

## DEINDUSTRIALIZATION IN BRAZILIAN METROPOLISES

*Marcelo Gomes Ribeiro\**

\*Universidade Federal do Rio de Janeiro, Instituto de Pesquisa e Planejamento Urbano e Regional, Rio de Janeiro, RJ, Brazil

### Abstract

*This article discusses the phenomenon of deindustrialization in the main metropolitan regions of Brazil during the first two decades of the twenty-first century. The objectives are to present an analysis of the production structure of the manufacturing industry in Brazilian metropolises, vis-à-vis its national insertion, to identify the branches of activity that were most crucial to the country's metropolitan deindustrialization process, and to characterize the metropolitan regions in which this phenomenon has mostly occurred. For this, public data has been used, together with a tabulation requested from the IBGE regarding the value of industrial manufacturing in metropolitan regions over several years. It was identified that Brazilian deindustrialization is fundamentally a metropolitan phenomenon, specifically when considering the branches with the highest technological intensity. However, this process has not occurred homogeneously across the metropolises. Those that have most contributed to its occurrence were São Paulo, Salvador and Curitiba, while those that most counterbalanced this process were Rio de Janeiro and Recife.*

### Keywords

*Deindustrialization; Manufacturing Value Added; Technological Intensity Levels; Metropolises; Metropolitan Region.*

## DESINDUSTRIALIZAÇÃO NAS METRÓPOLES BRASILEIRAS

*Marcelo Gomes Ribeiro\**

\*Universidade Federal do Rio de Janeiro, Instituto de Pesquisa e Planejamento Urbano e Regional, Rio de Janeiro, RJ, Brasil

### Resumo

*O presente artigo discute o fenômeno da desindustrialização nas principais regiões metropolitanas no Brasil nas duas primeiras décadas do século XXI. Os objetivos são apresentar a análise da estrutura produtiva da indústria de transformação das metrópoles brasileiras vis-à-vis sua inserção nacional, identificar os ramos de atividade mais determinantes para o processo de desindustrialização metropolitano do país e caracterizar as regiões metropolitanas em que esse fenômeno se apresenta com mais frequência. Foram utilizados dados públicos e uma tabulação solicitada ao IBGE sobre o valor da transformação industrial das regiões metropolitanas referente a vários anos. Constatou-se que a desindustrialização brasileira é fundamentalmente um fenômeno metropolitano, sobretudo quando se consideram os ramos de intensidade tecnológica mais elevada. Contudo, esse processo não aconteceu de modo homogêneo entre as metrópoles. Aquelas que mais contribuíram para a sua ocorrência foram São Paulo, Salvador e Curitiba, ao passo que as que mais contrabalancearam esse processo foram Rio de Janeiro e Recife.*

### Palavras-chave

*Desindustrialização; Valor da Transformação Industrial; Níveis de Intensidade Tecnológica; Metrópoles; Região Metropolitana.*

# DEINDUSTRIALIZATION IN BRAZILIAN METROPOLISES<sup>1</sup>

*Marcelo Gomes Ribeiro*

## 1. Introduction

This article discusses the phenomenon of deindustrialization in the main metropolitan regions of Brazil. These spaces have been historically constituted as leading centers of manufacturing production par excellence that occurred in Brazil during the second half of the twentieth century. The reference period adopted by the analysis is the first two decades of the twenty-first century, when the phenomenon of deindustrialization had already become more apparent in both academic and public debates and its territorial effects were distinctly evident. Thus, it is argued that the Brazilian deindustrialization process is fundamentally a metropolitan phenomenon since it has mostly occurred in the main metropolitan regions; those recognized as metropolises (REGIC/IBGE, 2020).

The objective of this study is to present an analysis on the production structure of the manufacturing industry in the main Brazilian metropolitan regions vis-à-vis its national insertion, in order to obtain a more effective understanding of the territorial characteristics in which this phenomenon has become manifested. An attempt has also been made to identify the industrial branches that most determine the occurrence of the country's metropolitan deindustrialization process, considering that the behavior of the different branches of manufacturing production

---

1. I would like to thank the National Council for Scientific and Technological Development (CNPq) for the funding the project and the ad hoc reviewers at RBEUR for the questions and suggestions that contributed to the improvement of this article. Any possible flaws and limitations, however, are the sole responsibility of the author.

has not been homogeneous. Thus, based on an analysis of deindustrialization, an emphasis is placed on the “internalization” processes that characterize certain manufacturing branches. Furthermore, a description of the metropolises is also presented in which this process of deindustrialization is most frequent and the branches of economic activity in which it occurs.

An analysis of deindustrialization in Brazilian metropolises is relevant due to their importance as a population agglomeration, and because they are significant spaces for the country’s economic dynamics to function given their articulating role in the economic relations they establish with the “interior” of the country and with the rest of the world. Indeed, until the 1970s, industrial manufacturing was concentrated in some of these metropolitan regions – São Paulo and Rio de Janeiro, in particular –, and, even with the process of industrial deconcentration that occurred during the final decades of the twentieth century, these metropolises, and others that have since been established, remain relevant spaces for industrial concentration. However, as deindustrialization has continued to advance across the country, especially after the 2008 international crisis, there is a need to examine this process in Brazil’s main metropolitan regions. Because they constitute major population clusters, deindustrialization in these spaces drains the diversity of economic activities, reduces territorial economic articulation with the interior and the rest of the world and generates serious social consequences, through reducing employment opportunities and access to income.

This article uses public data, made available by the Brazilian Institute of Geography and Statistics (IBGE), referring to the Regional Accounts and the Municipal GDP – on national and metropolitan levels, for the period from 2002 to 2020 –, in addition to data from the Annual Survey of Industries (ASI), on a national level, and other related data linked to a special tabulation requested from the IBGE, on a metropolitan level, for the years 2007 and 2019. These indicators, based on the aforementioned databases, are concerned with the gross domestic product (GDP), the gross value added (GVA) of the industrial sector and the manufacturing value added (MVA). With regard to this last indicator, the analysis is conducted through branches of activity in the manufacturing industry for the metropolises considered in this article. These branches, in turn, are classified according to their level of technological intensity, according to the formulation made by EUROSTAT (EUROSTAT, n.d.).

The article is structured into four more sections, in addition to this introduction. In the second section, the most recent debate on Brazilian deindustrialization is presented, problematizing the role of metropolises in this process. The third section introduces the methodological aspects that support the analysis. The fourth section

discusses the results and provides an analysis of metropolitan deindustrialization in Brazil. In the fifth section, as final considerations, a summary is made of the main results and of the main conclusions obtained.

## 2. Brazilian deindustrialization and the role of the metropolises

The international debate on the phenomenon of deindustrialization originally focused on countries with advanced economies, given that they were the first to demonstrate a reduction in the contribution of manufacturing value added to the GDP and a decline in the number of manufacturing jobs in the overall employment level. In these countries, the reversal stage in the contribution of manufacturing to employment occurred when high levels of per capita income were attained, constituting a process of deindustrialization typical of mature economies, resulting from the modernization of economic activity and characterized by the expansion of knowledge-intensive service activities in employment and the GDP (Tregenna, 2016).

Developing countries manifested the phenomenon of deindustrialization later than developed nations. However, when deindustrialization occurred in these countries, the respective economies had not yet reached productive maturity, given that, at that time, per capita income levels were lower than those observed in countries with advanced economies and without the service sector presenting a high level of knowledge intensity, as a consequence of modern economic activity (Tregenna, 2016; Morceiro; Guilhoto, 2019). As the manufacturing industry tends to be characterized by static, dynamic economies of scale, by concentrating technical progress, by causing upstream and downstream chaining effects in production chains and by presenting greater income elasticity of demand (Hiratuka; Sarti, 2017), the consequences of deindustrialization in countries that have not constituted sufficiently mature economies may be negative for both economic growth and job creation. Moreover, in the industrial sector, by concentrating highly-skilled and semi-skilled jobs – and, therefore, higher remuneration –, deindustrialization may bring about an increase in income inequality (Tregenna, 2016).

