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Deindustrialization in the Divinópolis (MG) Microregion: An Analysis of the 2011–2020 Period

Uma análise do processo de desindustrialização na Microrregião de Divinópolis (MG) no período 2011-2020

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Abstract: This paper analyzes the deindustrialization hypothesis for the municipalities of the Divinópolis Microregion in Minas Gerais using value added and employment data from 2011 to 2020 to estimate the Deindustrialization Relative Regional Index (DRR). The analysis of industry's share in gross value added and employment reveals a process of absolute deindustrialization in the Divinópolis Microregion and in certain municipalities. However, the DRR results do not indicate evidence of deindustrialization for the Microregion relative to Minas Gerais and Brazil during the analyzed period, although the evidence supports the existence of this process in the most economically relevant municipalities of the Microregion.

Keywords: Deindustrialization; Minas Gerais; Microregion; Divinópolis.
JEL Classification: O14; R11

Resumo: Este artigo analisa a hipótese de desindustrialização nos municípios da Microrregião de Divinópolis em Minas Gerais. Para isso, são utilizados dados do valor adicionado e do emprego industrial dos municípios da Microrregião de 2011 a 2020 para elaboração do Índice de Desindustrialização Relativa Regional (DRR). Ao analisar a participação da indústria no valor adicionado e no emprego é possível verificar um processo de desindustrialização absoluta na Microrregião de Divinópolis e em certos municípios. Contudo, os resultados do Índice de DRR não sinalizam evidências de desindustrialização para a Microrregião em relação a Minas Gerais e ao Brasil no período analisado, mas são favoráveis ao processo nos municípios mais relevantes da Microrregião.

Palavras-chave: Desindustrialização; Minas Gerais; Microrregião; Divinópolis.
Classificação JEL: O14; R11.

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1. Introduction

The process of deindustrialization in the Brazilian economy has drawn increasing attention from economists and the general public since the early 2000s. This growing concern is reflected in the economic literature, which over the past two decades has provided substantial evidence of Brazil's deindustrialization process—particularly the declining share of manufacturing in GDP, employment, and international trade (Oreiro; Feijó, 2010).

Beyond the national-level analysis, recent studies have increasingly sought to examine the deindustrialization process from a regional perspective. In this context, the literature has paid particular attention to the Southeast region of Brazil and its constituent states. The relevance of analyzing this regional context lies in the fact that the Southeast region accounted for a large share of Brazil's GDP—51.9% in 2020—and concentrated 41.8% of the country's resident population in 2022. It is also important to highlight the individual significance of the states composing the region, as three of them represented the largest shares of the national GDP in 2020: São Paulo with 31.3%, followed by Rio de Janeiro (9.9%) and Minas Gerais (9.0%) (IBGE, 2022).

Among the states composing the Southeast region of Brazil, Minas Gerais exhibits characteristics very similar to those of the national economy. This state has a highly heterogeneous productive structure, encompassing activities ranging from mining and agribusiness to a manufacturing industry with varying technological intensities, which lead to distinct growth and economic development indicators across its various regional units (Veríssimo; Saiani, 2023). Considering the importance of Minas Gerais in the national context, it becomes relevant to investigate the particularities of changes in the productive structure of Minas Gerais at a more localized spatial level that may contribute to the decline in the industry's share in generating output, employment, and income.

From this perspective, among the various microregions of the state, the Divinópolis Geographic Microregion stands out. It comprises 11 municipalities: Carmo do Cajuru, Cláudio, Conceição do Pará, Divinópolis, Igaratinga, Itaúna, Nova Serrana, Perdigão, Santo Antônio do Monte, São Gonçalo do Pará and São Sebastião do Oeste. Located approximately 120 km from the capital Belo Horizonte, this microregion accounted for about 2.5% of Minas Gerais's GDP in 2020, ranking eighth in production relevance among the state's 66 microregions. It contributed around 2.8% of the industrial activity and 4.8% of the manufacturing employment in the state that year (IBGE, 2022; RAIS, 2023).

Given the importance of the industry in the Divinópolis Microregion, this paper aims to analyze the industrial activity performance in the microregion from 2011 to 2020 in order to verify whether it is undergoing a process of relative deindustrialization compared to the state of Minas Gerais. To this end, the paper uses data on industrial production and employment and develops the Deindustrialization Relative Regional Index (DRR) proposed by Pereira and Cario (2018) to investigate the industrial performance of the microregion relative to the rest of the state.

