number one, with 15,6% of the total, followed by Basic chemicals (13,6%), Pharmaceuticals (11,6%), Parts and accessories for motor vehicles (8,3%) and Synthetic filament yarn (7,2%). Refined petroleum fell to the 6th position, with 6,5%.

The general picture show that India's exports to Brazil have always been concentrated in chemicals and petrochemical sectors, that are the most important sectors in total export of goods from India (responsible for approximately 30% in recent years). In spite of this, some other types of goods have been gaining ground, like Textiles, Wearing apparel, Parts and accessories for vehicles, Machinery and equipment and Iron and steel.

TABLE 2.2
Indian exports to Brazil, according to main products – selected periods
(in US\$ Million and %)

Products	US\$ Million			Contribution to growth (%)		Market-share in Brazilian imports		
	2000-02(A)	2012-14(B)	2017-19(C)	(B)/(A)	(C)/(B)	2000-02	2012-14	2017-19
Refined petroleum	44,4	3.555,5	226,2	56,8	-113,5	5,5	15,7	1,7
Basic chemicals	61,4	364,8	474,4	4,9	3,7	2,3	5,2	7,7
Pesticides and agrochemical products	8,8	307,8	544,8	4,8	8,1	3,7	3,6	5,4
Pharmaceuticals	44,1	279,3	406,2	3,8	4,3	1,7	24,4	24,9
Synthetic filament yarn	7,0	252,5	252,3	4,0	-0,0	0,1	2,0	2,0
Parts and accessories for motor vehicles	1,8	217,9	290,5	3,5	2,5	5,7	6,9	4,0
Wearing apparel	6,9	169,0	76,8	2,6	-3,1	0,0	4,8	11,3
Machinery and equipment	15,7	68,6	91,3	0,9	0,8	0,2	1,1	1,3
Textiles	8,9	107,5	81,5	1,6	-0,9	2,6	6,2	6,5
Iron and steel	4,1	103,1	104,7	1,6	0,1	0,6	1,9	4,0
Other fabricated metal products	1,5	70,3	76,8	1,1	0,2	0,2	2,0	2,6
Aluminum	-	12,0	89,9	0,2	2,7	-	6,9	13,3
Other products	52,4	926,0	784,8	14,1	-4,8	0,2	0,7	0,9
Total	257,0	6.434,4	3.500,3	100,0	100,0	0,5	1,1	0,9

Source: Comtrade/UNCTAD.

2.2 Trade Opportunities

It's possible to make a brief assessment of trade opportunities between Brazil and India, considering goods in which there's few or any bilateral trade and that combine (i) a good competitive position of one country in the international market and (ii) a significant amount of imports made by the other country. The most common way to assess this is through the indicators of revealed comparative advantage (RCA) at the exporter's side, and the revealed comparative disadvantage (RCD) at the importer's side. The idea of revealed comparative advantage was proposed by Balassa (1965) and turned out to be universally adopted in academic papers and also official reports to evaluate the international trade specialization of countries.

In this paper, the RCA and RCD of Brazil and India were calculated for each product at

the 4-digit level of the Harmonized System (HS) classification of international trade, encompassing 1.223 items. The products with exporter's RCA and importer's RDC equal or greater than 0,9 were selected⁷, and then the ones with exports or imports lower than US\$ 1 million were excluded. Products in which the country also has at least a 10% market-share in the partner's imports were excluded.

In the case of Brazilian exports to India, 59 products were selected, and the complete list is available in Appendix A (Table A.1). Interestingly, Table 2.3 shows that there are 11 items related to the Chemicals sector, one in which India is very competitive. In these, Indian imports amount to US\$ 4,5 billion and Brazil's market-share is of only 1,4%. In fact, as a very diversified sector, there's a great amount of intra-industry trade in this sector, and Brazil is able to take advantage of this in products that are from mineral origin, like artificial corundum, iron oxides and hydroxides, manganese oxides and Colloidal precious metals. Looking at the other groups of products in which India's imports are relatively high, there are opportunities in three items of Plastics (including cellulose and its chemical derivatives), six Mineral products (like natural graphite, kaolin, manganese ores and copper ores), six products of iron and steel, five non-ferrous metals products, seven vegetal products (highlighting coconuts, Brazil nuts and cashew nuts), four Articles of stone and ceramic, three items of Paper and pulp and five Textiles products (especially cotton and raw silk).

TABLE 2.3
Export opportunities from Brazil to India, according to product groups
(in US\$ Million and %).

Products	Number of products	India's total imports	Brazil's total exports	Brazil's exports to India	Brazil's market-share (%)
Chemicals	11	4.515,1	4.016,5	61,6	1,4
Plastics	3	4.361,5	1.720,8	8,5	0,2
Mineral products	6	4.164,3	3.262,8	235,9	5,7
Iron and steel	6	3.982,5	4.857,5	102,4	2,6
Non-ferrous metals products	5	2.556,3	615,8	13,4	0,5
Vegetal products, manufactured or not	7	2.459,7	1.523,8	9,9	0,4
Articles of stone, ceramic	4	1.735,1	369,8	12,9	0,7
Paper and pulp	3	1.538,6	968,7	3,3	0,2
Textiles	5	1.213,1	1.587,1	25,3	2,1
Machines	2	546,9	85,9	0,3	0,1
Tanning or dyeing extracts	2	514,7	405,5	20,4	4,0
Raw hides, skins and leather	3	471,9	1.464,1	20,3	4,3
Hand saws; blades	1	155,8	45,1	0,4	0,2
Other rail locomotives	1	98,6	14,3	-	-
Total	59	28.314,3	20.937,9	514,5	1,8

Source: Comtrade/UNCTAD.

The big picture is that real opportunities of increasing and diversifying Brazilian exports to India are limited, and concentrated in mineral and agriculture derivative goods. Anyway, the potential gain in terms of export value is not negligible. Each percentage point increase in the market-share of the selected products would bring US\$ 280 million of extra Brazilian exports, what accounts for a 7,5% increase to the current amount.

⁷ A country is considered to have comparative advantage/disadvantage if the RCA/RCD is equal or higher than 1, but this threshold was reduced to 0,9 in this study so as to capture some borderline products.

The same exercise relating to India's export opportunities to Brazil selected 2 times more products (127), but the total amount of Brazilian imports is equal to the total amount of India's import of the products selected as opportunities for Brazil (US\$ 28 billion). The complete list of products is presented in Appendix A (Table A.2). Table 2.4 shows that the Chemicals sector alone has 33 products selected, with total Brazil's imports of US\$ 6 billion. India's market-share in these products is also 5,9%, so there's probably not much space for increasing sales.

There is also a number of opportunities in Mechanical machines, Rubber products, Non-ferrous metals products, Electrical machines, Plastics, Iron and steel and Textiles. In Medicaments there's only one product at 4-digit level, but its description is "Medicaments consisting of mixed or unmixed products for therapeutic or prophylactic uses, put up in measured doses or in forms or packings" what encompasses a large diversity of products.

Finally, it's interesting to see that there are some opportunities in Animal and vegetable raw products (highlighting fish, onions and garlies and rice) and Food products (especially wheat flour and vegetable saps and extracts).

In sum, India's opportunities for increasing exports to Brazil are more diversified and relates predominantly to chemicals, machines and other manufacturing products. The potential gain in terms of export value, though, is not different from Brazil's. Each percentage point increase in the market-share of the selected products would bring US\$ 280 million of extra Indian exports to Brazil, what accounts for a 8,0% increase to the current amount.

TABLE 2.4
Export opportunities from India to Brazil, according to product groups
(in US\$ Million and %)

Products	Number of products	Brazil's total imports	India's total exports	India's exports to Brazil	India's market-share (%)
Chemicals	33	6.089,0	8.218,4	359,4	5,9
Mechanical machines	16	5.498,2	7.939,1	135,8	2,5
Medicaments	1	3.468,8	12.928,7	184,4	5,3
Rubber products	7	2.214,7	2.806,2	34,2	1,5
Non-ferrous metals products	10	1.845,8	2.514,6	13,9	0,8
Electrical machines	7	1.831,1	2.957,3	33,6	1,8
Plastics	6	1.754,1	2.240,4	71,1	4,1
Iron and steel	5	1.559,1	2.336,4	22,6	1,4
Textiles	15	1.445,5	1.926,6	36,8	2,5
Animal and vegetable raw products	7	943,8	3.988,4	4,5	0,5
Parts and accessories of vehicles	1	558,3	237,6	12,7	2,3
Non-metallic mineral products	6	397,4	529,2	14,4	3,6
Food products	4	353,9	1.237,6	11,6	3,3
Sulfur and clays	2	271,2	166,1	1,1	0,4
Wearing apparel	2	101,5	256,9	2,1	2,0
Fertilisers	1	18,5	22,5	0,2	1,3
Other manufacturing products	4	361,6	523,1	11,7	3,2
Total	127	28.712,5	50.829,1	950,1	3,3

Source: Comtrade/UNCTAD.

3 TRADE POLICY

3.1 Historical Background

Brazil and India have both opted for an autarkic development project in the post-war era, and their trade policy regimes were shaped by this goal. The two countries are also similar in the timing and context of their dismantling of their trade repression apparatus -- in the midst of a balance of payment crisis – and in the extent of the liberalization, with producers in both countries still enjoying relatively high protection from foreign competitors.

Panagariya (2004) divides the history of India's trade policy until the early 2000's in three main periods: autarky (until 1975), ad-hoc liberalization (1976-1991), and systematic liberalization (1992 onwards). The first period, as the name suggests, was characterized by severe restrictions to foreign trade, with very high tariffs and a host of non-tariff barriers. One of the main pillars of this quasi-autarkic regime was a complex system of import licensing, which was itself one of the cornerstones of the broader industrial licensing system infamously titled the "License Raj" (Aghion et al., 2008). The autarkic structure lasted for more than a quarter century, defying threats such as the 1966 devaluation – which spurred a very brief (dismantled before the decade ended) liberalization attempt (Bhagwati and Srinivasan, 1975).

The 1980's witnessed a gradual moderation of the trade regime, which coincided with the dismantling of the "License Raj" that gained traction in Rajiv Gandhi's government. Despite these efforts, however, by the end of the decade the trade policy apparatus was still largely intact: import protection was still high (averaging 90%), and licensing was required to import 88% of manufactured products (Topalova and Khandelwal, 2011).

Trade liberalization only became systematic against the backdrop of the 1991 balance-of-payment crisis and the resulting assistance package arranged with the International Monetary Fund. As was the norm, financial aid by the Fund was conditioned to a broad range of structural reforms, which included a complete refurbishment of the foreign trade system. The measures envisaged in the package were incorporated into state policy by the Eighth Five-Year Plan (1992-1997).

The average tariff was slashed by half in less than five years, from almost 80% in 1991 to around 40% in 1995 (Figure 3.1), and the dispersion in tariffs fell by a third, with the abolition of a host of exemptions and concessions (Topalova, 2010). Non-tariff measures were also addressed, especially the cumbersome licensing regime: the existing 26 license lists were ousted, and substituted by a single negative list, eliminating the large discretionary power of trade authorities (Hasan, Mitra, and Ramaswamy, 2007). Moreover, the exchange system – which acted as an additional protection from imports – were also reformed, with the elimination of exchange controls and acceptance of the IMF's Article VIII obligations in 1994 (Panagariya, 2004).

By the turn of the century, with the external payments crisis tamed, the impetus for reform waned, especially after the government change in 1997 (Topalova and Khandelwal, 2011). However, the reduction on tariff protection continued, if not with the same impetus (and broadly ignoring the agricultural sector), at least until the mid 2000's (Panagariya, 2008). The average tariff has fallen from around 30% to 10% in

2007. Moreover, there was some countermovement in non-tariff measures, as the country resorted ever more intensively to trade defense measures: by 2015, it was the world's second largest user of antidumping measures (Mohan 2018), as will be discussed further.

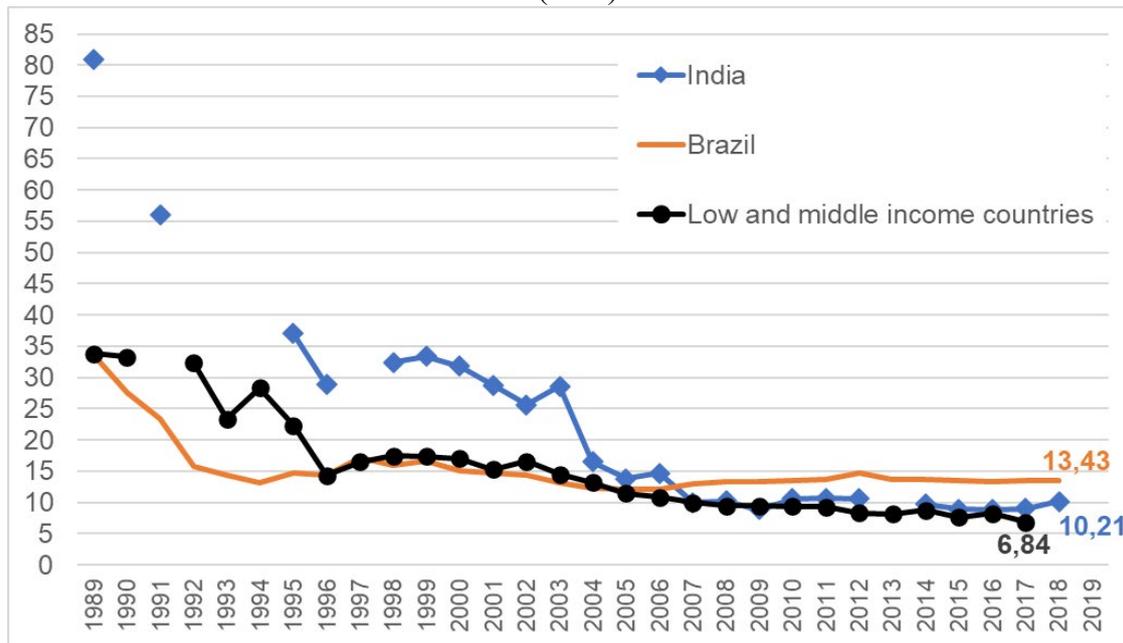
Brazil started to impose high tariffs in the verge of the 1930's international crisis, as a means to avoid a complete depletion of foreign reserves in face of decreasing exports – as a consequence of the dramatic fall in coffee prices. This induced an import substitution process that boosted the development of a more complex industrial sector than the one that emerged gradually since the end of the 19th century (Fishlow, 1972). But the import substitution as a strategy for economic development – with protectionism playing a central role – took place definitely only in the 1950's, when a number of initiatives were put in place by the government aiming at encouraging the development of more advanced and capital-intensive industries, like automobiles, capital goods and chemicals.

After a brief period of liberal reforms between 1964 and 1966, in the initial years of the military regime, the government opted for a new round of industrialization based on import substitution, and so high tariffs. This phase was marked by an increase in the investment ratio, financed by foreign savings in the context of abundant liquidity in the international market. This process continued even after the oil shocks of the 1970's, and lost steam only after the debt crisis of the beginning of the 1980's. At that time, protectionism has taken root in the Brazilian economy, and a set of import-competing industrial sectors benefited from high levels of protection and made intensive use of some mechanisms of public policy that have gone far beyond high tariff rates, like special import regimes, credit incentives and export incentives.

These vested interests, beside the successful experience of the Brazilian industrialization under the import substitution policies, made difficult to implement an import liberalization process. This finally began cautiously in 1988 by eliminating the tariff redundancy, suppressing certain surcharges applicable to imports and partially eliminating the 42 special tax regimes applied to imports in force. These measures decreased the average nominal tariff rate from 57.5% in 1987 to 32.1% in 1989. Unilateral trade liberalization was extended in 1990 and concluded at the middle of 1993, eliminating the extensive range of non-tariff border barriers and reducing the average tariff to around 13% (Oliveira et al., 2019). At that moment, Brazilian average tariff was similar to that of low and middle income countries as a group.

In the following years, though, there was no additional tariff reductions in Brazil, unlike the trend of gradual reduction seen in most of the low and middle income countries. In fact, there was some tariff increases that took the average to more than 16% in 2000. For example, the import tariffs in automobiles were elevated to 70% (from 20% in 1994), in the context of a special regime created to boost the domestic production in 1995. In the last two decades, government policy was oriented by a more interventionist approach, sensible to protectionist demands from the industrial sector and adopting industrial policies aimed at boosting the domestic production in various areas, including local content requirements.

FIGURE 3.1
Average import tariff of Brazil, India and Low and Middle Income Countries 1989-2019
 (in %)



Source: World Bank.

Curiously, this situation has been supported even by export-oriented and internationally competitive sectors, be it in the agribusiness or manufacturing. They actually seem comfortable with the *status quo* that guarantees them some non-residual level of tariff protection in comparison to export markets where no tariff (or residual tariffs) is faced (Oliveira et al., 2019). This resulted in a steady average tariff, with some punctual elevations, and policies that increasingly resorted to non-tariff barriers and trade defense instruments to restrain imports.

3.2 Recent Trends

In 2014, a government change in India induced a new shift in the focus of trade policy: the new direction, announced in 2015, centered explicitly on export promotion, in consonance with the “Make in India” initiative, which set ambitious – but yet unfulfilled – goals of doubling exports and increasing the country’s share in global trade to 3.5% (Puri, 2017). Although the main focus of the new policy is on enhancing infrastructure and improving the business environment, the plan features also trade-related measures, such as local content requirements for government procurement. More recently, and especially since the onset of the COVID-19 crisis, however, concerns about the challenges faced by the Indian economy led to a growing call for a new pivot to internal orientation – which is reflected in the recent reversal of the liberalizing trend (Chatterjee and Subramanian, 2020). As a result, average tariffs increased from the lowest level of 8,9% reached in 2016 to more than 10% in 2019.

