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Covid-19: Public Policies and Society's Responses

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Policy Briefing Note 19

Pandemic reduces brazilian exports of high complexity goods. Emergency public actions are necessary to prevent an even worse regression of the economy's competitiveness

Main Conclusions

- The effects of the crisis were much more conspicuous on the export of high complexity goods than on the export of low complexity goods. Exports fell more in states with a more complex production structure while imports fell more in states with a less complex production structure.
- Export gains were concentrated in the North and Midwest regions, in addition to the states of Pernambuco, Piauí, and Alagoas. All other states recorded a drop in exported goods.
- 17 Brazilian states saw their exports of high complexity goods drop over 20% in comparison to the first half of 2019.
- Only 9 of the 27 states saw an increase in imports compared to 2019: Roraima, Piauí, Pará, Ceará, Rio Grande do Norte, Alagoas, Rio de Janeiro, Espírito Santo, and Distrito Federal (DF).
- 10 states increased their high-tech imports, which tends to reinforce the loss of competitiveness of the domestic production in these sectors.
- The vast majority of states had a positive trade balance in low complexity products and a negative trade balance in high complexity products.
- There was an expressive growth (6.4%) in China's participation as the main destination of Brazilian exports between the first semesters of 2019 and 2020 and a drop of 3.5% in the participation of the USA.

Introduction

The pandemic has deeply affected international trade flows. The industry sector has been either paralyzed or slowed down and consumption was reduced due to social isolation measures.

Before the pandemic, Brazil had not yet recovered from the economic crisis of recent years, which has skyrocketed unemployment to alarming levels. Brazilian GDP grew 1.1% in 2019, according to the Brazilian Institute of Geography and Statistics (IBGE)[1], the weakest performance in 3 years, mainly resulting from the slowdown of household consumption and private investments. In current values, last year's GDP totaled R$ 7.3 trillion in 2019.

In 2019, exports totaled US$ 225 billion, a decline of 5.8% compared to the previous year (2018), which registered US$ 239 billion. Imports, on the other hand, totaled US$ 177 billion, a drop of 2.1% over international purchases in 2018.

However, this scenario has been further aggravated by the impact of the coronavirus pandemic. The IMF forecasts a 9.1% drop in Brazil's GDP this year[2]. In addition, the Institute for Applied Economic Research (Ipea) predicts that the economic slowdown in international trade as a result of the pandemic will decrease Brazilian exports between 11% and 20% in 2020, bringing the country's sales to levels below US$ 200 billion[3].

This Technical Note analyzes the effects of the current crisis on Brazil's national trade flows as well as in each of the states during the first 6 months of 2020. For this purpose, we used import and export data from the Comexstat platform[4].

We developed our analysis by dividing the traded products and states according to their complexity index[5]. Generally speaking, complex products are those produced by a reduced amount of countries with a diversified productive structure, which indicates a greater capacity for the competitive production of these goods. Complex countries, in turn, are those that competitively produce a more diversified and more complex basket of goods. Hence, economic complexity reflects the level of knowledge incorporated into the economy's productive structure, and therefore countries with higher than expected complexity for their income level tend to grow more than high-income countries.

The sectorial classification of goods and states matters as it allows us to analyze how the production of high complexity goods relates to greater GDP per capita growth rates[6]. In addition, recent studies have shown that increased economic complexity is also associated with reducing inequality[7] and the intensity of greenhouse gas emissions[8], thus contributing to a more inclusive and sustainable economic growth.

1 Available at https://www.ibge.gov.br/estatisticas/economicas/contas-nacionais/9300-contas-nacionais-trimestrais.html?edicao=26998&t=destaques.
2 Available at https://www.imf.org/en/Publications/WEO/Issues/2020/06/24/WEOUpdateJune2020.
3 Available at https://www.ipea.gov.br/cartadeconjuntura/wp-content/uploads/2020/04/CC47_NT_Comércio-externo-Covid-19.pdf
4 Available at http://comexstat.mdic.gov.br, Acesso em 01 de agosto, 2020
5 Hidalgo C.A.; Hausmann, R. (2009) The building blocks of economic complexity, Proceedings of the National Academy of Sciences, 106(26), p. 10570–10575.
6 Hausmann, R.; Hidalgo C.A.; Bustos, S.; Coscia, M.; Chung, S.; Jimenez, J.; Simões, A.; Yildirim, M. A (2011) The Atlas of Economics Complexity – Mapping Paths to prosperity. Puritan Press, p. 364.

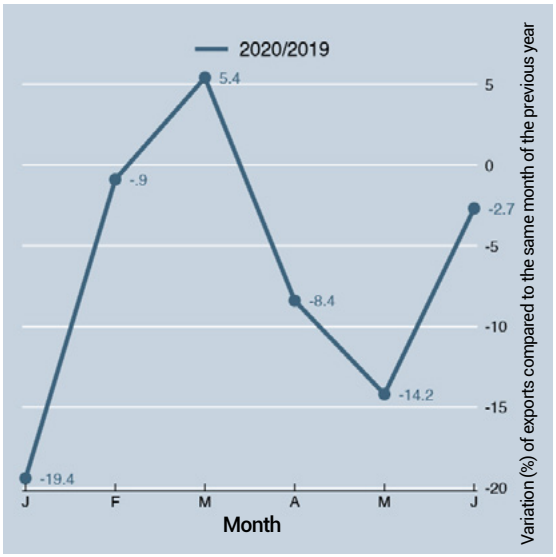
Exports and imports

Given the scarcity of trade data from other countries for comparing the effects of the pandemic across different nations, an alternative solution for analyzing how intensely the pandemic has impacted the Brazilian international trade is to compare the exports and imports values for the first six months in 2020 against the same months in 2019.

