

Export reprimarization and the role of small business: an analysis of the Brazilian case (2003-2015)*

Reprimarização das Exportações e o Papel das Pequenas Empresas: uma análise do caso brasileiro (2003-2015)

Roberto Alexandre Zanchetta Borghi
Universidade de Campinas - Unicamp
razb@unicamp.br

Miguel Juan Bacic
Universidade de Campinas - Unicamp
bacic@unicamp.br

Abstract

This paper assesses the phenomenon of “reprimarization” of Brazilian exports in the 2003-2015 period from a firm size perspective. Export “reprimarization” has been an important worldwide issue but more accentuated in Brazil. In this regard, the paper reveals important differences between exports of large and small firms regarding the proportion of exporting companies, total amount exported and, especially, export composition according to levels of technological intensity and product categories. It shows that the Brazilian export dynamics were deeply associated with the exporting behavior of large firms in the period. Responsible for the greatest part of total Brazilian exports, they presented exports relatively more concentrated in primary goods, benefiting more from the boom of commodities. Smaller firms tend to face bigger challenges to start exporting or to become successful exporters. Despite this fact, micro and small firms showed an export composition relatively less dependent on commodities and more dependent on higher technology-intensive products, therefore with important policy implications in favor of supporting their international activity.

Keywords: exports; Brazil; “reprimarization”; firm size; technological intensity.
JEL Classification: F14; L25; O54.

Resumo

Este artigo avalia o fenômeno da "reprimarização" das exportações brasileiras no período de 2003 a 2015, sob a perspectiva do tamanho das empresas. A "reprimarização" das exportações tem sido uma questão importante em todo o mundo, mas mais acentuada no Brasil. Nesse sentido, o artigo revela diferenças significativas entre as exportações de grandes e pequenas empresas em relação à proporção de empresas exportadoras, ao valor total exportado e, especialmente, à composição das exportações de acordo com os níveis de intensidade tecnológica e categorias de produtos. O estudo mostra que a dinâmica das exportações brasileiras esteve profundamente associada ao comportamento das grandes empresas no período. Responsáveis pela maior parte das exportações brasileiras, elas apresentaram exportações relativamente mais concentradas em produtos primários, beneficiando-se mais do boom das commodities. As empresas menores tendem a enfrentar desafios maiores para iniciar a exportação ou se tornar exportadoras bem-sucedidas. Apesar disso, micro e pequenas empresas apresentaram uma composição de exportação relativamente menos dependente de commodities e mais dependente de produtos com maior intensidade tecnológica, com implicações políticas importantes em favor do apoio à sua atividade internacional.

* Recebido em 03 de março de 2022, aprovado em 19 de maio de 2023, publicado em 01 de novembro de 2023.

Palavras-chave: exportações; Brasil; "reprimarização"; tamanho das empresas; intensidade tecnológica.

Classificação JEL: F14; L25; O54.

1. Introduction

Brazilian exports grew substantially in the 2003-2015 period, moving from US\$ 73.1 billion to US\$ 191.1 billion. The peak of Brazilian exports was registered in 2011, when they surpassed US\$ 256 billion. The proportion of exporting firms in Brazil, however, is small in comparison with the large amount of companies in the country.

In the period, there was a growing share of primary commodity exports, especially due to the world demand and commodity price increases in the international market. Manufacturing exports summed over 50% of total exports in 2003, but only a third by 2015, giving room for an increasing share of primary commodity exports.

This trajectory of Brazilian exports, particularly in terms of export composition toward "reprimarization", led to several studies on the increasing dependence upon such goods. To a large extent, the Brazilian economy benefited from the favorable international context for commodities while, at the same time, observed a relatively smaller dynamism of national manufacturing production. Both movements resulted in a higher concentration of exports in low-technology intensive products (ApexBrasil, 2011; Cunha, Lelis, & Fligenspan, 2013; Bacha, & Fishlow, 2011; Gonçalves, 2011; Ministerio da Fazenda, 2011; De Negri, & Alvarenga, 2011; IEDI, 2011, & 2015). According to Hausmann, Hwang, & Rodrik (2005), such trend would represent a deterioration of export quality from Brazil.

It is known that the larger the firm size, the higher is the probability of a firm to export. Large firms tend to get easier access to financing sources, capabilities and resources that allow them to reach foreign markets (Hirsch, & Adar, 1974; Wagner, 1995). In turn, smaller companies tend to face bigger challenges of different kinds in their efforts to promote exports, therefore usually focusing on domestic markets rather than foreign markets. Even so, small firms which prove to be able to overcome such obstacles and become exporters can also turn to be important dynamic sources for their countries of origin, once able to produce and export higher technology-intensive products (Bonaccorsi, 1992).

The existing literature, however, does not refer to the role of small business in the "reprimarization" process, or in other words, does not address the firm size of Brazilian exporting companies and their contribution to export "reprimarization". Therefore, the aim of this paper is to study the evolution of Brazilian export profile by firm size from 2003 to 2015. The main hypothesis is that Brazil's export dynamics has been mainly influenced by exports of large firms, and such exports have mostly been concentrated in primary goods, whilst small business exports have presented a relatively lower dependence upon primary goods and a larger share of high-technology intensive products.

The paper intends to show important differences between exports of micro and small firms and large firms regarding the proportion of total exporting companies, the export amounts and, especially, their export composition, including by technological intensity. This research contributes to the ongoing debate about export "reprimarization" not only for Brazil but also for other Latin American economies facing similar issues, particularly revealing the importance that small firms can have in building a different track from traditional commodity exports.

This paper is divided into three sections, besides this introduction and conclusions. The first section addresses a literature review on the process of Brazilian export "reprimarization". The second section details data and methodological aspects applied in this research to address firm size and technological intensity. The third section summarizes the

main results and the discussion around the different export profiles by firm size found for the 2003-2015 period.

2. Theoretical framework: the debate about the Brazilian export “reprimarization”

As in several Latin American economies, the expansion of Brazilian exports in the 2000s was largely associated with intense world demand for primary commodities, mainly from China, and sharp increases in international commodity prices. As Castillo, & Martins Neto (2016, p. 23) highlight, “Argentina, Brazil and Chile face premature deindustrialization, as they increased their specialization in commodities, resource-based manufactures and low productivity services”.

Aligned with such trends, many studies have pointed to significant changes in the Brazilian export composition. De Negri, & Alvarenga (2011) show the increasing dependence of Brazilian exports upon commodities during the 2000s. The authors also register the increasing share of Brazil in world commodity exports, from 2.8% in 2000 to 4.7% in 2009. At the same time, the Brazilian share regarding manufacturing goods of different technological intensity increased much less or even reduced in total world exports over the period.

Data from Ministerio da Fazenda (2011) also highlight the performance of Brazilian exports, in particular the growing share of commodities, which increased especially after 2006. According to ApexBrasil (2011), this movement toward export “reprimarization” was not limited to Brazil. In face of the international commodity cycle, world exports also presented similar trend. However, in the Brazilian case, this process was deeper in comparison to other economies also facing export “reprimarization”.

To some extent, the debate on “reprimarization” also appears in the literature with other related discussions, such as the concepts of “deindustrialization” and “Dutch disease”. The “deindustrialization” of an economy refers to the persistent reduction of industrial production (or employment) in total production (or employment), declining manufacturing competitiveness in international trade. The “Dutch disease”, in turn, refers to the process of “deindustrialization” caused by overvalued exchange rates stimulated by the commodity boom in international markets, then resulting in a reduction of industrial competitiveness (Bresser-Pereira, 2010; Oreiro, & Feijó, 2010). In the Brazilian case, although evidence is not conclusive regarding such phenomena in the 2000s, it is possible to state that high commodity exports and large capital inflows have contributed to maintain the Brazilian currency overvalued during that period, which in turn has tended to pressure down the industrial competitiveness in the country (Bacha, & Fishlow, 2011; Gonçalves, 2011; Cunha, Lelis, & Fligenspan, 2013; Cunha, Bichara, & Lelis, 2013; Nassif, Feijó, & Araújo, 2015). Recent study by Morceiro, & Guilhoto (2023) explores disaggregated deindustrialization by economic sector in Brazil, showing a sharp decline of manufacturing to GDP since the 1980s and highlighting that this process started prematurely in more technology and knowledge-intensive sectors, although also affecting labor-intensive sectors.