In Brazil, the administration that took office in 2019 has committed to a liberal agenda in economic policy, including reductions of import tariffs, removal of non-tariff barriers

and improved negotiations of free trade agreements. However, until now the most relevant achievement was the conclusion of negotiations for a European Union-Mercosur agreement after 20 years of discussions. Anyway, the final details of the agreement are already being discussed and it's not clear for now if it will be ratified by European countries. There wasn't any relevant movements in tariffs, though there were some initiatives, like the proposal for reducing tariffs on capital and informatics/telecommunications goods and the idea of a linear 10% reduction in the Common External Tariff of Mercosul, that was officially presented to the bloc, but was resisted by Argentina.

Actually, trade liberalization is not a hot topic on current policy agenda, dominated by concerns on public accounts and the economic recovery after the pandemic. And trade policy faces two big constraints: the absence of a consensus about the benefits of openness to imports, outstandingly in the industrial sector, but also in some academic circles and part of government bureaucracy; and difficulties to align the interests among Mercosur partners in order to promote advances in the bloc's trade agenda.

3.3 Tariff Profile

Table 3.1 shows that Brazil and India have different patterns of sectoral tariff protection. The main difference relates to the agricultural sector. Brazil has lower tariffs on these products, although the average tariff of 10,1% is not as low as could be expected for a country that is one of the biggest world exporters. In fact, the country impose high tariffs on items like fruits, nuts, vegetables and horticultural specialties, and there are import restrictions even in typically exporting products, such as coffee. In India, average agricultural tariffs are as high as 36,2%, resulting from the low productivity of domestic production and worries about preserving jobs, since more than 40% of the population are employed in agricultural activities⁸. India also imposes a 8,1% tariff in petroleum, even with its high dependence on imports of the product. Regarding industrial tariffs, they're not so much higher in Brazil than in India.

Both countries apply higher tariffs on consumer goods, according to the principle of tariff escalation. Brazil has higher tariffs on capital goods (13,0%), but it's needed to say that the *ex-tarifario* regime allows reductions to zero on goods that are not produced domestically, so that the effectively applied rate is much lower. Both countries have similar (and relatively high) tariffs on intermediate goods, and India also imposes a 21,7% tariff on raw materials, in contrast to 6,8% in Brazil, reflecting higher tariffs on agricultural, but also on forestry and mining products.

The lower part of Table 3.1 presents the average tariff by mains ISIC sectors. In India, the higher tariffs refer to Food and beverages and Motor vehicles, besides Agriculture, Forestry and Mining. Textiles, Wearing apparel, Leather and shoes and Furniture and other manufacturing also have tariffs well above the average. These same four sectors are among the ones with higher average tariffs in Brazil, besides Motor vehicles, Eletrical machines and Metal products. Actually, all manufacturing sectors on Brazil have average tariffs above 10%, except for Chemicals and Oil refinery.

⁸Source: World Development Indicators, World Bank.

TABLE 3.1
Sectoral import tariffs in Brazil and India – 2019.
 Most favored nation (MFN) tariffs (in %).

Products	Brazil	India
Total	13,4	10,2
Agricultural	10,1	36,2
Industrial	14,2	11,8
Petroleum	0,0	8,1
Capital goods	13,0	8,8
Consumer goods	19,5	18,9
Intermediate goods	11,8	12,1
Raw materials	6,8	21,7
Agriculture	7,7	42,5
Fishing	8,0	0,0
Forestry	7,6	19,8
Metal ores	2,0	2,5
Mining	4,0	13,0
Basic metals	11,1	7,9
Food and beverages	12,6	41,3
Chemicals	7,9	9,5
Oil refinery	3,0	10,0
Rubber and plastics	14,9	10,9
Paper	14,2	9,6
Publishing and printing	10,7	9,3
Metal products	16,3	10,5
Non-metallic mineral products	12,0	13,6
Textiles	25,9	13,4
Wearing apparel	34,4	18,6
Leather and shoes	27,1	15,2
Wood products	11,1	10,0
Machinery and equipment	12,7	8,0
Electrical machinery and apparatus	14,9	9,7
Medical, optical and precision equipment	12,7	7,1
Motor vehicles	15,4	25,2
Office and computing machinery	10,3	2,3
Other transport equipment	15,7	12,1
Communication equipment	10,0	4,8
Furniture and other manufacturing	16,8	16,0

Source: WITS.

3.4 Trade Agreements

Brazil and India had not been among the most active countries regarding the wave of trade agreements that occurred the world around in the last three decades. Both have a low number of relevant agreements, and basically with countries in their same

continents.

India has agreements only with other Asian countries, except for the partial scope agreement with Mercosur. But they are certainly more impacting than the ones signed by Brazil, once some big economies are included, such as China, Japan and South Korea. As can be seen in Table 3.2, the largest agreement, in terms of countries involved, is between India and ASEAN countries (Brunei Darussalam, Myanmar, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Philippines, Singapore, Viet Nam and Thailand). That's a FTA but envisages the establishment of an ASEAN-India Regional Trade and Investment Area (RTIA) as a long term objective.

The Asia Pacific Trade Agreement (APTA), established back in the 1970's as a partial scope agreement known as the "Bangkok Agreement", is also a multi-country agreement that gained weight with the accession of China in 2002. Although still limited in scope, the members have been talking of this as refocusing from the initial negotiation of tariff concessions on merchandise trade to negotiating liberalization in investment and services trade and to trade facilitation.

Other important multi-country agreement is the South Asian Free Trade Agreement (SAFTA), established in 2006 by India, Afghanistan, Bangladesh, Bhutan, Sri Lanka, India, Maldives, Nepal and Pakistan. This one substituted for a partial scope agreement established in 1995.

Concerning individual countries, India has two important agreements with Japan and South Korea. The Comprehensive Economic Partnership Agreement between Japan and the Republic of India goes beyond an FTA, including themes like financial services, telecommunications services and commitments related to the four modes of operation for many kinds of services, including the movement of natural persons. With Korea, India also signed a Comprehensive Economic Partnership Agreement, including trade in goods, services and easier access to foreign direct investment.

India also has bilateral agreements with Chile (partial scope), Afghanistan, Bhutan, Malaysia, Nepal, Singapore, Sri Lanka, and Thailand. Except for Chile, the other were, in practice, overlapped by the multilateral agreements with ASEAN, SAFTA and APTA.

India has been part of the countries that negotiated the Regional Comprehensive Economic Partnership (RCEP), but decided to walk out of the agreement at the last minute, in November, 2019.

Brazil is part of Mercosur, a customs union took in force in 1995 with Argentina, Paraguay and Uruguay. Almost all of its other trade agreements were signed in the scope of Mercosur and the Latin American Integration Association (ALADI, in Portuguese). Actually, Brazil (and Mercosur) has free trade agreements with all other countries of South America (Table 3.3), except Suriname and Guiana (with which there's only partial scope agreements). There's also a FTA with Panama and partial scope agreements with Cuba and Mexico, this last one including mainly the automotive sectors. In recent years, Mercosur and Mexico have been negotiating to create a more comprehensive free trade agreement.

Out of the continent, Brazil (via Mercosur) has free trade agreements with Israel, Egypt

and Palestine (this one not enforced yet) and partial scope agreements with India and the South African Customs Union, encompassing South Africa, Botswana, Lesotho, Namibia and Eswatini. It means that the country doesn't have any agreement with the biggest world economies. Trying to change this landscape, in recent years the country launched or accelerated negotiations with partners like European Union, European Free Trade Area (Norway, Switzerland, Iceland and Liechtenstein), Canada, South Korea and has been showing interest in discussing possible agreement with United States and Japan. The agreements with European Union and EFTA have been already signed, but ratifications are pending.

TABLE 3.2
Preferential trade agreements of India.

India - RTA Name	Coverage	Type	Year	Signatories	Remarks
Association of Southeast Asian Nations (ASEAN)	Goods, Services	FTA, EIA	2010 - 2014	India; Brunei Darussalam; Myanmar; Cambodia; Indonesia; Lao People's Democratic Republic; Malaysia; Philippines; Singapore; Viet Nam; Thailand	Dates of entry into force: Framework Agreement: 2004, TIG Agreement: India, Brunei Darussalam, Indonesia, Malaysia, Myanmar, Singapore, Thailand and Viet Nam: 2010, Cambodia, Lao PDR, Philippines: 2011
Asia Pacific Trade Agreement (APTA)	Goods, Services	PSA, EIA	1976 - 2013	Bangladesh; Sri Lanka; China; India; Korea, Republic of; Lao People's Democratic Republic	Formerly known as "Bangkok Agreement". Accession of China in 2002
South Asian Free Trade Agreement (SAFTA)	Goods	FTA	2006	Afghanistan; Bangladesh; Bhutan; Sri Lanka; India; Maldives; Nepal; Pakistan	Accession of Afghanistan in 2011
Southern Common Market (MERCOSUR) - India	Goods	PSA	2009	India; Argentina; Brazil; Paraguay; Uruguay	
Korea, Republic of - India	Goods, Services	FTA, EIA	2010	India; Korea, Republic of	
Chile - India	Goods	PSA	2007	Chile; India	
India - Afghanistan	Goods	PSA	2003	Afghanistan; India	
India - Bhutan	Goods	FTA	2006	Bhutan; India	
India - Japan	Goods, Services	FTA, EIA	2011	India; Japan	
India - Malaysia	Goods, Services	FTA, EIA	2011	India; Malaysia	
India - Nepal	Goods	PSA	2009	India; Nepal	
India - Singapore	Goods, Services	FTA, EIA	2005	India; Singapore	
India - Sri Lanka	Goods	FTA	2000	Sri Lanka; India	
India - Thailand	Goods	PSA	2004	India; Thailand	

Source: Mario Larch (2021) and WTO (2021).

TABLE 3.3
Preferential trade agreements of Brazil.

Brazil - RTA Name	Coverage	Type	Year	Signatories	Remarks
Southern Common Market (MERCOSUR)	Goods, Services	CU, EIA	1991	Argentina; Brazil; Paraguay; Uruguay	
Latin American Integration Association (LAIA)	Goods	PSA	1981	Argentina; Bolivia, Plurinational State of; Brazil; Chile; Colombia; Cuba; Ecuador; Mexico; Paraguay; Peru; Uruguay; Venezuela, Bolivarian Republic of	
Mercosul-Bolivia	Goods	FTA	1996	Brazil, Argentina, Paraguai, Uruguai, Bolívia	
Mercosul-Chile	Goods	FTA	1996	Brazil, Argentina, Paraguai, Uruguai, Chile	
Mercosul-Colômbia	Goods	FTA	2017	Brazil, Argentina, Paraguai, Uruguai, Colombia	Overlapped the FTA between Mercosur and Andean Community, signed in 2005
Mercosul- Andean Community	Goods	FTA	2005	Brazil, Argentina, Paraguai, Uruguai, Equador, Colombia, Venezuela	
Mercosul-Peru	Goods	FTA	2005	Brazil, Argentina, Paraguai, Uruguai, Peru	
Mercosul-Venezuela	Goods	FTA	2012	Brazil, Argentina, Paraguai, Uruguai, Venezuela	Overlapped the FTA between Mercosur and Andean Community, signed in 2005. Venezuela became a member of Mercosur, but is currently suspended from the bloc. The trade agreement continues to apply.
Brazil - Mexico	Goods	PSA	2003	Brazil; Mexico	
Brazil - Panama	Goods	FTA	2012	Brazil; Panama	
Mercosul-Cuba	Goods	PSA	2006	Brazil, Argentina, Paraguai, Uruguai, Cuba	
Brazil-Suriname	Goods	PSA	2005	Brazil, Suriname	
Brazil-Guiana-San Cristovan and Nevis	Goods	PSA	2001	Brazil-, Guiana, San Cristovan and Nevis	
MERCOSUR - Egypt	Goods	FTA	2017	Egypt; Argentina; Brazil; Paraguay; Uruguay	
MERCOSUR - India	Goods	PSA	2009	India; Argentina; Brazil; Paraguay; Uruguay	
MERCOSUR - Israel	Goods	FTA	2009	Israel; Argentina; Brazil; Paraguay; Uruguay	Dates of entry into force: 2009 for Uruguay and Israel; 2010 for Brazil, Paraguay and Israel; 2011 for Argentina.
Mercosul-Palestine	Goods	FTA	2011	Palestine; Argentina; Brazil; Paraguay; Uruguay	Not yet enforced.
MERCOSUR - Southern African Customs Union (SACU)	Goods	PSA	2016	Argentina; Brazil; Paraguay; Uruguay; Botswana; Lesotho; Namibia; South Africa; Eswatini	

Source: Mario Larch (2021) and WTO (2021).

3.4.1 Mercosur-India Trade Agreement

The existing agreement between Mercosul and India has a limited scope, encompassing just 450 products – in an universe of around 10,000 products of NCM classification – , and the majority of the products benefits from a margin or preference of only 10% or 20%. Table 3.4 shows that the products in which Brazil has tariff preferences in India registered a total amount of US\$ 3,55 billion exported in the period 2010-2019, or 9,4% of total Brazilian exports to India. The bulk of this amount refers to only one product, soybean oil, that benefits from a 10% preference margin.⁹

TABLE 3.4
Products in which India granted preferences to Mercosul in bilateral agreement.

Number and amount of Brazilian exports to India in 2010-2019

Products	Number	Exports 2010-2019 (US\$ Million)
Machinery and equipment	118	202,6
Tanning or dyeing extracts	74	0,4
Chemicals	48	36,2
Leather, skins and articles of leather	46	5,9
Textiles	29	-
Optical, photographic, cinematographic instruments	24	1,7
Non-metallic minerals	23	0,2
Iron and steel products	17	2,4
Forestry	12	0,0
Wool and silk	11	0,0
Metal products	9	0,2
Paper	7	0,1
Shoes	6	0,1
Aluminum articles	5	1,0
Vegetable oils	2	3.305,0
Other products	19	2,9
Total	450	3.558,8
Memo:		
Total exports		37.874,5

Source: Brazilian Secretary of Trade (Secex).

Regarding the number of NCM items, some 25% of the products are Machinery and equipment, that exported a total amount of US\$ 202,6 million in 2010-2019, or just 0,5% of the total exports to India. Tanning or dyeing extracts, Chemicals, Leather, skins

⁹ The details of the agreement, including the complete list of products and their margins of preference, are available at: <http://siscomex.gov.br/acordos-comerciais/mercosul-india/>

and articles of leather, Textiles, Optical, photographic, cinematographic instruments and Non-metallic minerals also have a good number of benefited products, but the preferences had no significant effect in terms of exports.

Considering preferences granted by Mercosul to India, the amount of exports were US\$ 20,2 billion in the period 2010-2019, that represents 45,8% of total exports. Almost 80% of this total, though, refers to diesel oil, in which India has a 100% margin of preference but the tariff imposed by Mercosul is also zero. So, the preference means nothing in this case. Looking at the rest of the products in the agreement, more than half of them are Chemicals, that accounted for exports of US\$ 2,5 billion in 2010- 2019 (5,7% of the total). There's also a great number of Machinery and equipment products.

A brief assessment makes clear that the current agreement is very limited not only in terms of number of products, but also because of the small margins of preference in the majority of the cases. It's not surprising, then, that it had no significant effect in terms of boosting bilateral trade, except, maybe, for soybean oil in Brazilian exports, and some Chemicals and Machinery and equipment in India's exports. That makes clear the necessity and pertinence of negotiating a more comprehensive and ambitious free trade agreement.

TABLE 3.5

Products in which Mercosul granted preferences to India in bilateral agreement.

Number and amount of Indian exports to Brazil in 2010-2019

Products	Number	Exports 2010-2019
Chemicals	257	2.536,3
Machinery and equipment	70	697,7
Metal products	20	149,9
Non-metallic minerals	14	374,5
Food and beverages	12	22,2
Essential oils, perfumery, cosmetic	12	32,9
Rubber	12	109,0
Pharmaceuticals	10	282,2
Plastics	9	1,5
Oil refinery	5	15.991,8
Pulp and paper	5	0,4
Ores and stones	4	0,0
Photographic or cinematographic goods	4	0,1
Other products	18	21,7
Total	452	20.220,2
Memo:		
Total exports		44.193,8

Source: Brazilian Secretary of Trade (Secex).

3.5 Non-Tariff Measures

Many recent studies show that non-tariff measures are becoming a more important

restriction to trade flows than tariffs (Marks and Rahardja, 2012; Kee, Nicita, & Olarreaga, 2009; Niu et al., 2018). Non-tariff barriers are rising in almost all countries, mostly after the 2008 financial crises, as shown by some estimates of *ad valorem* equivalent. Niu et al. (2018) estimates that, for a sample of around 90 countries, the average *ad valorem* equivalent (AVE) has risen from 27% in 2003 to 57% in 2015. In Brazil, the AVE came from 30% to 76% in the same period, and in India the same numbers are 12% and 74%.

In spite of methodological controversies on how to find precise estimations of AVE, the fact is that they are very important, so that any discussions involving trade policy and trade agreements must include them as an essential theme. Actually, almost all free trade agreements negotiated in the last decades have clauses aimed at reducing non-tariff barriers between the parties, especially related to reduction or elimination of quantitative restrictions and local content requirements, simplification of customs procedures, harmonization of rules and technical requirements etc.

