**THE PECULIAR INSERTION OF BRAZIL INTO GLOBAL VALUE CHAINS**

**Julia de Oliveira Callegari –** Especialista em Análise Econômica pela Universidade de São Paulo

**Tatiana Massaroli Melo** – Professora do Departamento de Economia da UNESP

**Carlos Eduardo Carvalho** - Professor do Departamento de Economia da PUCSP e do Programa de Pós-Graduação em Relações Internacionais San Tiago Dantas (Unesp/Unicamp/PUCSP)

**ABSTRACT**

Brazil plays a very peculiar role in global value chains (GVCs): the country imports high technology goods while going through early deindustrialization and relying mainly on basic goods for its exports. Even after developing a broad, diversified industrial framework and becoming one of the countries that has received the most foreign direct investments in the past few years, Brazil has been struggling to occupy a more technology-oriented place in GVCs. This paper examines the determinants of this pattern of insertion by characterizing the country’s quantitative and qualitative model of integration into GVCs and by analyzing the elements that can explain this performance.

Keywords: Brazil, global value chains, industrialization, foreign trade

**RESUMO**

O Brasil apresenta uma inserção peculiar nas cadeias globais de valor (CGVs): nível elevado de importações de bens tecnologicamente avançados com peso crescente dos produtos primários na pauta de exportações e desindustrialização precoce. Apesar de ter desenvolvido uma estrutura industrial ampla e diversificada e de ser um dos principais receptores de investimento externo direto nos últimos anos, o país tem inserção reduzida em CGVs com maior dinamismo tecnológico. O artigo avalia os determinantes desta natureza da inserção brasileira por meio da caracterização quantitativa e qualitativa do padrão de integração do país nas CGVs e da análise dos elementos que podem explicar esse desempenho.

Palavras-chave: Brasil, cadeias globais de valor, industrialização, comércio exterior

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1. **INTRODUCTION**

The fragmentation of production in GVCs challenges traditional forms of participation of countries in the international economy and imposes new conditions on the integration of nations across global trade.

The concept of "value chain" refers to the various production stages in which companies engage in order to provide products or services to the market, from their conception to their delivery as final products. Examples of these activities range from design and marketing to assembly, logistics, and distribution, and can be internalized by one company or coordinated among several (Baldwin and Venables, 2013; Backer and Miroudot, 2013; Kowalski et al., 2015). Technological advances across communication and transportation, as well as the reduction of trade barriers, have resulted in companies sourcing inputs from other countries, signifying the emergence of value chains as a global feature. The main objective of leading companies with the division of production into stages located outside their national territories is to reduce costs and improve quality. As a result, they are able to obtain final products and services that are more competitive and to expand or maintain their position in the markets in which they participate.

The process of geographical fragmentation of production has gained in speed, scale and complexity since the end of the 1970s due to a significant reduction of the costs involved in business transactions. More reliable, dynamic and cost effective telecommunication systems; faster and safer means of transportation; liberalization of investments; a reduction in trade barriers; and the development of management software and powerful computers are examples of elements that have facilitated and strengthen the exchange and coordination of activities among companies distant from each other.

With this new global arrangement, significant changes started to take place in the international economy. Regions and countries begun to enter the global market as producers of intermediate goods, which currently account for over 60% of world trade; specialization in specific parts and sub-processes has become a more competitive alternative to vertical integration of production within one country; and bilateral or regional trade agreements are slowly replacing multilateral negotiations.

Nations of South and South-East Asia provide examples of successful insertion into GVCs. The integration of their economies into world production began in low technology sectors with intense demand for low-skilled labor and, in some cases, natural resources. In some of these nations, upgrading in GVCs towards more advanced stages of production allowed consolidation of advanced technology sectors.

In Latin America and the Caribbean (LAC), on the other hand, the results have been different: while 56% of total South and South-East Asian exports were integrated into GVCs in 2009, a level similar to that of all developed nations (59%), the corresponding percentage for all LAC nations was 40% (Zhang et al., 2014, using data from UNCTAD)[[1]](#footnote-1). Looking at specific nations from both regions and considering the 25 biggest exporters in 2009, the UNCTAD data also reveal that Singapore, Philippines and Malaysia had high rates of participation in GVCs, respectively 71%, 67% and 66%, while Brazil was the second lowest ranked nation, at 36%, ahead of only India.

Brazil's insertion into these GVCs can be initially characterized by the low use of imported inputs in the country’s exports (a concept known as backward participation) – and that is usually the case in countries with a large domestic market and high levels of industrial development. While imports are mostly used to add value to exports in countries with high backward participation, Brazilian imports of technological goods are mainly for domestic consumption. That is reinforced by the 'early deindustrialization' process the Brazilian economy is going through as the share of the industrial sector in total employment and GDP decreases without a corresponding increase in service sector productivity.

Considering the forward participation criteria – i.e. the share of national inputs in third countries’ exports – Brazil's performance is similar to that of other developing countries, but with a high concentration of basic goods with a low level of processing and few bonds with the country's domestic industrial structure.

Therefore, Brazil’s singular insertion in GVCs can be characterized by (I) an industrial sector that is highly focused on the domestic market and boosted by high foreign direct investments and imported medium-high technology goods; and (II) increasing basic goods exports. In informal settings, this process has been described as a kind of 'inverted *maquila* industry', oriented to the internal market. That is a reference, though exaggerated, to Mexico's *maquila* industry, which is oriented to the external market, where factories import products from the USA for assembly and then export finished products, with low participation of local suppliers.