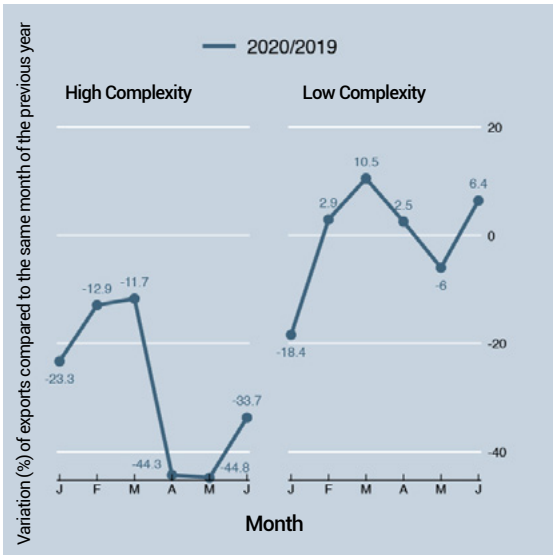
Figure 1A shows the flow of Brazilian exports in the first 6 months of 2020 against the first 6 months of 2019. The numbers in the figure indicate the percentage change in exports for each month against the same month of the previous year. In January 2020, Brazilian exports were 20% lower than in 2019. This difference decreases in February. In March the exported value becomes 5.4% greater against the same month in 2019. The crisis engendered by the pandemic causes Brazilian exports to drop once again below 2019 levels in April (-8.4%), a situation further aggravated in May (-14.2%). In June, while the export value remains 2.7% lower than 2019, we begin to see a decreased difference in values.

Figure 1 – Variation (%) of Brazilian exports compared to the same month of the previous year in the first half of 2020

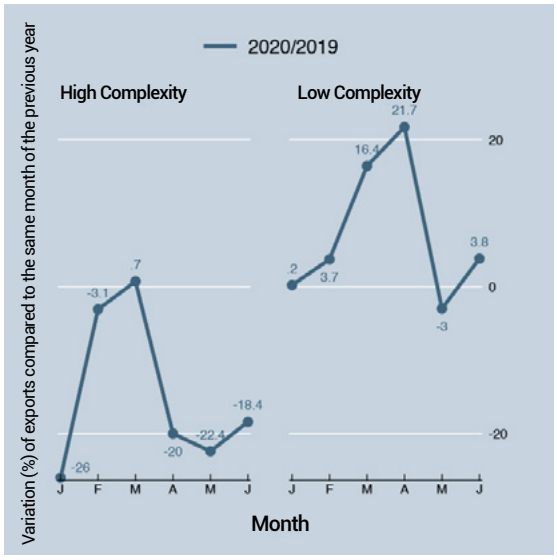
A. Total exports



B. By product complexity



C. By state complexity



Source: Prepared by the authors based on data from Comexstat.

Figure 1B replicates the analysis in Figure 1A, but now dividing the exported products into two groups: low complexity and high complexity products. Figure 1C divides the states between those with a low complexity production structure and those with a high complexity production structure. The complexity indices for regions and products are standardized. Thus, products with an index below zero may be considered low complexity products. Correspondingly, products with an index greater than zero are considered high complexity products. The same is true for the economic complexity index used to classify the production structures of the states.

Among the high complexity products exported by Brazil in 2019, the top 3 are cars, heavy-duty vehicles for construction, and gas turbines, which accounted for circa 3.6% of Brazilian exports in 2019. As for low complexity products, crude oil, iron ore, and corn, are the top 3 exports, together these products represented circa 24% of Brazilian exports in 2019.

Regarding low complexity products, only in January and May did exports in 2020 fall below 2019 levels, which indicates the good export performance of these goods during the first 6 months of 2020, despite the pandemic. For these products, the flow was akin to the general flow presented in Figure 1A: increase between January and March 2020, decline in April and May, and recovery in June. For high complexity products, in all first 6 months of 2020 exports were lower than in 2019, indicating the worsening of this sector. The drop observed in the months of April and May was particularly impressive: in these months, Brazilian exports of high complexity goods were 44.3% and 44.8% lower than in the same months of 2019. Furthermore, the recovery in June was equally modest, with exports of these goods still 33.7% lower than in the previous year.

In the analysis by groups of states, the panorama remains similar to the export flow subdivided by low and high complexity products: the drop in exports in low complexity states is lower than the drop in high complexity states, and the recovery of exports is slower in the latter group.

In summary, Figure 1 reveals two relevant pieces of information on export flows during the first half of 2020: (1) the effect of the crisis on the export of high complexity goods was much more conspicuous than on the export of low complexity goods; and (2) the crisis had a greater impact on states with more complex production structures.

Figure 2A shows the flow of Brazilian imports in the first 6 months of 2020 compared to the first 6 months of 2019. The value of imports improved from January to March and declined thereafter. January already registered a drop compared to the same month of the previous year. The difference in relation to 2019 becomes positive in February and March, but with the pandemic we see a sharp drop in the months of April (-14.8%), May (-10.5%), and June (-19.8%).

Figure 2B repeats the analysis in Figure 2A by separating low and high complexity products. For high complexity products, the flow is very similar to the general imports, with the drop in imports

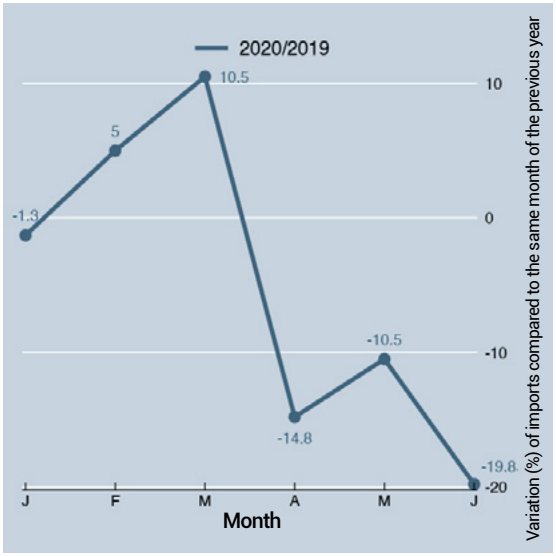
7 Hartmann, D, Guevara, M, Jara-Figueroa, C, Aristarán, M, Hidalgo, C. (2017) Linking Economic Complexity, Institutions, and Income Inequality. *World Development*, v.93, p.75-93. According to the article, countries that produce and export more complex products tend to have more inclusive institutions and lower levels of inequality, even when controlling education and other variables. Although further research is necessary to better understand this relationship, this result is likely associated to the type of employment, with higher qualification and remuneration, required to produce more complex goods.

8 Romero, J. P.; Gramkow, C. (2020) *Economic Complexity and Greenhouse Gas Emission Intensity*, Cambridge Centre for Economic and Public Policy Working Paper, WP-03-20, p. 1-32.