The loss of domestic industrial dynamism in parallel with the expansion of commodity exports is highlighted by several IEDI (2011, 2012, 2014, & 2015) reports, thus showing the increasing dependence of Brazilian trade surpluses upon exports of primary commodities, given the trade deficit registered by different manufacturing goods over the years. While Brazil has reduced consistently its participation in world manufactures exports, the same trend has not been observed for its imports, causing manufacturing trade deficits to increase, especially of higher value-added products.

Brazilian export “reprimarization” was not only linked to the favorable international context for commodity exports but also to a domestic industrial performance relatively lower

in the period. During the 2000s, especially from 2004 to 2008, when higher economic growth has been registered, there has been industrial expansion. However, this expansion has been largely attached to meet domestic demand. Manufactures exports have increased less than exports of primary goods (Gonçalves, 2011; Cunha, Lelis, & Fligenspan, 2013).

After the outbreak of the 2008 global financial crisis and, above all, after 2011, when a reversal in commodity prices and a demand reduction of developed and emerging economies took place, Brazilian exports tended to decline. While the domestic market remained heated through several fiscal and monetary incentives, industrial production has concentrated in meeting national consumption, as pointed out by Borghi (2017).

Nonetheless, this situation would aggravate when Brazil faced one of its main recessions in 2015-2016. The loss of Brazilian industrial competitiveness has affected not only its export performance but also the amount of imported goods, which contributed to enlarge manufacturing trade deficits (IEDI, 2014, & 2015). In order to explore and better understand the phenomenon of export “reprimarization” in the country, this study sheds light on the differences between the export patterns by firm size. On the one hand, smaller firms, especially from Latin America, tend to face several bottlenecks to access foreign markets, from the lack of skills to finance, as documented by ECLAC (2015) and OECD (2020). On the other, although exports are identified as important to Brazilian growth recovery, as discussed by Oliveira et al. (2021), firm size is little explored in the literature to describe differences in the Brazilian export pattern and, in particular, in the movement of export “reprimarization” observed in the past decades.

3. Methodological aspects: data by firm size

The empirical evidence presented in this paper is based on the application of statistics, whose nature is descriptive, with the aim of highlighting the characteristics of Brazilian exports by firm size. According to Richardson (2017) and Gil (2022), researches proposing to describe the features of a certain phenomenon are considered of descriptive nature.

The method applied is quantitative, as statistical data are expressed numerically (in values and percentage, organized in tables) and are analyzed according to basic statistical techniques. In other words, the paper uses descriptive analysis and applies quantitative methods to describe and investigate the Brazilian export “reprimarization” in numerical terms from statistical sources.

This paper, therefore, details the following data according to firm size: the number of establishments in the country, the amount of exporting firms, the proportion of exporting companies, the total exported amount, the exports according to technological intensity and the export composition by product categories. Data on total Brazilian exports and the share of both primary commodities and manufacturing goods are also presented.

In addition to literature review, the following data sources were applied to carry out this research:

a. To obtain information regarding the number of establishments by size and sector of economic activity: Annual Report of Social Information (RAIS), recorded by the Ministry of Labor in Brazil, covering until 2015. These are administrative data reported by firms. Although data are available until 2021, for the purpose of this research only data up to 2015 were used, given the availability of data for exports by firm size.

b. To obtain data on Brazilian exports: Database from the Ministry of Development, Industry, Foreign Trade and Services (MDIC). Data cover until 2015, when detailed data were available, showing Brazilian exports yearly and classified according to the firm size. When

data were collected, the current MDIC and other ministries were part of the Ministry of Economy, following the merger of several ministries which occurred in 2019 in Brazil.

The classification of companies by size covers the following segments: micro firm, small firm, medium firm and large firm. The criteria of classification by size from MDIC follow the parameters adopted by Mercosur, according to the resolutions Mercosur-GMC n° 90/93 and 59/98, and the adjustments made by the Department of Statistics and Support for Exports of the Secretariat of Foreign Trade (Deaex/Secex). MDIC used to apply as criteria to classify companies by firm size the number of employees and the amount of exports, as detailed in Appendix (Box 1).

The data from RAIS about the number of companies in Brazil by firm size and sector of economic activity are presented in the Appendix as accumulated frequency, following the size of companies classified by the number of employees as released by RAIS: 0 employee; 1 to 4 employees; 5 to 9 employees; 10 to 19 employees; 20 to 49 employees; 50 to 99 employees; 100 to 249 employees; 250 to 499 employees; 500 to 999 employees; 1,000 or more employees. Based on such classification, it is possible to make a comparative analysis, although as a proxy, between the data of number of companies and the data on exports provided by MDIC. In order to calculate the proportion of exporting companies in Brazil by firm size, the classification used to group RAIS data and MDIC data considered only the number of employees in each establishment for any sector as follows: establishments with 0 to 9 employees were considered micro firms; establishments with 10 to 49 employees were considered small firms; establishments with 50 to 249 employees were considered medium firms; and establishments with 250 or more employees were considered large firms.

Brazilian export data by size and technological intensity were calculated from data released by MDIC according to product categories and grouped according to the methodological classification applied by the Organization for Economic Cooperation and Development (OECD). Product categories were divided into: non-industrial goods, low-tech industrial goods, medium-low industrial goods, medium-high industrial goods, and high-tech industrial goods (OECD, 2005; MDIC, 2016). Product categories comprised by each degree of technological intensity were classified as follows:

- Non-industrial goods: agriculture, livestock, fishing, mineral extraction, art objects and special transactions;
- Low-tech industrial goods: textiles, clothing, footwear, leather, food and beverages, food waste, toys, wood, furniture, tobacco, paper and printing;
- Medium-low industrial goods: metallurgy, metal products, non-metallic mineral products, rubber and plastic products, fuels, and shipbuilding;
- Medium-high industrial goods: vehicles and components, railways and other transport equipment, machinery and equipment, electrical equipment, and chemical products;
- High-tech industrial goods: airplanes and components, optical, computer and electronic equipment and devices, and pharmaceutical products.

Export composition by firm size listing the main product categories exported by micro, small, medium and large companies over the entire period is also presented. The results allow distinguishing the Brazilian exports according to the firm size and, therefore, assessing them in regard to export “reprimarization” from 2003 to 2015.

It is also important to highlight some limitations of the research. The main limitation consists in the period of analysis. Due to data discontinuity publicly released by MDIC after 2015 about detailed exports according to firm size, the analysis does not cover more recent data. In addition, aforementioned data of product categories are only released disaggregated up to the ten major categories of exports in the respective year (at least, until 2012), the rest

being grouped into the label of “other categories” (Tables 7 and 8 of this paper), which, however, presents a significant share of total exports, thus not allowing for a more detailed description of other product exports. Finally, conclusions should be taken carefully, especially because even when describing exports by firm size, there is still large heterogeneity within groups of companies, so that the paper characterizes and evaluates the differences in the average exporting pattern according to firm size, highlighting the differences between, but not within, groups.

4. Results and discussion: the different export profiles

Data from RAIS point to an expansion of the number of establishments in Brazil between 2003 and 2015. In 2003, there was around 2.5 million establishments in the country. These figures surpassed 3 million in 2008 and reached almost 4 million establishments in 2015. Over 70% of all establishments were concentrated in trade and services and near 85% had up to 9 employees (as observed in Appendix, Table 1).