With a view to analyzing the conditioning elements of the Brazilian pattern of insertion into GVCs and their impacts on the competitive dynamics of the country's economy, this paper has been divided into an introduction, three sections and a conclusion: the first section discusses the relevance of insertion into GVCs for economic development and presents a theoretical framework for the proposed discussion, with a literature review of definitions of different forms of GVC participation (backward and forward) and of its determining factors; the second section shows indicators of the Brazilian participation in GVCs; and the third section explores the economic elements that can explain the country's performance in such indicators.

1. **THE PARTICIPATION OF COUNTRIES IN GVCs: BASIC TYPOLOGY AND DETERMINANTS**

As briefly mentioned before, academic literature about GVCs (Baldwin and Venables, 2013; Backer and Miroudot, 2013; Gereffi et al., 2001) usually divides the participation of countries in GVCs into backward and forward linkages. Each of these forms of engagement is determined by distinct elements, which may be structural factors of the economy or factors arising from trade or industrial policies. Kowalski et al. (2015) conducted an econometric study seeking to correlate the GVC integration index and various aspects of the economy. As a result, the authors propose a list of elements that have the greatest impact on the participation of a country in these GVCs due to the high statistical significance found in this correlation. The results of the authors’ study are presented below, along with further explanations about the relevance of each of these factors to determine the participation in GVCs:

1. **Degree of industrialization:** positively correlated with the backward participationand negatively with forward participation. Reason: economies exporting raw products tend to have less imported intermediates used in their exports, given the primary stage of processing in which these products are sold externally. On the other hand, forward participation tends to be higher in primary economies, as commodities are used as inputs into production processes in third countries and resold by them.
2. **Protectionism:** negative correlation between tariffs imposed on a country’s exports and its forwardparticipation index; negative correlation between tariffs imposed by a country on intermediate inputs and its backward participation. One of the characteristics that defines the GVCs (OECD, 2013) is that final exports increasingly incorporate intermediate imports, considering that the decentralization of production might generate potential productivity gains and higher competitiveness. Thus, the restricted access to such imported inputs, due to tariff and non-tariff protectionist measures, could result in a significant competitive disadvantage (Miroudot, Rouzet, Spinelli, 2013).
3. **Size of the internal market:** positive correlation with forward participation index and negative correlation with backwardparticipation index. The explanation is that the larger the domestic market, the greater tends to be the variety and quantity of domestic intermediate products available, reducing the necessity of importing them. On the other hand, the forward index tends to be higher due to the larger amount of these products used in third parties’ exports.
4. **Investments in research and development (R&D) and intellectual property rights:** positive correlation with backward participation given that a particularly important driver for upgrading in GVCs is the investment in knowledge-based capital and the existence of intellectual property rights.
5. **Reliability of suppliers related to logistic and institutional quality:** positive correlation with backward participation. The explanation of Kowalski et al. (2015) for this evidence is that companies face risks when producing abroad, such as the possibility of delays in the delivery of components. Therefore, it is natural that such companies seek trade partners with adequate logistics infrastructure, for example in transport and in information and communication technologies (ICTs), in order to reduce logistic failures that may result in various costs related to stock maintenance, depreciation and others. In addition, reliability refers to the credibility of the government and national companies when it comes to fulfilling their commitments and agreements and it is also linked to the political and macroeconomic stability of the nation.
6. **Inward foreign direct investment (FDI) openness:** positive correlation with backward participation. Reason: many foreign multinationals establish subsidiaries in other countries to import intermediate products, process and then export them.
7. **Preferential trade agreements (PTAs):** positive correlation between the share of imports covered by PTAs and the backward participation index. The number of PTAs has increased mainly due to difficulties faced in multilateral trade negotiations, represented by the deadlock of the Doha Round negotiations, and the need to update the rules of international trade. In this context, the new PTAs are not limited to the scope of the World Trade Organization (WTO) agreements on market access through the reduction of tariff and non-tariff barriers to trade between the partners. Besides the elimination or reduction of tariffs, PTAs often incorporate and promote new topics, such as harmonization of technical norms and standards, intellectual property, the openness of the service sector and investment. This contributes to reducing costs of transactions and to eliminating antagonisms in the regulatory framework of the signatory countries, which could create obstacles to the international fragmentation of production.
8. **Location:** negative correlation between backward participation and distance to the closest manufacturing hubs. The reason is that GVC activity is usually organized around large manufacturing hubs, as large industrial economies tend to develop supply chains in their trade and investment relationships with neighboring countries.

After pointing out some factors that have a significant impact on a country's participation in GVCs, it is important to consider the possible effects of such participation on a country’s economy. On the one hand, insertion into GVCs is considered one factor of high potential impact on the development of small nations, due to their limited internal markets, which imply lesser conditions for the diversification of input production internally. In larger economies, on the other hand, the relative importance of GVC participation to economic development is smaller. This is because an internal market of significant dimensions, as well as making possible a greater variety and quantity of domestically produced intermediate goods, also allows for the use of more restrictive commercial and industrial protectionist policies which are unviable in smaller economies, such as local content policies (Gereffi, 2014).

A second important consideration is that GVC participation implies certain risks, such as that (I) nations which participate in the initial stages of these chains may never develop the autonomy and capacity necessary to create and commercialize goods and services led by their own companies; (II) involvement in low value added activities may lock companies and national industries in non-lucrative and intellectually restricted segments; and (III) the greatest profits from the final product in transnational chains are concentrated among the leading companies, which control, for example, the brand and conceptualization of the product (Humphrey, 2004).