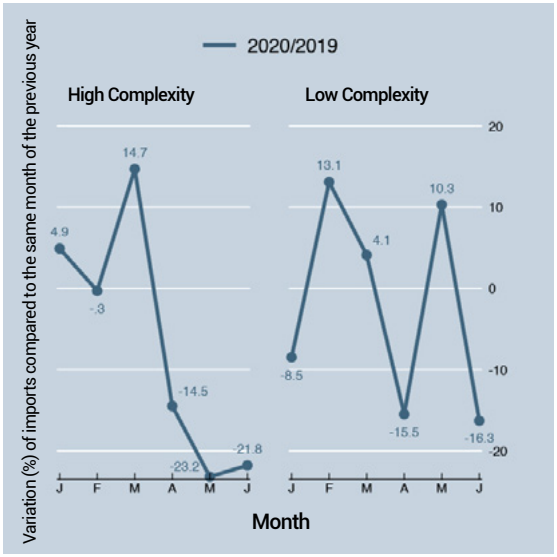
of these goods reaching -23.2% in May 2020. The major novelty is that the flow of low complexity imports shows very distinct trends: changing from a negative difference in relation to 2019 in January to a positive difference in February and March, returning to negative in April, and rising to a positive difference again in May, before finally going back to negative in June.

Figure 2 – Variation (%) of Brazilian imports compared to the same month of the previous year in the first half of 2020

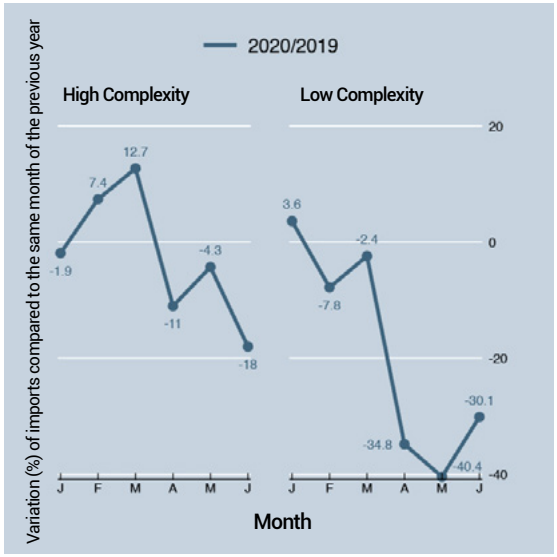
A. Total imports



B. By product complexity



C. By state complexity



Source: Prepared by the authors based on data from Comexstat.

Figure 2C subdivides the states into low and high complexity and shows that the flow pattern is again similar to Brazil's total imports. The most important finding here is the sharpest decline in imports in low complexity states, which dropped -40.4% in May, while the drop in high complexity states reached -18% in June.

In summary, Figure 2 reveals two relevant pieces of information on import flows during the first half of 2020: (1) the effect of the crisis on the import of high complexity goods was more conspicuous than on the import of low complexity goods; and (2) the crisis had a greater impact on imports in states with less complex production structures.

Regarding product groups, the flow of Brazilian exports and imports saw a drop in exports in most product groups. The main drops in the first half of 2020 were in Arms and ammunition (-41.3%), Arts and antiques (-87.4%), Instruments (-42.2%), and Transport (-55.3%). Regarding imports, the most relevant drops were in Plastic and rubber products (-3.5%), Wood Products (-11.6%), Plant-based products (-3.4%), Chemical products (- 2.1%), Instruments (-8.9%), and Machinery (-3.2%). On the other hand, there was a slight increase in the import of Plant and animal products (1.2%) and Transport (8.8%). And a significant increase in the import of Metals (27.8%) and Arms and ammunition (98.2%).

Trade Balance

Figure 3 shows the flows in Brazil's trade balance throughout the first 6 months of 2019 and 2020.

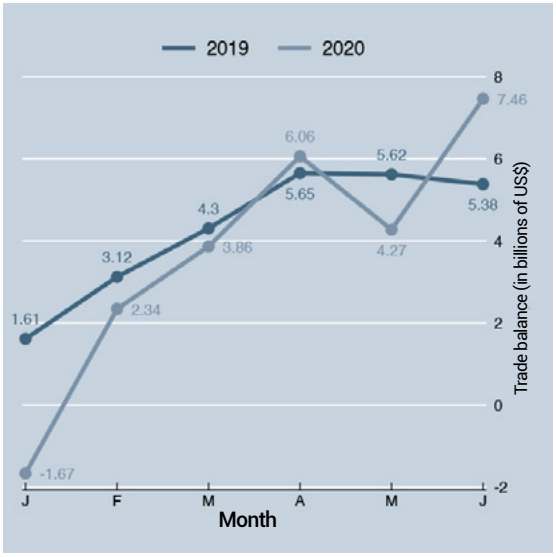
Figure 3A reveals that the monthly balance of 2020 maintained a similar pattern to 2019, except for May. Between January and April there was an increase in the trade balance, while the balances of 2020 were below 2019 levels in the first three months, and exceeding the balance of 2019 in the month of April.

Figure 3B shows the trade balances for low and high complexity products. The flow of the trade balance for low complexity products is very similar to the flow of the general trade balance, with a positive difference throughout the period and with values greater than the total trade balance. This is valid for both 2019 and 2020. For high complexity products, the balance remains negative across all months in both years. In 2020, the lowest results were in January (US$ -6.4 billion) and March (US$ -5.6 billion).

Lastly, Figure 3C analyzes the trade balances of the states, divided between states with high and low complexity production structures. Different to the analysis by product groups, the more complex states now present flows similar to the total balance flow. However, this balance starts off negative compared to the total in 2020, and only reaches positive values in April and June (both at US$ 1.1 billion). The month of May 2020 once again sees a much sharper drop in the trade balance than observed in the same month in 2019. The situation is very different for low complexity states: the trade balance is always positive and increases over the months, reaching US$ 4.7 billion in April 2020, a level well above the US$ 3.8 billion peak seen in May 2019.