Not only the number of establishments in Brazil has increased during the period of analysis, but also the number of Brazilian exporting firms, according to MDIC data, moving from less than 20 thousand in 2003 to more than 23.5 thousand companies in 2015. This trend, however, was more pronounced in the 2003-2007 period, followed by a decline in the number of exporting economies thereafter, at least until 2012, and a recovery in the final years. The distribution of exporting companies by size shows a relative balance between the number of large and small businesses. Nonetheless, there was an expansion of large firms, whose share increased over time, particularly to the detriment of micro and medium companies (Table 1).

The comparison between these data and data from RAIS presented in the Appendix suggests that there was a relatively more pronounced trend of higher concentration of firm activities in the domestic market rather than an expansion to foreign markets in the analyzed period. Although the number of exporting firms increased, the proportion of exporting companies within the total number of Brazilian establishments declined, thus indicating a stronger expansion of the number of total establishments not necessarily followed by increasing export efforts, which is aligned with the growing domestic market in most of the period. It is noticeable also that the larger the firm size, the higher the proportion of exporting companies, but no matter the firm size there was a reduction in the proportion of exporting firms, even though relatively lower in the case of large businesses. Of total micro and small companies, less than 0.2% and 1% accounted for exporting firms, respectively, while for large companies nearly 30% were exporters (Table 2). This trend of a few exporting firms is also confirmed by Gomes and Ellery Jr. (2007).

Table 1. Distribution of Brazilian exporting firms by size, 2003-2015* (%)

Year	Size					Total	
	Micro	Small	Medium	Large	PF	%	Quantity
2003	23.1	24.8	28.5	21.3	2.3	100.0	19,796
2004	23.7	27.9	25.1	20.2	3.1	100.0	20,902
2005	19.2	26.6	28.2	23.3	2.7	100.0	19,992
2006	25.0	26.1	25.6	20.7	2.7	100.0	23,113
2007	26.4	24.2	24.5	21.9	3.0	100.0	23,537
2008	21.9	26.3	25.2	23.9	2.7	100.0	23,032
2009	23.1	20.9	30.0	23.6	2.5	100.0	22,434
2010	21.5	24.8	25.9	25.6	2.2	100.0	21,918
2011	20.8	24.7	26.0	26.4	2.2	100.0	21,947

2012	18.7	24.0	25.4	30.0	1.9	100.0	21,480
2013	18.8	23.3	25.4	30.6	1.9	100.0	21,814
2014	20.2	24.1	26.6	27.3	1.9	100.0	22,320
2015	21.7	24.7	26.0	26.0	1.7	100.0	23,548

Source: authors' own elaboration. Data from MDIC.

*PF = natural person (pessoa fisica, in Portuguese). It includes a "non-defined" category from 2011 onward.

Table 2. Proportion of exporting firms by size, 2003-2015* (%)

	Micro	Small	Medium	Large	Total
2003	0.21	1.55	10.28	30.86	0.77
2004	0.22	1.73	8.92	28.91	0.77
2005	0.17	1.50	9.20	30.07	0.71
2006	0.24	1.62	9.11	29.00	0.79
2007	0.25	1.44	8.31	29.08	0.78
2008	0.20	1.44	7.88	30.05	0.73
2009	0.19	1.07	8.82	27.65	0.68
2010	0.17	1.15	6.83	27.43	0.63
2011	0.15	1.08	6.51	27.28	0.60
2012	0.13	0.99	6.04	29.78	0.57
2013	0.13	0.95	6.00	29.96	0.56
2014	0.14	0.98	6.37	27.27	0.55
2015	0.15	1.07	6.89	28.67	0.58

Source: authors' own elaboration. Data from MDIC and RAIS.

*Do not include natural person as exporters.

Such trends must be examined given the significant increase in Brazilian exports from 2003 to 2015. Exports increased from around US\$ 73 billion in 2003 to over US\$ 256 billion at its peak in 2011, following the boom in international commodity markets.

Table 3. Distribution and average value of exports from Brazilian firms by size, 2003-2015* (% and US\$ million)

Year	Size					Total	
	Micro	Small	Medium	Large	PF	%	US\$ million
2003	0.30	2.07	8.00	89.49	0.14	100.00	73,084
2004	0.31	2.34	8.09	89.02	0.24	100.00	96,475
2005	0.20	1.62	6.76	91.24	0.18	100.00	118,308
2006	0.20	1.53	6.72	91.41	0.15	100.00	137,807
2007	0.25	1.62	6.05	91.89	0.19	100.00	160,649
2008	0.14	1.03	4.50	94.16	0.17	100.00	197,942
2009	0.16	0.70	5.62	93.33	0.19	100.00	152,995
2010	0.11	0.86	4.06	94.83	0.14	100.00	201,915
2011	0.09	0.71	3.44	95.60	0.16	100.00	256,040
2012	0.08	0.66	3.35	95.70	0.21	100.00	242,580
2013	0.08	0.65	3.26	95.89	0.12	100.00	242,179
2014	0.10	0.78	3.85	95.13	0.15	100.00	225,101
2015	0.12	0.96	4.41	94.35	0.17	100.00	191,134
Average value of exports (US\$ million)	249	1,830	8,328	165,931	293	-	176,632

Source: authors' own elaboration. Data from MDIC.

*PF = natural person (pessoa fisica, in Portuguese). It includes a "non-defined" category from 2011 onward.

Due to the effects of global financial crisis in 2008-2009, exports reduced but recovered soon. Exports remained high after 2011 but in a downward trend, reaching US\$ 191 billion in 2015, which was attached to a lower dynamism of commodity prices and international trade, as described earlier (Table 3).

A similar trend was observed in the world share of Brazilian exports. In 2003, exports from Brazil accounted for less than 1%. Between 2003 and 2008, this participation increased strongly, only with a little reduction in face of the global crisis in 2009. The growing share resumed in 2010 and 2011, when registered 1.4% of total world exports. However, this share reduced thereafter to levels similar to 2007 (Table 4).

According to these data, Brazilian export composition showed a clear process of “reprimarization”, that means, an increasing concentration in primary goods, which are usually associated with lower value-added and technological intensity. From 2003 to 2015, the share of primary goods in total Brazilian exports increased from 47% to around 65%, while the share of manufacturing goods presented an opposite trend. Accounting for half of Brazilian exports at the beginning of the period, manufacturing exports reduced its share to one-third only, reflecting two processes aggravated over time: on the one hand, the growing dynamism of exports of primary goods and, on the other, the low competitiveness of the Brazilian industry, resulting in a deindustrialization movement, as discussed by some authors before (Table 4).

Table 4. World share of Brazilian exports and distribution between primary and manufacturing goods, 2003-2015 (%)

	% Primary goods	% Manufacturing goods	% Others	Total	% World exports
2003	47.4	50.9	1.7	100.0	0.96
2004	46.0	52.5	1.5	100.0	1.05
2005	46.0	52.1	1.8	100.0	1.13
2006	48.4	49.7	1.9	100.0	1.14
2007	50.7	46.7	2.7	100.0	1.15
2008	53.8	43.7	2.4	100.0	1.23
2009	60.0	38.2	1.8	100.0	1.22
2010	64.2	35.8	0.0	100.0	1.32
2011	65.7	32.3	2.0	100.0	1.40
2012	64.7	33.1	2.2	100.0	1.31
2013	65.4	32.5	2.1	100.0	1.28
2014	65.7	32.1	2.2	100.0	1.18
2015	63.6	34.8	1.6	100.0	1.15

Source: authors' own elaboration. Data from UnctadStat.

The trajectory of Brazilian exports over this period is largely related to the international boom of primary commodities. As a key exporter of such goods, Brazil benefited from high international prices and a rising world demand, especially from China, between 2003 and 2008. Similarly, the reversal of the international cycle both in terms of reduction in demand from advanced and, to some extent, developing economies and the decline of commodity prices, particularly after 2011, affected negatively the Brazilian exporting performance. As previously discussed, a great part of the Brazilian export composition refers to primary goods, which is also highlighted in the analysis by firm size.