With these considerations in mind, it is argued that, although GVC participation is no panacea for development (Gereffi, 2014), especially for nations with diversified internal markets, discussion of a nation’s integration into these chains is of great importance. This is due to the opportunity that such integration generates for the diversification of trade and, consequently, for job creation and productivity gains resulting from learning, technology transfer and knowledge diffusion. These gains arise from the fact that, as GVC transactions and investments are normally accompanied by quality control systems and predominant global business standards, nations which participate in these chains have the opportunity to acquire new competencies and skills (Sturgeon, Gereffi, Guinn and Zylberberg, 2013). These improvements in productive processes, in turn, may extend to other companies and sectors, not only exporters.

In fact, a study by the OECD, WTO and UNCTAD (2013) revealed a positive correlation between the GVC participation of developing nations and their GDP growth per capita: considering a 20-year period (from 1990 to 2010), economies with faster growth in GVC participation (top quartile of GVC participation growth) had an annual rate of GDP per capita growth approximately 2.5 percentage points greater than economies in the lowest quartile.

1. **BRAZIL IN GVCs: SOME RELEVANT INDICATORS**

In 2013, the WTO and OECD jointly launched the TiVA (Trade in Value Added) Database, with backward and forward participation indexes, based on the indices calculated by Koopman et al. (2010). The methodology used in this calculation consisted of decomposition of gross exports into value added shares by source country, resulting in the development of a matrix that enables to obtain (I) the contribution of foreign industries to exports (backward); and (II) the contribution of domestically produced intermediates to exports in third countries (forward). The general GVC participation index adds the backward and forward participation and is expressed as a share of gross exports. TiVA’s data consolidation is still in progress and the latest year available is 2009.

Figure 1 shows that Brazil is behind many developing countries (selected from the list of the 25 largest developing economies) when it comes to its participation in GVCs.

The most critical point for determining Brazil's low participation in GVCs is the modest use of foreign inputs in exports (backward indicator, see Figure 2), suggesting that imports are generally purchased for the domestic market, not to add value to exports. Brazilian inputs used in third countries’ exports (forward participation, see Figure 3) is relatively high, but that is mainly due to the fact that Brazil exports basic goods that are subsequently processed by other countries. The focus on exporting commodities (as explained later) is accompanied by the country’s significant participation in the GVCs as a supplier of basic goods used in other countries’ productive chains.

Figure 4 shows the index of foreign value added in exports of electric machinery and apparatus, an industry that usually consists of medium-high technology goods, in which one would expect fairly high value added from foreign inputs in exports since Brazil has average levels of income and technological sophistication. The six largest indices correspond to countries with average levels of technological sophistication, while the three most technically advanced countries show relatively low indices: Japan, the United States and Germany. Brazil scores last in Figure 4, right next to Japan, which suggests that both countries have low backward participation in GVCs and high density in national productive chains in this sector. Nonetheless, contrary to Japan, Brazil cannot rely on a developed high-technology industrial sector. Therefore, high foreign value added in the production of medium and high technology goods becomes paramount to be competitive in exports.

According to TiVA, basic products concentrate the largest share of intermediate goods that are imported and re-exported by Brazil, despite their low level of processing: agriculture (21%), mining (20%), basic metals (19%), food (17%), mineral products (16%), paper and wood (13%). That shows that Brazil's participation in GVCs is concentrated on commodities also from the backward perspective.

1. **DETERMINING FACTORS OF BRAZIL'S PARTICIPATION IN GVCs: KOWALSKI'S EIGHT ELEMENTS**

In order to explain Brazil's competitiveness and the country's insertion into the global market, this section discusses how the eight factors previously mentioned as determinants of a country's participation in GVCs are presented in the Brazilian economy, as well as the interrelation between them. The industrialization level is the first topic addressed given its importance in the analysis of the Brazilian scenario.

**4.1 Deindustrialization and reprimarization of the Brazilian economy**

The discussion on Brazil's insertion into GVCs must take into consideration the process of deindustrialization seen in the past few years. In economic theory, deindustrialization is not necessarily a negative phenomenon, but rather a byproduct of economic progress in developed countries, marked by a GDP that relies less on manufacturing and more on services. That could be explained by an increase in per capita income in developed countries and by a reduction in the income elasticity coefficient of the demand for manufactured products (Clark, 1957; Sachs and Shatz, 1994; Rowthorn and Ramaswany, 1999). Early deindustrialization, on the other hand, is considered an unwanted phenomenon. This earliness may be identified when a certain target is not met – i.e. when deindustrialization takes place before the economy has reached high per capita income, estimated at US$ 25,000.00 based on constant 2005 prices (Morceiro, 2016), or before the service sector uses technical improvements to increase manufacturing productivity.

In Latin America, contrary to developed countries, deindustrialization has been followed by a reduction of the value added to manufacturing processes (an average 2.0% decrease per year from 2004 to 2014) and low per capita income (US$ 5,000 in 2015), which can be interpreted as early deindustrialization (UNCTAD, 2003).