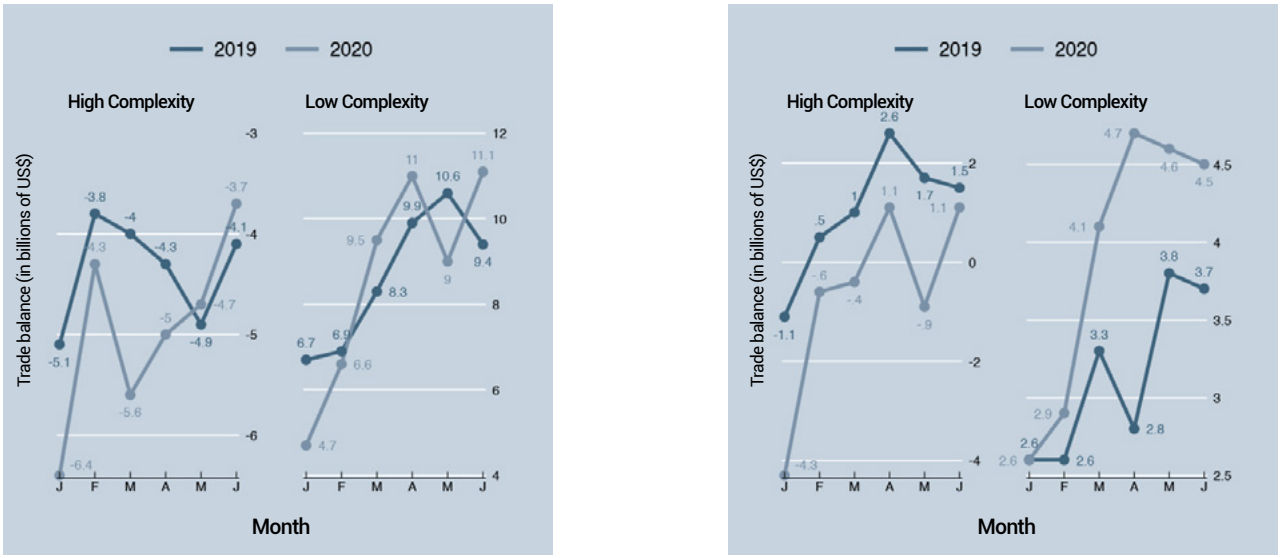
Figure 3 – Brazilian trade balance in the first half of 2019 and 2020

A. Total trade balance



B. By product complexity

C. By state complexity



Source: Prepared by the authors based on data from Comexstat.

In short, Figure 3 presents four significant pieces of information about Brazil's trade balances during the first semester of 2020: (1) with the exception of January, the balance was always positive and grew over the semester, which indicates that the drop in Brazil's exports throughout the period was lower than the drop in imports; (2) the positive balance was a consequence of the high and growing trade balance in low complexity goods; (3) the trade balance for high complexity goods was negative throughout the entire period, and although it dropped over the semester, this indicates a low relative competitiveness of the national production in this sector; and (4) the general positive trade balance was largely determined by the positive trade balances of low complexity states.

It is also worth noting that the participation of Brazil's leading export and import trading partners in the first 6 months of 2020 remained practically unchanged compared to 2019. Among the main partners, the participation of China, the United States, and Japan remained relatively constant in both periods. There was a slight reduction in the participation of Germany (-0.7% p.p.) and Argentina (-1.3% p.p.) in Brazilian imports. As for exports, there was an expressive growth of 6.4% p.p. in China's participation as the main destination of Brazilian exports between the first half of 2019 and within the same period in 2020, and a drop in USA's participation of 3.5% p.p.

Exports by State

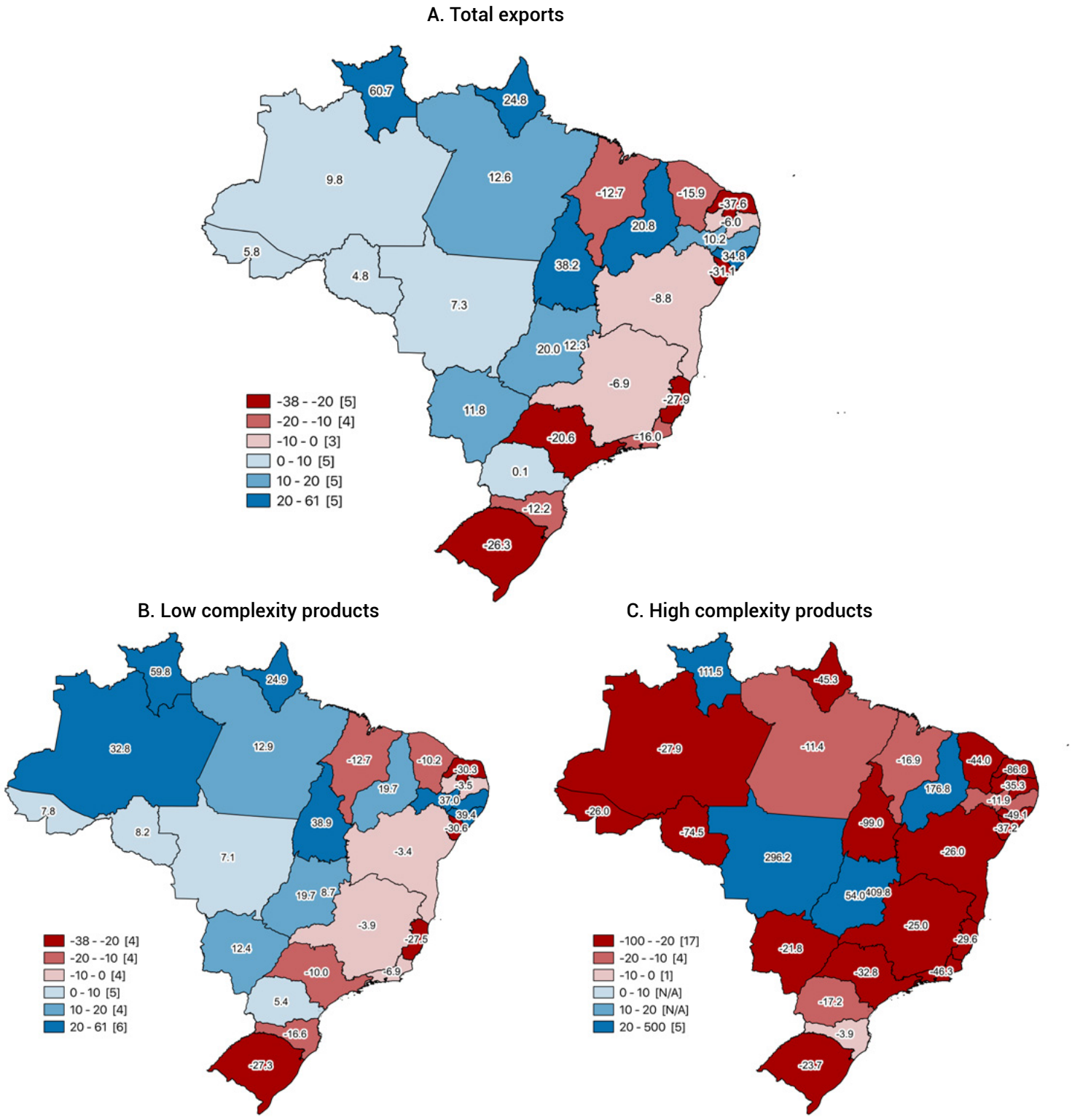
Figure 4 shows the states that saw an increase (shades of blue) and states that saw a decrease (shades of red) in exports compared to the first half of 2019.