This section explores the incidence of Non-Tariff Measures (NTM's) on India and Brazil, using data from the UNCTAD TRAINS and COMTRADE databases. We adopt an inventory approach and describe the data via three distinct indices. The frequency index (FI) is the percentage of products in the nomenclature exposed to any NTM; the prevalence score (PV) is the average number of unique NTM codes applied to a set of commodities; the Cover Ratio (CR) is the percentage of imports exposed to any NTM. The effort to understand NTM's is linked to the development of the International Classification of Non-Tariff Measures, a nomenclature that classifies each measure using a up to four-digit code. Chart C.1 in Appendix C displays a description of the NTM chapters (UNCTAD, 2019). Measures can also be classified according to the country they are applied to: General Measures are those applied to all countries in the economy; Specific Measures are measures applied to an arbitrary set of partners.

Table 3.6 describes the incidence of NTM's on India and Brazil. The incidence of NTM's in Brazil covers a greater number of commodities and percentage of imports. Nevertheless, the practice is more intense in India. Considering All Measures, Brazil apply NTM's to almost 76% of all commodities in the nomenclature (FI) and covers more than 86% of imports (CR). Regarding the intensity (PV), the average number of unique NTM codes applied by product is almost 7. On the other hand, India applies NTM's to almost 66% of all commodities, what corresponds to close to 74% of trade (CR). On average, each product has 9 NTM codes applied to it (PV).

Most of NTM's applied by Brazil are included in Chapter B (Technical Barriers to Trade - TBT) and E (Non-automatic import licensing, quotas, prohibitions, quantity-control measures, and other restrictions not including sanitary and phytosanitary measures or measures relating to technical barriers to trade). Both chapters cover more than 80% of imports and Chapter B is also the one most intensively used (PV). Other important chapters are A (Sanitary and Phytosanitary Measures - SPS); C (Pre-shipment inspection and other formalities) and P (Export-related measures).

The NTM's applied by India concentrate in similar chapters, Chapters B and E also being the most used, based on CR, and chapters P and C still being relevant. Chapter A measures are less common in the country, that applies more extensively measures of Chapter F (Price-control measures, including additional taxes and charges), present in more than 22% of commodities and covering close to 30% of imports.

Finally, for both countries most measures are applied to all countries in the economy (Global measures). Brazil applies specific measures to only to 8% of trade. India, otherwise, applies specific measures to almost 30%, which are concentrated in chapters E and P.

TABLE 3.6
Incidence of Non-Tariff Measures - Frequency Index, Cover Ratio and Prevalence Score, by type of measure and chapter.
Brazil and India.

Measures/Chapters	India ⁽¹⁾			Brazil ⁽²⁾		
	FI (%)	CR (%)	PV	FI (%)	CR (%)	PV
All Measures	65.52	73.95	9.36	75.95	86.24	6.72
A	22.40	7.67	2.74	57.18	69.84	2.20
B	46.37	59.06	2.28	73.61	81.85	2.98
C	38.71	45.87	0.75	26.68	42.47	0.27
E	47.71	58.87	0.88	58.57	80.88	1.02
F	22.51	29.97	0.41	0.92	6.30	0.01
G	0.13	8.81	0.00	0.00	0.00	0.00
H	2.59	2.62	0.03	0.61	9.55	0.01
I	0.00	0.00	0.00	0.00	0.00	0.00
P	56.20	56.56	2.27	23.97	45.63	0.25
General Measures	57.26	70.83	8.89	75.91	86.24	6.70
A	22.40	7.67	2.73	57.18	69.84	2.18
B	46.14	59.05	2.28	73.61	81.85	2.98
C	38.53	45.85	0.75	26.68	42.47	0.27
E	47.10	51.37	0.85	58.53	80.88	1.02
F	22.47	29.97	0.41	0.92	6.30	0.01
G	0.13	8.81	0.00	0.00	0.00	0.00
H	2.59	2.62	0.03	0.61	9.55	0.01
I	0.00	0.00	0.00	0.00	0.00	0.00
P	47.45	48.19	1.85	23.68	45.59	0.25
Specific Measures	19.63	29.79	0.58	4.44	8.40	0.09
A	1.63	0.38	0.03	3.61	4.00	0.07
B	0.60	0.43	0.01	0.52	4.37	0.01
C	0.21	0.03	0.00	0.00	0.00	0.00
E	2.98	27.88	0.04	0.54	4.37	0.01
F	0.04	0.00	0.00	0.00	0.00	0.00
G	0.00	0.00	0.00	0.00	0.00	0.00
H	0.00	0.00	0.00	0.00	0.00	0.00
I	0.00	0.00	0.00	0.00	0.00	0.00
P	18.19	29.47	0.51	0.29	0.04	0.00

Note: The table displays inventory indexes of the incidence of Non-Tariff Measures applied by India and Brazil. The results are presented by the type of NTM, All Measure, General or Specific, and chapter of the NTM nomenclature (version of 2019). Not all codes in the nomenclature are covered by the data collection process. *FI* and *PV* are based on the number of 6-digit codes of the Harmonized System (2012 version), and *CR* uses total imports (value), for all chapters. (1) Data collected in 2017. (2) Data collected in 2016.

Source: Data prepared by authors, based on UNCTAD TRAINS and COMTRADE.

Tables 3.7 and 3.8 lists and describes the 4-digit level commodity codes that have specific measures applied to Brazil and India by each other. Specific NTM's applied by India to Brazilian imports cover more commodity codes and are more diverse, including chapters A, B, E, F and P, while Brazil only applies measures of Chapter A to India. Another distinguishing result is that the specific measures applied by Brazil to India do not cover any imported value, once the commodities listed are not actually imported by Brazil from India. Conversely, commodities codes 3814, 3808, 3824, and 0808 are regulated and imported by India from Brazil. In those cases, the NTM's covers approximately all values imported from Brazil of each heading.

Table C.1, in the appendix C, describes the incidence of NTM's by the 2-digit level of the Harmonized System, considering All Measures.

TABLE 3.7
NTM applied by India to specifically to Brazil. Inventory Indexes and NTM 4-digit codes, by HS4 code.

Specific measures applied to Brazil. Data collected in 2017

HS4	Description	Specific Measures applied to Brazil			
		FI (%)	CV (%)	PV	NTM codes
3814	Organic composite solvents and thinners, not elsewhere specified or included; prepared paint or varnish removers	100.00	100.00	4.00	B859; E1; P22; P33
3826	Biodiesel and mixtures thereof; not containing or containing less than 70% by weight of petroleum oils or oils obtained from bituminous minerals	100.00	0.00	4.00	B859; E1; P22; P33
3813	Preparations and charges for fire extinguishers; charged fire-extinguishing grenades	100.00	0.00	4.00	B859; E1; P22; P33
3808	Insecticides, rodenticides, fungicides, herbicides, anti-sprouting products, plant growth regulators, disinfectants and the like, put up in forms or packings for retail sale or as preparations or articles	83.33	100.00	3.33	B859; E1; P22; P33
3824	Prepared binders for foundry moulds or cores; chemical products and preparations of the chemical or allied industries (including those consisting of mixtures of natural products), not elsewhere specified or included	55.56	98.02	2.22	B859; E1; P22; P33
0808	Apples, pears and quinces; fresh	100.00	100.00	2.00	A53; A83
2903	Halogenated derivatives of hydrocarbons	40.74	0.00	1.63	B859; E1; P22; P33
6802	Monumental or building stone, worked (except slate) and articles thereof (not of heading no. 6801) mosaic cubes etc., of natural stone including slate; artificially coloured granules of natural stone	25.00	0.00	0.25	F19
0801	Nuts, edible; coconuts, Brazil nuts and cashew nuts, fresh or dried, whether or not shelled or peeled	14.29	0.00	0.14	A11

Note: Indexes are based on the number and imported values of unique 6-digit level codes included in the heading of the Harmonized System. CV refers to the imported values from the partner of the 4-digit level reference.

Source: Prepared by the authors based on UNCTAD TRAINS and COMTRADE.

TABLE 3.8
NTM applied by Brazil to specifically to India. Inventory Indexes and NTM 4-digit codes, by HS4 code

Specific measures applied to India. Data collected in 2016

HS4	Description	Specific Measures applied to India			
		FI (%)	CV (%)	PV	NTM codes
0101	Horses, asses, mules and hinnies; live	100.00	0.00	4.00	A82; A83; A84; A86
1004	Oats	50.00	0.00	0.50	A11
1003	Barley	50.00	0.00	0.50	A11
1002	Rye	50.00	0.00	0.50	A11
1001	Wheat and meslin	50.00	0.00	0.50	A11
0901	Coffee, whether or not roasted or decaffeinated; husks and skins; coffee substitutes containing coffee in any proportion	20.00	0.00	0.20	A9
1209	Seeds, fruit and spores; of a kind used for sowing	10.00	0.00	0.10	A11

Note: Indexes are based on the number and imported values of unique 6-digit level codes included in the heading of the Harmonized System. CV refers to the imported values from the partner of the 4-digit level reference.

Source: Prepared by the authors based on UNCTAD TRAINS and COMTRADE.

3.6 Anti-Dumping Measures Affecting the Partner

Brazil and India are among the most intense users of trade defense measures in the world, especially concerning anti-dumping rights. According to the last report of the WTO Committee on Anti-dumping Practices¹⁰, India ranked second in the number of anti-dumping measures in force on June 2020, with 243 measures¹¹, behind United States (398 measures). Brazil ranks 4th, with 156 measures.

Tables 3.9 lists the products that are subject to *anti-dumping* measures imposed since 2009 by Brazil and that affects India. Brazil imposed 15 measures, most of them related to chemicals, iron and steel and rubber products. Six of them have also been terminated, so there are also nine still in force. Two of them affect only India: Flasks of glass, imposed in 2009 but terminated a year after; and Grinding balls, imposed in 2017 and still in force.

India imposed only three anti-dumping measures affecting Brazil, all still in force: High speed steel of non-cobalt, Non-plasticized industrial grade nitrocellulose (both imposed in 2018) and Hot-rolled flat products of alloy or non-alloy steel (imposed in 2017).

¹⁰ <https://docs.wto.org/dol2fe/Pages/SS/directdoc.aspx?filename=q:/G/L/1366.pdf&Open=True>.

¹¹ The number considers each pair of measure-country affected.

TABLE 3.9
Antidumping measures applied by Brazil and India on each other's imports (2009-2020).

Member/Observer	Implemented	Terminated	Affected products	Description	Affected trading partners
Brazil	2020*		390210, 390230	Polypropylene resins	India, South Africa
	2020*		401150	Pneumatic tyres of rubber for bicycles/bikes	China, India, Viet Nam
	2018*		730300	Iron pipes	India, China, United Arab Emirates
	2017		732591	Grinding balls	India
	2015			Poly(ethylene terephthalate) resin	India, China, Indonesia, Chinese Taipei
	2014		392062, 392062, 392062	PET films	India, China, Egypt
	2013	2015	392020	Biaxially oriented polypropylene "BOPP"	India, Argentina, Chile, Colombia, Peru, Chinese Taipei
	2013		390210, 390230	Polypropylene resin	India, Korea, Republic of, South Africa
	2013	2013	390730, 390730, 390730, 390730	Liquid epoxy resin	India, China, Korea, Republic of, Mexico, Saudi Arabia, Kingdom of, Chinese Taipei
	2012		401150	Rubber for bicycles / bikes	India, China, Viet Nam
	2011	2012	721030, 721061, 721070, 721049,	Flat-rolled	India, Australia, China, Korea, Republic of, Mexico
	2010	2012	732393	Stainless steel cookware	India
	2010	2012	400259	Nitrile rubber "NBR" not hydrogenated	India, Argentina, France, Korea, Republic of, Poland, United States of America
	2009	2010	701090	Flasks of glass	India
	2009		390210, 390230	Polypropylene resins	India, United States of America
India	2018		722810, 722810	High speed steel of non-cobalt	Brazil, China, Germany
	2018		391220	Non-plasticized industrial grade nitrocellulose	Brazil, Indonesia, Thailand
	2016		7208, 7211, 7225, 7226	Hot-rolled flat products of alloy or non-alloy steel in coils of a width up to 2,100 mm and thickness up to 25 mm and hot-rolled flat products of alloy or non-alloy steel not in coils (commonly known as sheets and plates) of a width up to 4,950 mm and thickness up to 150 mm	Brazil, China, Indonesia, Japan, Korea, Republic of, Russian Federation

Source: Own elaboration based on the WTO (2021) and Ministry of Economy (2021). * Measures updated by the Special Secretariat for Foreign Trade and International Affairs (Ministry of Economy, Brazil) and not notified to the WTO.

4 SERVICES AND BILATERAL TRADE IN SERVICES

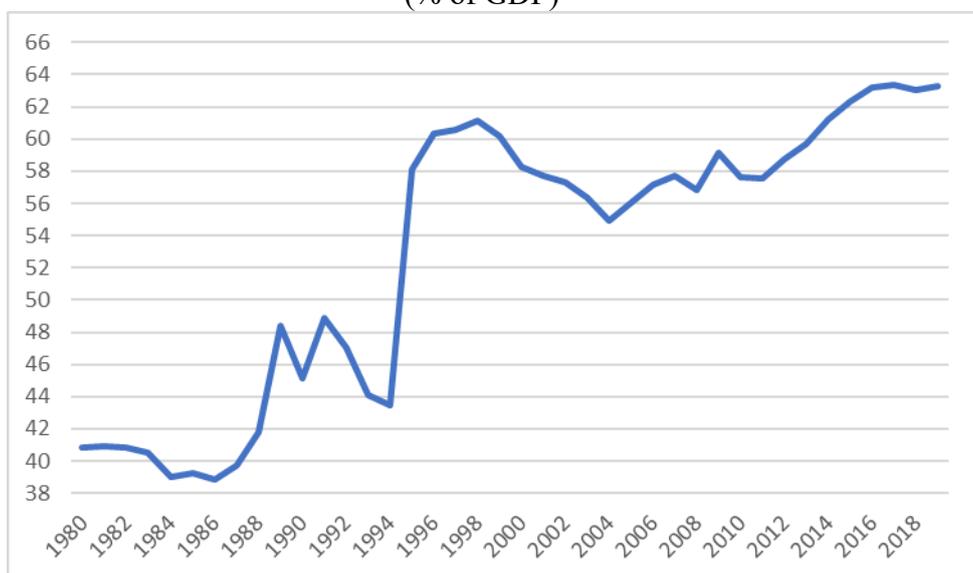
The economy of the 21st century has in services its main driving force. The role of the services sector in generating new businesses and creating jobs, apart from its capacity to support business competitiveness, is currently a consensual position among analysts and policy-makers. The positive influence of services permeates all sectors of the economy.

This section highlights some relevant trends of the services sector in each of the two countries, then discusses some indicators of bilateral trade in services.

4.1 Brazil

The services sector is the largest one in Brazil, contributing with more than half of the country's GDP since the 1990s. In 2019 it was responsible for 64% of GDP and it employs around 70% of the labor force. According to Figure 4.1, its importance has increased systematically since the mid-2000s.

FIGURE 4.1
Brazil – Services Value Added
(% of GDP)



Source: World Development Indicators, World Bank

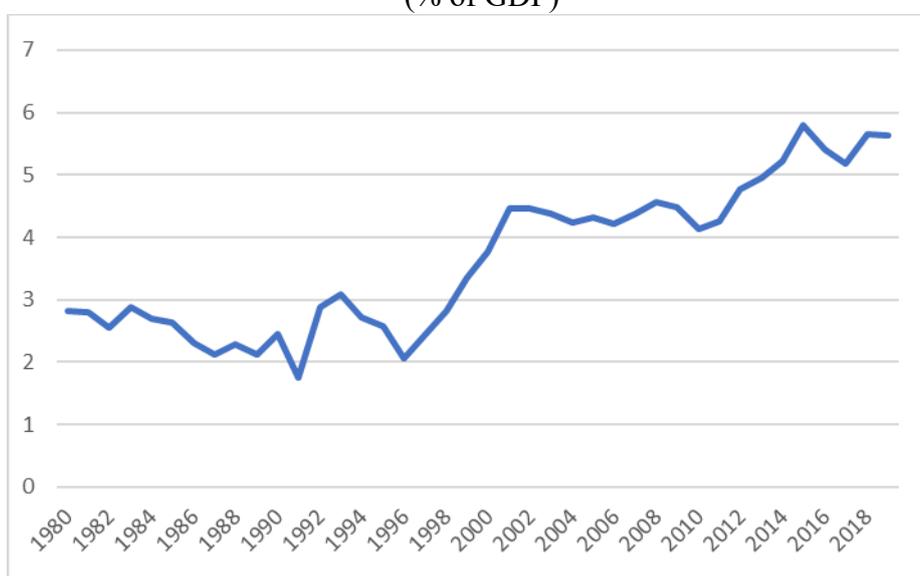
Services account for the largest share of FDI stocks in Brazil, absorbing in 2018 to 2020 an average 68.3% of foreign capital flows. It is also the main destination of Brazilian direct investment abroad: in the same period the outflow of investment in services corresponded to an average 65.6% of total direct investment abroad.

The financial sector is by far the most important service industry in Brazil. Brazilian banks showed great strength during the 2008 crisis. Also, financial services accounted

for 72% of total investment in services abroad. Travel and tourism are also essential components of the services sector in Brazil.