The Brazilian case is a clear example of early deindustrialization. According to UNCTAD, per capita income growth averaged 2.3% per year in Brazil from 2004 to 2014, lower than other Latin American countries, such as Argentina (3.9%), Chile (3.1%), Colombia (3.5%) and Peru (4.8%). Based on constant 2005 prices, per capita income was US$ 5,600.00 in Brazil in 2015, lower than Argentina's (US$ 7,800.00), Chile's (US$9,900.00) and Uruguay’s (US$ 8,100.00).

Low income growth and a decrease in the share of the manufacturing sector in the GDP make a stronger case for early deindustrialization in Brazil. According to UNCTAD, the value added by the Brazilian industrial sector to the country's GDP dropped by 4.4% from 2004 to 2014, which caused Brazil to rank last in this indicator among Latin American countries. It is important to note that the 1970s were a time of sound investment to build industrial parks in Brazil, and the industrial sector accounted for 30% of the country's GDP (to a peak of 31.7% in 1974). However, the value added by the industrial sector to Brazil's GDP dropped heavily after its economic opening in 1990. Between 1990 and 1995, this indicator plunged by 32.6%, reaching 17.2% in 1995. In recent years, the share of Brazil's GDP coming from the industrial sector ranked among the lowest in Latin America, accounting for as little as 10.1% in 2014, only higher than Guiana (6%).

It is important to highlight that the country has been receiving significant FDI since its economic opening, but such investments in the country have not yielded results such as productivity growth due to improved technologies at industrial parks. According to the foreign capital Census published by the Brazilian Central Bank, FDI stock grew by an average of 13% per year in Brazil from 1995 to 2014, while productivity dropped by 1.3% per year on average.

Although there was an increase in overall investments made in the Brazilian economy in the 2000s – especially between 2003 and 2008, when the investment growth rate (4.8% per year) was higher than the growth in value added (3.2% per year) –, the purpose of such investments should be looked into. The main investments were made to replace depreciated capital, not to expand and diversify the country's industrial infrastructure (Bielschowsky et al., 2015; Carvalho and Kupfer, 2011).

As one of the results of this process, there has been an increase in the share of basic goods in Brazilian exports and in the share of high value added industrialized goods in the country’s imports. An analysis of export and import penetration coefficients based on data published by the Brazilian National Confederation of the Industrial Sector (CNI) shows that the export coefficient of the Brazilian manufacturing industry grew at an average of 0.1% per year during the period of investment growth (2003 through 2008), meaning it grew significantly less than the extraction industry (4% per year). On the other hand, the manufacturing industry's import penetration coefficient grew considerably (9% per year) due to a boost by high-technology segments, such as information technology, electronics, optical devices, chemicals and electrical supplies.

CNI's data indicate that the trade balance deterioration trend continued. The manufacturing industry's import penetration increased by 5% per year between 2003 and 2015, while its export coefficient dropped by 0.4% per year.

In addition to a drop in industrial productivity and a gradual decrease in industrial participation in the country's GDP, this major gap between Brazil’s export coefficients and import penetration of manufactured goods explains the country's pattern of insertion into GVCs: importing high value added goods for the domestic market and exporting basic goods that require low level of processing, as explained in the previous section.

According to Morceiro (2016), there is evidence that Brazilian industries of medium-high technology concentrate their activities on products’ assembly in order to meet the domestic demand, with a few rare exceptions. That is the reason why imports – used in many countries as intermediate goods that add a high value to exports – have not been making Brazil more competitive in the foreign market.

According to the Brazilian Institute of Geography and Statistics (IBGE)'s national accounts data, an analysis of the final demand for goods in the country’s domestic market in recent years helps better understand this scenario, in which Brazil uses imported goods to meet the demand of its own market. Family consumption had an actual growth of 78% between 2004 and 2014, while exports increased only by 13%. Even though consumption increased significantly, domestic production did not follow the same trend and was unable to meet the increase in domestic demand. Morceiro (2016) argues that domestic demand increased by 55% from 2004 to 2013, while the manufacturing sector's domestic production grew only by 34%. The consistently high import coefficients needed to supply the Brazilian market are supported by the country's macroeconomic policies of persistently high interest rates and currency appreciation.

Finally, in order to better understand the deindustrialization that is taking place in Brazil, it is also necessary to consider the consequences of the deepening of trade ties between Brazil and China, as well as the economic rise experienced by the latter.

On the one hand, China's economic growth has given rise to an increased demand for raw materials, increasing both their prices and the income of countries producing these primary goods. Brazil, in particular, benefited from the general rise in commodity prices until 2011, with its terms of trade improving until that year (Figure 6). On the other hand, China's comparative advantage in the production of manufactured goods allowed the country to gain ground in the markets for industrial imports, including, among these, the LAC countries. Struggling to fight the competitiveness of Chinese products, Brazil lost its market share of manufacturing in the LAC region, its main export destination for these products (Figure 7).

Therefore, this trend of the rise in commodities prices, combined with the increase in exports of Chinese manufactured products to LAC, led to a rise in the share of natural resources in Brazilian exports.

**4.2 Protectionist policies and size of the internal market**

In an attempt to develop a diversified and vertically integrated industrial foundation, from the 1950s to the 1970s Brazil adopted policies that aimed at maintaining its limited exposure to the international trade, by means of an import replacement approach. According to Veiga and Rios (2015), such industrial policy was only softened in the late 1980s, when the country went through what is known as 'the decade of liberalization.' The average nominal import rate dropped from 57.5% to approximately 13% from 1987 to 1993. After a decade of liberalization, trade and industrial policies remained relatively stable in Brazil until 2010. Since then, the country's strategy to fight the international crisis was to resume its focus on protecting domestic industries and strengthening local bonds in its value chains.