The motivation for this study lies in the consequences of recent crises in Brazil—most notably, the corruption scandals revealed by Operation Car Wash (*Operação Lava Jato*) in 2014 and the COVID-19 pandemic in 2020. As a result of these events, several long-established companies in the Divinópolis Microregion closed their operations, while others were drawn to the area through government incentive programs—a pattern also observed in other regions of the state and the country. Thus, it is important to understand that certain municipalities have lost their industrial hubs and shifted towards developing the service sector, changing the industry's weight in their economic outcomes. Moreover, it is essential to assess the varied industrial development across the different municipalities within the microregion during the analyzed period.

The paper is organized into five sections, including this introduction. Section 2 reviews the main concepts related to deindustrialization. Section 3 introduces the microregion under study and examines key industrial indicators. Section 4 outlines the methodology used to calculate the DRR and discusses the main findings. Finally, Section 5 presents the concluding remarks.

2. Literature Review on the Concepts of Deindustrialization

From a heterodox perspective, the industrial sector plays a key role in economic dynamics, as it is characterized by increasing returns to scale and serves as both a source and main channel for the diffusion of technological progress. Accordingly, deindustrialization is viewed as a phenomenon that negatively affects long-term growth potential by weakening the generation of increasing returns, slowing the pace of technical progress, and intensifying the external constraint on growth (Oreiro; Feijó, 2010).

The concept of deindustrialization is widely debated in the economic literature. Rowthorn and Ramaswamy (1999) contributed significantly to the literature by characterizing the process as a persistent decline in the share of industrial employment within total employment of a regional or national economy. Later, Tregenna (2009) extended the classical concept proposed by Rowthorn and Ramaswamy. According to her, the phenomenon also occurs when there is a decrease in the industry's Value Added (VA) relative to GDP, not only in the reduction of industrial employment relative to total employment.

Building on this expanded concept of deindustrialization, the process may be compatible with an increase in industrial production in physical terms. However, mere gross growth does not imply the absence of deindustrialization. According to Oreiro and Feijó (2010, p. 221), "an economy does not deindustrialize when industrial production stagnates or declines, but when the industrial sector loses importance as a source of employment and/or value added for a given economy."

They further distinguish deindustrialization as either positive or negative. In the former case, the process occurs when labor-intensive and/or lower value-added manufacturing activities migrate abroad while exports with higher technological content and greater value added increase their share in the export basket. In the latter case, when

deindustrialization is accompanied by "reprimarization," that is, a reversal of the export composition toward commodities, primary products, or manufactures with low value added and/or low technological content, the phenomenon is considered harmful to the economy as it may lead to low economic growth. They explain that deindustrialization can be classified as: absolute, following the classical concept involving a decline in industrial employment and value added relative to the respective totals; or relative, when industrial employment and value added do not decline in absolute terms, but higher-technology sectors lose relative share to those with lower value added or to resource-based sectors within the production chain.

At the regional level, Silva (2017) argues that deindustrialization may take place in three distinct forms: stagnant, regressive, and progressive. Stagnant regional deindustrialization occurs when the manufacturing sector loses share in the region's GDP, while its share in national industrial GDP remains relatively unchanged. Regressive regional deindustrialization arises when the industrial sector loses share both in the region's total GDP and in the national industrial GDP. Finally, progressive regional deindustrialization refers to a decline in the industry's share of the region's total GDP alongside an increase in its share of national industrial GDP.

Deindustrialization can be driven by both internal and external factors at the regional or national level. Two key internal factors are worth highlighting: the changing relationship between income elasticity of demand for industrial goods versus services; and the rapid increase in industrial productivity—outpacing that of the services sector. As income rises, the demand for manufactured products increases, but, subsequently, the service sector begins to receive the increase in demand. Productivity gains reduce the amount of labor required in industry, consequently leading to a decline in the sector's share of total employment. External contributors of deindustrialization, conversely, are linked to the degree of trade and production integration among economies. Some regions may specialize in manufactured goods or in service activities; others may specialize in labor-intensive manufacturing, whether skilled or unskilled (Rowthorn; Ramaswamy, 1999; Oreiro; Feijó, 2010; Veríssimo; Araújo, 2016).