The distribution of total exported value according to firm size (Table 3 before) presents interesting results and is complementary to the analysis of Bedê, Moreira and Schmidt (2013) for 1998 to 2011. As expected, the larger the firm size, the higher the firm's

share in total Brazilian exports. Hence, large firms accounted for the greatest part of exports, followed by medium, small and micro firms. The concentration of exports made by large firms was extremely high and increased over the period under study, to the detriment of the exporting participation of small-sized companies. This movement occurred in parallel with the relatively higher expansion of the quantity of large exporting firms previously observed, but the distribution of the number of exporting firms according to firm size was relatively more proportional than the total value exported by them.

Large firms, which already accounted for almost 90% of Brazilian exports at the beginning of the period, registered over 95% in the last years. The share of medium companies, in turn, was reduced by half, from 8% in 2003 to less than 4% from 2011 to 2014. Micro and small firms also had their respective share reduced, from 0.3% to 0.1% and from 2% to less than 1%. Besides the declining share, it is important to highlight the low amount of exports by small-sized firms, which even in periods of growth, such as 2004, did not total 3% of the country's export value (Table 3).

Such results are partly explained by the dynamics of large businesses which, in general, are multinational firms operating in different markets and countries, and therefore present an active and more interconnected international trade network. Smaller companies, in turn, present a profile more attached to the dynamics of the domestic market and face bigger challenges – e.g. financial, competitive, among others – to promote a more dynamic international integration, as discussed by Vieira and Bertrand (2007) in a case study and by Klotzle and Thomé (2006) more broadly.

Part of the explanation also refers to the export composition by firm size itself. The high and increasing participation of non-industrial goods in the export composition of large companies during the commodity cycle, much above other companies, tended to increase their relative share in the Brazilian exports until 2008 and to slightly attenuate in the last years in face of the reversal of the international commodity cycle.

Based on the classification of exported goods by technological intensity, it is also possible to identify a high concentration of exported value by large companies within the different groups of technological intensity. This concentration showed to be even higher in the exports of non-industrial goods (around 97%), thus contributing to increase the average of total exports by such companies, while for exports of medium-high industrial goods the share of large companies was lower, nearly 91% to 93% in the last years (Table 5).

In addition, it is important to note that in the period there was in general an increase of the relative share of firms of other sizes, such as micro, small and medium companies, in the exports of different categories of technological intensity. Their share was particularly higher for exports of medium-high industrial goods and low-tech industrial goods (Table 5).

Table 5. Distribution of exported value by firm size within each category of technological intensity, 2012-2015* (%)

	2012	2013	2014	2015
Non-industrial goods				
Micro	0.05	0.04	0.05	0.07
Small	0.45	0.44	0.50	0.68
Medium	1.77	1.68	2.07	2.49
Large	97.74	97.84	97.38	96.77
Total	100.00	100.00	100.00	100.00
Low-tech industrial goods				
Micro	0.11	0.11	0.12	0.15
Small	0.85	0.85	1.08	1.20
Medium	5.05	4.64	5.40	5.80

Large	93.99	94.40	93.40	92.86
Total	100.00	100.00	100.00	100.00
<hr/>				
Medium-low industrial goods				
Micro	0.06	0.06	0.07	0.09
Small	0.48	0.52	0.60	0.85
Medium	3.01	3.35	3.76	4.28
Large	96.45	96.07	95.57	94.77
Total	100.00	100.00	100.00	100.00
<hr/>				
Medium-high industrial goods				
Micro	0.15	0.16	0.21	0.24
Small	1.15	1.07	1.32	1.46
Medium	5.56	5.37	6.58	7.15
Large	93.14	93.39	91.88	91.14
Total	100.00	100.00	100.00	100.00
<hr/>				
High-tech industrial goods				
Micro	0.09	0.11	0.15	0.13
Small	0.61	0.68	0.89	0.87
Medium	3.09	3.72	4.49	5.06
Large	96.22	95.49	94.48	93.94
Total	100.00	100.00	100.00	100.00
<hr/>				
Total				
Micro	0.08	0.08	0.10	0.12
Small	0.66	0.65	0.78	0.96
Medium	3.36	3.27	3.85	4.42
Large	95.90	96.00	95.27	94.50
Total	100.00	100.00	100.00	100.00

Source: authors' own elaboration. Data from MDIC.

*Do not include exports made by natural person. Detailed data by product categories used to classify goods according to technological intensity only available for 2012 onward. To more detail on the technological intensity classification, see methodological section of this paper.

These data on Brazilian exports according to the firm size and the technological intensity of exported goods also exhibit important differences in companies' export profile. Differently from what one would expect in terms of exports of larger companies being concentrated in more dynamic goods if compared to exports of smaller firms, the Brazilian case in this period showed an opposite scenario. Small-sized companies, especially micro firms, had their exports relatively more concentrated in industrial goods, particularly those involving a higher technological intensity, such as medium-high industrial goods (Table 6).

Data compiled in Table 6 point that only 20% of total exports made by micro firms were of non-industrial goods from 2012 to 2015. Their exports were concentrated in industrial goods, especially medium-high industrial goods, which accounted for over one-third of total exports. However, as previously indicated, total exports of micro firms are still very little expressive in Brazilian exports as a whole.

For small firms, the share of exports of non-industrial goods (around 27%) was higher than observed for micro firms. Nonetheless, medium-high industrial goods still prevailed in their export composition, followed by non-industrial goods and low-tech industrial goods. The participation of exports of small firms in total Brazilian exports was a little higher than for micro firms, but still represented a relatively small share.

Brazilian medium firms, in turn, registered around 20% of their exports as non-industrial goods. Medium-high and low-tech industrial goods presented a similar participation

in the export composition of this group of firms. As aforementioned, the proportion of their exports in Brazilian total exports was a bit more expressive than the proportion of smaller firms, but declining.

A considerably different profile was observed in the case of large firms, which are also the major Brazilian exporters. Most exports of large companies – around 40% – corresponded to non-industrial or primary goods. This amount was equivalent to nearly double of exports of medium-low and low-tech industrial goods. Medium-high and high-tech industrial goods accounted together for nearly 20% of exports made by large companies, which is much lower than the 30% share or more observed in smaller firms. As large companies accounted for more than 90% of Brazilian exports in the period, their profile – highly dependent on commodities and lower value-added – reflected in the Brazilian export composition.

Data from Sebrae (2015) also show, for a longer period, the export profile according to firm size and technological intensity. The participation of non-industrial goods in total exports of large companies almost doubled between 2003 and 2014, from 20% to almost 40%, to the detriment of industrial goods, especially those of higher technological intensity (medium-high and high-tech industrial goods). Small-sized companies, in turn, registered a participation higher than 80% of industrial goods in their exports, also showing an upward trend of medium-high industrial goods (from 25% in 2003 to approximately 35% in 2014) and a reduction in the share of low-tech industrial goods (from 40% in 2003 to less than 30% in 2014).

Table 6. Distribution of Brazilian exports according to firm size and technological intensity, 2012-2015* (%)

Technological intensity	2012	2013	2014	2015
	Micro firms			
Non-industrial goods	23.0	20.6	20.3	21.2
Low-tech industrial goods	25.6	25.3	22.5	23.7
Medium-low industrial goods	15.7	15.5	16.1	15.3
Medium-high industrial goods	32.4	34.8	36.6	35.9
High-tech industrial goods	3.4	3.8	4.4	3.9
Total (%)	100.0	100.0	100.0	100.0
Total (US\$ million)	193.5	196.5	215.3	231.0
Small firms				
Non-industrial goods	26.1	28.0	26.7	27.5
Low-tech industrial goods	24.5	24.5	25.9	24.5
Medium-low industrial goods	16.2	15.9	15.9	17.9
Medium-high industrial goods	30.3	28.6	28.2	27.0
High-tech industrial goods	2.9	2.9	3.3	3.2
Total (%)	100.0	100.0	100.0	100.0
Total (US\$ million)	1,593.5	1,569.0	1,746.0	1,833.4
Medium firms				
Non-industrial goods	20.3	21.2	22.1	22.0
Low-tech industrial goods	28.4	26.6	26.1	25.8
Medium-low industrial goods	19.7	20.5	20.2	19.5
Medium-high industrial goods	28.6	28.5	28.2	28.7
High-tech industrial goods	2.9	3.2	3.4	4.0
Total (%)	100.0	100.0	100.0	100.0
Total (US\$ million)	8,132.4	7,905.6	8,663.9	8,427.9
Large firms				
Non-industrial goods	39.3	41.9	42.1	40.0

Low-tech industrial goods	18.5	18.4	18.2	19.3
Medium-low industrial goods	22.2	20.0	20.8	20.1
Medium-high industrial goods	16.8	16.9	15.9	17.1
High-tech industrial goods	3.2	2.8	2.9	3.5
Total (%)	100.0	100.0	100.0	100.0
Total (US\$ million)	232,155.7	232,222.9	214,144.4	180,326.7

Source: authors' own elaboration. Data from MDIC.