In spite of these efforts to protect the domestic industrial sector, the effect seen during the 2000s and especially from 2010 onwards, as mentioned above, was an increased import penetration in the manufacturing industry to meet the rising domestic demand. In turn, that actually put even more pressure on the industrial sector for it to become more politically active trade-wise.

That resulted in an increase of tariff and non-tariff barriers. Baumann and Kumme (2013) show that, in 2010, Brazilian tariffs for capital and intermediate goods were higher in comparison to other developing countries (Table 1).

The intermediate goods tariff had a larger increase from 2005 to 2010 (from 10.7% to 11.7%) when compared to capital goods (from 13% to 13.2%). According to Veiga and Rios (2015), from 2004 to 2014 intermediate goods share in Brazilian exports dropped by 10 p.p., while consumer and capital goods grew by 6.2 and 2.2 p.p. respectively.

**Table 1: Average import tariff**



Souce: Baumann and Kume, 2013

When it comes to non-tariff barriers, they also contributed to lower the backward participation level. The increase in protectionism after 2010 was mainly due to the increase in the number of products subject to antidumping rights, the local content requirement to access tax and credit benefits, and the preference given to Brazilian companies in government procurement policies. Since 2012, out of all WTO members, Brazil is the country that launches the largest number of dumping investigations and ranks second in the number of antidumping rights (Veiga and Rios, 2015). The antidumping measures adopted in Brazil focus primarily on intermediate products: 91% of the dumping investigations launched from 2008 to 2013 targeted steel and iron, chemical, plastic, and rubber products, as well as electrical and mechanical products, basic metals, minerals, cement materials and raw materials used in the paper and textile industries; and 88% of the measures were aimed at the same products (WTO).

Analyzing the employment of these measures over a longer period, table 2 shows that between January 1995 (the year of Brazil's entry into the WTO) and 2014, 2,111 non-tariff measures were notified to trade partners and entered into force. Among the countries shown in the Table, this quantity is only below that of China (2,148 non-tariff measures), a country that has a trade flow almost 10 times larger than that of Brazil, which joined the WTO six years after Brazil (in 2001), and whose economy is still considered "market socialism".

**Table 2: Non-tariff barriers to trade – initiated and entered into force measures- 1995 a 2014**



Source: WTO

Therefore, the results suggest that the tariff and non-tariff barriers imposed by the Brazilian government have led to a decrease in backward participation due to the difficulties they pose on imports, especially of intermediate goods. This in turn may lead to a lack of incentive for the development of the technological competencies and pose competitive difficulties on the export markets (Carneiro, 2014).

The increased use of these protectionist measures and restrictive policies has been possible throughout the whole Brazilian industrial development process due to the country’s relatively diversified and integrated productive structure, which is boosted by a significantly large domestic market that grew even further with the increase in family consumption and demographic dividend. Different from some developed markets, in which population growth is stagnant, the number of Brazilians from 16 to 64 years of age – who are fit to work – grew from 115 million to 134 million, increasing the working age population that is able to foster consumption and capital formation.

However, despite the protectionist measures, the national industries face productive and competitive difficulties to supply the growing domestic demand. This has resulted in more room for imported consumer goods in the Brazilian economy, especially medium-high technology products, which does not mean that a higher value is added to exports, though. It is possible to assume, then, that little effort has been expended in Brazil towards technological progress in order to add more value to exports and gain shares of international markets.

**4.3 Innovation, R&D, and intellectual property** – **elements to design a policy for industry and innovation**

The challenges in competition and productivity described in the previous section are directly related to the lack of incentives to innovate and create technological competencies in the Brazilian productive structure. This has increased the technological gap between Brazil and other developed and developing economies.

A central question for the analysis of a nation’s efforts to innovate, with the objective of stimulating competitiveness, is expenditure by the productive sectors of the economy on R&D. By comparing R&D expenditure in different economies, especially among nations in different stages of development, it is possible to perceive the relevance of the technological dimension to increases in national competitive capacity. For Dosi et al. (2014), an economy’s engagement with technological activity is a critical element in achieving or strengthening market share for the nation’s exports and, in this manner, increasing its capacity to compete in external markets.

In this sense, a comparison of Brazil’s R&D expenditure with that of its international competitors may serve as an indicator of the nation’s low competitive capacity. According to the International Labour Organization (ILO), Brazil’s R&D expenditure, at 1.2% of GDP in 2011, was below the average of developing nations of East Asia and the Pacific and slightly higher than the average for the Latin America region (Figure 8).

The Brazilian results of R&D expenditure, which can be measured by the country’s number of patents in operation or by the country’s capacity for innovation, are also less than satisfactory. Brazil is poorly ranked in The Global Innovation Index 2015, occupying the 70th position among 141 nations, behind other nations of its own region, such as Chile (42nd), Colombia (67th) and Uruguay (68th). When considering the relationship between R&D expenditure and patents in operation, Brazil continues to underperform other nations, both developed and developing. The number of patents in operation is some 50 times greater in the United States, 40 times in Japan, 16 times in South Korea and China and 13 times in Germany.