Figure 4A reveals that the North and Midwest regions concentrated these gains, in addition to the states of Pernambuco, Piauí, and Alagoas. Santa Catarina was stable while all other states saw a drop in exports. The sharpest drops (over 20%) were in São Paulo (-20.6%), Rio Grande do Sul (-26.3%), Espírito Santo (-27.9%), Sergipe (-31.1%), and Rio Grande do Norte (-37.6%). The states of Minas Gerais (-6.9%), Bahia (-8.8%), and Paraíba (-6%) had relatively smaller drops (below 10%).

Figure 4B reveals that a similar pattern to Figure 4A emerges if we consider only low complexity products. From the positive side, the main differences are the greatest increases in Amazonas and Pernambuco. From the negative side, the main differences are the less expressive drops in São Paulo and Rio de Janeiro.

Figure 4C, however, shows the alarming and widespread drop in the production of high complexity goods in the first half of 2020 compared to the first half of 2019. Only the states of Piauí, Roraima, Mato Grosso, and Goiás saw an increase in exports of these goods, albeit over a tiny initial base (see Figure 5). On the other hand, 17 states saw a drop greater than 20% in the export of high complexity goods when compared to the first half of 2019.

Figure 4 – Export variation in Brazilian states compared to the first half of 2019

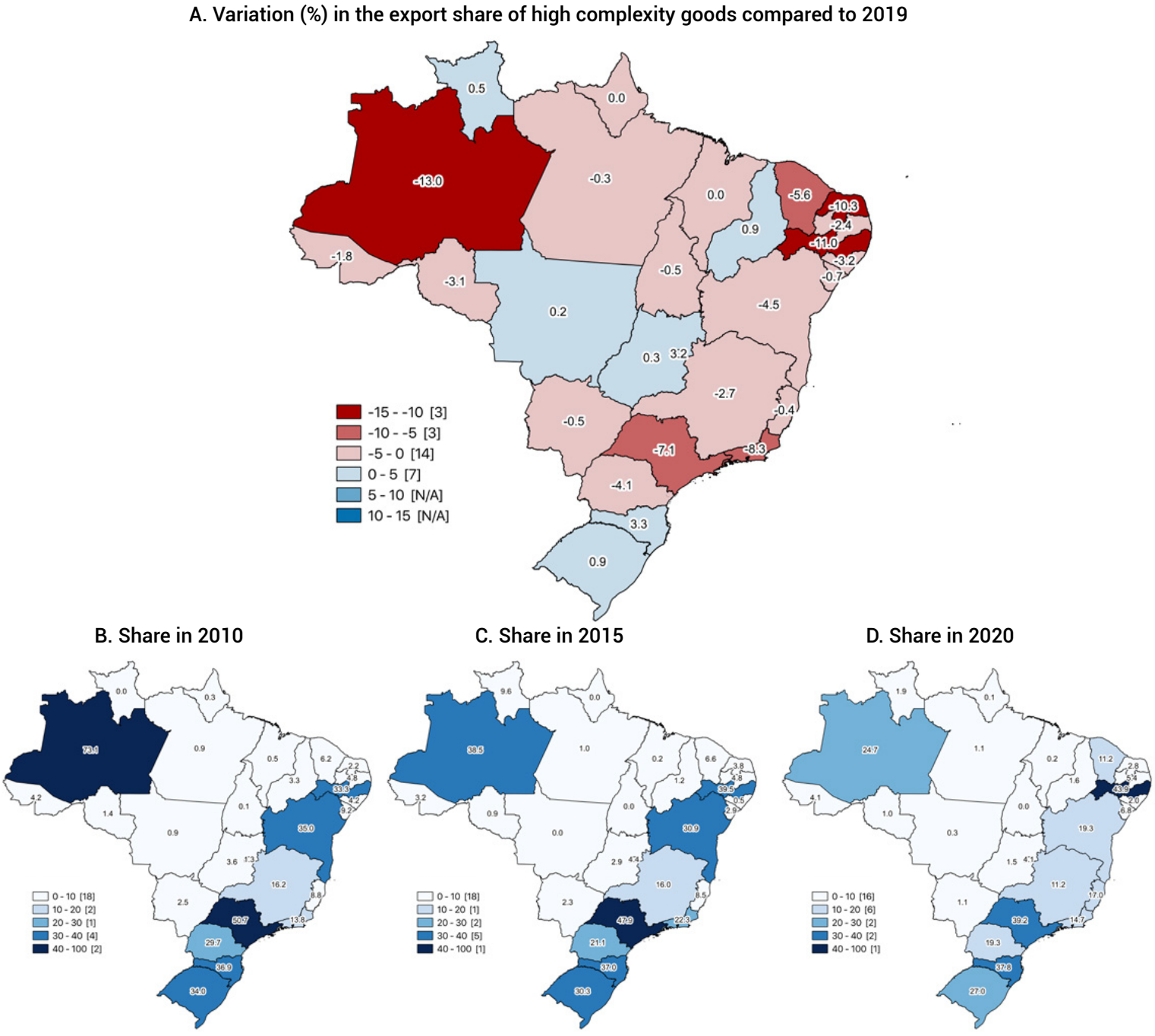


Source: Prepared by the authors based on data from Comexstat.

Figure 5 shows the variation in the export share of high complexity goods, i.e., the composition of the states' export basket. Figure 5A reveals that only 7 states had an increase (positive variation – blue) in the export share of high complexity goods, albeit in most of these states the increase was extremely modest. The sole exception is Santa Catarina, which had a 3.3% increase in the share of this sector. In the remaining 20 states, there was a drop (negative variation – red) in the export share

of these goods. The sharpest drops (greater than 10%) were in Pernambuco (-11%), Rio Grande do Norte (-10.3%), and Amazonas (-13%) followed by São Paulo (-7.1%), Rio de Janeiro (-8.3%) and Ceará (5.6%) with drops greater than -5%. Figures 5B, 5C and 5D, in turn, illustrate that the drop in the export share of high complexity goods is not a novelty, but has been occurring for more than a decade.