Evidence of the Brazilian deindustrialization process began to be observed in the 1980s, when there was a decline in the import substitution policy – a characteristic of the country's industrialization process. It was from this period onwards that there was a drop in the contribution of the manufacturing value added in the national GDP. This behavior became accentuated during the 1990s as a result of the commercial and financial opening of the Brazilian economy and, subsequently, of the orthodox macroeconomic policies that were implemented in the middle of that decade, in addition to those that became known as the macroeconomic tripod (floating exchange rate, inflation target and primary surplus), from 1999 onwards.

All these policies contributed to the production restructuring process of Brazilian industry and, consequently, to a reduction in the weight of the manufacturing industry in the national economy (Cano, 2012).

During the 2000s, due to maintaining the macroeconomic tripod and to the expansion of the Chinese economy, Brazil increased its exports of primary products – agricultural and mineral –, at the same time that it increased its imports of manufactured products. Although, from 2002 onwards, a surplus in the trade balance was attained and economic growth increased, there were nonetheless some economic consequences, such as the reprimarization of the Brazilian export agenda, characterized as regressive specialization, and an intensification of the deindustrialization process, explained by what was called the *Dutch disease*<sup>2</sup> (Cano, 2012; Bresser-Pereira; Gala, 2010).

Contrary explanations have given rise to the debate on the existence and causes of Brazilian deindustrialization and have fueled significant methodological contributions to understanding this phenomenon (Bonelli; Pessôa, 2010; Bonelli; Pessôa; Matos, 2013; Morceiro, 2021). These methodological advances have contributed to a better understanding of the deindustrialization process, particularly for analyzes carried out on a national level, considering that, following the international crisis of 2008, there was a convergence in the specialized literature with regard to its occurrence (Maia, 2020). Despite this, causal explanations still appear as points of disagreement, chiefly among those portraying a structural and conjunctural nature of deindustrialization, or, equally, among explanations that place greater emphasis on the country's internal aspects and relations with foreign trade, despite the fact that no one has ever considered the existence of a single explanation for such a complex phenomenon.

Although this field of discussion has progressed considerably, analyzing the sectoral profile of the manufacturing industry, given the patterns of technical changes, has only occurred in more recently. When analyzing the contribution of thirteen manufacturing branches to Brazil's GDP, at constant prices, in an analysis carried out for the period between 1970 and 2016, Morceiro and Guilhoto reported that deindustrialization in Brazil “occurs heterogeneously among the sectors of the manufacturing industry” (2019, p. 22).<sup>3</sup> The labor-intensive sectors that provide basic needs were the first to deindustrialize, which is in line with expectations, since this phenomenon tends to take effect when per capita income rises to a certain

---

2. A situation in which dependence on commodity exports causes the exchange rate to appreciate and, therefore, stimulates imports of manufactured goods, which causes the deindustrialization of a country.

3. This and all other non-English citations hereafter have been translated by the author.

level. Some high-tech and knowledge-intensive sectors subsequently demonstrated a process of deindustrialization, but at a level of per capita income that was not as high compared to developed countries, which may suggest that it had occurred prematurely. Other high-tech and knowledge-intensive sectors, despite the non-reversal of their contribution to the GDP, demonstrated no robust growth in their activity. Thus, it is clear that an analysis of deindustrialization needs to take into account the different manufacturing sectors, since its occurrence may lead to different social and economic consequences.

Despite this, little attention has been given to the territorial dimension of the deindustrialization process, especially with regard to the contexts of the major metropolises in Brazil,<sup>4</sup> which were the main loci of the national industrialization process, particularly the metropolises of São Paulo and Rio de Janeiro.

The Brazilian industrialization process was concentrated in the state of São Paulo, centered in the Metropolitan Region that surrounds its capital, which, in 1970, represented 44% of the MVA of the national manufacturing industry. Although the Metropolitan Region of Rio de Janeiro presents a smaller contribution, in 1970, together they corresponded to more than 50% of the MVA of the country's manufacturing industry (Cano, 1988; Diniz; Crocco, 1996). More than 80% of the manufacturing industry's MVA was generated in the Southeast, which reveals the low industrial dynamism of the other Brazilian regions. Even so, some cities that contained a significant portion of the population also constituted relevant regional industrial centers.

From the 1970s onwards, the process of economic deconcentration in Brazil, by and large, took place in manufacturing. This movement received different explanations in each economic period. In the 1970s, when the country presented high rates of economic growth, deconcentration occurred in a virtuous manner, considering that all regions were growing at a faster pace than that of the state of São Paulo and its Metropolitan Region. In the 1980s, which was characterized as the first lost decade, it was interpreted as something spurious, since most Brazilian regions experienced a reduction in growth – with the exception of the states that

---

4. With the exception of some studies that have focused on analyzing large regions of the country or on the state level, in addition to the work by Sobral (2016), on the Metropolitan Region of Rio de Janeiro, and Abdal et al. (2019), on the São Paulo Macrometropolis. SOBRAL, B. L. B. Desindustrialização e questão metropolitana: o caso da “arrebentação urbana” na periferia da Região Metropolitana do Rio de Janeiro [Deindustrialization and the metropolitan issue: the case of “urban bustling” on the outskirts of the Metropolitan Region of Rio de Janeiro]. *Geosul*, vol. 31, no. 62, p. 193-220, Jul./Aug. 2016. ABDAL, A.; MACEDO, C. C. F. de.; ROSSINI, G. A. A.; GASPAR, R. C. Caminhos e descaminhos da macrometrópole paulista: dinâmica econômica, condicionantes externos e perspectivas [Paths and detours of the São Paulo macrometropolis: economic dynamics, external conditions and perspectives]. *Cadernos Metrópole*, v. 21, no. 44, p. 145-168, Jan./Apr. 2019.

were established with an agricultural frontier –, which occurred in a more intense manner, also, in the state of São Paulo. Over the following decade, deconcentration took on a new character, resulting from neoliberal economic policies, a moment in which trade opened up with a view to facing the competitiveness of the international market (Cano, 2007).

The process of economic deconcentration helped to consolidate the metropolization of some regional urban centers that had already begun to emerge in populational and economic terms since the 1960s, in addition to serving as new urban centralities in Brazil's metropolization process.

In the mid-1970s, the Federal Government institutionalized the first nine metropolitan regions of Brazil – São Paulo, Rio de Janeiro, Belo Horizonte, Curitiba, Porto Alegre, Salvador, Recife, Fortaleza and Belém (Davidovich, 2004). Almost fifty years later, as a result of studies on the Brazilian urban network, the IBGE classified fifteen population arrangements in Brazil under the name metropolis, given their influence on articulating other cities in the urban network, “considering both their commanding role in business activities and public management, and also due to their attractiveness in supplying goods and services to other cities” (REGIC/IBGE, 2020, p. 11).

These metropolises occupy the top of the hierarchy of our urban network. In addition to the nine metropolitan regions mentioned, the clusters of Brasília, Goiânia, Manaus, Greater Vitória, Florianópolis and Campinas were considered metropolises. Thus, these fifteen metropolises currently constitute the major Brazilian urban centers.

If, a few decades ago, the country's first metropolises were loci for concentrating manufacturing production, when considering the continuity of the national deindustrialization process, especially more recently, it is therefore of significance to assess this phenomenon in the current existing metropolises in Brazil.

### 3. Methodological procedures

The degree of industrialization or deindustrialization may be assessed in several different manners. However, the main indicators used, as highlighted by the specialized literature, refer to the contribution of the value added from the manufacturing industry to the GDP and the contribution of this productive sector to overall employment. In the case of middle-income countries, which experienced deindustrialization prematurely, both indicators are relevant for analyzing this process (Tregenna, 2009). In this study, however, deindustrialization is investigated based on the contribution of the value added from the manufacturing industry to the GDP and, in addition, a detailed analysis of the particularity of Brazilian metropolises through the MVA.