One factor which may explain differences in these measures between Brazil and other nations mentioned above is the participation of private finance in R&D, which is significantly higher in the group of developed countries and in some developing economies (84% in Japan, 78% in China, 75% in South Korea, 70% in Germany, 63% in Chile and 58% in Colombia, compared with 47% in Brazil)[[2]](#footnote-2). Private participation in R&D expenditure is key to increasing innovation, given that patents, one of the principal outcomes of R&D expenditure, are typical products of the business environment and an important instrument to increase company competitiveness.

Although econometric studies are needed to demonstrate the relationship between low innovation effort and weak competitive performance, Brazil’s low presence in world exports in medium-high and high technology intensity sectors (Figure 9 and 10) indicates that efforts should be pursued to try to improve the nation’s technological and competitive performance.

The low innovation effort seen in the Brazilian industry has not encouraged the development of mechanisms capable of boosting competition, such as product patents, productivity gains, among other factors.

One factor that explains Brazil’s weak integration in international markets is the lack of consolidation of its private sector as a key element of the national innovation system, as briefly mentioned above. In the absence of a technologically dynamic private sector, Brazil has tended to fail in its efforts to promote the conditions necessary for economic development by way of fostering investment and innovation (Reiner and Staritz, 2013; Reinert, 2007).

One of the challenges that must be met by industrial policy makers in developing nations is the promotion of greater strength in technological skill in the private sector, encouraging leading companies to pursue modernization efforts in local production. This is due to a recognition that private agents are the fundamental element of economic dynamics in capitalist economies and, in this sense, the result of their actions reflects the competitive conditions of the nation (Gadelha, 2001).

Thus, the State’s fostering of innovative activities by private agents should be incentivized as a direct form of action for industrial transformation and the promotion of economic development, creating conditions for domestic companies to compete in international markets with companies at the forefront of technology.

**4.4 Credibility and trust in domestic suppliers** – **Brazilian logistic and institutional quality**

As introduced previously, Kowalski et al. (2015) suggests that a country’s performance when it comes to its ability to meet deadlines, honor agreements and set up an efficient logistic coordination should be considered a determining factor for participation in GVCs. In Brazil, this performance can be better understood by analyzing the performance of the service sector as a whole.

According to Arbache, J. and Moreira, R. (2015), the service sector has a transversal, structuring and synergetic nature in comparison with the other sectors in the Brazilian economy. The authors claim that a positive correlation was found between work productivity and service participation in the industrial production process.

The Brazilian service sector, however, is characterized by an “early gigantism”: despite being highly relevant to the national economy (about 70% of GDP and labor market), it presents low levels of productivity, which accounts for approximately 19% of the American service sector productivity and is five times lower than the productivity of the Brazilian mineral extraction sector (Arbache, J., Moreira, R., 2015).

Possible causes of such low productivity may be observed in the results of some indicators connected to logistics. As a first example, the infrastructure of Brazilian roads, railroads and ports is significantly poorer than the average of emerging countries, as shown in Table 3. Additionally, the value added by the ICT sector accounted for as little as 5% of the value added by the whole business sectors in 2010 (UNCTAD). In South Korea – an example of a developing economy that has reached better technology levels – this number was 13% in the same year.

**Table 3: Quality of transport infrastructure - 2013**



Source: Federation of industries of the State of Sao Paulo, using data from WEF and the Central

Intelligence Agency (CIA)

Lastly, the Business Environment Index 2014 results calculated by *The Economist Intelligence Unit* can be used as a proxy indicator in the broader concept of institutional quality. It includes variables such as the political macroeconomic environment, market opportunities, infrastructure conditions and competition policies, among others. Brazil was in a relatively low position in this index: 43rd place out of 74 countries, lower than Malaysia (19th), Mexico (32nd), Thailand (34th), and Costa Rica (40th).

**4.5 Direct foreign investment: strengthening primary economy**

Considering the FDI relevance pointed out by Kowalski for the country’s backward participation, the flow of investments in Brazil is analyzed below.

The country holds an outstanding position in the international capital flow, especially as a receiver of FDI made by multinational companies. The inflow of such FDI has been sustained despite the deteriorating economic conditions (Figure 11). This can be explained by the size of the domestic market, the decrease of poverty and the growth of specific segments despite the crisis (e.g. upmarket goods), among other factors. Since 2011, the country has been one of the five main FDI destinations in the world. The importance of foreign companies’ share in the country’s production structure can be represented by the increase of FDI stock participation in the Brazilian GDP from 9.1% in 1990 to 27.9% in 2015, according to UNCTAD.

Despite the significant FDI inflow, all of these investments were mainly made in sectors related to primary and industrial commodities (Arend, 2015). Therefore, foreign capital has contributed very little to change the national production structure.

The Census data about foreign capitals, disclosed by the Brazilian Central Bank, reveal that the FDI stock participation in more technologically dynamic sectors is deeply reduced compared to low technology sectors, using the OECD sector classification. More recent Census data show that, between 2010 and 2014, an average of 47% of FDI stock from industrial activities was concentrated in low technology sectors and only 5% went to high technology sectors. Figure 12 indicates the asymmetry in FDI stock distribution in the Brazilian industry.

Medium-high technology

Low-medium technology

Considering only the industrial sectors, Census data indicate that, between 2010 and 2014, the stock of FDI in wooden goods production – a sector with very low technological dynamism – grew by an average of 28% per year. On the other hand, activities that contribute to capital formation and that are more technologically dynamic experienced a decrease in investments. In the machinery and equipment sector, for example, FDI stock decreased by an average of 1.7% per year.