Services are oriented towards a large domestic market and attract over two-thirds of incoming foreign investments, but their export performance remains bleak. The services sector suffers from structural weaknesses and low international performance. One of the reasons is a productivity deficit. High production costs, a complex tax system and infrastructure constraints make the price of services in Brazil relatively high. Considering the last two decades, the evolution of the Brazilian trade in services as a percentage of GDP barely reached 6% of GDP (Figure 4.2).

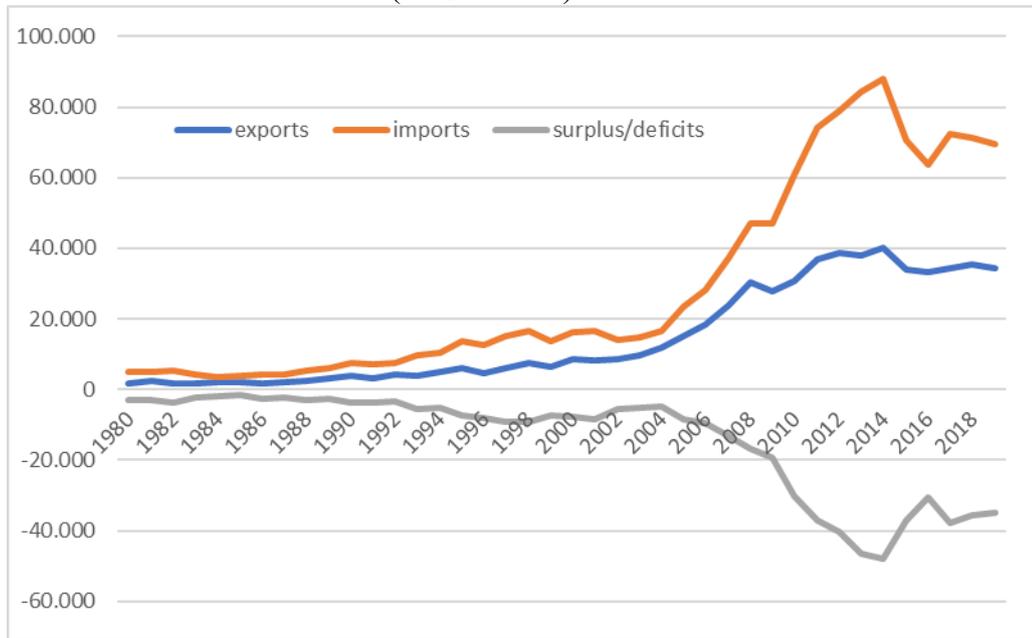
FIGURE 4.2
Brazil – Trade in Services
(% of GDP)



Source: World Development Indicators, World Bank

Despite its importance to GDP, the amount of services exported has remained relatively low, even though with a light increase since 2005. Imports of services, at the same time, have boomed, reaching a maximum in 2014. As a result, Brazil's trade in services shows a significant deficit since the mid-2000s (Figure 4.3).

FIGURE 4.3
Brazil – Trade in Services
(US\$ Million)



Source: World Development Indicators, World Bank

Part of the explanation for this result has to do with low competitiveness, but also with the fact that firms focus their activities on the domestic market. This can be seen (Table 4.1) by the ratio of services exports on the net operational revenue of firms in those sectors that correspond to most of the Brazilian exports of services.

TABLE 4.1
Brazilian Exporting Companies – Services Exports/Revenue
 (%)

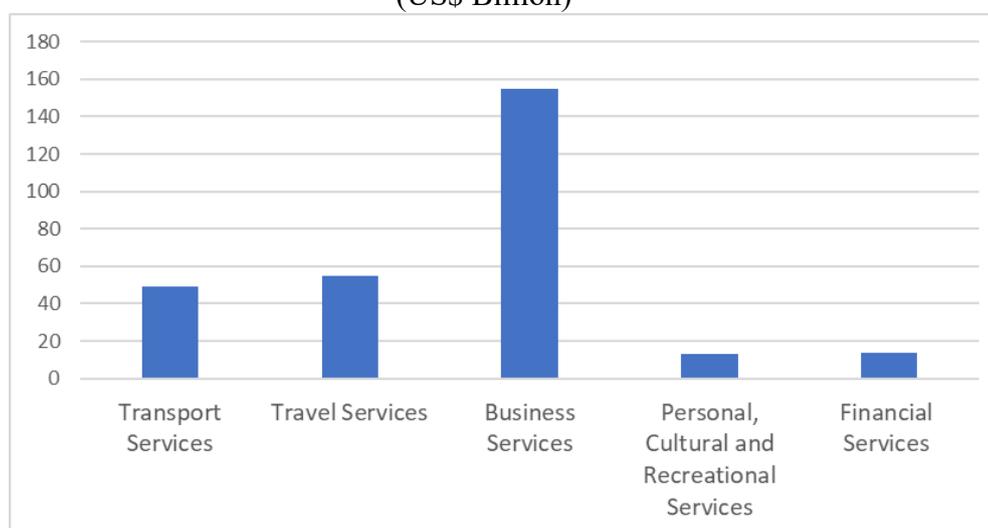
	Services Exports/Net Operational Revenue			
	2014	2015	2016	2017
Telecommunication	1.0	0.0	0.0	0.5
Information technology	5.0	6.0	6.7	7.0
Technical-professional services	3.6	4.2	3.8	3.6
Travel agencies, tourism companies	2.5	3.1	5.1	7.0
Office and administrative services	0.3	0.0	0.0	0.0
Other services to companies	0.0	0.0	0.5	0.0
Transportation	4.7	5.5	5.6	5.2
Road transportation	0.9	0.0	1.2	1.4
Passenger transportation	0.0	0.0	0.0	0.0
Cargo transportation	1.2	0.0	0.0	1.9
Water transportation	25.9	26.9	25.5	23.5
Air transportation	20.0	0.0	0.0	19.0
Support activities to transportation	5.3	6.1	6.2	0.0
Post Office and couriers	1.4	1.5	2.1	1.8
Support services to agriculture and forestry	0.0	0.0	0.0	0.0
Support services to the financial sector, insurance and others	4.9	0.0	0.0	0.0

Source: IBGE, Pesquisas Anuais do Comércio

The export activities correspond to a significant share of net operational revenue only for some types of transportation. For all other sectors, this ratio is less than 10% of the companies' total revenue.

In a sector overview of Brazilian trade in services five sectors are worth considering: transport services; travel services; business services; personal and cultural services and financial services (Figure 4.4).

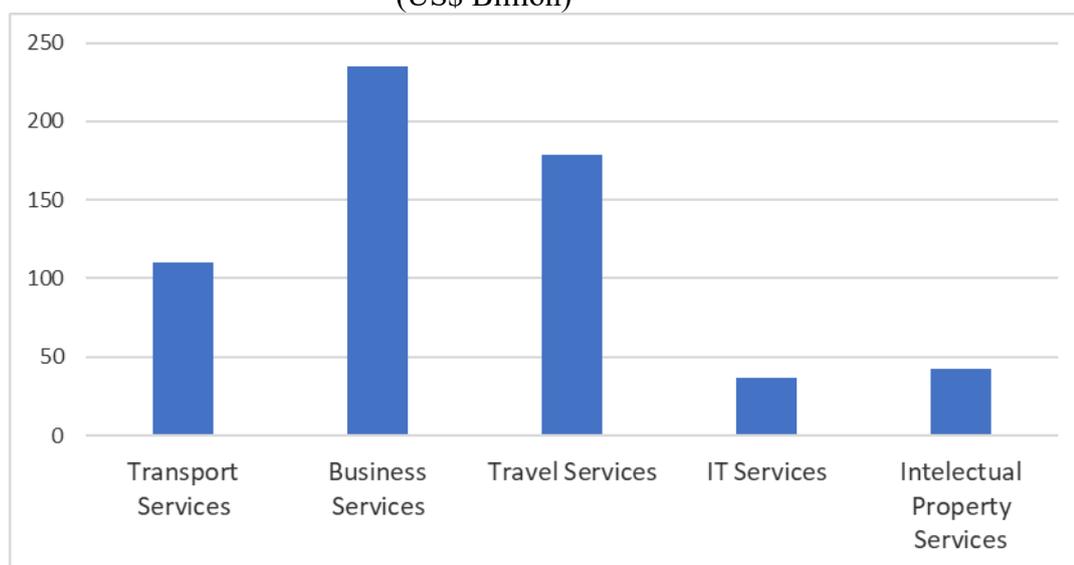
FIGURE 4.4
Brazil - Most Important Services Exporters – Cumulative amount in 2010-2018
 (US\$ Billion)



Source: ALADI Database.

As per the main import sectors, the three most important ones in 2010-2018 are business services, travel services and transport services (Figure 4.5), a ranking very much like the one in export services. This is an indirect indication of a significant degree of intra-industry trade in these activities.

FIGURE 4.5
Brazil - Most Important Services Importers – Cumulative amount in 2010-2018
 (US\$ Billion)



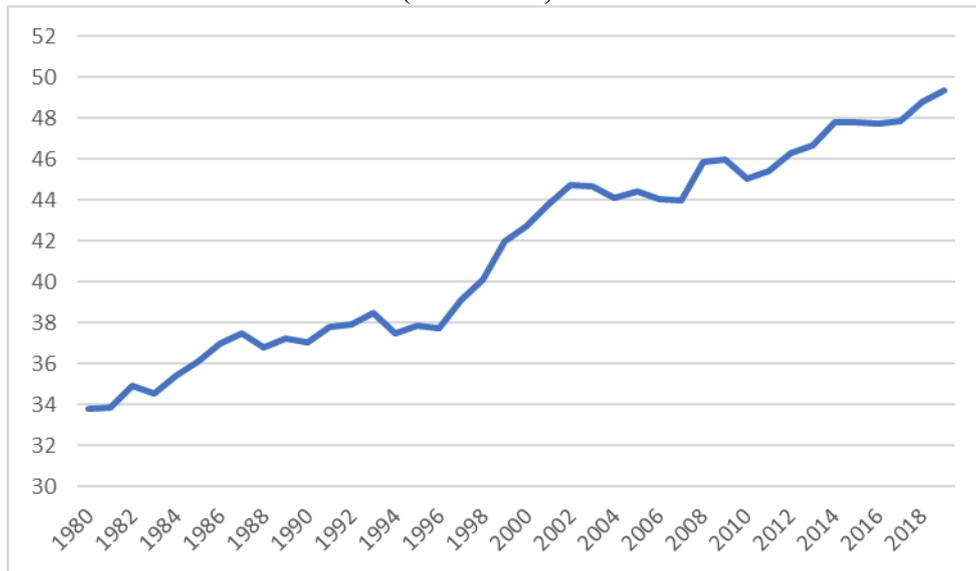
Source: ALADI Database

According to OECD (2016), a good deal of the low performance in Brazil trade in services has to do with regulations being more restrictive towards foreign services providers than even its Latin American peers, coupled to deficiencies in infrastructure. To these it should be added the facts that services firms are relatively small and that the tax burden on services tend to be heavier than in other sectors.

4.2 India

The services sector is a key driver of India's economic growth. Despite its dynamism, its relative weight in domestic production is less remarkable in comparative terms: it accounts for about half the country's GDP, a smaller share when compared to the relative weight of the service sector in Brazil (Figure 4.6).

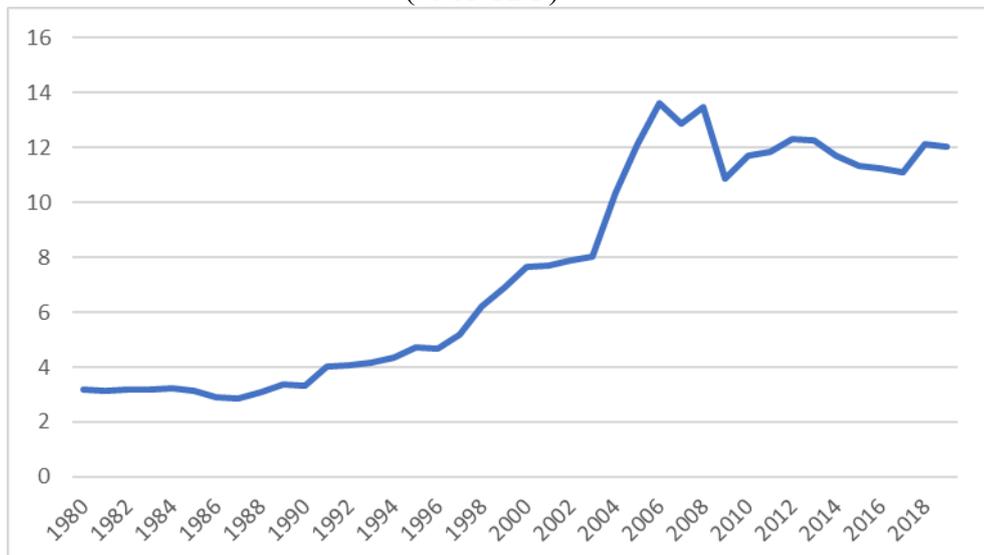
FIGURE 4.6
India - Value Added in Services
 (% of GDP).



Source: World Development Indicators, World Bank

If the relative size of the service sector is comparatively smaller in India, trade in services to GDP in India is twice as important as in Brazil. According to Figure 4.7, it corresponds to some 12% of GDP, having reached a peak of almost 14% in 2008, what dwarfs the less than 6% of GDP in the Brazilian case.

FIGURE 4.7
India - Trade in Services
 (% of GDP)

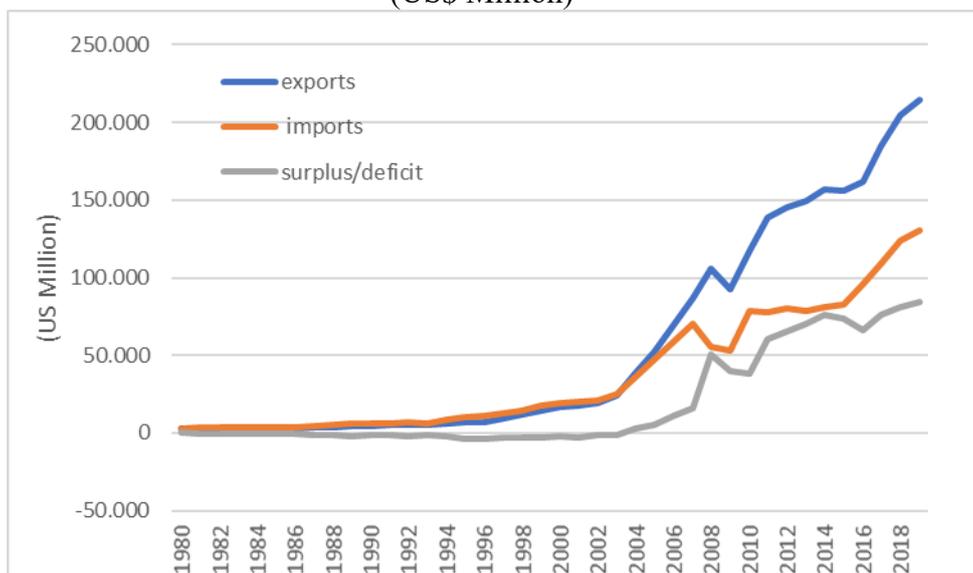


Source: World Development Indicators, World Bank

Another, even more important difference between the two countries is that if Brazil has experienced increasing deficits in trade in services, India has, on the contrary,

obtained since 2004 systematic surpluses in its relations with other economies, reaching, in the last three years, an average surplus corresponding to almost 30% of total services exports (Figure 4.8).

FIGURE 4.8
India - Trade in Services
(US\$ Million)



Source: World Development Indicators, World Bank

India has developed a rather diversified set of comparative advantages in services. One of the most well-known service sectors in India is informatics and telecommunication, with strong advantages stemming from low-cost, high-skill, predominantly English-speaking labor force. Exports is its largest component. Financial risk management services, insurance, natural disaster modelling and underwriting are some examples of services performed to external clients. The objective is to move from being mainly a low-cost service provider to a high value-added partner.

Another remarkable service sector in India is the healthcare industry, one that is intertwined with the tourism industry. Tourism, by itself, is a major player, given the numerous attractions – natural and historical – of India. However, and as in other countries, the provision of low-cost, good-quality health services in India stimulates the inflow of individuals looking for health care.

Independently from the link with tourism, the Indian healthcare industry is expected to shift to digitally enabled remote consultations via teleconsultation, a direct link with the IT sector. Healthcare is certainly an industry that has been directly affected by the pandemic and the increased demand for medical services.

Another sector that is remarkable in India is, of course, the biggest movie industry in the world. Bollywood activities are a major potential contributor to the service sector income.