To this end, a special MVA tabulation<sup>5</sup> has been used, based on the Annual Survey of Industries (ASI) by the IBGE for the main metropolitan regions in Brazil, covering the period from 2007 to 2019. The IBGE does not publish MVA data if, in the CNAE 2.0 [National Classification of Economic Activities] Division, there are less than three local units in any given metropolitan region. This data is only issued when there are three or more local units in that division. For the branches of the manufacturing industry, this situation occurred, but to a lesser extent, since data from only 0.62% of local units were unavailable in 2007, and only 0.67% in 2019. Therefore, the results presented comprise almost all local units in the metropolitan regions.

With the possibility of analyzing the manufacturing industry disaggregated by the CNAE 2.0 Division, which comprises 24 categories, with a view to building a synthesis of the analysis carried out, it was decided to organize them according to their level of technological intensity, based on the classifications of EUROSTAT (EUROSTAT, n.d.), which defines the technological intensity of manufacturing industries as: (i) high-technology; (ii) medium-high technology; (iii) medium-low technology; and (iv) low technology. This was possible because the CNAE 2.0 Division categories are compatible with the international classification of economic activities, also used by EUROSTAT.

In the analysis of metropolitan regions, the MVA was deflated using the IPADI (Broad Producer Price Index – Internal Availability) from the Fundação Getúlio Vargas, considering that this index measures the average variations in prices received by domestic producers in the sale of its products, both in the agricultural and industrial sectors. Therefore, from the viewpoint of this article, it is a more suitable deflator for the monetary correction of the MVA.

Although the MVA is considered a proxy for the GVA, there are differences between them. The first corresponds to the difference between the Industry Gross Value Added (IGVA) and the Industrial Operating Costs (IOC). The second is related, in turn, to the difference between the Gross Value of Production (GVP) and Intermediate Consumption (IC). It turns out that the IC incorporates more cost elements than the IOC, which explains the fact that the MVA usually presents higher values than the GVA. Since we only have MVA data for the metropolitan analysis, comparisons will first be established at a national level between the MVA and the GVA so as to demonstrate the relationship between these two indicators of added value.

---

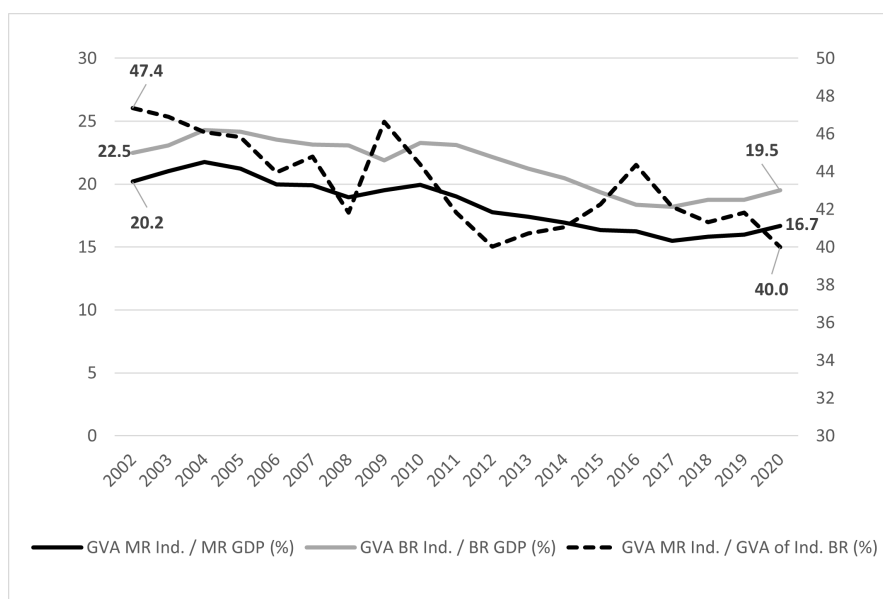
5. This special tabulation is the result of a request made to IBGE, which made ASI data available by metropolitan region according to CNAE 2.0. Division.

This article takes into account the metropolitan regions that correspond to the Brazilian metropolises identified in the IBGE study called *Areas of Influence of Cities*, from 2018, also known as REGIC (REGIC/IBGE, 2020). By studying this network of Brazilian cities, the IBGE sought to establish them into a hierarchy, which made it possible to define fifteen population arrangements with metropolitan characteristics, since they exert influence over other cities throughout the national territory. These are: São Paulo (the major national metropolis), Rio de Janeiro and Brasília (national metropolises), Belém, Belo Horizonte, Campinas, Curitiba, Florianópolis, Fortaleza, Goiânia, Porto Alegre, Recife, Salvador, Greater Vitoria and Manaus (regional metropolises). As the metropolitan regions addressed herein correspond to those that are considered metropolises, for the purposes of this article the terms main metropolitan regions and metropolises are used synonymously, always referring to the population arrangements mentioned above.

#### 4. Results and analysis

##### 4.1 Metropolitan deindustrialization and national deindustrialization

The contribution of the industrial sector's GVA to the GDP in the main metropolitan regions and Brazil as a whole, presented below in Graph 1, demonstrates that: (i) the contribution of the industrial sector to the GDP is greater throughout Brazil than in the main metropolitan regions; (ii) the behavioral trajectory of metropolitan industry is similar to that of national industry; (iii) despite the slight recovery that occurred over the last years of the historical series, there has been, since the beginning of the second decade of the twenty-first century, a more intense reduction in the contribution of the GVA to the GDP, which corroborates the decline in the output of the industrial sector in metropolitan regions and throughout the country. These findings suggest that this decrease in the main metropolitan regions is also responsible for the drop throughout Brazil as a whole, given the same behavior in the curves showing the industrial GVA contribution to the GDP in the metropolises and across the country. In other words, when the industrial contribution grows in the metropolises, this extends throughout the country, and when the contribution in metropolitan regions drops, this also occurs on a national level.



Graph 1. Contribution of the industrial sector's GVA to the GDP of the main metropolitan regions and across Brazil, and the contribution of the industrial GVA of the main metropolitan regions to the industrial GVA of Brazil – 2002 to 2020 (in %)

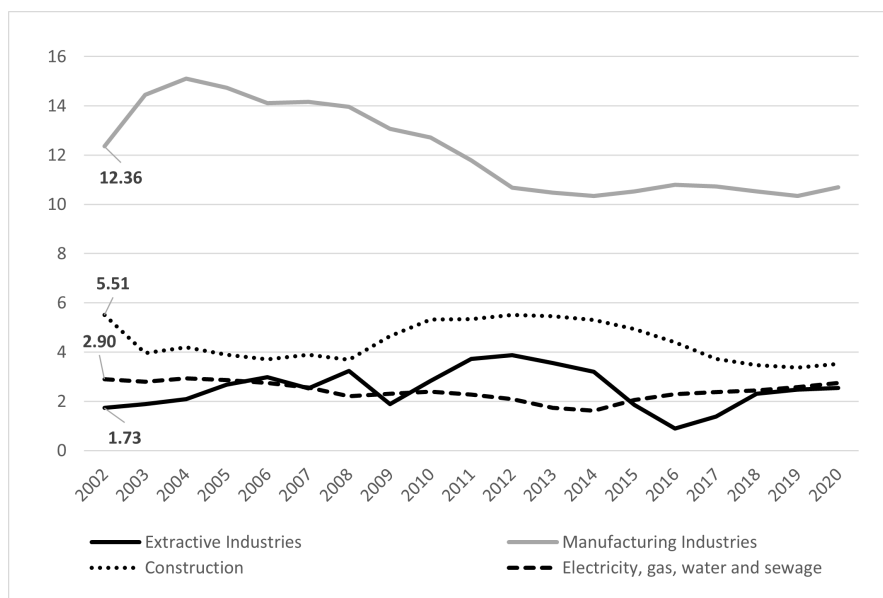
Key: GVA – Gross Value Added; MR - Metropolitan Region; BR – Brazil; Ind. – Industry; GDP – Gross Domestic Product.