*Do not include exports made by natural person. Detailed data by product categories used to classify goods according to technological intensity only available for 2012 onward. To more detail on the technological intensity classification, see methodological section of this paper.

Finally, Tables 7 and 8 show the evolution of ten main product categories exported annually from 2003 to 2015 by micro and small, as well as medium and large firms, respectively. These data confirm the conclusions from previous analyses regarding the relatively higher share of exports of large firms in primary goods or lower value-added industrial goods, while smaller firms presented a higher degree of diversification of their export composition with products of different levels of technological intensity.

Micro and small firms registered a more diversified export composition in the 2003-2015 period in relation to large firms, presenting a relatively vast and variable list of exported product categories. This can be seen, for example, by the evolution of the label “other categories” in the following tables. Only in the case of large firms “other categories” registered a reduction in its relative share during the period, reaching less than 32% in 2011. This fact may indicate that all product categories listed in the table accounted for most of the exported value by these companies, concentrated in fewer product categories. In the case of medium firms, “other categories” showed an increase in its participation, surpassing 50%. For small firms, there was also an increasing participation from 40% to 47%. For micro firms, although the share of “other categories” also increased, there was higher stability in exports of products under this classification. To certain degree, the unavailability of more disaggregated data also poses limitations to the analysis.

However, some important features and differences of export composition between groups can be highlighted. In the export composition of micro firms, “boilers, mechanical machines and instruments” were the main exports, with an increasing share close to 20% over time. In turn, “wood and charcoal” reduced its participation from more than 11% to less than 5% of total exports. This reduction in the relative share was also observed in other categories of lower value-added products, while categories of higher value-added products had an increase in their share, such as “electrical machines, devices and materials”, “optical and photo instruments” and “autovehicles, parts and components” (Table 7).

In the case of small firms, a similar – although less intensive – process was also observed. There was a reduction in the participation of some lower value-added goods in the export composition of these companies, such as “wood and charcoal”, and an increase of higher value-added goods, including “boilers, mechanical machines and instruments” and “electrical machines, devices and materials”, although not as intense as in the case of micro firms (Table 7).

Table 7. Export composition of Brazilian micro and small firms, by main exported product categories, 2003-2015* (%)

Micro firms - Product category	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Boilers, mechanical machines and instruments	13.3	12.8	13.0	14.2	12.2	13.9	15.4	17.7	15.9	17.1	17.9	19.4	18.3
Wood and charcoal	10.8	11.3	11.6	7.7	9.4	8.1	9.2	6.2	6.3	4.8	5.2	3.7	4.6
Pearls and precious stones	5.5	5.8	6.7	7.7	7.2	7.1	7.0	7.3	7.3	7.6	6.7	5.8	6.0
Furniture	5.3	5.5	5.3	4.9	4.3	3.8	3.4	3.2	2.6	3.1	2.8	-	2.3
Stone, plaster, cement and similar works	4.5	4.4	4.1	4.2	4.8	4.2	4.3	3.8	3.3	3.5	2.9	3.0	3.0
Electrical machines, devices and materials	3.9	3.7	3.2	4.5	4.2	3.7	3.9	5.8	6.0	6.3	6.0	5.2	5.7
Knitwear, clothing and accessories	3.8	3.0	3.3	2.8	-	-	2.6	-	-	-	-	-	-
Footwear	3.7	4.1	4.0	3.4	3.8	3.8	3.5	4.0	4.3	4.6	2.9	2.7	3.0
Fruits and peels	2.8	3.1	2.8	2.7	2.8	-	-	2.4	-	-	-	-	-
Special transactions	2.7	-	-	-	2.6	-	-	-	-	-	-	-	-
Plastics in general	-	2.7	2.4	2.9	3.1	8.2	3.1	3.7	4.3	4.2	3.8	3.6	3.9
Optical and photo instruments	-	-	-	-	-	2.8	2.4	-	2.9	2.6	3.1	3.6	3.4
Clothing and accessories, apart from knitwear	-	-	-	-	-	2.3	-	-	-	-	-	-	-
Autovehicles, parts and components	-	-	-	-	-	-	-	2.3	2.3	3.1	2.5	3.1	3.3
Iron and steel	-	-	-	-	-	-	-	-	-	-	-	2.8	-
Other categories	43.9	43.5	43.4	45.0	45.6	42.2	45.2	43.6	44.7	43.0	46.0	47.0	46.3
Total (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total (US\$ million)	220.4	302.1	238.7	272.3	396.2	267.3	250.8	230.8	225.5	193.5	196.5	215.3	231.0
Small firms - Product category	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Wood and charcoal	17.1	17.2	15.6	14.2	14.5	11.4	9.0	8.9	8.0	8.1	8.2	9.0	8.9
Boilers, mechanical machines and instruments	10.1	11.2	10.5	10.9	10.2	13.7	14.3	11.9	14.1	14.6	13.7	14.1	13.2
Stone, plaster, cement and similar works	6.9	6.1	7.7	8.0	7.7	7.5	8.2	7.4	5.7	5.9	6.0	6.4	7.0
Furniture	5.3	5.0	4.5	3.9	3.9	4.1	3.3	3.5	2.7	3.2	2.7	3.1	-
Fruits and peels	4.1	3.8	3.3	3.1	3.9	2.8	-	3.0	3.0	2.9	2.6	3.0	3.3
Footwear	3.9	3.8	4.3	2.9	3.4	2.9	2.7	-	2.5	2.6	2.3	-	-
Fish, crustaceans and molluscs	3.6	3.0	2.5	3.0	-	-	-	-	-	-	-	-	-
Pearls and precious stones	3.3	2.8	3.7	3.4	3.7	4.1	3.8	4.0	4.4	4.7	5.5	5.0	4.8
Electrical machines, devices and materials	3.0	2.8	3.8	4.6	3.3	4.0	4.4	4.2	5.1	4.8	4.1	4.3	4.0
Autovehicles, parts and components	2.8	-	-	-	2.6	2.4	-	-	-	-	-	-	-
Plastics in general	-	2.8	-	2.7	-	-	3.2	3.1	3.4	3.1	2.9	2.8	3.1
Coffee, tea and spices	-	-	2.7	-	3.4	2.4	-	3.0	3.2	3.3	3.0	2.9	2.8
Chemical products in general	-	-	-	-	-	-	2.6	-	-	-	-	-	-
Salt, sulfur, lime, cement and similars	-	-	-	-	-	-	2.5	2.7	-	-	-	3.0	3.1
Optical and photo instruments	-	-	-	-	-	-	-	-	-	-	-	-	2.2
Other categories	40.0	41.4	41.4	43.3	43.4	44.7	45.9	48.3	47.8	46.7	49.2	46.5	47.6
Total (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total (US\$ million)	1,515.7	2,252.8	1,911.9	2,115.1	2,598.6	2,042.1	1,067.3	1,733.6	1,807.0	1,593.5	1,569.0	1,746.0	1,833.4

Source: authors' own elaboration. Data from MDIC.