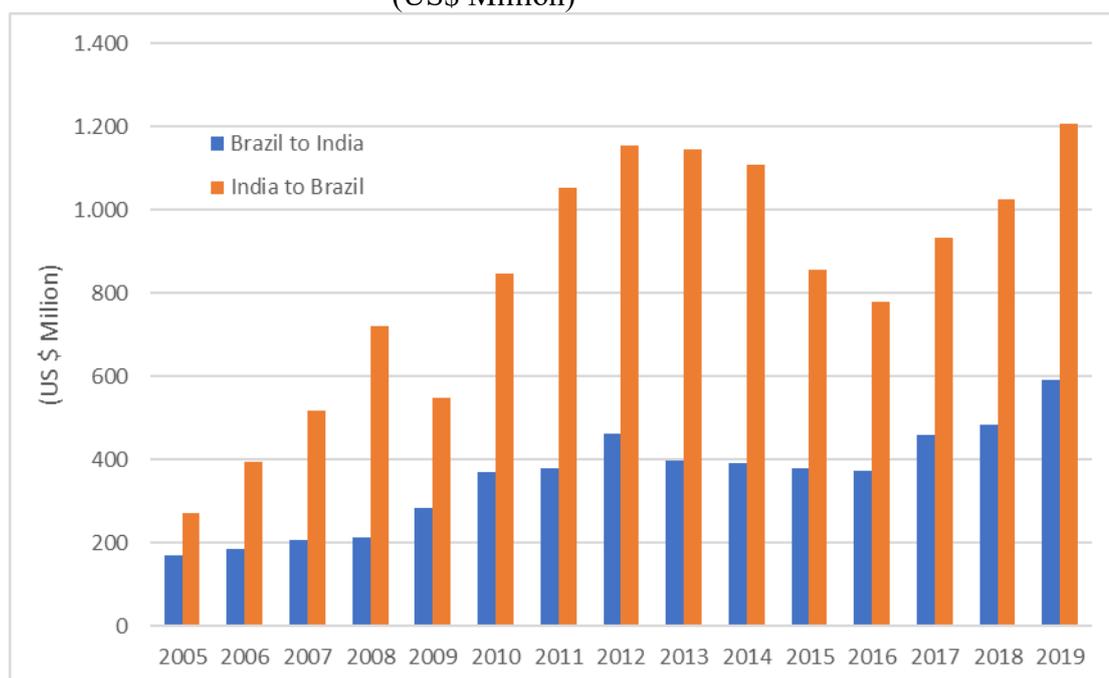
More recently, India has shown remarkable competitiveness in the space transportation industry, via the launching of a series of satellites into space at lower costs than its competitors. This has called the attention of several countries, interested in using this significant advantage to facilitate the launching their own satellites.

4.3 Bilateral Trade in Services

Trade in services between Brazil and India has shown a good deal of dynamism. Between 2005 and 2019 total bilateral trade quadrupled, reaching US\$ 1,8 Billion¹².

According to Figure 4.9, most of this dynamism has to do with Brazilian imports from India. Throughout this period Brazilian exports of services to India varied in the range of 30-40% of Brazilian imports from that country.

FIGURE 4.9
Brazil-India Trade in Services
(US\$ Million)



Source https://www.wto.org/english/res_e/statis_e/trade_datasets_e.htm.

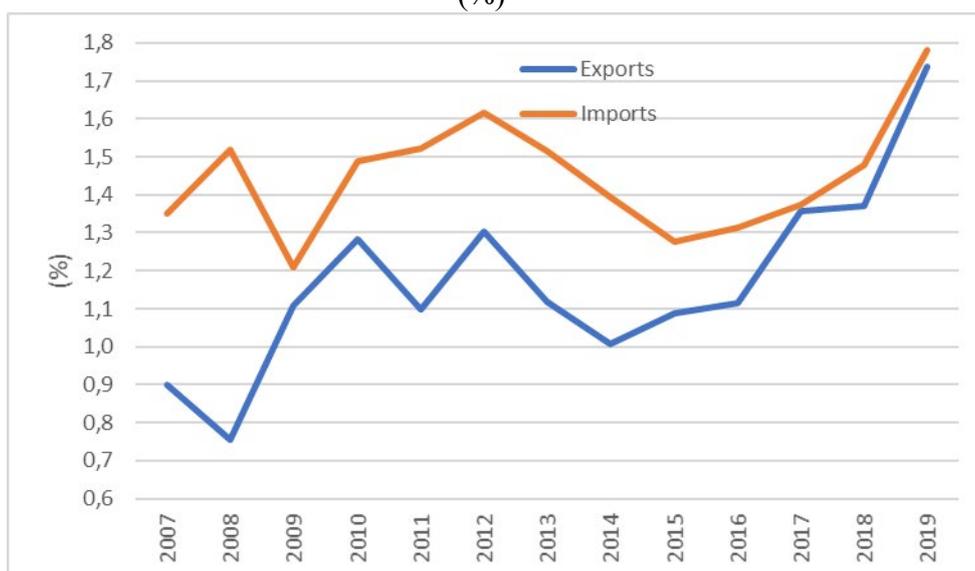
This is not to say that there has not been some dynamism from Brazilian side. Comparing 2005-2007 to 2017-2019 Brazilian exports of services to India increased 174%, a slightly more pronounced variation than the 167% increase in its bilateral

¹² Data from https://www.wto.org/english/res_e/statis_e/trade_datasets_e.htm

imports in the same period.

In 2005 services trade with India accounted for 0,9% of Brazilian total exports of services and 1,4% of Brazilian imports. In 2019, those percentages have both become 1,7%, indicating that, even if its weight remains quite limited, the Indian market for services has become more important to Brazilian exports than Indian services in total Brazilian imports. Figure 4.10 shows the evolution over time of India's share of Brazil trade in services.

FIGURE 4.10
India's share of Brazilian trade in services
(%)



Source https://www.wto.org/english/res_e/statistics_e/trade_datasets_e.htm

Comparative advantage stemming from widely spoken English and to the availability of large number qualified workers in the IT industry explains part of these indicators.

As shown in Table 4.2, it is remarkable to notice that the Brazilian export bill has become far more concentrated than the Indian one in recent years.

TABLE 4.2
Brazil-India Share of 5 Main Traded Services
(%)

	2014	2019
Brazilian Exports	57	89
Brazilian Imports	65	24

Source: SISCOSERV, Ministry of Economy, Brazil.

The WTO data on bilateral trade on services are presented in accordance to a given

sector structure, and follow from information provided by the Central Banks. Hence, it allows for comparison of specific ten services sectors, presumably the most important ones. Therefore Tables 4.3 and 4.4 have the same presentation.

Be that as it may, a comparison of the two Tables allows for some observations worth noting. Among the services Brazil exported to India from 2005 to 2019 there is a clear predominance of business services and travel services, with an increasing importance, in recent years, of telecommunications, computer and information services. Maintenance and repair services are also worth mentioning, due to the sharp increase since 2012.

TABLE 4.3
Composition of Brazilian services exports to India
(US\$ million)

	2005-2007	2012-2014	2017-2019
Manufacturing services on physical inputs owned by foreigners	-	-	-
Maintenance and repair services	-	4,0	17,0
Travel	42,3	85,7	98,0
Construction	1,0	1,7	2,0
Insurance and pension services	2,0	5,3	6,3
Financial services	3,7	12,0	7,0
Charges for the use of intellectual property	0,7	2,0	5,0
Telecommunications, computer, and information services	4,7	12,7	38,0
Other business services	45,3	124,0	145,7
Personal, cultural, and recreational services	-	5,0	4,3
Total	186,3	416,7	511,7

Source: https://www.wto.org/english/res_e/statis_e/trade_datasets_e.htm

As per the Brazilian service imports from India, according to Table 4.4 the amounts are obviously much bigger. There is a predominance of telecommunications, computer and information services, travel services and other business services. The ranking is somewhat different from Table 4.3, but it is worth noting the similarity of the most important sectors: there is a clear incidence of intra-sectoral trade in services between the two economies, a dimension that could be exploited more systematically by negotiators. As per the rates of growth in recent years, Brazilian imports of construction services and personal, cultural, and recreational services are also remarkable.

TABLE 4.4
Composition of Indian services exports to Brazil
(US\$ Million)

	2005-2007	2012-2014	2017-2019
Manufacturing services on physical inputs owned by foreigners	-	-	-
Maintenance and repair services	-	0,7	1,0
Travel	60,3	208,7	189,0
Construction	1,7	4,7	7,0
Insurance and pension services	2,7	5,3	5,3
Financial services	7,0	19,7	16,7
Charges for the use of intellectual property	1,3	3,7	3,7
Telecommunications, computer, and information services	169,7	488,3	458,3
Other business services	98,7	281,0	271,7
Personal, cultural, and recreational services	2,3	9,7	10,3
Total	394,7	1.137,7	1.055,3

Source: https://www.wto.org/english/res_e/statis_e/trade_datasets_e.htm

So far for a broad picturing of merchandise and service trade between the two economies. It remains to infer the perspectives of this relationship, as indicated by the bilateral direct investment flows.

5 BILATERAL INVESTMENT

Brazil and India have a long-standing relationship, for more than 70 years. As far as direct investment flows are concerned, however, relations are quite limited, and presumably there should be margin for more intensification of bilateral resource flows.

As already mentioned, a bilateral agreement on investment was signed early in 2020 but is not in force yet. This should not be a major obstacle, even though it is expected that it might provide some positive signaling to potential investors in both countries.

At present the bilateral direct investment stocks are very low. India accounts for much less than one percent of Brazilian direct investment, both from the inflow and outflow perspectives, according to Table 5.1. It is hard to infer that there is no margin to improving this relationship.

TABLE 5.1
Brazil - FDI stocks (equity)
(US\$ million)

	2010	2015	2019
Outward FDI			
Total	171,778	299,110	385,009
India	27	33	42
India/Total	0.02%	0.01%	0.01%
Inward FDI			
Total	587,209	362,516	623,317
India	1,250	719	2,059
India/Total	0.21%	0.20%	0.33%

Source: Central Bank of Brazil.

This Note considers the information available at the fDi Markets database as well as the websites of several companies to try to identify the sectors where those investing companies operate in both countries. For that purpose, the sales and marketing operations were dismissed, hence the selected companies were those with actual productive activities. Data refer to companies that have invested since 2003, and mostly since 2009. Table 5.2 provides a picturing obtained this way for the direct investment from Brazilian firms in India.

There is a clear concentration in manufacturing sectors, with more intense focus in auto parts and in firearms and ammunition. Given the recent performance of the agribusiness sector in the two countries and the huge Indian population, it is noticeable that there is no indication of investment in the agricultural sector.

TABLE 5.2
Brazilian firms with local production in India.

Company	Sector
Companhia Brasileira de Cartuchos (CBC)	ammunitions
Fanem	medical devices
Forjas Taurus	arms
Formas Kunz	footwear parts
Fras-Le	autoparts
Iochpe-Maxion	autoparts
Stefanini	IT services
Vulcabras/Azaleia	footwear
WEG	electric motors

Source: fDi Markets and firms' websites.

By the same token, direct investment from India into Brazil is also focused in the industrial sector, but with a much more diversified presence, by sectors, as indicated in Table 5.3.

TABLE 5.3
Indian firms with local production in Brazil

Company	Sector
Algonomy	IT services
Aptech	computer education
Associated Capsule Group	pharmaceutical inputs
Bharat Petroleum	oil & gas
Bilcare	pharmaceutical packaging
HCL Technologies	IT services
Infosys	digital services
Mahindra	tractors
Novelis/Aditya Birla	aluminium/recycling
Ranbaxy/Sun Pharma	pharmaceuticals
Roha Dyechem	synthetic colors
SalaryFits	fintech
SMR	auto parts
Sterlite Power	power transmission
Suzlon Energy	wind power solutions
Tata Consultancy Services	IT services
UPL	agrochemicals
Varroc Lighting	auto parts
Vijai	power transmission equipment
Wipro	IT services

Source: fDi Markets and firms' websites

Not surprisingly, given the well-known comparative advantage of India in this sector, IT services is the sector that apparently has attracted the biggest number of Indian companies in Brazil.

The same is true for pharmaceuticals. India is known as the 'pharmacy of the world', given its big competitiveness in the production of pharmaceutical products. This is mirrored in the presence of Indian companies in Brazil.

Two other peculiarities that come out from Table 5.3 is, first, that there are (at least) two Indian companies operating in the auto parts sector in Brazil. When compared to data in Table 5.2, with Brazilian firms operating in this sector in India, it turns out that this is

an additional apparent indication of some degree of intra-industry trade, as stressed in the analysis of bilateral services trade, with several implications for policy. Secondly, if Brazilian investors in India are totally apart from the agricultural sector, there is at least one Indian company operating in Brazil in activities indirectly linked to that sector, the production of agrochemicals.

One area that might be considered for further negotiations seems to be, therefore, the possibilities of investment in activities associated to production in the agricultural sector, in both countries.

6 COOPERATION IN TECHNOLOGY

Brazil and India share (at least) one common characteristic, as far as science and technology are concerned: a good deal of the domestic investment in R&D is public investment, even more so in India. For instance, according to SECAP (2019) in 2017 Brazil's private sector investment in R&D was 0,6% of GDP and public investment was of the same amount. In India, the numbers were 0,4% and 0,3%, respectively.

In 2019 fiscal incentives in Brazil aimed at fomenting innovation and scientific and technological research by companies (as established by Law 11.196, from 2015) accounted for US\$ 500 million approximately, about 20% of total public expenditure in science and technology.

Public expenditures in science and technology in 2019 were distributed as follows: 55% in informatics and automation; 21% in technological innovation; 13% in scientific and technological research; 7% in support to the technological development of the industry of semiconductors; 4% in other activities.

Law 11.196 allows for – independently of sector, region or firm size - up to 180% of expenditures in R&D that can be classified as operational expenditures. For companies with registered patent this percentage can reach 200%. Such incentives lead to the possibility that expenditures in R&D reduce up to 34% of the tax on profits due by the company. Furthermore, this legislation allows for a reduction of 50% of value-added tax on the acquisition of machinery aimed at R&D activities, income tax exemption on remittances related to the registration of patents and subsidies to hiring researchers.

A comparison of the policies in the two countries will show that there are differences in the policy approach to stimulating domestic production. For instance, one sector where India's performance is remarkable is the pharmaceutical industry. India is among the world's leading exporters of pharmaceuticals. Brazil is one of the largest markets for pharmaceutical products.

Hasenclever, Paranhos (2014) provide a comparative overview of the policy conditions that have determined the trajectory of pharmaceutical industry in the two countries. The following paragraphs are based on their reasoning.

The TRIPS Agreement at the WTO established basic conditions for the concession of patents and a protection extension for 20 years.

In Brazil, to promote adequacy to the TRIPS Agreement, domestic legislation enlarged

the patentability to substances and products acquired by chemical processes and to substances, mixes, food, pharminochemical products and any kind of drugs, and their processes. For only two years (out of the 20 years allowed by the Agreement) every depositor who had obtained a patent in any other country would be able to request it in Brazil for the rest of the patent period, with the additional possibility of retroactive examination of patent deposits from products that only became patentable after the enactment of the new law.

In India the transition period was totally used and initiatives such as the Indian Patents Act of 1970 allowed pharmaceutical companies to perform reverse engineering of branded drugs and sell them as generic drugs. As it turns out, not only there was protection to domestic industry, but also the implementation of active industrial policies has stimulated the pharmaceutical sector.

In 2005, India's intellectual property rights regime changed to be adapted to the WTO rules. The way this has been done, coupled to the establishment of the Pharmaceutical Research and Development Support Fund, made Indian companies able to produce drugs that did not have patents until 1994, as well as anticipate the production of drugs whose patent deposits were made during the transition period.

India has comparative advantages that make the drugs it produces to be among the cheapest in the world: low labor costs, local production of machinery and equipment, and a price control regime by the National Pharmaceutical Pricing Authority. India is self-sufficient in drugs and exports generic drugs to some 200 countries.

The two countries have until recently, at least, been developing partnerships for setting the agenda in multilateral forums like the WHO, the WTO and the BRICS forum. Apart from facilitating trade negotiating positions at WTO for exporting drugs and pharmaceuticals to the affected countries, India and Brazil have also launched joint R&D projects in biomedicine. At the R&D level, Brazil has predominant focus on biomedical. Both sides have identified malaria, leishmaniosis, HIV, tuberculosis, and leprosy as target diseases for joint research.

The Covid 19 crisis has affected most countries severely. India has stepped up production of vaccines, whereas Brazilian authorities have taken some unprecedented measures to tackle the drug shortages, such as fast track approvals to COVID related drugs, special import authorization to products manufactured outside Brazil and others.

Cooperation in technology takes place in a double track: both on bilateral terms as well as within the BRICS. For instance, the BRICS has been developing its own Energy Research Platform. Also, in October 2020, under the chairmanship of India, the BRICS Working Group on Materials Science and Nanotechnology agreed on the concept for the BRICS Network Centre for Materials Science and Nanotechnology.

Earlier last year, during the State Visit of the President of Brazil to India, a set of MOUs was signed related to technology exchange:

⇒ MoU for Cooperation in Oil and Natural Gas;

⇒ MoU on Cooperation between the Indian Computer Emergency Response Team (CERT-In), Ministry of Electronics and Information Technology (MEITY) of India and

the General Coordination of Network Incident Treatment Centre and the Department of Information Security, Institutional Security, Cabinet of the Presidency of Brazil (CGCTIR/DSI/GSI) for cooperation in Cyber Security;

⇒ Program of Scientific and Technological Cooperation for implementing the agreement on scientific and technological cooperation by Brazil and India (2020-2023);

⇒ MoU on Cooperation in Geology and Mineral Resources between Geological Survey of India (GSI), Ministry of Mines of the Republic of India and the Geological Survey of Brazil - CPRM, Ministry of Mines and Energy of Brazil; and

⇒ MoU between Indian Oil Corporation Ltd. and Centro Nacional de Pesquisa em Energia e Materiais (CNPEM) for Cooperation on research in Bioenergy.

Other areas – such as collaboration in health, artificial intelligence, and environment – have been the object of consultation between the Ministers of Science and Technology of the two countries.

It is worth noting that there has been recently cooperation in the launching of Brazilian satellite using Indian rockets. In February 2021 India launched satellite Amazonia-1, designed to deliver remote sensing data for monitoring deforestation in the Amazon region as well as analysis of agricultural activities across the Brazilian territory. This is the first observation satellite totally designed, built, and operated by Brazil. The launching took place in India basically due to the dimensions of the satellite; Brazil has no rocket able to launch an equipment of that size.