Source: Municipal GDP, IBGE (2002 to 2020, [n.d.]).

According to Graph 1, the contribution of the Brazilian metropolises to the country's industrial GVA has decreased, since in 2002, the contribution was 47.4% and by 2020, it had fallen to 40% – a drop of 7.4 percentage points over two decades. This finding demonstrates that Brazilian metropolises have lost their leading role in Brazilian industrial production. Added to the previous observation – that there is a similarity between the curves for the contribution of the industrial GVA to the GDP in the metropolises and in Brazil –, it is evident that the deindustrialization process – measured by the contribution of the industrial GVA to the GDP – is characterized as a metropolitan phenomenon and it was the deindustrialization of these regions, at least over the last decade, that caused the national deindustrialization.

Graph 2 presents the GVA contribution of the four Brazilian industrial sectors to the country's GDP: extractive industries, manufacturing industries, construction, and electricity, gas, water, and sewage. Despite the oscillatory increases at the end of the first decade and a decline in the middle of the second, the extractive and construction industries accounted for smaller contributions to the national GDP. The contribution of the electricity and gas, water and sewage sectors was even lower, always below 3%. The GVA contribution of the manufacturing industries to the GDP, to the contrary, constantly revealed double-digit levels. However, it was the industry sector that suffered the biggest drop: in 2004, when it achieved its

highest contribution, it accounted for 15.1%; and in 2019, the year in which the lowest contribution was recorded, it accounted for around 10.3%, an almost 5 percentage point drop. These results demonstrate, therefore, that the manufacturing industries were those that most contributed to a reduction in the contribution of industrial GVA to the national GDP.



Graph 2. Contribution of the sectoral GVA of industry to the Brazilian GDP – 2002 to 2020 (in %)

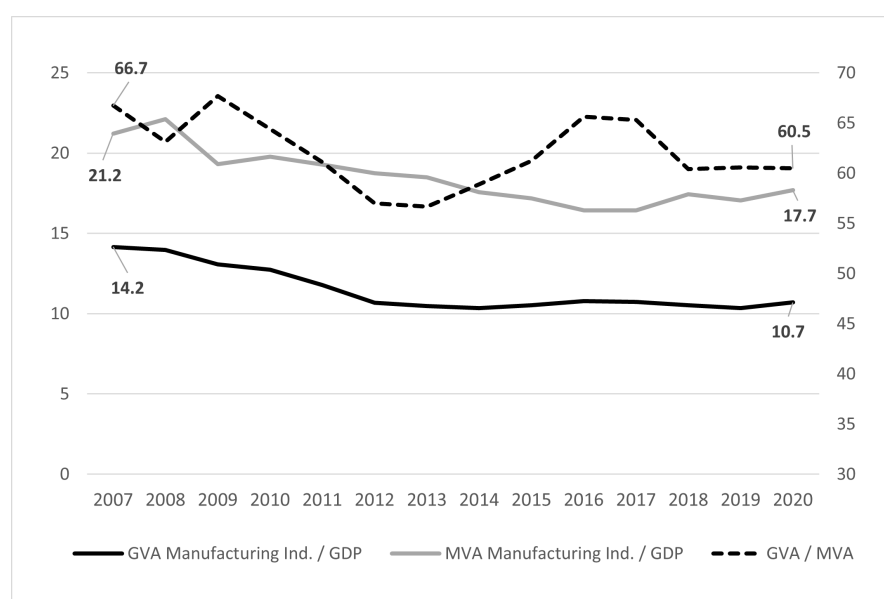
Source: Regional Accounts, IBGE (2002 to 2020, [n.d.]).

Thus, when we consider that the recent Brazilian deindustrialization is, above all, a metropolitan phenomenon, and that this process has occurred most notably in the manufacturing industries, it becomes necessary to undertake a more detailed assessment of the production activities in the manufacturing industry in the main metropolitan regions of the country.

#### 4.2 Metropolitan-national deindustrialization and interiorization

In order to conduct an in-depth analysis of the deindustrialization process in metropolitan regions, focusing on the branches of economic activities in the manufacturing industry, it is necessary to use another database – different from the National Accounts –, with the availability of data disaggregated by these productive branches on a metropolitan scale. The basis in question refers to the special ASI data tabulation, requested from IBGE. For this reason, before delving into an analysis on metropolitan regions, a relationship will be made between the behavior of the GVA and the MVA at a national level, taking into account their relationship with one another, even if at different monetary levels.

Graph 3 presents the evolution of the GVA contribution of the manufacturing industry and the contribution of the MVA in relation to the national GDP, during the period from 2007 to 2020. Both curves demonstrate a downward trend from the end of the first decade of the twenty-first century, registering a small increase again toward the end of the historical series, although without ever reaching the same level as the previous period. The drop in the contribution of the GVA and the MVA to the GDP reveals the occurrence of the Brazilian deindustrialization process (Tregenna, 2009), given the relative reduction of manufacturing production in the composition of the country's output.

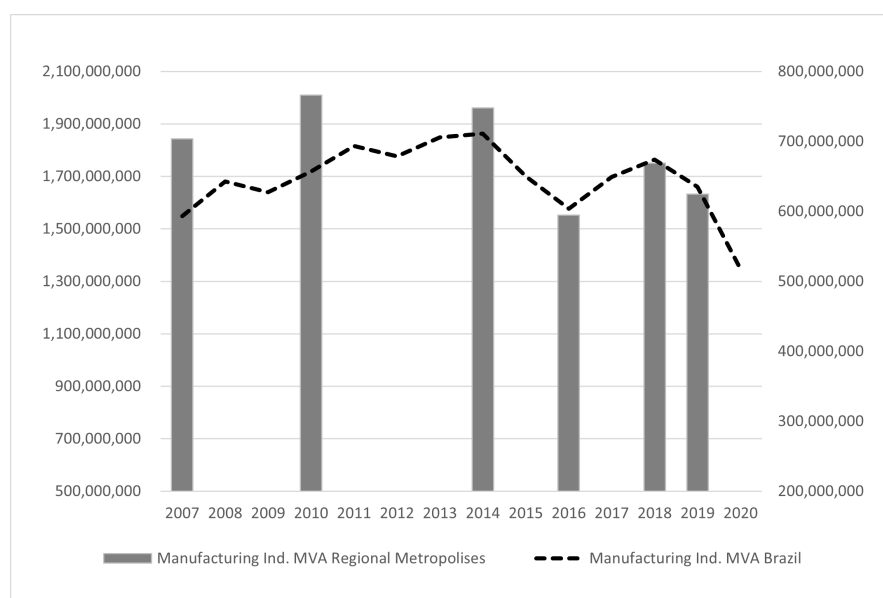


Graph 3. Contribution of the GVA of the manufacturing industry to the GDP, the contribution of the MVA to the GDP and the contribution of the GVA of the manufacturing industry to the MVA in Brazil – 2007 to 2020 (in %)

Source: Regional Accounts, IBGE. Annual Survey of Industries (ASI), IBGE (2007 to 2020, [n.d.]).

Furthermore, the relationship between the GVA and the MVA presents a relatively low variation, since the lowest contribution of the first over the second was 56.7%, and the highest was 67.7%, i.e., an amplitude of just 11 percentage points. This difference arises because the first incorporates non-operational costs, which are not included in the second. It should be emphasized that such costs may be influenced by the variation in the country's exchange rate. In any case, considering that the variation difference between these two indicators is relatively low, the MVA may be used as a proxy for value added, in the absence of the GVA, especially for subnational analysis in which there is a greater lack of disaggregated data from national accounts.