Figure 5 – Variation in the export share of high complexity goods in Brazilian states



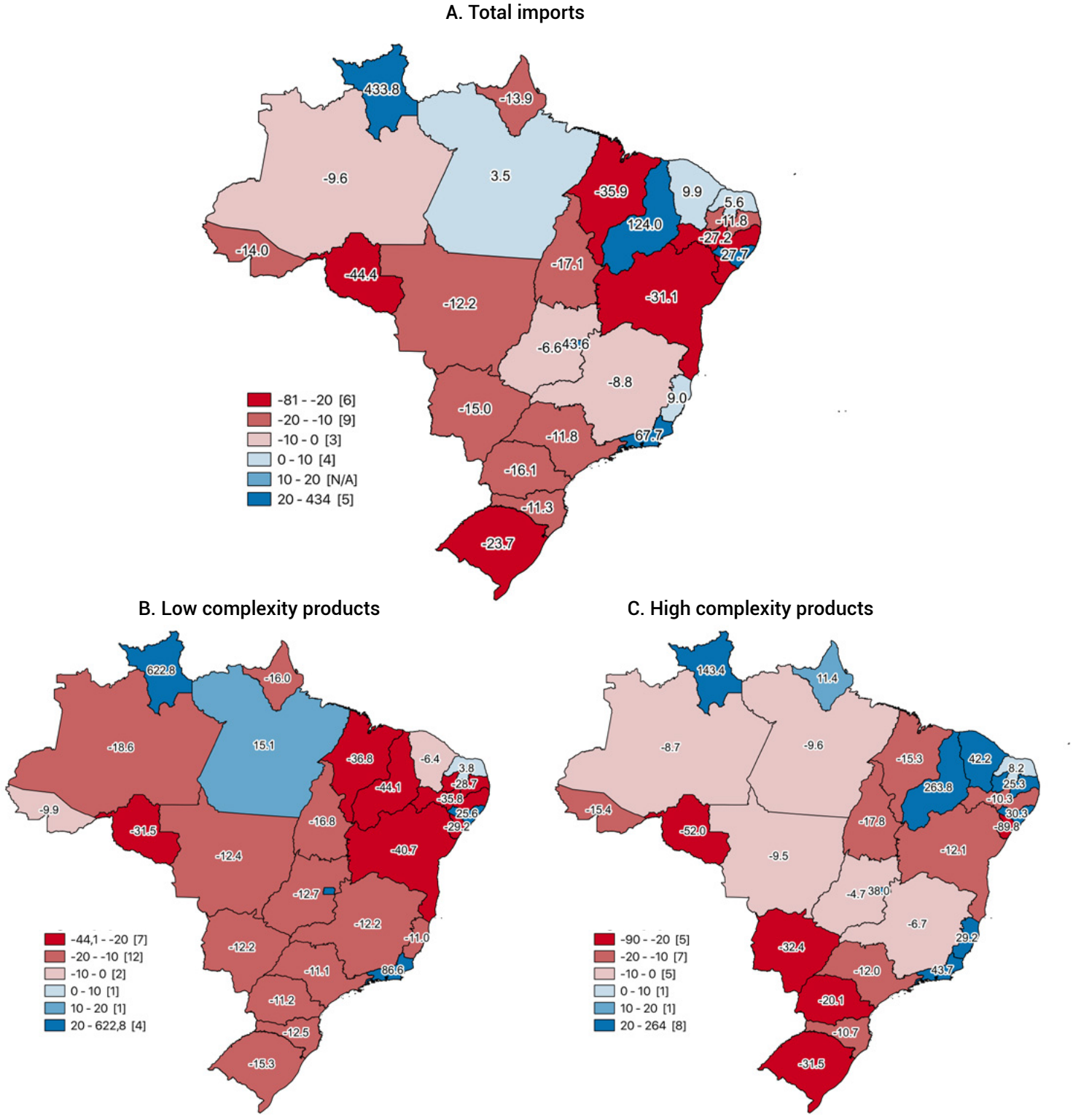
Source: Prepared by the authors based on data from Comexstat.

Imports by state

Figure 6 shows the states with an increase (shades of blue) and states with a decline (shades of red) in imports compared to the first half of 2019.

Figure 6A reveals that only 9 of the 27 states had an increase in imports compared to 2019: Roraima, Piauí, Pará, Ceará, Rio Grande do Norte, Alagoas, Rio de Janeiro, Espírito Santo, and Distrito Federal (DF). The sharpest drops (over 20%) were in Rondônia (44.4%), Maranhão (-35.9%), Bahia (-31.1%), Pernambuco (-27.2%), and Rio Grande do Sul (-23.7%). In turn, Minas Gerais (-8.8%), Goiás (-6.6%), and Amazonas (-9.6%) were the states with the smallest drops (below 10%).

Figure 6 – Import variation in Brazilian states compared to the first half of 2019 (%)



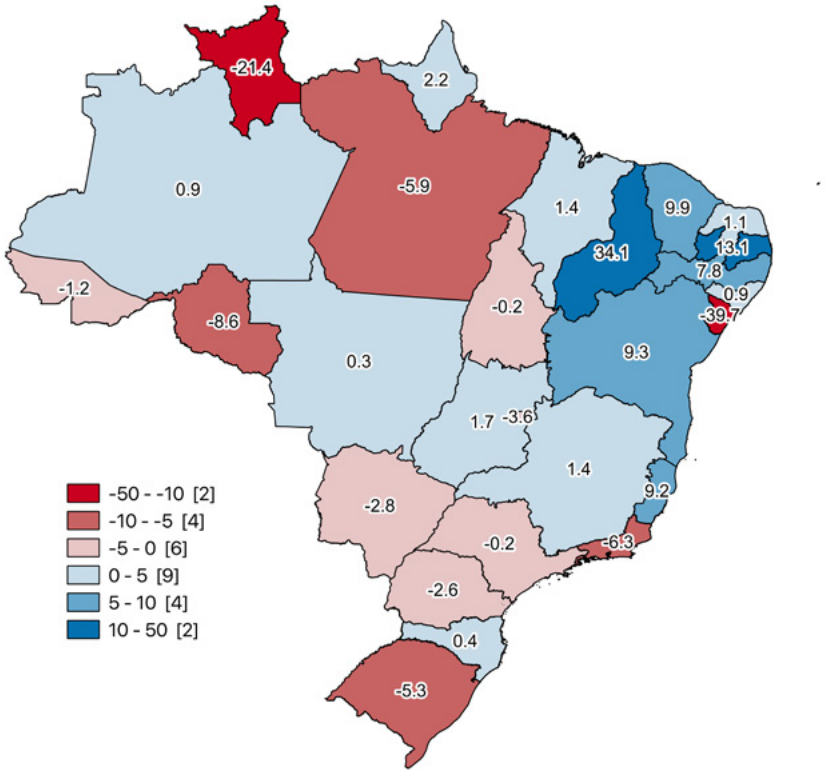
Source: Prepared by the authors based on data from Comexstat.