7 SUGGESTED FURTHER STEPS TO FOSTER BILATERAL RELATIONS

Previous sections have shown implicitly the existence of a good deal of potential to improve and intensify economic relations between the two countries. An agenda of areas to be considered to foster bilateral relations would comprise the following items. The sequence in which they are presented does not mirror any ranking of priorities.

- i. the amplification of the existing bilateral trade preferences, to significantly increase the number of items with reciprocal preferential access, and aiming at establishing a free trade agreement;
- ii. efforts to put into force the existing non-operational bilateral agreement in investment, to provide security and clearer signaling to potential investors;
- iii. negotiations to try and stimulate the IBSA mechanism, by identifying clear bilateral objectives;
- iv. negotiations aimed at identifying the potential for bilateral investment in activities associated to the agricultural sector, including technology transfer;
- v. negotiations to foster joint R&D projects in biomedicine and other sectors;

- vi. identification of common interests to exploit more intensely the potential opportunities offered by the BRICS's Energy Research Platform and the BRICS's Network for Materials Science and Nanotechnology;
- vii. negotiations to foster bilateral activities in the space area, via technology transfer;
- viii. identification of common interests to exploit more intensely the potential opportunities offered by the United Nations Technology Bank for Least Developed Countries.

REFERENCES

- AGHION, P., ROBIN B., STEPHEN J. R., FABRIZIO Z. “The Unequal Effects of Liberalization: Evidence from Dismantling the License Raj in India.” **American Economic Review** 98 (4): 1397–1412. 2008. <https://doi.org/10.1257/aer.98.4.1397>.
- BALASSA, B. “Trade liberalization and ‘revealed’ comparative advantage”. **The Manchester School of Economic and Social Studies**, 32, 99–123, 1965.
- BHAGWATI, J. N., THIRUKODIKAVAL N. S. 1975. India. Foreign Trade Regimes and Economic Development 6. New York: **Columbia Univ. Pr.**
- CHATTERJEE, S., ARVIND S. India’s Inward (Re)Turn: Is It Warranted? Will It Work? 1. **Policy Paper**. Ashoka Centre for Economic Policy. 2020.
- FISHLOW, A. “Origens e Consequências da Substituição de Importações no Brasil”. **Estudos Econômicos**. IPE-USP, vol.2, n.6, 1972.
- HASAN, R., DEVASHISH M., RAMASWAMY, K.V. Trade Reforms, Labor Regulations, and Labor-Demand Elasticities: Empirical Evidence from India. **Review of Economics and Statistics** 89 (3): 466–81. 2007. <https://doi.org/10.1162/rest.89.3.466>.
- KEE, H. L.; NICITA, A.; OLARREAGA, M. Estimating Trade Restrictiveness Indices. **The Economic Journal**, v. 119, n. (January), p. 172–199, 2009.
- L.HASENCLEVER, J. PARANHOS, The development of the pharmaceutical industry in Brazil and India: technological capability and industrial development, in <https://www.researchgate.net/publication/228859162>, 2014
- LARCH, M. D. RTA - **Data**. Disponível em: <<https://www.ewf.uni-bayreuth.de/en/research/RTA-data/index.html>>. Acesso em: 19 abr.. 2021.
- MARKS, S.; RAHARDJA, S. Effective rates of protection revisited for Indonesia”, *Bulletin of Indonesian Economic Studies*, 48:1, 57-84, 2012.
- MINISTÉRIO DA ECONOMIA. **Defesa Comercial e Interesse Público**. Disponível em: <<https://www.gov.br/produtividade-e-comercio-exterior/pt-br/assuntos/comercio-exterior/defesa-comercial-e-interesse-publico>>. Acesso em: 20 abr. 2021.
- MOHAN, R., ed. 2018. **India Transformed: 25 Years of Economic Reforms**. Washington, D.C: Brookings Institution Press.
- NICITA, A.; GOURDON, J. A preliminary analysis on newly collected data on non-tariff measures. **United Nations Conference on Trade and Development**, 2013.
- NIU, Z.; CHANG, L.; GUNESSEE S.; MILNER, C. Non-tariff and overall protection: evidence across countries and over time. **Review of World Economics**, v. 154, n. 4, p. 675–703, 2018. Panagariya, Arvind. 2004. India’s Trade Reform.
- . 2008. India: The Emerging Giant. New York, N.Y: **Oxford University Press**.

OECD, **Services and Performance of the Brazilian Economy: analysis and policy options**, Report prepared for the Services Trade Restrictiveness Index workshop, Brasilia, 1-3 March 2016

OLIVEIRA, I.; VEIGA, P. M; RIOS, S. e RIBEIRO, F. The Political Economy of Trade Policy in Brazil. Brasília: **IPEA**, 2019. Available at: https://www.ipea.gov.br/portal/images/stories/PDFs/relatorio_institucional/190904_the_political_economy_of_trade_policy_in_brazil.pdf.

PURI, H. S. India's Trade Policy Dilemma and the Role of Domestic Reform. **Carnegie India**. 2017.

SECAP, Ministério da Economia, **Boletim sobre os Subsídios da União**, Edição 19, March. 2021

TOPALOVA, P., AMIT K. 2011. Trade Liberalization and Firm Productivity: The Case of India. **Review of Economics and Statistics** 93 (3): 995–1009. 2011. https://doi.org/10.1162/REST_a_00095.

TOPALOVA, P. Factor Immobility and Regional Impacts of Trade Liberalization: Evidence on Poverty from India. **American Economic Journal: Applied Economics** 2 (4): 1–41. 2010. <https://doi.org/10.1257/app.2.4.1>.

UNCTAD. **International Classification of Non-Tariff Measures**. Geneva: United Nations, 2019.

UNCTAD. UNCTAD TRAINS: **The Global Database on Non-Tariff Measures**. Geneva: United Nations, 2017.

WTO - **World Trade Organization. Regional Trade Agreements Gateway**. Disponível em: <https://www.wto.org/english/tratop_e/region_e/region_e.htm>. Acesso em: 19 abr. 2021.

WTO. TMDb Explore the measures database - Goods. WTO - Open Trade Data Portal. Disponível em: <<https://tmdb.wto.org/en/explore/goods#nogo>>. Acesso em: 20 abr. 2021.

APPENDIX A: TRADE OPPORTUNITIES

TABLE A.1

List of Brazilian Export Opportunities to India, by HS4 code

HS4	Description	Imports India	Exports Brazil	Exports Bra to Ind	RCA Brazil	RCD India	M-S Brazil
0801	Coconuts, Brazil nuts and cashew nuts, fresh or dried, whether or not shelled or peeled	1.563,2	150,1	-	1,3	5,9	-
0904	Pepper of the genus Piper; dried or crushed or ground fruits of the genus Capsicum or of the genus Pimenta	145,6	225,0	8,5	5,6	1,6	5,85
0907	Cloves (whole fruit, cloves and stems)	150,6	11,7	-	2,4	13,4	-
0910	Ginger, saffron, turmeric (curcuma), thyme, bay leaves, curry and other spices	82,4	31,8	0,1	1,1	1,2	0,07
1301	Lac; natural gums, resins, gum-resins and oleoresins (for example, balsams)	188,5	32,1	0,0	3,0	7,5	0,01
1520	Glycerol (glycerine), glycerol waters and lyes	27,2	88,4	1,3	10,7	1,4	4,67
2207	Undenatured ethyl alcohol of an alcoholic strength by volume of 80 % vol or higher; ethyl alcohol and other spirits, denatured, of any strength	302,2	984,8	0,0	9,7	1,3	0,00
2504	Natural graphite	29,2	33,0	1,9	4,6	1,7	6,66
2507	Kaolin and other kaolinic clays, including calcined	50,9	256,4	0,3	11,6	1,0	0,52
2519	Natural magnesium carbonate (magnesite); fused magnesia; dead-burned (sintered) magnesia, whether or not containing small quantities of other oxides added before sintering; other magnesium oxide, whether or not pure	127,1	110,5	0,2	3,9	1,9	0,19
2602	Manganese ores & concentrates inc mangnfrs iron ores	775,6	551,7	54,0	5,2	3,1	6,97
2603	Copper ores and concentrates	2.959,7	2.305,7	179,4	3,0	1,7	6,06
2612	Uranium or thorium ores and concentrates	221,9	5,6	-	1,2	20,7	-
2713	Petroleum coke, petroleum bitumen and other residues of petroleum oils or of oils obtained from bituminous minerals	2.468,0	240,6	14,2	1,0	4,4	0,58
2818	Artificial corundum, whether or not chemically defined; aluminium oxide; aluminium hydroxide	1.201,0	2.867,7	5,7	13,3	2,4	0,48
2820	Manganese oxides	19,8	7,1	0,0	1,4	1,7	0,24
2821	Iron oxides and hydroxides; earth colours containing 70 % or more by weight of combined iron evaluated as Fe2O3	36,0	28,5	0,0	2,4	1,3	0,00
2825	Hydrazine and hydroxylamine and their inorganic salts; other inorganic bases; other metal oxides, hydroxides and peroxides	256,7	200,1	8,7	3,3	1,8	3,41
2843	Colloidal precious metals; inorganic or organic compounds of precious metals, whether or not chemically defined; amalgams of precious metals	315,2	90,5	-	1,9	2,8	-
2847	Hydrogen peroxide, whether or not solidified with urea	38,0	52,7	0,0	5,4	1,6	0,12
2849	Carbides, whether or not chemically defined	94,9	39,8	0,0	1,4	1,5	0,00
2901	Acyclic hydrocarbons	981,3	473,0	1,5	1,5	1,3	0,15
2910	Epoxides, epoxyalcohols, epoxyphenols and epoxyethers, with a three-membered ring, and their halogenated, sulphonated, nitrated or nitrosated derivatives	167,3	48,8	0,0	1,1	1,6	0,00
2916	Unsaturated acyclic monocarboxylic acids, cyclic monocarboxylic acids, their anhydrides, halides, peroxides and peroxyacids; their halogenated, sulphonated, nitrated or nitrosated derivatives	845,5	122,0	6,3	0,9	2,8	0,74
2926	Nitrile-function compounds	559,5	86,3	39,3	1,2	3,4	7,02

TABLE A.1 (cont.)
List of Brazilian Export Opportunities to India, by HS4 code

HS4	Description	Imports India	Exports Brazil	Exports Bra to Ind	RCA Brazil	RCD India	M-S Brazil
3202	Synthetic organic tanning substances; inorganic tanning substances; tanning preparations, whether or not containing natural tanning substances; enzymatic preparations for pre-tanning	30,3	9,3	0,4	1,1	1,6	1,41
3301	Essential oils (terpeneless or not), including concretes and absolutes; resinoids; extracted oleoresins; concentrates of essential oils in fats, in fixed oils, in waxes or the like, obtained by enfleurage or maceration; terpenic by-products of the deterpe	484,5	396,2	19,9	5,7	3,0	4,11
3901	Polymers of ethylene, in primary forms	2.650,3	1.029,5	2,9	1,1	1,2	0,11
3902	Polymers of propylene or of other olefins, in primary forms	1.301,4	602,9	0,4	1,2	1,1	0,03
3912	Cellulose and its chemical derivatives, not elsewhere specified or included, in primary forms	409,8	88,4	5,1	1,3	2,6	1,25
4104	Tanned or crust hides and skins of bovine (including buffalo) or equine animals, without hair on, whether or not split, but not further prepared	219,2	868,6	13,6	15,2	1,6	6,20
4107	Leather further prepared after tanning or crusting, including parchment-dressed leather, of bovine (including buffalo) or equine animals, without hair on, whether or not split, other than leather of heading 4114	243,3	589,8	6,7	5,1	0,9	2,75
4115	Composition leather with a basis of leather or leather fibre, in slabs, sheets or strip, whether or not in rolls; parings and other waste of leather or of composition leather, not suitable for the manufacture of leather articles; leather dust, powder and	9,5	5,7	0,0	1,3	0,9	0,00
4408	Sheets for veneering (including those obtained by slicing laminated wood), for plywood or for other similar laminated wood and other wood, sawn lengthwise, sliced or peeled, whether or not planed, sanded, spliced or end-jointed, of a thickness not exceedi	262,8	40,9	0,8	0,9	2,6	0,31
4702	Chemical wood pulp, dissolving grades	546,6	625,3	0,3	9,6	3,6	0,05
4810	Paper and paperboard, coated on one or both sides with kaolin (china clay) or other inorganic substances, with or without a binder, and with no other coating, whether or not surface-coloured, surface-decorated or printed, in rolls or rectangular (includin	729,2	302,6	2,2	1,0	1,0	0,31
5002	Raw silk (not thrown)	180,2	24,0	0,3	4,6	14,8	0,16
5003	Silk waste (including cocoons unsuitable for reeling, yarn waste and garnetted stock)	3,4	0,9	-	1,0	1,6	-
5004	Silk yarn	12,8	4,8	-	1,7	2,0	-
5201	Cotton, not carded or combed	1.014,5	1.553,8	25,0	10,3	2,9	2,46
5308	Yarn of other vegetable textile fibres; paper yarn	2,3	3,6	-	3,6	1,0	-

TABLE A.1 (cont.)
List of Brazilian Export Opportunities to India, by HS4 code

HS4	Description	Imports India	Exports Brazil	Exports Bra to Ind	RCA Brazil	RCD India	M-S Brazil
6813	Friction material and articles thereof (for example, sheets, rolls, strips, segments, discs, washers, pads), not mounted, for brakes, for clutches or the like, with a basis of asbestos, of other mineral substances or of cellulose, whether or not combined	47,0	85,2	0,0	5,5	1,3	0,02
6814	Worked mica and articles of mica, including agglomerated or reconstituted mica, whether or not on a support of paper, paperboard or other materials	16,2	5,3	0,8	1,6	2,1	4,83
6902	Refractory bricks, blocks, tiles and similar refractory ceramic constructional goods, other than those of siliceous fossil meals or similar siliceous earths	202,6	51,7	0,2	1,1	1,9	0,08
7103	Precious stones (other than diamonds) and semi-precious stones, whether or not worked or graded but not strung, mounted or set; ungraded precious stones (other than diamonds) and semi-precious stones, temporarily strung for convenience of transport	1.469,3	227,7	11,9	2,1	5,7	0,81
7202	Ferro-alloys	1.086,7	2.779,7	83,2	7,3	1,2	7,65
7206	Iron and non-alloy steel in ingots or other primary forms (excluding iron of heading No 7203)	15,0	22,1	-	3,4	1,0	-
7208	Flat-rolled products of iron or non-alloy steel, of a width of 600 mm or more, hot-rolled, not clad, plated or coated	1.519,4	826,2	-	1,4	1,1	-
7224	Other alloy steel in ingots or other primary forms; semi-finished products of other alloy steel	101,5	780,4	-	17,6	1,0	-
7228	Other bars and rods of other alloy steel; angles, shapes and sections, of other alloy steel; hollow drill bars and rods, of alloy or non-alloy steel	393,2	157,2	3,4	1,0	1,1	0,86
7304	Tubes, pipes and hollow profiles, seamless, of iron (other than cast iron) or steel	866,8	291,8	15,9	1,0	1,3	1,83
7408	Copper wire	1.662,2	213,2	7,7	1,1	3,6	0,46
7505	Nickel bars, rods, profiles and wire	78,8	38,0	5,8	1,1	1,0	7,33
7901	Unwrought zinc	578,3	210,4	-	1,1	1,3	-
8001	Unwrought tin	237,0	154,2	-	2,9	1,9	-
8202	Hand saws; blades for saws of all kinds (including slitting, slotting or toothless saw blades)	155,8	45,1	0,4	0,9	1,4	0,24
8437	Machines for cleaning, sorting or grading seed, grain or dried leguminous vegetables; machinery used in the milling industry or for the working of cereals or dried leguminous vegetables, other than farm-type machinery	129,9	25,7	0,1	1,3	2,8	0,08
8455	Metal-rolling mills and rolls therefor	417,0	60,1	0,2	1,2	3,6	0,05
8602	Other rail locomotives; locomotive tenders	98,6	14,3	-	1,5	4,5	-

Source: Elaborated by the authors.