*List of ten main product categories exported each year. Full list released only from 2012 onward. Categories marked by "-" are presented in "other categories" to the respective year.

The export composition of medium companies also registered a decline in the share of "wood and charcoal" and an increase of "boilers, mechanical machines and instruments" in total exports. Both were among the main product categories exported by such group of firms, which also included a growing share of "stone, plaster, cement and similar works" (Table 8).

Finally, the export profile of large firms pointed to a very different composition if compared to firms of other sizes. The share of "autovehicles, parts and components" and "boilers, mechanical machines and instruments", which corresponded to the main product categories exported at the beginning of the period, reduced substantially over time (Table 8). In turn, the relative participation of "seeds and oleaginous fruits, grains and seeds", "minerals and ash", "fuels and mineral oil" and "meat and offal" increased, thus reinforcing the degree of dependence of Brazilian exports on primary goods.

Table 8. Export composition of Brazilian medium and large firms, by main exported product categories, 2003-2015* (%)

Medium firms - Product category	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Wood and charcoal	13.9	14.7	12.0	11.4	11.7	10.6	8.7	9.4	8.5	7.8	7.8	8.4	8.6
Boilers, mechanical machines and instruments	10.5	9.5	10.7	10.1	9.3	12.0	11.0	10.6	11.9	12.4	12.5	11.5	11.5
Plastics in general	4.6	4.6	4.6	4.0	4.0	4.4	3.8	5.2	4.6	4.2	4.2	4.1	4.0
Furniture	4.2	4.9	4.5	4.5	3.8	3.9	3.7	3.6	3.3	2.8	2.6	2.8	2.5
Iron and steel	4.1	3.9	3.9	3.4	3.0	3.5	4.3	3.7	3.2	-	2.4	2.8	-
Stone, plaster, cement and similar works	3.4	3.5	5.0	5.7	6.3	6.1	5.5	6.4	6.1	6.4	7.2	6.6	6.6
Furs and leather	3.4	3.9	2.7	-	-	-	-	2.6	-	-	2.9	-	-
Fruits and peels	3.3	-	-	-	-	2.6	2.6	-	-	-	-	-	2.4
Electrical machines, devices and materials	3.1	2.8	3.0	3.4	3.3	3.6	3.3	3.2	3.1	3.7	3.9	3.6	4.1
Seeds and oleaginous fruits, grains and seeds	2.9	-	-	-	3.1	-	-	-	-	-	-	3.1	2.3
Footwear	-	3.1	3.1	3.0	3.8	2.6	2.4	-	2.6	2.4	-	2.3	2.4
Autovehicles, parts and components	-	2.8	-	3.1	-	-	-	-	-	2.3	-	-	-
Sugar and confectionery products	-	-	2.8	-	-	-	-	-	-	3.2	-	-	-
Coffee, tea and spices	-	-	-	2.9	4.5	-	3.9	2.7	-	-	2.8	-	-
Animal or vegetable fats, oils and waxes	-	-	-	-	-	2.5	-	-	2.5	-	-	-	-
Chemical products in general	-	-	-	-	-	-	-	3.0	3.3	3.6	3.9	3.8	3.7
Other categories	46.7	46.2	47.6	48.5	47.2	48.3	50.7	49.7	51.0	51.0	49.9	51.0	51.8
Total (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total (US\$ million)	5,844.4	7,809.6	7,995.3	9,254.4	9,719.0	8,899.9	8,598.6	8,199.0	8,819.0	8,132.4	7,905.6	8,663.9	8,427.9
Large firms - Product category	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Autovehicles, parts and components	9.0	9.4	10.4	9.5	8.8	7.7	5.8	6.2	5.5	5.3	6.0	4.5	5.2
Boilers, mechanical machines and instruments	7.3	7.8	7.9	7.7	6.9	6.0	4.9	5.2	5.2	5.4	5.0	5.3	5.6
Iron and steel	6.8	7.4	7.6	6.7	6.2	6.7	4.4	4.2	4.8	4.5	3.5	4.4	4.8
Seeds and oleaginous fruits, grains and seeds	6.3	6.1	4.8	4.3	4.3	5.8	8.0	5.7	6.6	7.5	9.8	10.8	11.6
Fuels and mineral oil	5.8	5.1	6.5	8.4	9.0	10.0	9.5	10.3	10.9	11.4	7.7	9.6	7.6
Minerals and ash	5.5	6.0	7.4	7.7	8.1	10.0	10.1	16.1	18.0	14.3	15.1	13.2	9.2
Meat and offal, edible	5.4	6.3	6.5	5.7	6.4	6.5	6.8	6.1	5.5	5.8	6.3	7.1	7.2
Electrical machines, devices and materials	4.5	3.6	4.8	4.7	4.0	3.5	3.4	-	-	-	-	-	-
Residues and waste from food industries	4.1	3.9	-	-	-	-	3.3	2.6	2.4	2.9	3.0	3.4	3.3
Sugar and confectionery products	3.3	-	3.6	4.9	3.5	3.0	6.0	6.7	6.2	5.5	5.1	4.5	4.3
Aircraft and parts	-	3.9	3.0	2.7	3.4	3.2	-	-	-	-	-	-	-
Coffee, tea and spices	-	-	-	-	-	-	-	2.7	3.3	-	-	2.9	3.2
Cereals	-	-	-	-	-	-	-	-	-	2.8	-	-	-
Vessels and floating structures	-	-	-	-	-	-	-	-	-	-	3.4	-	-
Other categories	42.0	40.5	37.4	37.6	39.3	37.5	37.8	34.1	31.5	34.5	35.1	34.2	37.9
Total (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total (US\$ million)	65,400.6	85,880.4	107,945.5	125,963.1	147,626.9	186,388.5	142,791.3	191,473.8	244,782.2	232,155.7	232,222.9	214,144.4	180,326.7

Source: authors' own elaboration. Data from MDIC.

*List of ten main product categories exported each year. Full list released only from 2012 onward. Categories marked by "-" are presented in "other categories" to the respective year.

5. Conclusions

This paper discussed the trend of export "reprimarization" in the Brazilian economy during the 2003-2015 period from a firm size perspective. This approach allowed to distinguish export profiles of companies from different sizes as to contribute to the understanding of the "reprimarization" phenomenon and its occurrence in each segment. The evidence provided in this paper also points to the need of further studies on the productive and trade dynamics of both small and large companies regarding their focus on domestic and foreign markets, the differences of export specialization within each group of companies, among other issues.

During the analyzed period, it was highlighted that: (i) the quantity of exporting companies increased and was distributed in a relatively similar way between smaller and larger companies; (ii) there was, however, a relatively stronger trend of concentration of companies' activities in the domestic market, so that the proportion of exporting firms declined; (iii) the bigger the firm size, the higher the proportion of exporting companies and the greater their representativeness in Brazilian total exports, so that the country's export profile was largely attached to the export behavior of large firms, which accounted for a considerable part of total exports; (iv) exports of smaller companies as a whole were

relatively more concentrated in more dynamic and higher value-added goods if compared to exports of larger firms.

This study also provided evidence that exports made by smaller firms, especially micro firms, in Brazil were, on average, relatively more concentrated in industrial goods, including those of higher technological intensity, comparatively to exports of larger companies. Nonetheless, given the participation of exports of large companies in Brazilian total exports and their concentration in primary goods or lower value-added industrial goods, the highly commodity-dependent standard was reflected in the Brazilian export composition during the period.

As such, large firms were more affected by the commodity cycle, being favored when prices and demand were higher in international markets, what contributed to explain the increase in its share in total exports. Smaller companies, in turn, were less exposed to such effects, once revealing a more diversified and lower commodity dependent export composition. These trends clearly indicate how important is to investigate the process of export “reprimarization” according to firm size, as in those years for Brazil this phenomenon was mainly associated with the dynamics of exports of large companies.