Although between 2007 and 2020 there were fluctuations in the total sum of MVA in the Brazilian manufacturing industry, in real values, the result of the entire period was a reduction from 1.55 billion BRL, in 2007, to 1.35 billion BRL, in 2020, despite attaining 1.86 billion BRL in 2014, its highest level, as presented in Graph 4. The drop in 2020 was intensified by the effects of the Covid-19 pandemic, since the level recorded in 2019, already in decline when compared to the previous year (2018), was slightly higher than that observed at the beginning of the historical series – in 2019, the MVA was 1.66 billion BRL, an increase of 7.1% compared to 2007, but a drop of 10.9% compared to 2014. This is demonstrated by the stagnation of industrial manufacturing production in Brazil, which is expressed in a relative reduction of its contribution to the country's GDP, as previously observed.



**Graph 4. The MVA, at constant prices\* – Brazil and main metropolitan regions – 2007 to 2020**

Source: Annual Survey of Industries (ASI), IBGE. Special tabulation for the metropolitan regions.

Note: \* Corrected by the IPA-DI/FGV, in 2020 values.

For the main metropolitan regions of the country, the MVA fell by 11.2% between 2007 and 2019. When considering the most recent period, between 2014 and 2019, the reduction was 16.5%, which demonstrates a relative loss of production in Brazilian metropolises, possibly resulting from the combined effect of a reduction in the national industrial production located in metropolises and the internalization of industrial manufacturing production. This last phenomenon corresponds to the displacement processes of productive activities from the metropolises to other areas of Brazil, in either small or medium-sized cities in the Brazilian urban network, which is why the same downward behavior in the MVA of these sectors has not been observed in the country as a whole.

A reduction in the MVA in the main metropolitan regions, in real values, was partly responsible for a decline in its contribution to the MVA of the national manufacturing industry, considering that, between 2007 and 2019, it fell from 45.4% to 37.6%, as may be observed in Table 1. With this, its concentration in Brazilian manufacturing production was reduced. This was a perverse metropolitan deconcentration, since it originated from a reduction in production – measured by the MVA. The situation was even more dramatic for metropolises because this behavior occurred at all levels of technological intensity, although differences exist both between them and within them, as may be viewed below.

Industrial branches with high technological intensity are those in which Brazilian metropolises still have a high concentration of production. Despite this, during the period between 2007 and 2019, there was a reduction in the metropolitan contribution of 4.6%. In these branches, there was a decline in production, in real values, both across the country and in the main metropolitan regions, which was relatively more intense in this latter spatial context. This demonstrates that there has been an explicit reduction in national production due to the decrease in the metropolises. There, the real variation in the MVA during the period was negative for the two industrial branches of this level of technological intensity, although it was only negative on a national level for the branch manufacturing computer equipment, and electronic and optical products (-16.1%), since it demonstrated a slight positive change in the manufacturing of pharmaceutical and pharmaceutical products (+3.9%).

At the level of medium-high technological intensity, there was a reduction in the concentration of metropolitan production, measured by the MVA in real values, and a negative real variation both across the country and in metropolitan regions. Thus, in the industrial branches that make up this level of technological intensity, there has also been a reduction in national production, mostly resulting from a decrease in metropolitan production. With the exception of the chemical manufacturing branch, for which the variation was positive on a national level and negative in the metropolises, all other branches of this technological level presented a negative variation across the country and in the main metropolitan regions. In 2019, it was only in the branches that manufactured chemical products and motor vehicles, trailers and semi-trailers that the contribution of the metropolises was above 50%. Although the fact that production in the metropolises is still greater than 50% for the whole of the aforementioned technological level, in three industrial branches this contribution had already dropped below 40% – the manufacture of electrical machines, appliances and materials (37.1%), the manufacture of machinery and equipment (38.2%) and the manufacture of other transport equipment, excluding motor vehicles (37.7%)

| Code                                | Level of technology intensity/ CNAE 2.0 Division                                  | Manufacturing Value Added* |      |                          |       |
|-------------------------------------|---|----------------------------|------|--------------------------|-------|
|                                     |   | MR/BR                      |      | Real variation 2007-2019 |       |
|                                     |   | 2007                       | 2019 | BR                       | MR    |
| High technological intensity        |   |                            |      |                          |       |
| 21                                  | Manufacture of pharmaceutical and pharmaceutical products                         | 84.0                       | 73.4 | 3.9                      | -9.2  |
| 26                                  | Manufacture of computer, electronic and optical products                          | 70.9                       | 71.8 | -16.2                    | -15.2 |
| Subtotal                            |   | 77.3                       | 72.7 | -6.5                     | -12.0 |
| Medium-high technological intensity |   |                            |      |                          |       |
| 20                                  | Manufacture of chemical products  | 64.5                       | 55.1 | 10.9                     | -5.3  |
| 27                                  | Manufacture of electrical machines, appliances and materials                      | 44.8                       | 37.1 | -5.1                     | -21.4 |
| 28                                  | Manufacture of Machinery and equipment  | 46.3                       | 38.2 | -5.4                     | -21.8 |
| 29                                  | Manufacture of motor vehicles, trailers and semi-trailers                         | 63.8                       | 58.2 | -24.9                    | -31.6 |
| 30                                  | Manufacture of other transport equipment, excluding motor vehicles                | 53.0                       | 37.7 | -28.3                    | -49.0 |
| Subtotal                            |   | 58.3                       | 50.1 | -9.2                     | -22.0 |
| Medium-low technological intensity  |   |                            |      |                          |       |
| 19                                  | Manufacture of coke, petroleum products and biofuel                               | 48.1                       | 40.2 | 34.6                     | 12.6  |
| 22                                  | Manufacture of rubber and plastic products  | 56.8                       | 48.2 | 13.6                     | -3.7  |
| 23                                  | Manufacture of non-metallic mineral products                                      | 40.3                       | 34.0 | -3.3                     | -18.4 |
| 24                                  | Manufacture of basic metals   | 29.8                       | 27.4 | -28.0                    | -33.7 |
| 25                                  | Manufacture of metal product, excluding machines and equipment                    | 43.4                       | 33.8 | -6.9                     | -27.3 |
| 33                                  | Maintenance, repair and installation of machinery and equipment                   | 46.2                       | 30.3 | 67.1                     | 9.8   |
| Subtotal                            |   | 43.5                       | 37.6 | 11.2                     | -3.8  |
| Low technological intensity         |   |                            |      |                          |       |
| 10                                  | Manufacture of food products  | 21.5                       | 17.5 | 40.1                     | 14.6  |
| 11                                  | Manufacture of beverages  | 62.2                       | 45.8 | 9.0                      | -19.8 |
| 12                                  | Manufacture of tobacco products   | 2.2                        | 0.0  | -34.7                    | -     |
| 13                                  | Manufacture of textiles   | 42.0                       | 34.4 | -13.2                    | -28.8 |
| 14                                  | Manufacture of clothing and accessories   | 22.1                       | 22.3 | 8.4                      | 9.4   |
| 15                                  | Tanning of leather and manufacture of leather goods and travel articles and shoes | 31.3                       | 27.1 | 1.6                      | -12.1 |
| 16                                  | Manufacture of products of wood   | 18.1                       | 12.8 | -5.7                     | -32.9 |
| 17                                  | Manufacture of cellulose, paper and paper products                                | 33.7                       | 29.3 | 15.7                     | 0.4   |
| 18                                  | Printing and reproduction of recorded media                                       | 57.9                       | 51.9 | -30.8                    | -38.0 |
| 31                                  | Manufacture of furniture  | 22.6                       | 18.2 | 22.5                     | -1.4  |
| 32                                  | Manufacture of miscellaneous products   | 45.3                       | 40.3 | 38.1                     | 22.6  |
| Subtotal                            |   | 30.6                       | 24.3 | 19.2                     | -5.1  |
| Total                               |   | 45.4                       | 37.6 | 7.1                      | -11.2 |

**Table 1. Contribution of the MVA of the main metropolitan regions in relation to the MVA of Brazil, and the real variation in the MVA between 2007 and 2019, according to the level of technological intensity and the CNAE 2.0 Division of the Manufacturing Industry – 2007 and 2019 (in %)**

Source: Annual Survey of Industries (ASI), IBGE (2007 and 2019, [n.d.]). Special tabulation for metropolitan regions.