TABLE A.2
List of Indian Export Opportunities to Brazil, by HS4 code

HS4	Description	Imports Brazil	Exports India	Exports Ind to Bra	RCA India	RCD Brazil	M-S India
0303	Fish, frozen, excluding fish fillets and other fish meat of heading 0304	211,9	349,6	0,0	1,0	1,1	0,02
0510	Ambergris, castoreum etc, glands etc for pharmacy	41,6	8,8	4,0	13,6	1,9	9,58
0703	Onions, shallots, garlic, leeks and other alliaceous vegetables, fresh or chilled	262,2	268,7	-	5,2	3,5	
0711	Vegetables provisionally preserved (for example, by sulphur dioxide gas, in brine, in sulphur water or in other preservative solutions), but unsuitable in that state for immediate consumption	31,0	75,0	0,4	5,2	8,4	1,27
0713	Dried leguminous vegetables, shelled, whether or not skinned or split	115,3	207,5	0,0	1,4	1,7	-
1006	Rice	260,8	3.052,0	0,1	1,8	13,9	0,02
1008	Buckwheat, millet and canary seed; other cereals	21,0	26,8	0,0	2,5	2,2	-
1101	Wheat or meslin flour	113,9	77,4	-	5,0	2,2	
1209	Seeds, fruit and spores, of a kind used for sowing	93,1	160,3	3,2	1,4	1,6	3,42
1302	Vegetable saps and extracts; pectic substances, pectinates and pectates; agar-agar and other mucilages and thickeners, whether or not modified, derived from vegetable products	118,8	926,4	7,4	1,9	10,0	6,21
1516	Animal or vegetable fats and oils and their fractions, partly or wholly hydrogenated, inter-esterified, re-esterified or elaidinised, whether or not refined, but not further prepared	28,0	73,4	1,1	1,0	1,8	3,76
2503	Sulfur of all kinds	246,4	74,4	1,0	6,6	1,3	0,40
2508	Other clays (not including expanded clays of heading No 6806), andalusite, kyanite and sillimanite, whether or not calcined; mullite; chamotte or dinas earths	24,7	91,6	0,1	1,3	3,2	0,34
2801	Fluorine, chlorine, bromine and iodine	29,4	22,9	0,0	2,4	1,2	0,03
2803	Carbon, (including carbon black)	46,5	104,0	0,1	1,0	1,5	0,14
2811	Other inorganic acids and other inorganic oxygen compounds of non-metals	90,4	73,2	1,3	1,9	1,0	1,43
2813	Sulphides of non-metals; commercial phosphorus trisulphide	10,6	11,2	0,0	5,5	3,9	0,41
2817	Zinc oxide and zinc peroxide	23,2	25,9	0,0	1,7	1,3	0,02
2819	Chromium oxides and hydroxides	20,9	9,0	0,7	5,1	1,5	3,56
2823	Titanium oxides	27,2	13,2	0,3	3,2	1,0	1,14
2827	Chlorides, chloride oxides and chloride hydroxides; bromides and bromide oxides; iodides and iodide oxides	30,6	146,3	2,7	1,3	4,1	8,67
2828	Hypochlorites; commercial calcium hypochlorite; chlorites; hypobromites	20,4	20,6	0,4	3,8	2,6	2,07
2831	Dithionites and sulphonylates	13,7	35,6	1,2	5,8	10,0	8,54
2832	Sulphites; thiosulphates	17,3	15,9	0,0	4,5	2,8	0,04
2833	Sulphates; alums; peroxosulphates (persulphates)	165,2	106,3	13,9	4,6	2,0	8,42
2903	Halogenated derivatives of hydrocarbons	156,9	185,2	5,7	1,7	1,3	3,63
2904	Sulphonated, nitrated or nitrosated derivatives of hydrocarbons, whether or not halogenated	33,4	75,9	2,0	3,1	4,6	5,98
2912	Aldehydes, whether or not with other oxygen function; cyclic polymers of aldehydes; paraformaldehyde	57,2	130,0	4,0	2,8	4,2	7,07
2914	Ketones and quinones, whether or not with other oxygen function, and their halogenated, sulphonated, nitrated or nitrosated derivatives	122,5	397,3	8,3	1,9	4,2	6,74
2915	Saturated acyclic monocarboxylic acids and their anhydrides, halides, peroxides and peroxyacids; their halogenated, sulphonated, nitrated or nitrosated derivatives	264,3	389,7	25,1	2,0	2,0	9,48
2916	Unsaturated acyclic monocarboxylic acids, cyclic monocarboxylic acids, their anhydrides, halides, peroxides and peroxyacids; their halogenated, sulphonated, nitrated or nitrosated derivatives	273,9	337,2	10,4	2,8	2,3	3,80
2917	Polycarboxylic acids, their anhydrides, halides, peroxides and peroxyacids; their halogenated, sulphonated, nitrated or nitrosated derivatives	231,6	249,0	5,2	1,8	1,3	2,24

TABLE A.2 (cont.)
List of Indian Export Opportunities to Brazil, by HS4 code

HS4	Description	Imports Brazil	Exports India	Exports Ind to Bra	RCA India	RCD Brazil	M-S India
2918	Carboxylic acids with additional oxygen function and their anhydrides, halides, peroxides and peroxyacids; their halogenated, sulphonated, nitrated or nitrosated derivatives	250,8	603,3	22,0	3,3	5,3	8,76
2920	Esters of other inorganic acids of non-metals (excluding esters of hydrogen halides) and their salts; their halogenated, sulphonated, nitrated or nitrosated derivatives	49,8	73,0	2,9	3,3	3,2	5,89
2921	Amine-function compounds	211,6	480,6	20,2	2,3	3,4	9,55
2923	Quaternary ammonium salts and hydroxides; lecithins and other phosphoaminolipids, whether or not chemically defined	46,3	112,4	1,1	2,1	3,3	2,46
2924	Carboxamide-function compounds; amide-function compounds of carbonic acid	240,0	654,9	21,1	3,3	6,0	8,77
2928	Organic derivatives of hydrazine or hydroxylamine	267,5	115,5	1,1	20,0	5,7	0,40
2931	Other organo-inorganic compounds	547,4	176,9	4,7	8,9	1,9	0,87
2933	Heterocyclic compounds with nitrogen hetero-atom(s) only	2.327,2	3.248,9	195,1	3,1	2,9	8,38
2936	Provitamins and vitamins, natural or reproduced by synthesis (including natural concentrates), derivatives thereof used primarily as vitamins, and intermixtures of the foregoing, whether or not in any solvent	261,0	193,6	7,9	3,4	1,7	3,03
2938	Glycosides, natural or reproduced by synthesis, and their salts, ethers, esters and other derivatives	34,9	31,8	0,3	3,0	1,8	0,90
3004	Medicaments (excluding goods of heading 3002, 3005 or 3006) consisting of mixed or unmixed products for therapeutic or prophylactic uses, put up in measured doses (including those in the form of transdermal administration systems) or in forms or packings	3.468,8	12.928,7	184,4	1,0	2,4	5,32
3101	Fertilizers of animal or plant origin, whether or not mixed together or chemically treated; fertilizers resultant of the mixing or chemical treatment of animal or vegetable products	18,5	22,5	0,2	2,4	2,0	1,31
3202	Synthetic organic tanning substances; inorganic tanning substances; tanning preparations, whether or not containing natural tanning substances; enzymatic preparations for pre-tanning	35,0	58,5	1,3	5,6	6,2	3,72
3404	Artificial waxes and prepared waxes	48,8	59,9	0,2	1,8	1,5	0,37
3603	Safety fuses; detonating cords; percussion caps; igniters; electric detonators	13,9	24,2	-	1,0	1,2	
3801	Artificial graphite; colloidal or semi-colloidal graphite; preparations based on graphite or other carbon in the form of pastes, blocks, plates or other semi-manufactures	119,7	36,7	0,1	4,8	1,0	0,10
3902	Polymers of propylene or of other olefins, in primary forms	525,9	596,1	3,1	1,4	1,0	0,59
3907	Polyacetals, other polyethers and epoxide resins, in primary forms; polycarbonates, alkyd resins, polyallyl esters and other polyesters, in primary forms	645,9	918,6	1,5	1,2	1,2	0,23
3911	Petroleum resins, coumarone-indene resins, polyterpenes, polysulphides, polysulphones and other products specified in note 3 to this chapter, not elsewhere specified or included, in primary forms	121,4	96,5	1,9	1,9	1,0	1,57
3912	Cellulose and its chemical derivatives, not elsewhere specified or included, in primary forms	166,5	69,0	1,9	3,3	0,9	1,14
3914	Ion-exchangers based on plastics, in primary forms	16,8	63,5	0,6	1,1	2,7	3,83
3920	Other plates, sheets, film, foil and strip, of plastics, non-cellular and not reinforced, laminated, supported or similarly combined with other materials	514,5	717,2	10,3	1,0	0,9	2,00
3921	Other plates, sheets, film, foil and strip, of plastics	223,8	345,2	14,9	1,0	1,0	6,64
4007	Vulcanized rubber thread and cord	13,1	9,1	0,2	2,8	1,3	1,67
4009	Tubes, pipes and hoses, of vulcanised rubber other than hard rubber, with or without their fittings (for example, joints, elbows, flanges)	175,8	172,4	6,7	1,8	1,2	3,84
4010	Conveyor or transmission belts or belting, of vulcanised rubber	118,3	128,0	1,0	2,3	1,7	0,85
4011	New pneumatic tyres, of rubber	954,2	1.424,6	49,4	1,4	1,4	5,18
4013	Inner tubes, of rubber	57,1	21,8	0,3	7,9	2,0	0,51

TABLE A.2 (cont.)
List of Indian Export Opportunities to Brazil, by HS4 code

HS4	Description	Imports Brazil	Exports India	Exports Ind to Bra	RCA India	RCD Brazil	M-S India
4016	Other articles of vulcanised rubber other than hard rubber	435,6	484,6	13,4	1,7	1,2	3,08
5211	Woven fabrics of cotton, containing less than 85 % by weight of cotton, mixed mainly or solely with man-made fibres, weighing more than 200 g/m2	28,4	57,4	1,4	1,5	2,0	4,76
5309	Woven fabrics of flax	11,5	28,8	0,2	1,4	2,3	1,76
5407	Woven fabrics of synthetic filament yarn, including woven fabrics obtained from materials of heading 5404	471,3	449,2	9,4	3,4	2,1	1,99
5503	Synthetic staple fibres, not carded, combed or otherwise processed for spinning	191,4	248,4	10,3	2,7	2,3	5,38
5504	Artificial staple fibres, not carded, combed or otherwise processed for spinning	33,6	192,1	2,8	1,2	4,5	8,23
5510	Yarn (other than sewing thread) of artificial staple fibres, not put up for retail sale	190,8	67,1	5,2	15,7	3,7	2,73
5516	Woven fabrics of artificial staple fibres	165,4	42,8	0,1	6,3	1,1	0,08
5608	Knotted netting of twine, cordage or rope; made-up fishing nets and other made-up nets, of textile materials	14,9	58,3	0,9	1,2	3,1	6,30
5705	Other carpets and other textile floor coverings	28,5	206,7	2,8	2,5	11,8	9,70
5804	Tulles and other net fabrics, not including woven, knitted or crocheted fabrics; lace in the piece, in strips or in motifs, other than fabrics of headings 6002 to 6006	25,0	16,6	0,0	2,2	1,0	0,17
5810	Embroidery in the piece, in strips or in motifs	28,8	165,2	1,9	3,2	12,0	6,54
5902	Tyre cord fabric of high tenacity yarn of nylon or other polyamides, polyesters or viscose rayon	76,0	41,4	-	2,9	1,0	
5903	Textile fabrics impregnated, coated, covered or laminated with plastics, other than those of heading 5902	92,8	131,4	0,2	1,1	1,0	0,20
5910	Transmission/conveyor belts/belting, of tex.material	10,1	15,6	0,3	2,0	2,0	3,41
6101	Men's or boys' overcoats, car-coats, capes, cloaks, anoraks (including ski-jackets), wind-cheaters, wind-jackets and similar articles, knitted or crocheted, other than those of heading No 6103	42,5	43,4	0,5	1,5	1,0	1,08
6106	Women's or girls' blouses, shirts and shirt-blouses, knitted or crocheted	59,0	213,6	1,6	1,3	3,2	2,71
6301	Blankets and travelling rugs	77,1	205,6	1,3	2,2	4,0	1,71
6804	Millstones, grindstones, grinding wheels and the like, without frameworks, for grinding, sharpening, polishing, trueing or cutting, hand sharpening or polishing stones, and parts thereof, of natural stone, of agglomerated natural or artificial abrasives,	177,3	65,9	1,5	4,1	1,0	0,82
6813	Friction material and articles thereof (for example, sheets, rolls, strips, segments, discs, washers, pads), not mounted, for brakes, for clutches or the like, with a basis of asbestos, of other mineral substances or of cellulose, whether or not combined	28,0	54,1	1,2	2,4	3,1	4,13
6902	Refractory bricks, blocks, tiles and similar refractory ceramic constructional goods, other than those of siliceous fossil meals or similar siliceous earths	43,9	134,6	1,3	1,3	2,6	2,85
6903	Refractory ceramic goods, retorts, tubes, etc	35,3	80,3	1,1	1,9	2,8	3,18
7010	Carboys, bottles, flasks, jars, pots, phials, ampoules and other containers, of glass, of a kind used for the conveyance or packing of goods; preserving jars of glass; stoppers, lids and other closures, of glass	101,1	170,1	9,1	1,1	1,2	8,98
7017	Laboratory, hygienic or pharmaceutical glassware, whether or not graduated or calibrated	11,8	24,3	0,3	1,1	1,6	2,79
7210	Flat-rolled products of iron or non-alloy steel, of a width of 600 mm or more, clad, plated or coated	587,0	1.004,8	9,0	1,4	1,6	1,53
7220	Flat-rolled products of stainless steel, of a width of less than 600 mm	54,5	75,4	1,3	1,3	1,2	2,47
7302	Railway or tramway track construction material of iron or steel, the following: rails, check-rails and rack rails, switch blades, crossing frogs, point rods and other crossing pieces, sleepers (cross-ties), fish-plates, chairs, chair wedges, sole plates (94,7	46,6	0,0	3,1	1,0	0,01

TABLE A.2 (cont.)
List of Indian Export Opportunities to Brazil, by HS4 code

HS4	Description	Imports Brazil	Exports India	Exports Ind to Bra	RCA India	RCD Brazil	M-S India
7307	Tube or pipe fittings (for example, couplings, elbows, sleeves), of iron or steel	211,9	619,7	2,3	1,3	2,5	1,09
7318	Screws, bolts, nuts, coach screws, screw hooks, rivets, cotters, cotter-pins, washers (including spring washers) and similar articles, of iron or steel	611,1	589,9	9,9	1,7	1,1	1,62
7403	Refined copper and copper alloys, unwrought	1.184,6	1.585,7	2,5	2,1	1,9	0,21
7609	Accessories for tubes of aluminum	12,6	13,4	0,0	1,6	1,2	0,35
7614	Stranded wire, cables, plaited bands and the like, of aluminium, not electrically insulated	50,8	99,7	1,4	6,4	8,3	2,83
7801	Unwrought lead	153,3	357,0	0,0	2,2	3,4	0,01
8203	Files, rasps, pliers (including cutting pliers), pincers, tweezers, metal cutting shears, pipe-cutters, bolt croppers, perforating punches and similar hand tools	24,7	50,2	2,2	1,2	1,6	8,71
8205	Hand tools (including glaziers' diamonds), not elsewhere specified or included; blow-lamps; vices, clamps and the like, other than accessories for and parts of, machine tools; anvils; portable forges; hand or pedal-operated grinding wheels with frameworks	58,9	112,7	1,1	0,9	1,1	1,90
8209	Plates, sticks, tips etc f tools unmounted sntrd crbds/cermets	67,7	126,1	2,3	1,2	1,5	3,35
8215	Spoons, forks, ladles, skimmers, cake-servers, fish-knives, butter-knives, sugar tongs and similar kitchen or tableware	21,7	49,3	1,7	1,2	1,7	8,02
8307	Flexible tubing of base metal, with or without fittings	211,6	37,8	0,8	10,9	1,3	0,37
8309	Stoppers, caps and lids (including crown corks, screw caps and pouring stoppers), capsules for bottles, threaded bungs, bung covers, seals and other packing accessories, of base metal	59,8	82,6	1,8	1,0	0,9	2,98
8402	Steam or other vapour generating boilers (other than central heating hot water boilers capable also of producing low pressure steam); super-heated water boilers	70,7	220,8	0,6	1,8	3,6	0,85
8404	Auxiliary plant for use with boilers of heading No 8402 or 8403 (for example, economisers, super-heaters, soot removers, gas recoverers); condensers for steam or other vapour power units	44,6	46,9	0,1	3,2	2,2	0,18
8406	Steam turbines and other vapour turbines	41,8	145,1	0,1	1,1	2,6	0,24
8408	Compression-ignition internal combustion piston engines (diesel or semi-diesel engines)	483,2	805,6	17,9	1,2	1,3	3,70
8409	Parts suitable for use solely or principally with the engines of heading No 8407 or 8408	991,2	1.069,9	23,1	1,7	1,2	2,33
8412	Other engines and motors	214,6	479,9	2,8	1,0	1,4	1,28
8413	Pumps for liquids, whether or not fitted with a measuring device; liquid elevators	674,9	947,6	18,2	1,1	1,1	2,70
8437	Machines for cleaning, sorting or grading seed, grain or dried leguminous vegetables; machinery used in the milling industry or for the working of cereals or dried leguminous vegetables, other than farm-type machinery	24,2	25,3	0,5	1,6	1,1	2,09
8441	Other machinery for making up paper pulp, paper or paperboard, including cutting machines of all kinds	78,9	89,2	0,1	1,4	1,0	0,16
8445	Machines for preparing textile fibres; spinning, doubling or twisting machines and other machinery for producing textile yarns; textile reeling or winding (including weft-winding) machines and machines for preparing textile yarns for use on the machines o	48,2	187,4	3,4	1,6	4,0	6,99
8448	Auxiliary machinery for use with machines of heading 8444, 8445, 8446 or 8447 (for example, dobbies, jacquards, automatic stop motions, shuttle changing mechanisms); parts and accessories suitable for use solely or principally with the machines of this he	57,2	149,1	1,7	1,4	2,3	2,97
8455	Metal-rolling mills and rolls therefor	90,2	67,7	0,3	2,4	1,2	0,31
8481	Taps, cocks, valves and similar appliances for pipes, boiler shells, tanks, vats or the like, including pressure-reducing valves and thermostatically controlled valves	965,1	1.492,7	7,9	1,2	1,2	0,82
8482	Ball or roller bearings	599,8	617,7	13,4	2,0	1,4	2,24
8483	Transmission shafts (including cam shafts and crank shafts) and cranks; bearing housings and plain shaft bearings; gears and gearing; ball or roller screws; gear boxes and other speed changers, including torque converters; flywheels and pulleys, including	1.013,9	1.501,0	45,2	1,9	1,9	4,46