In this scenario, it is possible to consider that, although FDI participation in the Brazilian GDP has grown in the past 15 years, the distribution of such investments has been very unequal across sectors. Activities in which the country already has some kind of technological progress, such as natural resources, have been a priority.

Therefore, the low presence of FDI in activities with high technological dynamism brings serious consequences to the Brazilian production structure, as it contributes to maintain the country’s position as heavily specialized in producing goods with little value added.

**4.6 Preferential trade agreements – Isolation of Brazil in international trade agreements**

Brazil is a signatory of a relatively small number of international trade agreements, particularly in the extra-regional scope. Furthermore, the content of the agreements that the country has signed are not really elaborate or innovative (Thorstensen et al., 2013).

The low number of signed agreements is explained by the fact that Brazil has prioritized the multilateral sphere as the main forum for international trade negotiations, because the country believes that this framework provides better conditions for developing nations to coordinate their positions, increasing their bargaining power relative to the interests of developed countries. However, the Brazilian strategy was undermined by the Doha Round deadlock at the same time that large economies began to give priority to PTAs as the main regulatory source of international trade, given their greater agility in the negotiation.

By lagging behind in these preferential agreements, especially in Latin America, where several countries have been negotiating a significant number of PTAs, Brazil faces ever increasing difficulties to find a place in global production chains and to sell its products internationally. The challenges to make Brazil’s interests prevail in other markets are also intensifying. In order to examine these matters in more detail, it is necessary to first identify the two international integration vectors in Brazil: the regional and the extra-regional.

Regarding the representativeness and character of Brazil’s existing agreements, in the regional vector, MERCOSUR is the main project of Brazilian trade integration. The following trade agreements are currently in force between the members of MERCOSUR and: (i) Chile; (ii) Bolivia; (iii) Mexico (general); (iv) Mexico (automotive industry); (v) Peru; (vi) Colombia, Ecuador and Venezuela; and (vii) Cuba. Brazil also signed agreements with (i) Guianaand (ii) Suriname (only rice). Overall, these regional agreements provide for a wide margin of tariff preferences to be granted to a significant number of products, as shown in Table 4. Consequently, Brazilian exports have gained greater access to some important markets to the country’s trade agenda. Together, they account for about 10% of the Brazilian export destinations, according to the Brazilian Ministry of Industry, Foreign Trade and Services (MDIC) data.

Regarding the content of the regulatory framework of these agreements, however, nothing new has been presented in relation to the rules already laid down in the WTO agreements. There was also no evidence of the approach of new themes (Thorstensen, V. et al., 2013).

In the extra-regional vector, Brazil and MERCOSUR have PTAs signed only with India, Israel, the South African Customs Union (SACU), Egypt, and Palestine, of which only the first two are currently in force. The participation of these countries in Brazilian exports is also variable, being relatively relevant in the case of India (2.13%) and Egypt (1.03%), but small in the case of Israel (0.18%), Palestine (0.01%) and SACU (0.56%), according to the MDIC data. The terms of the agreements are also less innovative (Thorstensen, V. et al., 2013).

**Table 4: Tariff preference to Brazilian exports**



From the facts mentioned above, it is observed that Brazil has two major challenges when it comes to international trade agreements. The first is to advance in the themes brought forth by them so that they are not limited to tariff liberalization and other issues already covered in the scope of the WTO. The second challenge is to maintain (in the case of regional integration) and expand (in the case of extra-regional integration) the condition of the tariff preference granted to Brazil.

It is relevant to consider that taking part in international agreements may represent limitations for the country when it comes to implementing more dashing foreign policies. However, in terms of GVC participation and economic competitiveness, failure to overcome these challenges may result in significant risks. In Latin America, despite relevant preferences given to Brazil in a region whose participation in the Brazilian trade agenda is of major importance, the proliferation of PTAs involving Latin American countries, but without the participation of Brazil, threatens to undermine Brazil’s tariff preferences. It is noteworthy that the loss of preference in these markets may have a negative impact on the Brazilian manufacturing sector, considering that approximately 77% of Brazilian exports to Latin America are precisely those same manufactured products (MDIC).

Within the extra-regional scope, the overall risk arising from the isolation is, in addition to the tariff competitive disadvantages, that the country also bears the burden of identifying and complying with the various regulatory subsystems brought upon by these new agreements, while the exporters who wish to access the Brazilian market may do so by relying on the multilateral rules (Thorstensen, V. et al., 2013). Additionally, due to the fact that the rules established through PTAs may end up creating the bases for future multilateral negotiations, there is a chance that Brazilian non-participation in the negotiation process of this new regulation may hinder the country’s ability to enforce its interests when the discussion achieves the multilateral scope.

**4.7 The regional factor – the low commercial and productive integration in Latin America and the Caribbean**

As explained in section 2, GVCs are currently formed primarily at the regional level. LAC, however, has a low productive integration, with negative impacts on the GVC engagement of Brazil and other countries from the region[[3]](#footnote-3). Two main factors explain this weak productive integration: (I) the low level of trade complementarity between countries in the region, resulting especially from the common supply of raw materials and the lack of a regional manufacturing hub; and (II) the weaknesses related to commercial and economic integration agreements in LAC.

Regarding the first factor, given the abundance of natural resources typical of Latin American countries and the resulting comparative advantage in the production of primary goods, it is possible to verify the existence of a common supply of raw materials among Brazil and other South American countries. That is observed together with low industrialization rates, a deindustrialization trend, as well as the lack of a broad network to trade manufactured goods and of a manufacturing hub that centralizes the demand for natural resources in the region.