By comparing Figures 6B and 6C, we find that the drop in imports was greater for low complexity products. The greatest declines in the import of low complexity products were in Rondônia (-31.5%), Bahia (-40.7%), Maranhão (-36.8%), Piauí (-44.1%), Pernambuco (- 38.5%), Paraíba (-28.7%), and Sergipe (-29.2%). As for high complexity products, the greatest drops were in Rondônia (-52%), Mato Grosso do Sul (-32.4%), Paraná (-20.1%), and Rio Grande do Sul (-31.5 %).

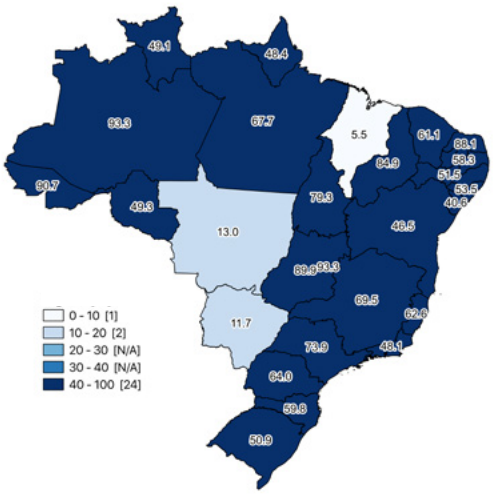
Significantly, 10 states saw an increase in high-tech imports, which reinforces the loss of competitiveness in the domestic production of this sector, as previously mentioned in the analysis of exports. Among the states with the most significant competitive production of high complexity goods (export share above 10%), Ceará, Rio de Janeiro, and Espírito Santo stand out with an expressive increase (greater than 20%) in the imports of these goods.

Figure 7 – Variation in the import share of high complexity goods in Brazilian states

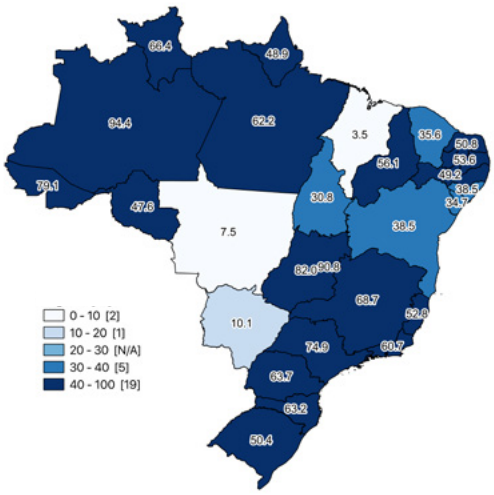
A. Variation (%) in the import share of high complexity goods compared to 2019



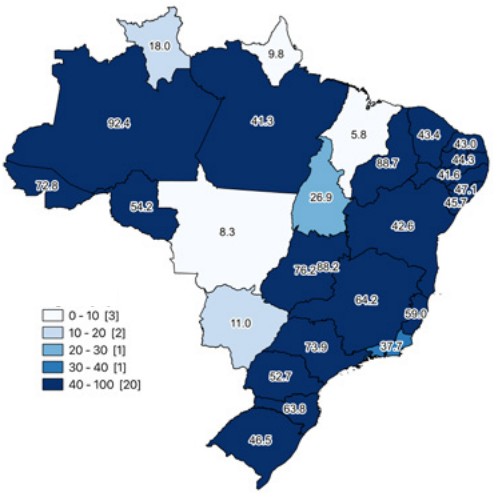
B. Share in 2010



C. Share in 2015



D. Share in 2020



Source: Prepared by the authors based on data from Comexstat.

Figure 7 shows the variation in the import share of high complexity goods, i.e., it addresses the import composition of the states. Figure 7A reveals an increase (positive variation – blue) in the share of high complexity imports in 15 states. In 9 of these states, the increase was modest (less than 5%). The most significant increases occurred in the Northeastern states: Piauí (34.1%), Paraíba (13.1%), Ceará (9.9%), Bahia (9.3%), and Pernambuco (7.8%).

Figure 7B shows that the import share of high complexity goods was already quite large in 2010, with 24 of the 27 states with an import composition of high complexity goods above 40%. Figure 7C, however, reveals that from 2010 to 2015 there was a drop in the import share of high complexity goods, wherein only 19 states had an import share of over 40% in this sector in 2015. There is a slight reversal of this situation in 2020.

We should recall, however, that the import of high complexity goods does not necessarily indicate a drop in the local productive capacity of goods in this sector, as it is characterized by more intense intra-industry trade. Furthermore, the production of high complexity goods is usually more integrated into broader international chains. Nonetheless, the increase in imports of these goods in several states, even amid the crisis, is somewhat alarming, especially since there has been a sharp drop in Brazilian exports in this sector throughout the same period.