TABLE A.2 (cont.)
List of Indian Export Opportunities to Brazil, by HS4 code

HS4	Description	Imports Brazil	Exports India	Exports Ind to Bra	RCA India	RCD Brazil	M-S India
8484	Gaskets and similar joints of metal sheeting combined with other material or of two or more layers of metal; sets or assortments of gaskets and similar joints, dissimilar in composition, put up in pouches, envelopes or similar packings; mechanical seals	99,6	93,0	0,6	1,6	1,0	0,58
8502	Electric generating sets and rotary converters	236,5	273,7	1,4	1,4	1,1	0,57
8503	Parts suitable for use with the machines of heading 8501 or 8502	169,1	288,0	3,7	1,1	1,2	2,21
8504	Electrical transformers, static converters (for example, rectifiers) and inductors	868,9	1.405,7	13,2	1,0	1,1	1,52
8511	Electrical ignition or starting equipment of a kind used for spark-ignition or compression-ignition internal combustion engines (for example, ignition magnetos, magneto-dynamos, ignition coils, sparking plugs and glow plugs, starter motors); generators (f	256,6	338,6	3,4	1,4	1,2	1,33
8535	Electrical apparatus for switching or protecting electrical circuits, or for making connections to or in electrical circuits (for example, switches, fuses, lightning arresters, voltage limiters, surge suppressors, plugs, junction boxes), for a voltage exc	134,7	163,9	4,3	2,0	1,6	3,17
8545	Carbon electrodes, carbon brushes, lamp carbons, battery carbons and other articles of graphite or other carbon, with or without metal, of a kind used for electrical purposes	115,5	428,7	6,5	1,6	3,9	5,64
8546	Electrical insulators of any material	49,8	58,8	1,1	2,3	1,8	2,26
8714	Parts and accessories of vehicles of headings 8711 to 8713	558,3	237,6	12,7	3,2	0,9	2,28
9022	Apparatus based on the use of X-rays or of alpha, beta or gamma radiations, whether or not for medical, surgical, dental or veterinary uses, including radiography or radiotherapy apparatus, X-ray tubes and other X-ray generators, high tension generators,	280,1	308,0	7,3	1,3	1,0	2,59
9114	Other clock or watch parts	17,2	28,2	0,0	0,9	1,0	0,01
9301	Military weapons, other than revolvers, pistols and the arms of heading 9307	13,1	41,0	-	3,3	6,9	-
9608	Ballpoint pens; felt-tipped and other porous-tipped pens and markers; fountain pens, stylograph pens and other pens; duplicating stylos; propelling or sliding pencils; pen-holders, pencil-holders and similar holders; parts (including caps and clips) of th	51,2	145,8	4,4	1,0	1,8	8,67

Source: Elaborated by the authors.

APPENDIX B: METHODOLOGICAL NOTES, NTM NOMECLATURE AND INCIDENCE BY REPORTER AND HS2 CODE

Equations (1) to (3) define the inventory approach indexes for a given reporter, specifically, the Frequency Index (*FI*), the Cover Ratio (*CR*) and the Prevalence Score (*PV*). For a given reporter *i*: D_i^s is a dummy variable that controls the incidence of any NTM on a commodity *s*; *H* is the number of commodities in the nomenclature; M_i^s is the import value of product *s*; N_i^s is the number of unique NTM codes applied to product *s*.

$$FI_i = \frac{\sum_s D_i^s}{H} \times 100 \quad (1)$$

$$CR_i = \frac{\sum_s D_i^s M_i^s}{\sum_s M_i^s} \times 100 \quad (2)$$

$$PV_i = \frac{\sum_s D_i^s N_i^s}{H} \quad (3)$$

The indexes can be further qualified by manipulating the terms in the equations above. A general solution is to restrict the universe in each of the terms and select arbitrary samples for each variable. For example, it means considering only a selection of NTM codes, such as measures included in specific chapters, restricting to a subset of the commodities in the nomenclature, or to control the type of measure, or applied to whole economy (general measures), or to specific sets of countries. Each criterion can be applied in combination with others and the result is a more diverse number of perspectives that enrich the analysis and take most of the qualitative content of data.

Chart A1 presents the organization of the Non-Tariff Measure international classification developed by UNCTAD in a tree structure and provide a description to each chapter in the nomenclature.

CHART C.1
Classification of Non-Tariff Measures, by Chapter.

Import-related Measures	Technical Measures	A	Sanitary and phytosanitary measures (SPS)
		B	Technical barriers to trade (TBT)
		C	Pre-shipment inspection and other formalities
	Non-technical Measures	D	Contingent trade-protective measures
		E	Non-automatic import licensing, quotas, prohibitions, quantity-control measures, and other restrictions not including sanitary and phytosanitary measures or measures relating to technical barriers to trade
		F	Price-control measures, including additional taxes and charges
		G	Finance measures
		H	Measures affecting competition
		I	Trade-related investment measures
		J	Distribution restrictions
		K	Restrictions on post-sales services
		L	Subsidies and other forms of support
		M	Government procurement restrictions
		N	Intellectual property
		O	Rules of origin
Export-related Measures	P	Export-related measures	

Source: Prepared by the authors based on UNCTAD (2017).

Table C.1
NTM Incidence on India and Brazil - Frequency Index, Cover Ratio and
Prevalence Score.
 HS2 code

HS2	Description	India (1)			Brazil (2)		
		FI (%)	CR (%)	PV	FI (%)	CR (%)	PV
01	Animals; live	100.00	100.00	11.91	100.00	100.00	12.21
02	Meat and edible meat offal	100.00	100.00	32.36	100.00	100.00	17.30
03	Fish and crustaceans, molluscs and other aquatic invertebrates	100.00	100.00	35.57	100.00	100.00	16.44
04	Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included	100.00	100.00	33.50	100.00	100.00	12.97
05	Animal originated products; not elsewhere specified or included	100.00	100.00	9.40	100.00	100.00	9.47
06	Trees and other plants, live; bulbs, roots and the like; cut flowers and ornamental foliage	100.00	100.00	18.00	100.00	100.00	9.38
07	Vegetables and certain roots and tubers; edible	100.00	100.00	32.70	100.00	100.00	11.61
08	Fruit and nuts, edible; peel of citrus fruit or melons	100.00	100.00	32.67	100.00	100.00	14.55
09	Coffee, tea, mate and spices	100.00	100.00	32.95	100.00	100.00	15.90
10	Cereals	100.00	100.00	31.50	100.00	100.00	13.58
11	Products of the milling industry; malt, starches, inulin, wheat gluten	100.00	100.00	32.85	100.00	100.00	14.04
12	Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit, industrial or medicinal plants; straw and fodder	100.00	100.00	32.10	100.00	100.00	13.69
13	Lac; gums, resins and other vegetable saps and extracts	100.00	100.00	29.80	100.00	100.00	12.30
14	Vegetable plaiting materials; vegetable products not elsewhere specified or included	100.00	100.00	11.80	100.00	100.00	9.00
15	Animal or vegetable fats and oils and their cleavage products; prepared animal fats; animal or vegetable waxes	100.00	100.00	29.90	100.00	100.00	16.35
16	Meat, fish or crustaceans, molluscs or other aquatic invertebrates; preparations thereof	100.00	100.00	32.66	100.00	100.00	14.29
17	Sugars and sugar confectionery	100.00	100.00	27.82	100.00	100.00	15.94
18	Cocoa and cocoa preparations	100.00	100.00	22.55	100.00	100.00	13.09
19	Preparations of cereals, flour, starch or milk; pastrycooks' products	100.00	100.00	25.89	100.00	100.00	14.58
20	Preparations of vegetables, fruit, nuts or other parts of plants	100.00	100.00	27.42	100.00	100.00	15.69
21	Miscellaneous edible preparations	100.00	100.00	28.44	100.00	100.00	14.88
22	Beverages, spirits and vinegar	100.00	100.00	23.50	100.00	100.00	12.00
23	Food industries, residues and wastes thereof; prepared animal fodder	100.00	100.00	10.91	100.00	100.00	12.13
24	Tobacco and manufactured tobacco substitutes	100.00	100.00	12.30	100.00	100.00	7.40
25	Salt; sulphur; earths, stone; plastering materials, lime and cement	54.41	69.29	3.50	45.59	83.56	3.12
26	Ores, slag and ash	43.24	3.47	5.32	32.43	96.72	1.05
27	Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes	74.42	82.69	8.30	74.42	86.78	1.93
28	Inorganic chemicals; organic and inorganic compounds of precious metals; of rare earth metals, of radio-active elements and of isotopes	47.59	63.42	4.86	100.00	100.00	12.11
29	Organic chemicals	62.20	68.76	6.16	100.00	100.00	13.24
30	Pharmaceutical products	87.10	99.27	13.35	100.00	100.00	14.26
31	Fertilizers	100.00	100.00	9.26	100.00	100.00	13.04
32	Tanning or dyeing extracts; tannins and their derivatives; dyes, pigments and other colouring matter; paints, varnishes; putty, other mastics; inks	15.91	21.08	1.05	100.00	100.00	11.66
33	Essential oils and resinoids; perfumery, cosmetic or toilet preparations	86.21	77.32	6.72	100.00	100.00	13.59
34	Soap, organic surface-active agents; washing, lubricating, polishing or scouring preparations; artificial or prepared waxes, candles and similar articles, modelling pastes, dental waxes and dental preparations with a basis of plaster	30.43	43.38	3.22	100.00	100.00	12.00
35	Albuminoidal substances; modified starches; glues; enzymes	80.00	58.10	21.20	100.00	100.00	13.13
36	Explosives; pyrotechnic products; matches; pyrophoric alloys; certain combustible preparations	87.50	100.00	11.00	87.50	99.43	1.63
37	Photographic or cinematographic goods	6.45	0.03	0.13	12.90	40.29	0.26
38	Chemical products n.e.c.	55.56	56.36	7.07	55.56	93.71	3.11
39	Plastics and articles thereof	7.14	1.61	0.72	19.05	14.56	0.45
40	Rubber and articles thereof	14.12	34.11	0.60	42.35	63.81	1.02

(Table C1 Continues)							
41	Raw hides and skins (other than furskins) and leather	100.00	100.00	7.32	83.78	89.06	5.68
42	Articles of leather; saddlery and harness; travel goods, handbags and similar containers; articles of animal gut (other than silk-worm gut)	100.00	100.00	6.15	95.00	100.00	1.50
43	Furskins and artificial fur; manufactures thereof	100.00	100.00	9.00	100.00	100.00	5.92
44	Wood and articles of wood; wood charcoal	81.58	97.54	11.08	100.00	100.00	8.09
45	Cork and articles of cork	71.43	79.69	7.14	100.00	100.00	4.71
46	Manufactures of straw, esparto or other plaiting materials; basketware and wickerwork	100.00	100.00	10.00	100.00	100.00	8.00
47	Pulp of wood or other fibrous cellulosic material; recovered (waste and scrap) paper or paperboard	76.19	99.78	1.71	0.00	0.00	0.00
48	Paper and paperboard; articles of paper pulp, of paper or paperboard	1.98	27.46	0.02	15.84	12.61	1.43
49	Printed books, newspapers, pictures and other products of the printing industry; manuscripts, typescripts and plans	5.26	5.87	0.05	0.00	0.00	0.00
50	Silk	100.00	100.00	2.89	88.89	99.86	1.22
51	Wool, fine or coarse animal hair; horsehair yarn and woven fabric	100.00	100.00	7.29	100.00	100.00	4.00
52	Cotton	100.00	100.00	3.48	100.00	100.00	3.08
53	Vegetable textile fibres; paper yarn and woven fabrics of paper yarn	100.00	100.00	5.78	100.00	100.00	3.48
54	Man-made filaments; strip and the like of man-made textile materials	97.14	98.49	2.97	82.86	82.56	0.83
55	Man-made staple fibres	79.44	55.13	2.37	90.65	84.89	0.92
56	Wadding, felt and nonwovens, special yarns; twine, cordage, ropes and cables and articles thereof	100.00	100.00	5.00	96.67	98.26	1.13
57	Carpets and other textile floor coverings	100.00	100.00	4.43	95.24	81.63	0.95
58	Fabrics; special woven fabrics, tufted textile fabrics, lace, tapestries, trimmings, embroidery	100.00	100.00	3.16	86.84	92.95	0.87
59	Textile fabrics; impregnated, coated, covered or laminated; textile articles of a kind suitable for industrial use	100.00	100.00	3.00	91.67	98.80	1.08
60	Fabrics; knitted or crocheted	100.00	100.00	3.23	95.35	99.89	0.95
61	Apparel and clothing accessories; knitted or crocheted	100.00	100.00	6.20	87.74	98.77	0.98
62	Apparel and clothing accessories; not knitted or crocheted	100.00	100.00	6.19	95.54	99.52	1.14
63	Textiles, made up articles; sets; worn clothing and worn textile articles; rags	100.00	100.00	4.14	68.63	87.28	0.71
64	Footwear; gaiters and the like; parts of such articles	100.00	100.00	3.80	68.00	72.43	1.12
65	Headgear and parts thereof	12.50	3.11	0.88	37.50	81.13	0.75
66	Umbrellas, sun umbrellas, walking-sticks, seat sticks, whips, riding crops; and parts thereof	33.33	47.94	2.33	0.00	0.00	0.00
67	Feathers and down, prepared; and articles made of feather or of down; artificial flowers; articles of human hair	25.00	46.65	1.75	12.50	0.56	0.13
68	Stone, plaster, cement, asbestos, mica or similar materials; articles thereof	26.53	15.60	0.78	2.04	0.00	0.02
69	Ceramic products	0.00	0.00	0.00	37.93	46.14	0.38
70	Glass and glassware	3.13	2.20	0.27	15.63	26.50	0.66
71	Natural, cultured pearls; precious, semi-precious stones; precious metals, metals clad with precious metal, and articles thereof; imitation jewellery; coin	50.94	97.21	1.79	7.55	0.01	0.19
72	Iron and steel	29.94	54.67	1.60	4.19	3.63	0.08
73	Iron or steel articles	5.65	1.48	0.09	42.74	30.25	0.68
74	Copper and articles thereof	16.00	24.34	0.28	18.00	6.52	0.20
75	Nickel and articles thereof	11.76	6.22	0.41	5.88	0.00	0.06
76	Aluminium and articles thereof	5.71	44.36	0.23	25.71	15.73	0.43
78	Lead and articles thereof	12.50	21.64	2.38	0.00	0.00	0.00
79	Zinc and articles thereof	11.11	25.12	0.22	22.22	6.75	0.22
80	Tin; articles thereof	20.00	0.00	0.40	20.00	0.00	0.20
81	Metals; n.e.c., cermets and articles thereof	56.25	26.10	4.38	27.08	5.93	0.27
82	Tools, implements, cutlery, spoons and forks, of base metal; parts thereof, of base metal	17.19	2.06	1.20	100.00	100.00	8.36
83	Metal; miscellaneous products of base metal	0.00	0.00	0.00	0.00	0.00	0.00
84	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof	82.84	81.86	11.63	100.00	100.00	8.56
85	Electrical machinery and equipment and parts thereof; sound recorders and reproducers; television image and sound recorders and reproducers, parts and accessories of such articles	82.20	81.47	11.51	100.00	100.00	8.28

(Table C1 Continues)

86	Railway, tramway locomotives, rolling-stock and parts thereof; railway or tramway track fixtures and fittings and parts thereof; mechanical (including electro-mechanical) traffic signalling equipment of all kinds	39.13	28.51	5.48	8.70	16.87	0.13
87	Vehicles; other than railway or tramway rolling stock, and parts and accessories thereof	51.35	46.54	2.14	100.00	100.00	10.84
88	Aircraft, spacecraft and parts thereof	40.00	63.56	0.40	60.00	97.55	4.80
89	Ships, boats and floating structures	33.33	0.07	0.56	5.56	0.00	0.06
90	Optical, photographic, cinematographic, measuring, checking, medical or surgical instruments and apparatus; parts and accessories	20.69	27.70	1.77	100.00	100.00	10.31
91	Clocks and watches and parts thereof	53.06	74.20	6.55	2.04	0.56	0.06
92	Musical instruments; parts and accessories of such articles	82.35	97.09	7.18	0.00	0.00	0.00
93	Arms and ammunition; parts and accessories thereof	100.00	100.00	8.28	100.00	100.00	2.61
94	Furniture; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings; lamps and lighting fittings, n.e.c.; illuminated signs, illuminated name-plates and the like; prefabricated buildings	87.18	94.48	1.51	69.23	71.07	4.67
95	Toys, games and sports requisites; parts and accessories thereof	19.35	58.14	1.68	100.00	100.00	8.35
96	Miscellaneous manufactured articles	31.25	22.08	1.81	25.00	47.66	2.06
97	Works of art; collectors' pieces and antiques	57.14	98.96	4.00	0.00	0.00	0.00
99	Commodities not specified according to kind	0.00	0.00	0.00	0.00	0.00	0.00

Note: Indexes are based on the number and imported values of unique 6-digit level codes included in the HS2 sections of the Harmonized System. (1) Data collected in 2017. (2) Data collected in 2016.

Source: Prepared by the authors based on UNCTAD TRAINS and COMTRADE.