Such scenario has an impact on the low level of trade complementarity in the region, since the countries that produce primary products in common tend to have a lower level of fragmentation of production among them. This is explained by the fact that, considering the lower level of processing of primary products compared to manufactured products, the input exchange among its producers becomes relatively less relevant.

The low commercial complementarity and weak productive integration is reflected in the low percentage of intraregional trade in LAC as compared to other groups of countries: while in the LAC region, intraregional trade accounts for only 18% of its total exports, this figure escalates to 63% in the European Union and 50% in the ASEAN + 5[[4]](#footnote-4) and NAFTA groups, according to the Economic Commission for Latin America and the Caribbean (ECLAC).

In addition, the share of parts and components in intraregional trade is only 9% in LAC, significantly below the European Union (17%), ASEAN + 5 (37%) and North American Free Trade Agreement (NAFTA0 (18%), also according to ECLAC.

It should be further noted that, as mentioned in the beginning of this section, the physical-natural availability of primary resources in the region is not the only factor that contributes to a low trade complementarity and weak productive integration in the region, but also the absence of a strong manufacturing hub. Unlike the United States in North America, Germany in Europe, and Japan and China in Asia, LAC has no 'headquarter' economies. The presence of a strong manufacturing country can play a key role in creating and promoting trade complementarity and productive integration. This is because their ability to invest in and open subsidiaries in neighboring countries to meet the demand for inputs for the industry can make each country specialize in specific components, exporting these parts to other multinational factories and at the same time importing inputs from them that are not produced domestically.

Considering the second factor - trade and economic integration agreements -, LAC countries are not integrated into a regional trade agreement, but rather they are interconnected by a complex web of multiple agreements, each of them with its own trade standards. This can result in variable rules applicable to each country, depending on agreement signed, causing institutional disorder and hindering the productive integration in international chains. Some of the most important agreements involving both the largest and smallest economies in the region are: MERCOSUL, Union of South American Nations (USAN), Bolivarian Alliance for the Peoples of Our America (ALBA), Andean Community, Central American Common Market, Latin American Integration Association (LAIA), Pacific Alliance, Caribbean Community and Common Market (CARICOM), and Community of Latin American and Caribbean States (CELAC).

The strongest of these agreements exclusively involving LAC countries is MERCOSUR. However, free trade within the bloc is constrained by delays in the trade liberalization schedule and by barriers maintained by country members, such as exceptions to the granted preferential tariffs, non-automatic import licenses, and non-internalization of negotiated commitments.

Hence, it is possible to observe that, despite a higher concentration in the production of primary goods and the presence of several small economies in the region that could be more prone to be established in the international trade as *maquilas*, LAC’s greatest challenge is not associated with the lack of initiatives for integration agreements between the countries. Rather, it is related to the weaknesses inherent to existing agreements and the lack of coordination among them, making it difficult to create production chains in the region.

1. **FINAL COMMENTS**

The analysis developed in this paper shows that Brazil’s participation in GVCs is characterized by an intense forward participation as a primary product supplier and a low backward participation, with a reduced use of imports in exports. This occurs despite the fact that the country has been one of the main destinations of FDI in the past few years and has imported great quantities of high value added products.

These elements demonstrate how peculiar, even paradoxical, the Brazilian participation in GVCs is: even though the Brazilian economy leverages exports in the rest of the world, especially in developed countries, as a supplier of goods with low value added and high competitive edge, the country is not capable of using imports to promote the competitive edge of its own exports. Due to the low technological dynamism that distinguishes Brazilian industry, having high value added imports in the country’s exports would be a relevant element to increase competitiveness.

Therefore, this specific model of participation in GVCs represents a trap that compromises competitive development, since it is incapable of enhancing the dynamism of the industry and service sectors. Causes for this peculiar process involve the widespread debate on the country’s development path, from the specific ways in which industrialization took place in the mid-twentieth century to the economic policies adopted to overcome the longstanding crisis in the 1980’s. Recent highlights have been the effects of persistent currency appreciation, a measure used in inflation-control policies, as well as the strategies to support income gains for the population. Chinese economic growth fueled this trend, with a strong increase in primary goods export revenue and the massive inflow of industrialized goods at competitive prices. Additionally, the massive FDI inflow contributed to currency appreciation and to the tendency for industrial sector specialization in the production of goods to supply the domestic market.

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1. This is calculated as a percentage of gross exports and has two components: the import content of exports and the exports of intermediate inputs (goods and services) used in third countries’ exports. The methodology used for this calculus will be explained with further details in section 3. [↑](#footnote-ref-1)
2. Data for the United States and Uruguay were not available. [↑](#footnote-ref-2)
3. Similar to the Brazilian case, Chile and Argentina also present low rates of backward participation (18.5 and 12.1, respectively) and high rates of forward participation (33.8 and 22.5, respectively). Mexico is an exception in Latin America. The country has a high rate of backward participation (30.3) due to the *maquila* industries, which import mainly American inputs, assemble them and re-export the finished goods mostly to the United States. Brazil, Argentina, Chile and Mexico are the only Latin American countries for which TiVA breaks down data at the nation level. [↑](#footnote-ref-3)
4. The Association of Southeast Asian Nations, a group comprised of Indonesia, Malaysia, the Philippines, Singapore and Thailand. [↑](#footnote-ref-4)