Note: \*Corrected by the IPA-DI/FGV in values for 2020.



Between 2007 and 2019, there was a decline in the metropolitan contribution to the national MVA, in the productive branches of medium-low technological intensity, from 43.5% to 37.6%. This may be explained by the negative variation of 3.8% in the metropolitan MVA during the period in question, when the national industry presented a positive variation of 11.2%. It may thus be demonstrated that deindustrialization at this level of technological intensity generally occurred concomitantly with a greater interiorization process of production. However, the behavior among the branches that make up this technological level was not homogeneous, while the branches manufacturing coke and petroleum products and biofuels, and maintenance, repair and installation of machinery and equipment experienced a positive variation in the metropolises and across the country – much more in the latter than the former. There was a negative variation in the metropolises for all other productive branches, which was more intense in the manufacture of basic metals (–33.7%) and in the manufacture of metal products, except machinery and equipment (–27.3%).

In general, the industrial branches with low technological intensity had previously presented a low metropolitan contribution to the national MVA, which reduced even further from 30.6%, in 2007, to 24.3%, in 2019. There was a drop of 5.1% in the variation of the metropolitan MVA and a 19.2% increase in the national MVA. At this level of technological intensity, in general, metropolitan deindustrialization also occurred concomitantly with a greater interiorization process of production. Even so, in four of the eleven production branches at this technological level, between 2007 and 2019, there was a positive variation in the metropolises, with a more significant expression in the manufacture of miscellaneous products (22.6%) and in the manufacture of food products (14.6%), despite the lower variation than that recorded across the country as a whole. It was only in the manufacturing of clothing and accessories that the variation in the metropolitan MVA was greater than that recorded for Brazil.

Overall, there has been a reduction in industrial production in branches of high and medium-high technological intensity and a growth in the branches of medium-low and low technological intensity. Thus, it may be observed that a deindustrialization process has begun in the most advanced productive segments, while those that are less advanced are still able to maintain the level of national manufacturing production. However, in the main metropolitan regions, the deindustrialization process has developed at all levels of technological intensity. In those with a higher technological intensity, where industry is still concentrated within the metropolises, their behavior has contributed to a national deindustrialization. In those with a lower intensity, where the concentration was already greater in the interior, the process of metropolitan deindustrialization

has been accompanied by the advancement of its interiorization. In any case, the deindustrialization process has been more accentuated in the metropolitan spaces, at all levels of technological intensity.

#### 4.3 Deindustrialization according to the contribution of each metropolis

We have seen that the real variation of the MVA in the main metropolitan regions of Brazil was  $-11.2\%$ , thereby demonstrating a drop in production in metropolitan manufacturing. While this reduction occurred at all levels of technological intensity, at differing degrees, it was higher in the industrial branches of medium-high and high technological intensity, in which the metropolises generally presented a concentration of production across the country. In view of the above, the question that arises is related to identifying the metropolitan regions that most decisively contributed to a reduction in the MVA at each level of technological intensity.

In order to obtain an answer to this, the participation was calculated of each metropolitan region in the level of technological intensity for 2007 and 2019, using the 2007 total as a reference base, in real values. Subsequently, the difference in the participation of each metropolitan region between 2019 and 2007 was established, which made it possible to verify which metropolis contributed to a reduction in the MVA at each level of technological intensity, when the result was negative, and which contributed to counterbalancing the reduction in the MVA, when the result was positive, as seen in Table 2.

Thus, it was possible to observe that, in 2007, industrial production, at the level of high technological intensity, was concentrated in the metropolitan regions of São Paulo, Manaus, Campinas, Rio de Janeiro and Curitiba, corresponding to  $91.9\%$  of the metropolitan MVA. The variation of the MVA in these metropolises demonstrated in 2019, in relation to 2007, was  $-11.5\%$ , although Campinas presented a positive variation. There was also a positive variation in the metropolises of Belo Horizonte and Brasília. While Brasília, Belo Horizonte and Campinas, on the whole, increased their contribution during this period, the result was a  $12\%$  reduction in the metropolitan MVA at this level of high technological intensity. Therefore, the negative result was mostly due to the performance of São Paulo, Rio de Janeiro, Curitiba and Manaus.

At the level of medium-high technological intensity, industrial production, in 2007, was concentrated in São Paulo, Campinas, Belo Horizonte, Curitiba, Porto Alegre, Salvador, Manaus and Rio de Janeiro, corresponding to  $97.2\%$ . This group of metropolises demonstrated a variation of  $-25\%$ , when comparing 2019 with 2007, although Curitiba presented a small positive variation. In addition to Curitiba, the metropolises of Recife, mostly, and Fortaleza presented a positive variation during the period, contributing to a reduction of  $22\%$  in the metropolitan MVA.

| Metropolitan Region | Level of Technological Intensity |       |                        |             |       |                        |            |       |                        |       |       |                        | Total |       |                        |
|---------------------|----------------------------------|-------|------------------------|-------------|-------|------------------------|------------|-------|------------------------|-------|-------|------------------------|-------|-------|------------------------|
|                     | High                             |       |                        | Medium-high |       |                        | Medium-low |       |                        | Low   |       |                        |       |       |                        |
|                     | 2007                             | 2019* | Difference (2019-2007) | 2007        | 2019* | Difference (2019-2007) | 2007       | 2019* | Difference (2019-2007) | 2007  | 2019* | Difference (2019-2007) | 2007  | 2019* | Difference (2019-2007) |
| Manaus              | 21.1                             | 20.0  | -1.1                   | 5.8         | 4.0   | -1.7                   | 2.1        | 2.4   | 0.3                    | 9.8   | 8.6   | -1.2                   | 6.8   | 5.9   | -0.8                   |
| Belém               | 0.0                              | 0.0   | 0.0                    | 0.1         | 0.2   | 0.1                    | 0.1        | 0.1   | 0.0                    | 1.8   | 1.7   | -0.1                   | 0.4   | 0.5   | 0.0                    |
| Fortaleza           | 0.6                              | 0.2   | -0.4                   | 0.6         | 1.0   | 0.5                    | 0.5        | 1.6   | 1.1                    | 5.9   | 7.1   | 1.2                    | 1.6   | 2.4   | 0.8                    |
| Recife              | 0.2                              | 0.2   | 0.0                    | 1.7         | 4.7   | 3.0                    | 1.3        | 1.5   | 0.2                    | 4.0   | 5.2   | 1.3                    | 1.9   | 3.3   | 1.4                    |
| Salvador            | 1.7                              | 0.2   | -1.5                   | 8.2         | 5.3   | -2.9                   | 14.2       | 10.5  | -3.7                   | 1.7   | 2.4   | 0.6                    | 8.3   | 6.0   | -2.3                   |
| Grande Vitória      | 0.0                              | 0.1   | 0.1                    | 0.3         | 0.2   | 0.0                    | 4.6        | 2.4   | -2.2                   | 1.7   | 0.9   | -0.8                   | 2.0   | 1.1   | -0.9                   |
| Belo Horizonte      | 1.6                              | 3.0   | 1.4                    | 9.2         | 4.3   | -4.9                   | 5.8        | 8.7   | 2.9                    | 4.5   | 4.0   | -0.5                   | 6.3   | 5.6   | -0.7                   |
| Rio de Janeiro      | 7.3                              | 5.7   | -1.6                   | 5.0         | 4.9   | -0.1                   | 17.4       | 29.4  | 12.0                   | 7.8   | 8.7   | 0.8                    | 10.1  | 14.3  | 4.2                    |
| Campinas            | 16.7                             | 20.3  | 3.7                    | 11.3        | 10.8  | -0.5                   | 14.4       | 11.9  | -2.4                   | 8.3   | 7.2   | -1.1                   | 12.3  | 11.4  | -0.9                   |
| São Paulo           | 41.4                             | 33.2  | -8.2                   | 40.1        | 24.8  | -15.3                  | 23.2       | 15.9  | -7.3                   | 30.8  | 22.7  | -8.1                   | 32.4  | 22.0  | -10.3                  |
| Curitiba            | 5.4                              | 1.2   | -4.2                   | 9.1         | 10.0  | 0.9                    | 11.7       | 7.8   | -3.9                   | 7.6   | 7.9   | 0.3                    | 9.4   | 8.0   | -1.4                   |
| Florianópolis       | 0.4                              | 0.5   | 0.1                    | 0.0         | 0.2   | 0.2                    | 0.3        | 0.5   | 0.2                    | 0.8   | 1.0   | 0.2                    | 0.3   | 0.5   | 0.2                    |
| Porto Alegre        | 2.8                              | 1.7   | -1.1                   | 8.5         | 7.1   | -1.4                   | 3.8        | 2.7   | -1.0                   | 10.2  | 11.4  | 1.2                    | 6.6   | 5.9   | -0.7                   |
| Goiânia             | 0.7                              | 0.4   | -0.3                   | 0.1         | 0.3   | 0.2                    | 0.3        | 0.4   | 0.1                    | 3.3   | 4.2   | 0.9                    | 0.9   | 1.2   | 0.2                    |
| Brasília            | 0.1                              | 1.3   | 1.2                    | 0.2         | 0.2   | 0.1                    | 0.4        | 0.3   | -0.1                   | 1.6   | 1.9   | 0.3                    | 0.5   | 0.7   | 0.2                    |
| Total               | 100.0                            | 88.0  | -12.0                  | 100.0       | 78.0  | -22.0                  | 100.0      | 96.2  | -3.8                   | 100.0 | 94.9  | -5.1                   | 100.0 | 88.8  | -11.2                  |