Maia (2020) examines the hypothesis of deindustrialization in Brazil between 1998 and 2014, based on the classical definition, through three alternative conceptual approaches: (i) premature deindustrialization; (ii) the "Cambridge view" (focused on the trade balance of manufactured goods); and (iii) structural change within the manufacturing sector. The classical definition distinguishes between two possible types of deindustrialization: positive (or natural) and negative. These alternative approaches diverge from the classical definition. According to the author, Brazilian deindustrialization appears more pronounced when analyzed through these lenses, given the country's persistent trade deficits and its pattern of regressive specialization—i.e., specialization in sectors with lower productivity and technological content—indicating a process of negative deindustrialization.

Premature deindustrialization occurs when a country loses relative importance of its industrial sector at a lower per capita income level than that observed in developed

countries. On the other hand, the "Cambridge view" interprets deindustrialization as a reflection of an industrial sector unable to meet domestic demand or generate sufficient export revenues to finance imports. In the Brazilian context, this perspective is associated with the New Developmentalism school, as advocated by economist Luiz Carlos Bresser-Pereira. Finally, deindustrialization resulting from structural change is characterized by increasing specialization in low-productivity industrial sectors at the expense of high-productivity, technology-intensive manufacturing activities.

Several factors are commonly cited as the main causes of deindustrialization: the inverse relationship between employment and productivity; changes in relative prices between industry and services; globalization; the statistical illusion caused by the outsourcing of industrial services; the Dutch disease; and persistent exchange rate overvaluation (Maia, 2020). It is important to highlight that, in the first cause, a decline in industrial employment occurs without affecting manufacturing value added, due to gains in industrial productivity. In this case, deindustrialization is measured by the ratio of industrial employment to total employment in the economy.

The second cause occurs when rising industrial productivity changes the relative prices between industry and services. Initially, relative demand for manufactured goods increases as income grows. However, after a certain income threshold, demand shifts toward the service sector. Here, deindustrialization is observed through the declining share of industrial VA in GDP.

The third cause is linked to the expansion of North-South global trade, which has reduced industrial employment in advanced economies as production is relocated to peripheral countries with lower labor costs. In Brazil, for instance, the textile sector has weakened as a result of globalization and intensified competition from China.

The fourth cause stems from a statistical illusion generated by the outsourcing of jobs linked to manufacturing activities, such as cleaning, security, design, research, advertising, engineering, and marketing services. In other words, these jobs still exist, but firms have outsourced non-core industrial functions.

The fifth cause, known as the Dutch disease, results from the real exchange rate appreciation following a commodity export boom. According to Bresser-Pereira and Marconi (2008), the surge in commodity prices boosts export revenues and leads to a real exchange rate appreciation, which in turn facilitates imports of manufactured goods while reducing industrial employment. Dutch disease can therefore be interpreted as a form of regressive deindustrialization.

The sixth cause—persistent exchange rate overvaluation—has the effect of making internationally tradable goods more competitive in the domestic market while increasing the cost of domestic products abroad. In the long run, this alters the productive structure: economic agents reduce investments in domestic manufacturing, and imported goods gain a larger share of the national market.

According to Bresser-Pereira (2019), the Brazilian economy, since the 1980s, has been experiencing a process of semi-stagnation, achieving growth at an average rate of 0.9% per year. The author argues that deindustrialization occurred in two waves: the first

from 1986 to 1999, and the second from 2004 to 2018. During this period, the manufacturing share in GDP fell from 27% in 1986 to only 11% in 2018. Employment in the manufacturing sector, measured by Employed Personnel (EP), grew at an average annual rate of 3.8% between 1998 and 2014. In contrast, mineral extractive industries and the overall economy posted average annual growth rates of 5.8% and 4.5%, respectively, over the same period. Meanwhile, the manufacturing share in total formal employment in Brazil declined from 18.2% in 1998 to 16.4% in 2014, lending support to the classical deindustrialization hypothesis (Maia, 2020).

Beyond the national scope, the literature has increasingly focused on subnational analyses of deindustrialization. In this context, a number of regional studies have been conducted—particularly on the Southeast region of Brazil and its states—due to their significant role in the country's economy. In line with the focus of the present study, it is important to highlight findings from research on deindustrialization in the state of Minas Gerais.