In sum, the results of this paper point to new and important issues that should be considered as challenges for Brazilian exporters and policymakers. Special incentives and support from different types – financial, technical, bureaucratic, among others – should be applied to activities of smaller companies, especially those competitive in international markets or willing to compete internationally, as the barriers to export by micro and small firms are still high and most of them are still focused on the domestic market. In this regard, it was highlighted the low participation of exports from small-sized companies in Brazilian total exports, while at the same time their export composition by technological intensity and different exported product categories – attached to a higher relatively dynamism – show the importance to support such activities in order to increase this participation.

6. References

- ApexBrasil (2011). As exportações brasileiras e os ciclos de *commodities*: tendências recentes e perspectivas. *Análise ApexBrasil Conjuntura & Estratégia*. Brasília: Agência Brasileira de Promoção de Exportações e Investimentos (Apex).
- Bacha, E., & Fishlow, A. (2011). The recent commodity price boom and Latin American growth: more than new bottles for an old wine? In J. A. Ocampo & J. Ros (Eds.), *The Oxford handbook of Latin American economics* (pp. 394 - 410). Oxford: Oxford University Press.
- Bedê, M. A., Moreira, R. F., & Schmidt, F. (2013). Exportações de micro e pequenas empresas brasileiras: desafios e oportunidades. *Radar Ipea: tecnologia, produção e comércio exterior*, n.25. Brasília: Instituto de Pesquisa Econômica Aplicada (Ipea), abril, pp. 55 - 65.
- Bonaccorsi, A. (1992). On the relationship between firm size and export intensity. *Journal of International Business Studies*, 23 (4), 605 - 635.
- Borghi, R. A. Z. (2017). The Brazilian productive structure and policy responses in the face of the international economic crisis: an assessment based on input-output analysis. *Structural Change and Economic Dynamics*, 43, 62 - 75.
- Bresser-Pereira, L. C. (Ed.) (2010). *Doença holandesa e indústria*. Rio de Janeiro: FGV Editora.
- Castillo, M., & Martins Neto, A. (2016). Premature deindustrialization in Latin America. *Production Development Series*, n.205, ECLAC. Santiago: United Nations.

- Cunha, A. M., Bichara, J. S., & Lelis, M. T. C. (2013). América Latina y el ascenso de China: una perspectiva desde Brasil. *América Latina Hoy*, 65, 185 - 207.
- Cunha, A. M., Lelis, M. T. C., & Fligenspan, F. B. (2013). Desindustrialização e comércio exterior: evidências recentes para o Brasil. *Revista de Economia Política*, 33 (3), 463 - 485.
- De Negri, F., & Alvarenga, G. V. (2011). A primarização da pauta de exportações no Brasil: ainda um dilema. *Radar Ipea: tecnologia, produção e comércio exterior*, n.13. Brasília: Instituto de Pesquisa Econômica Aplicada (Ipea), abril, pp. 7 - 14.
- ECLAC. (2015). *Reinforcing production and cooperation and dialogue spaces: the role of SMEs*. Hamburg: EU-LAC Foundation and the Economic Commission for Latin America and the Caribbean (ECLAC).
- Gil, A. C. (2022). *Como elaborar projetos de pesquisa*. 7. ed. São Paulo: Atlas.
- Gomes, V., & Ellery Jr., R. (2007). Perfil das exportações, produtividade e tamanho das firmas no Brasil. *Revista Brasileira de Economia*, 61 (1), 33 - 48.
- Gonçalves, J. S. (2011). Reprimarização ou desindustrialização da economia brasileira: uma leitura a partir das exportações para o período 1997-2010. *Análises e Indicadores do Agronegócio, Instituto de Economia Agrícola do Estado de São Paulo (Iea)*, 6 (12), 1 - 7.
- Hausmann, R., Hwang, J., & Rodrik, D. (2005). What you export matters. *Nber Working Paper*, n.11905. Cambridge: National Bureau of Economic Research (Nber), December.
- Hirsch, S., & Adar, Z. (1974). Firm size and export performance. *World Development*, 2 (7), 41 - 46.
- IEDI. (2011). A indústria de transformação por intensidade tecnológica: o desafio de crescer sem deteriorar ainda mais o saldo comercial. *Carta IEDI*, n.454. São Paulo: Instituto de Estudos para o Desenvolvimento Industrial (IEDI), fevereiro.
- IEDI. (2012). Os cenários para as commodities e as perspectivas de saldo comercial brasileiro. *Carta IEDI*, n.513. São Paulo: Instituto de Estudos para o Desenvolvimento Industrial (IEDI), março.
- IEDI. (2014). As exportações cadentes da indústria. *Carta IEDI*, n.650. São Paulo: Instituto de Estudos para o Desenvolvimento Industrial (IEDI), novembro.
- IEDI. (2015). Manufaturas: o Brasil está se tornando um exportador marginal. *Carta IEDI*, n.706. São Paulo: Instituto de Estudos para o Desenvolvimento Industrial (IEDI), novembro.
- Klotzle, M. C., & Thomé, C. C. (2006). Fatores associados ao desempenho exportador de micros, pequenas e médias empresas brasileiras. *Revista de Administração*, 41 (3), 339 - 346.
- MDIC. (2016). *Classificação da Secretaria de Comércio Exterior: classificação por intensidade tecnológica*. Brasília: Ministério do Desenvolvimento, Indústria e Comércio Exterior (MDIC).
- Ministerio da Fazenda. (2011). *Economia brasileira em perspectiva, ano de 2010* (special edition). Brasília: Ministério da Fazenda.
- Morceiro, P. C., & Guilhoto, J. J. M. (2023). Sectoral deindustrialization and long-run stagnation of Brazilian manufacturing. *Revista de Economia Política*, 43 (2), 418 - 441.
- Nassif, A., Feijó, C., & Araújo, E. (2015). Structural change and economic development: is Brazil catching up or falling behind? *Cambridge Journal of Economics*, 39 (5), 1307 - 1332.
- OECD. (2005). *Stan Indicators: 1980-2003*. Paris: Organization for Economic Cooperation and Development (OECD), Directorate for Science, Technology and Industry.
- OECD. (2020). *SME and entrepreneurship policy in Brazil 2020. OECD Studies on SMEs and Entrepreneurship*. Paris: OECD Publishing.

- Oliveira, I., Ribeiro, F. J. S. P., Tironi, L. F., Nonnenberg, M., Carneiro, F. L., & Oliveira, G. A. S. (2021). International integration as a vector for the Brazilian economic recovery: proposals for stimulating exports. *Revista Tempo do Mundo, IPEA*, 26, 103 - 143.
- Oreiro, J. L., & Feijó, C. A. (2010). Desindustrialização: conceituação, causas, efeitos e o caso brasileiro. *Revista de Economia Política*, 30 (2), 219 - 232.
- Richardson, R. J. (2017). *Pesquisa social: métodos e técnicas*. 4. ed. São Paulo: Atlas.
- Sebrae. (2015). *As micro e pequenas empresas nas exportações brasileiras, Brasil: 1998-2014*. Brasília: Serviço Brasileiro de Apoio às Micro e Pequenas Empresas (Sebrae).
- Vieira, F. J. C., & Bertrand, H. (2007). Micro, pequenas e médias empresas – principais barreiras à exportação (estudo dos problemas enfrentados pelo polo de moda íntima de Nova Friburgo). *4º Congresso do Instituto Franco-Brasileiro de Administração de Empresas (Igbae)*, Porto Alegre, Brazil, May 24 and 25.
- Wagner, J. (1995). Exports, firm size, and firm dynamics. *Small Business Economics*, 7, 29 - 39.

Appendix

Box 1. Classification of companies by firm size according to MDIC

Size	Industry		Agrobusiness, Trade and Services	
	Number of Employees	Amount	Number of Employees	Amount
Micro firm	Up to 10	Up to USD 400 thousand	Up to 5	Up to USD 200 thousand
Small firm	From 11 to 40	Up to USD 3.5 million	From 6 to 30	Up to USD 1.5 million
Medium firm	From 41 to 200	Up to USD 20 million	From 31 to 80	Up to USD 7 million
Large firm	Above 200	Above USD 20 million	Above 80	Above USD 7 million
Natural person	-	-	-	-

Source: MDIC (2016).