**Table 2. Participation of the metropolitan region per level of technological intensity in the MVA in the group of main metropolitan regions in Brazil (2007 and 2019) and the difference of the participation between 2019 and 2007 (in %)**

Source: Annual Survey of Industries (ASI), IBGE. Special tabulation for the metropolitan regions.

Nota: \*The values for each metropolitan region in 2019 were divided by the total for 2007 and multiplied by 100 so as to be expressed as a percentage.

At a level of medium-low technological intensity, in which there was a slight drop in the metropolitan MVA – of just  $-3.8\%$  –, the result was due to a reduction in the contribution of São Paulo, Curitiba, Salvador, Campinas, Greater Vitoria and Porto Alegre. However, Rio de Janeiro presented a significant growth, followed by Belo Horizonte, helping to offset the downward trend. At this level of technological intensity, the metropolis of São Paulo lost its lead to Rio de Janeiro and came in second place in the generation of MVA. Both were followed by Campinas, Salvador, Belo Horizonte and Curitiba, considered as presenting the highest contribution to the sector.

At the level of low technological intensity, the reduction mostly occurred in the metropolis of São Paulo. The metropolitan regions of Manaus, Campinas, Greater Vitoria and Belo Horizonte also contributed to this drop, although to a lesser extent. All of the others presented an increase, however, none of them by a large amount. The most relevant metropolises in generating MVA, at this level of technological intensity, continued to be São Paulo, Porto Alegre, Rio de Janeiro, Manaus, Curitiba, Campinas, Fortaleza, Recife, Goiânia and Belo Horizonte.

Overall, when comparing 2019 to 2007, eight metropolises presented a reduction in the variation of the MVA, corresponding to  $18.2\%$ . However, only the metropolis of São Paulo was responsible for a drop of  $10.4\%$ , followed mostly by Salvador ( $-2.3\%$ ) and Curitiba ( $-1.4\%$ ). On the other hand, when comparing 2019 to 2007, seven metropolises presented an increase in the variation of the MVA, corresponding to  $7.0\%$ . However, only the metropolis of Rio de Janeiro increased by  $4.2\%$ , followed mostly by Recife ( $+1.4\%$ ) and Fortaleza ( $+0.8$ ). This signifies that the negative variation in the MVA was concentrated in São Paulo, even though there was a relative diversification among the metropolises that witnessed a reduction, and that the positive variation was concentrated in Rio de Janeiro, also with a relative diversification among the metropolises that had grown.

The general result, as has been observed, was an  $11.2\%$  reduction of the MVA in all Brazilian metropolises. Therefore, despite the positive variation, especially in the abovementioned metropolises, it may be stated that the deindustrialization process continued to advance in these spaces, especially in the branches with the highest technological intensity, which are those concentrated in the metropolises and that have contributed to the national deindustrialization process.

## 5. Final considerations

In this study, three main findings may be highlighted regarding the phenomenon of deindustrialization, analyzed through the value of industrial manufacturing. The first is that Brazilian deindustrialization is fundamentally a

metropolitan phenomenon, which has caused a relative loss of production across the country's main metropolitan regions. The second highlights the fact that it occurs most notably in branches of economic activity with the highest technological intensity (medium-high and high), which are concentrated in the metropolises, while in activities with a lower technological intensity deindustrialization only occurs in metropolises, and not across the country. The third emphasizes the heterogeneous behavior of deindustrialization among the main metropolitan regions, some of which presented divergent results as a manifestation of this phenomenon.

The relative productive reduction in Brazilian metropolises, as a result of the deindustrialization process, may weaken their articulating role within the national economic dynamics, both in relation to the "interior" of the country and to the rest of the world, and weaken the internal performance of their economic activities with negative consequences in terms of job creation and income distribution, especially as they are spaces of population concentration. As the main Brazilian metropolises were constituted in the midst of the industrialization process and manufacturing production proved to be an important economic activity for regional and national territorial articulation, the process of metropolitan deindustrialization caused changes and modified the role of metropolises in the country's urban network. Given the fact that the manufacturing activity has high income elasticity of demand, the ability of the manufacturing industry to boost economic activities is also lost, thereby reducing higher-paying employment (Morceiro; Guilhoto, 2019).

The observation that Brazilian deindustrialization has occurred mainly in the most advanced technological branches is a cause of great concern, given the dynamizing and linking function of such industrial branches. This characteristic arises from the radiating role of these activities upstream and downstream of the production chains in which they are inserted into the territory where they have been established, also contributing to leveraging the development of economic activities in the service sector, especially those that are more knowledge-intensive. As the Brazilian deindustrialization process advances in these productive branches, the dynamizing and linking effects are lost, as, therefore, are jobs with higher industrial qualifications and higher pay. Furthermore, there is a loss of competitiveness in the international trade of manufactured products with higher added value (Bresser-Pereira; Gala, 2010).

However, deindustrialization in Brazilian metropolises has also occurred in productive branches with less technological intensity, generally more labor intensive and supplying basic products, but with jobs that require lower qualifications. This has the consequence of reducing industrial employment in spaces with a high population agglomeration, affecting, above all, the population

that makes up the low-skilled workforce and therefore contributing to an increase in income inequality in these spaces, since the remuneration for manual labor in the industrial sectors tends, on average, to be better than that for activities in the service sector. Industrial branches with less technological intensity have increased their participation in the interior of the country, which signifies that the metropolitan deindustrialization of these productive branches leads to industrial interiorization mainly toward medium-sized Brazilian cities.