Trade Balance by State

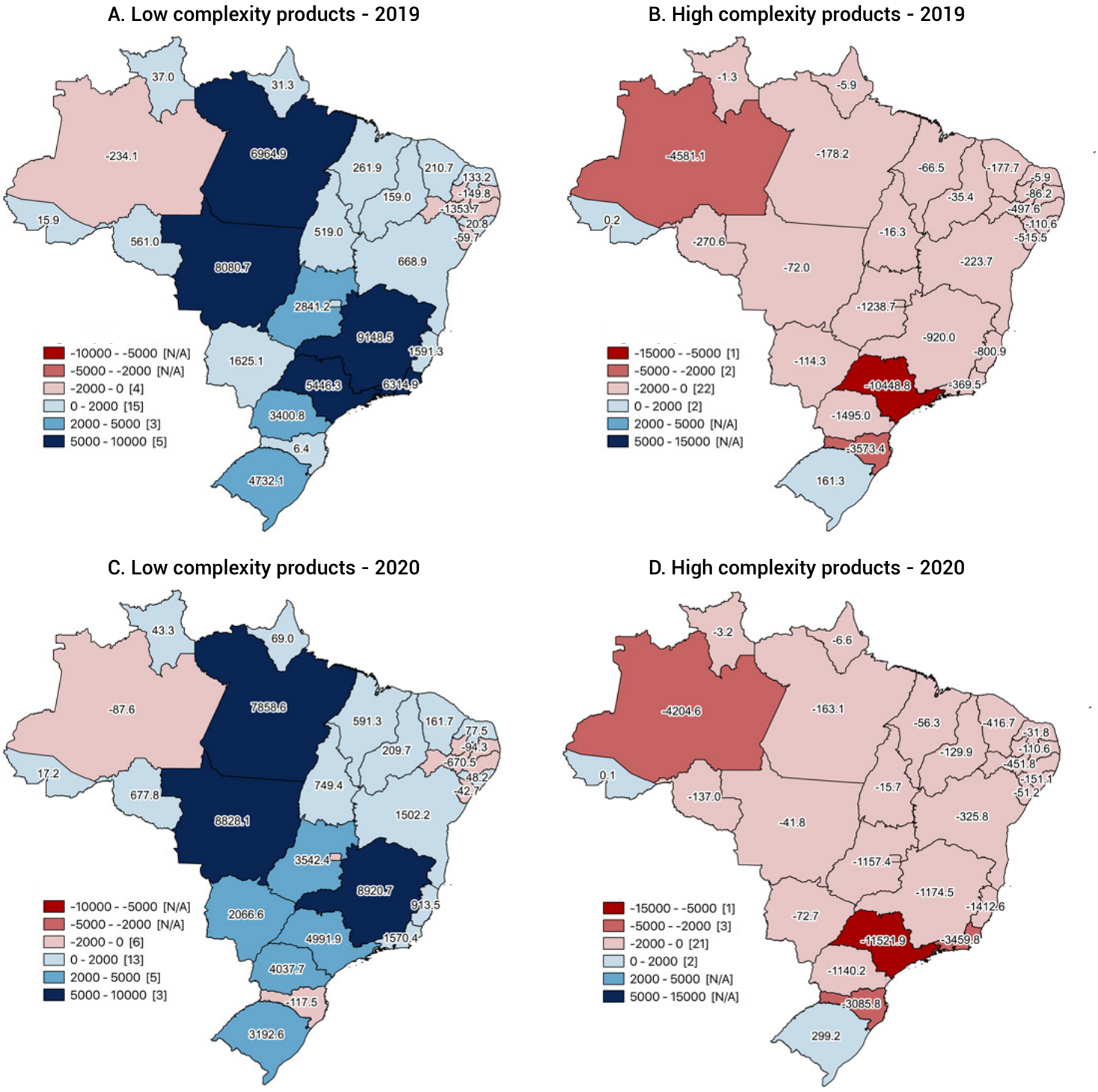
Figure 8 shows the states with a positive trade balance (shades of blue) and the states with a negative trade balance (shades of red) in the first half of 2019 and 2020, differentiating low and high complexity products.

Figure 8A shows that 23 of the 27 states had a positive trade balance in the first half of 2019 for low complexity products, particularly Pará (US$ 6.9 billion), Mato Grosso do Sul (US$ 8 billion), Minas Gerais (US$ 9.1 billion), Rio de Janeiro (US$ 6.3 billion), and São Paulo (US$ 5.4 billion). For high complexity products, Figure 8B shows that 25 of the 27 states had a negative trade balance of such goods, particularly São Paulo (US$ -10.4 billion), Amazonas (US$ -4.6 billion), and Santa Catarina (US$ -3.6 billion).

Figures 8C and 8D reveal a very similar pattern in 2020. Regarding the low complexity trade balance, the expressive declines in São Paulo (US$ 0.5 billion) and Rio de Janeiro (US$ 1.6 billion) are noteworthy. As for the high complexity balance, the sharp increase in Rio de Janeiro's trade deficit (US$ -3.5 billion) stands out, a value 10 times greater than observed in 2019.

Finally, some states had a negative trade balance for both product categories: Amazonas, Santa Catarina, Paraíba, Pernambuco, and Sergipe.

Figure 8 – Trade balance of Brazilian states in the first half 2019 and 2020 (in millions of US$)



Source: Prepared by the authors based on data from Comexstat.

In summary, Figure 8 discloses three important pieces of information regarding Brazil's trade balances during the first half of 2020: (1) the vast majority of states had a positive trade balance in low complexity products and a negative trade balance in high complexity products; (2) in 2020, positive trade balances in low complexity goods had an upward trend in most states; and (3) in 2020, negative trade balances in low complexity goods had a downward trend in most states.

Final Considerations

Among the main results presented in this Technical Note, we highlight the negative impact of the pandemic in the export of high complexity goods, which had been consistently dropping in recent years. Several studies[9] indicate that a decline in the competitive production of high complexity goods, should it become permanent, will have negative effects on the growth rate of GDP per capita in Brazil, on the level of income inequality, and on the intensity of greenhouse gas emissions.

It is vital that public authorities develop and implement policies for reversing the effects of the pandemic on the production of high complexity goods, precisely to prevent a major step backward in the country's productivity and competitiveness.

9 According to the empirical evidence presented by Hidalgo and Hausmann (2009), Hausmann et al. (2007; 2011), Hartmann et al. (2017), and Romero and Gramkow (2020).

ABOUT

We are over 40 researchers, actively engaged in the task of improving the quality of public policies within federal, state, and municipal governments as they seek to act amidst the Covid-19 crisis to save lives. We dedicate our energies towards rigorous data collection, devising substantial information, formulating indicators, and elaborating models and analyses to monitor and identify pathways for public policies and review the responses presented by the population.

The Solidary Research Network has researchers from all scientific fields (Humanities as well as Exact and Biological Sciences) in Brazil and overseas. For us, the combination of skills and techniques is vital as we face the current pandemic. The challenge ahead is enormous, but it is particularly invigorating. And it would never have come to fruition if it weren't for the generous contribution of private institutions and donors who swiftly answered our calls. We are profoundly grateful to all those who support us.

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WHO WE ARE

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