Table 1. Distribution of number of establishments by sector of economic activity and firm size*, selected years (units and %)

	0 Employees	1 to 4	5 to 9	10 to 19	20 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 or More	Total							
2003	25,574	114,696	51,906	192,176	38,714	230,890	26,505	257,395	9,581	266,976	5,744	272,720	2,044	274,764	908	275,672	470	276,142
Industry	9.3	41.5	18.8	69.6	14.0	83.6	9.6	93.2	3.5	96.7	2.1	98.8	0.7	99.5	0.3	99.8	0.2	100.0
Construction	28,414	37,638	12,783	78,835	8,373	87,208	6,100	93,308	2,229	95,537	1,202	96,739	299	97,038	104	97,142	48	97,190
	29.2	38.7	13.2	81.1	8.6	89.7	6.3	96.0	2.3	98.3	1.2	99.5	0.3	99.8	0.1	100.0	0.0	100.0
Trade	120,521	590,860	155,278	866,659	73,153	939,812	29,286	969,098	6,618	975,716	2,728	978,444	560	979,004	88	979,092	18	979,110
	12.3	60.3	15.9	88.5	7.5	96.0	3.0	99.0	0.7	99.7	0.3	99.9	0.1	100.0	0.0	100.0	0.0	100.0
Services	90,587	510,440	138,844	739,871	72,289	812,160	44,953	857,113	14,472	871,585	10,289	881,874	4,538	886,412	2,510	888,922	1,728	890,650
	10.2	57.3	15.6	83.1	8.1	91.2	5.0	96.2	1.6	97.9	1.2	99.0	0.5	99.5	0.3	99.8	0.2	100.0
Agriculture	36,878	202,971	25,749	265,598	11,050	276,648	5,144	281,792	1,415	283,207	664	283,871	190	284,061	84	284,145	47	284,192
	13.0	71.4	9.1	93.5	3.9	97.3	1.8	99.2	0.5	99.7	0.2	99.9	0.1	100.0	0.0	100.0	0.0	100.0
Non-classified	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	100.0	0.0	100.0
Total	301,974	1,456,605	384,560	2,143,139	203,579	2,346,718	111,988	2,458,706	34,315	2,493,021	20,627	2,513,648	7,631	2,521,279	3,695	2,524,974	2,311	2,527,285
	11.9	57.6	15.2	84.8	8.1	92.9	4.4	97.3	1.4	98.6	0.8	99.5	0.3	99.8	0.1	99.9	0.1	100.0
2008	27,688	136,734	64,219	228,641	48,157	276,798	34,520	311,318	12,659	323,977	7,299	331,276	2,644	333,920	1,187	335,107	779	335,886
Industry	8.2	40.7	19.1	68.1	14.3	82.4	10.3	92.7	3.8	96.5	2.2	98.6	0.8	99.4	0.4	99.8	0.2	100.0
Construction	31,383	49,401	17,809	98,593	12,398	110,991	9,538	120,529	3,666	124,195	2,125	126,320	648	126,968	258	127,226	144	127,370
	24.6	38.8	14.0	77.4	9.7	87.1	7.5	94.6	2.9	97.5	1.7	99.2	0.5	99.7	0.2	99.9	0.1	100.0
Trade	141,685	727,662	202,928	1,072,275	101,455	1,173,730	44,120	1,217,850	10,647	1,228,497	4,627	1,233,124	1,014	1,234,138	151	1,234,289	49	1,234,338
	11.5	59.0	16.4	86.9	8.2	95.1	3.6	98.7	0.9	99.5	0.4	99.9	0.1	100.0	0.0	100.0	0.0	100.0
Services	103,859	601,641	173,058	878,558	92,814	971,372	58,601	1,029,973	18,131	1,048,104	11,793	1,059,897	5,412	1,065,309	3,194	1,068,503	2,459	1,070,962
	9.7	56.2	16.2	82.0	8.7	90.7	5.5	96.2	1.7	97.9	1.1	99.0	0.5	99.5	0.3	99.8	0.2	100.0
Agriculture	43,471	222,297	29,281	295,049	12,920	307,969	5,902	313,871	1,758	315,629	856	316,485	232	316,717	94	316,811	67	316,878
	13.7	70.2	9.2	93.1	4.1	97.2	1.9	99.1	0.6	99.6	0.3	99.9	0.1	99.9	0.0	100.0	0.0	100.0
Non-classified	11	24	0	35	0	35	1	36	0	36	0	36	0	36	0	36	0	36
	30.6	66.7	0.0	97.2	0.0	97.2	2.8	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0	0.0	100.0
Total	348,097	1,737,759	487,295	2,573,151	267,744	2,840,895	152,682	2,993,577	46,861	3,040,438	26,700	3,067,138	9,950	3,077,088	4,884	3,081,972	3,498	3,085,470
	11.3	56.3	15.8	83.4	8.7	92.1	4.9	97.0	1.5	98.5	0.9	99.4	0.3	99.7	0.2	99.9	0.1	100.0

2015	0 Employees	1 to 4	5 to 9	10 to 9	10 to 19	20 to 49	0 to 49	50 to 99	0 to 99	100 to 249	0 to 249	250 to 499	0 to 499	500 to 999	0 to 999	1,000 or More	Total	
Industry	37,791	177,522	72,443	287,756	52,617	340,373	35,843	376,216	12,460	388,676	7,364	396,040	2,703	398,743	1,286	400,029	859	400,888
	9.4	44.3	18.1	71.8	13.1	84.9	8.9	93.8	3.1	97.0	1.8	98.8	0.7	99.5	0.3	99.8	0.2	100.0
Construction	52,986	92,911	29,245	175,142	18,589	193,731	12,869	206,600	4,254	210,854	2,422	213,276	706	213,982	277	214,259	156	214,415
	24.7	43.3	13.6	81.7	8.7	90.4	6.0	96.4	2.0	98.3	1.1	99.5	0.3	99.8	0.1	99.9	0.1	100.0
Trade	168,400	899,981	262,635	1,331,016	130,556	1,461,572	57,434	1,519,006	13,317	1,532,323	6,652	1,538,975	1,311	1,540,286	279	1,540,565	72	1,540,637
	10.9	58.4	17.0	86.4	8.5	94.9	3.7	98.6	0.9	99.5	0.4	99.9	0.1	100.0	0.0	100.0	0.0	100.0
Services	143,497	824,745	247,658	1,215,900	132,891	1,348,791	82,151	1,430,942	24,924	1,455,866	14,756	1,470,622	6,513	1,477,135	3,739	1,480,874	3,064	1,483,938
	9.7	55.6	16.7	81.9	9.0	90.9	5.5	96.4	1.7	98.1	1.0	99.1	0.4	99.5	0.3	99.8	0.2	100.0
Agriculture	38,966	235,735	33,475	308,176	13,805	321,981	6,182	328,163	1,787	329,950	890	330,840	219	331,059	99	331,158	72	331,230
	11.8	71.2	10.1	93.0	4.2	97.2	1.9	99.1	0.5	99.6	0.3	99.9	0.1	99.9	0.0	100.0	0.0	100.0
Total	441,640	2,230,894	645,456	3,317,990	348,458	3,666,448	194,479	3,860,927	56,742	3,917,669	32,084	3,949,753	11,452	3,961,205	5,680	3,966,885	4,223	3,971,108
	11.1	56.2	16.3	83.6	8.8	92.3	4.9	97.2	1.4	98.7	0.8	99.5	0.3	99.8	0.1	99.9	0.1	100.0

Source: authors' own elaboration. Data from RAIS.

*Number of establishments is presented in the upper line and percentage distribution by firm size in the line below for each sector of economic activity. For years 2003 and 2008, there was the "non-classified" category for those establishments without a specific sector framing.