In addition to the differences in metropolitan sectoral deindustrialization, there are also differences between the metropolises. If we considered the variation in the total MVA, deindustrialization would be mostly observed in the metropolises of São Paulo, Salvador and Curitiba and to a lesser extent in Campinas, Manaus, Greater Vitoria, Belo Horizonte and Porto Alegre. On the other hand, Rio de Janeiro, Recife and Fortaleza would counterbalance the negative variation in metropolitan manufacturing production. However, when the analysis takes into account the variation in the MVA by productive sectors according to the level of technological intensity, just Recife and Florianópolis failed to demonstrate a negative variation in any of them (observed in an aggregate form). All other metropolises presented a negative variation in some of the levels of technological intensity, demonstrating that this phenomenon occurs in almost all of the country's metropolitan regions.

However, as the deindustrialization process has caused greater concern regarding levels of higher technological intensity, due to their concentration in metropolises and having contributed to the country's deindustrialization, it is possible to verify that deindustrialization mostly occurs in the metropolitan regions of São Paulo, Rio de Janeiro, Curitiba and Manaus, when considering the branches of high technological intensity, and in the metropolitan regions of São Paulo, Campinas, Belo Horizonte, Porto Alegre, Salvador, Manaus and Rio de Janeiro when considering the branches of medium-high technological intensity. These are the metropolises with the highest weights in the total MVA of the metropolitan manufacturing industry – from 92.2%, in 2007, to 89.2%, in 2019. Although this is relatively the same contribution, it is in these metropolises where the process of deindustrialization has been observed in greater depth, most notably at the highest levels of technological intensity.

This analysis on metropolitan deindustrialization has been based on the variation of the MVA in 2019 in relation to that of 2007, which revealed a drop of 11.2% during this period. However, comparing the variation of the MVA in 2019 to that of 2014, when manufacturing production was higher than in 2007 (as presented in Graph 4, above), it may be noted that the variation would have been –16.5%. This result is due to a variation of –11.9%, at the level of high technological intensity,

of -25.6%, at the medium-high level, of -7.8%, at the medium-low level, and of -17.4%, in the low technological intensity. Therefore, in general, these are greater reductions than those seen in 2007. Indeed, it was during the period from 2014 to 2019 that the process of metropolitan deindustrialization became more acute in the current century, since from 2007 to 2014 there was relative industrial growth. Thus, the finding that the variation of the metropolitan MVA in 2019 in relation to 2007 is negative and at a level of 11.2% demonstrates that the level of metropolitan manufacturing production has reacted very intensely in recent years.

## References

- BONELLI, R.; PESSÔA, S. *Desindustrialização no Brasil: um resumo da evidência*. IBRE/FGV, Centro de Economia Aplicada: texto para a discussão, São Paulo, n. 7, mar. 2010.
- BONELLI, R.; PESSÔA, S.; MATOS, S. Desindustrialização no Brasil: fatos e interpretações. In: BACHA, E.; BOLLE, M. B. (org.). *O futuro da indústria no Brasil: desindustrialização em debate*. Rio de Janeiro: Civilização Brasileira, 2013.
- BRESSER-PEREIRA, L. C.; GALA, P. Macroeconomia estruturalista do desenvolvimento. *Revista de Economia Política*, v. 30, n. 4, out./dez. 2010.
- CANO, W. Questão regional e urbanização no desenvolvimento econômico brasileiro pós-1930. In: ENCONTRO NACIONAL DE ESTUDOS POPULACIONAIS DA ABEP, 2., Olinda, 1988. *Anais [...]*, 1988. p. 67-99.
- \_\_\_\_\_. *Desconcentração produtiva regional do Brasil: 1970-2005*. São Paulo: Editora da Unesp, 2007.
- \_\_\_\_\_. A desindustrialização no Brasil. *Economia e Sociedade*, v. 21, n. esp., p. 831-851, dez. 2012.
- DAVIDOVICH, F. A “volta da metrópole” no Brasil: referências para a gestão territorial. In: RIBEIRO, L. C. de Q. (org.). *Metrópoles: entre a coesão e a fragmentação, a cooperação e o conflito*. São Paulo; Rio de Janeiro: Editora Perseu Abramo; FASE, 2004.
- DINIZ, C. C.; CROCCO, M. A. Reestruturação econômica e impacto regional: o novo mapa da indústria brasileira. *Nova Economia*, v. 6, n. 1, p. 77-103, jul. 1996.
- EUROSTAT. Die Europäische Kommission. Aggregations of manufacturing based on NACE Rev. 2, [s.d.]. Available at: [https://ec.europa.eu/eurostat/cache/metadata/annexes/htec\\_esms\\_an3.pdf](https://ec.europa.eu/eurostat/cache/metadata/annexes/htec_esms_an3.pdf). Accessed on: May 1, 2023.
- HIRATUKA, C.; SARTI, F. Transformações na estrutura produtiva global, desindustrialização e desenvolvimento industrial no Brasil. *Rev. Econ. Polit.*, 37 (1), p. 189-207, jan./mar. 2017.
- IBGE. Instituto Brasileiro de Geografia e Estatística. *Contas Regionais – 2002 a 2020*. Rio de Janeiro: IBGE, [s.d.].
- \_\_\_\_\_. *Produto Interno Bruto dos municípios – 2002 a 2020*. Rio de Janeiro: IBGE, [s.d.].
- \_\_\_\_\_. *Pesquisa Industrial Anual – 2007 a 2020*. Rio de Janeiro: IBGE, [s.d.].

- IBGE. Instituto Brasileiro de Geografia e Estatística. *Pesquisa Industrial Anual – 2007 a 2020* (Tabulação especial). Rio de Janeiro: IBGE, [s.d.].
- MAIA, B. A. de A. Há desindustrialização no Brasil? Um estudo da abordagem clássica e de análises alternativas entre 1988 e 2014. *Economia e Sociedade*, v. 29, n. 2 (69), p. 549-579, maio/ago. 2020.
- MORCEIRO, P. C. Influência metodológica na desindustrialização brasileira. *Revista de Economia Política*, v. 41, n. 4, p. 700-722, out./dez. 2021.
- MORCEIRO, P. C.; GUILHOTO, J. J. M. *Desindustrialização setorial e estagnação de longo prazo da manufatura brasileira*. Nereus: texto para discussão, São Paulo, jan. 2019.
- REGIC. *Regiões de Influência das Cidades: 2018*. Coordenação de Geografia. Rio de Janeiro: IBGE, 2020.
- TREGENNA, F. Characterising deindustrialisation: an analysis of changes in manufacturing employment and output internationally. *Cambridge Journal of Economics*, 33, p. 433-466, 2009.
- \_\_\_\_\_. Deindustrialisation: an issue for both developed and developing countries. In: WEISS, J.; TRIBE, M. *Routledge handbook of industry and development*. London; New York: Routledge, 2016.



**Marcelo Gomes Ribeiro**

Adjunct professor at the Instituto de Pesquisa e Planejamento Urbano e Regional at the Universidade Federal de Rio de Janeiro (IPPUR/UFRJ) and researcher at the INCT Observatório das Metr opolis. He is also a Productivity Researcher at CNPq – level 2 and a Young Scientist of Our State researcher at the Research Support Foundation of the State of Rio de Janeiro (FAPERJ).

**Email:** marceloribeiro@ippur.ufrj.br

**ORCID:** 0000-0001-7448-0690

**Submitted:** June 15, 2023.

**Approved:** December 1, 2023.

**How to cite:** RIBEIRO, M. G. Deindustrialization in Brazilian metropolises. *Revista brasileira de estudos urbanos e regionais*. V. 26, E202403en, 2024. <https://doi.org/10.22296/2317-1529.rbeur.202403en>.

Article licensed under the Creative Commons License (CC-BY)

<https://creativecommons.org/licenses/by/4.0/>