For instance, Silva and Alves (2010) report a positive evolution of the Minas Gerais economy—above the national average—attributed to increased industrial competitiveness. Souza and Cardozo (2013) indicate that the Minas Gerais industrial sector increased its share in the national industrial GDP between 2000 and 2008, with no significant changes observed in the state's productive structure. This assessment is based on the composition of GDP and the Industrial Transformation Value (ITV), with the metal-mechanical and agro-industrial complexes remaining the key sectors of the economy. Conversely, Veríssimo and Araújo (2016), through empirical analyses, identified signs of deindustrialization in the state, albeit limited to the manufacturing industry. The extractive industry benefited from a favorable environment of commodity prices and external demand (notably from China) that supported its expansion during the 2000s.

Pereira and Cario (2018) also found evidence of relative deindustrialization in Minas Gerais compared to Brazil between 1996 and 2013. The authors applied the Deindustrialization Relative Regional Index (DRR), disaggregated by technological intensity and calculated using data on Gross Industrial Production Value (GIPV)), Industrial Transformation Value ITV, and Employed Personnel (EP). The - GIPV/ITV ratio expresses the proportion of value added transformed by the industry and can be summarized as an indicator of productive density. Since the GIPV/ITV ratio is highly sensitive to exchange rate fluctuations and does not capture intersectoral differences, the authors chose to develop the DRR Index, which reflects the relative industrial performance of a given region compared to a reference region. Their findings provide evidence of relative deindustrialization in the Southeast states, although São Paulo, Rio de Janeiro, and Minas Gerais have gradually shifted from low-tech industry toward medium-low and medium-high technology industries.

Based on the methodology employed by Pereira and Cario (2018), this study aims to assess whether the Divinópolis Microregion shows evidence of relative deindustrialization compared to the state of Minas Gerais and Brazil.

3. Economic Profile of the Divinópolis Microregion, 2011–2020

The territorial division of Brazil, as defined by the Brazilian Institute of Geography and Statistics (IBGE – *Instituto Brasileiro de Geografia e Estatística*), comprises five major regions: North, Northeast, Central-West, South, and Southeast. The state of Minas Gerais is part of the latter and is the fourth-largest federative unit in Brazil by land area, covering 586,514 km²—ranking behind only Amazonas, Pará, and Mato Grosso (IBGE, 2023a).

Data from IBGE (2023a) indicate that Minas Gerais has a population of 20,538,718, second only to the state of São Paulo, which has 44,420,459 inhabitants. These figures translate into a population density of 35.02 inhabitants/km², making Minas Gerais the fourteenth most densely populated state in Brazil. The national average population density is 23.86 inhabitants/km².

The regional division of Brazil into Geographic Microregions and Mesoregions, proposed by the IBGE in 1989, introduced new approaches to understanding the organization of national territory. IBGE (1990) defines a geographic mesoregion as a territorially bounded area within a federative unit, characterized by specific patterns of spatial organization. These patterns are shaped by three dimensions: the social process as the determinant; the natural environment as a conditioning factor; and the network of places and communication as the structuring element of spatial articulation. Microregions are considered subdivisions of mesoregions and were defined based on their specific characteristics in terms of agricultural, industrial, mineral extractive, and fishing production structures.

According to IBGE's regional division, Brazil's 5,570 municipalities are grouped into 558 microregions, which in turn are organized into 137 mesoregions. The state of Minas Gerais is divided into 12 mesoregions (Noroeste de Minas, Norte de Minas, Jequitinhonha, Vale do Mucuri, Triângulo Mineiro/Alto Paranaíba, Central Mineira, Metropolitana de Belo Horizonte, Vale do Rio Doce, Oeste de Minas, Sul/Sudoeste de Minas, Campo das Vertentes, and Zona da Mata) and 66 microregions. These divisions and subdivisions are shown in Figure 1, highlighting the Oeste de Minas Mesoregion—Figure 1(a)—and the Divinópolis Geographic Microregion—Figure 1(b).

Figure 1: Geographic Mesoregions and Microregions of Minas Gerais

(a)   **(b)**

Legend:

Mesoregion
- Oeste de Minas (green)
- Oeste de Minas (red outline)

Microregion
- Divinópolis (red)

0   100   200 km

Source: own elaboration based on IBGE data.
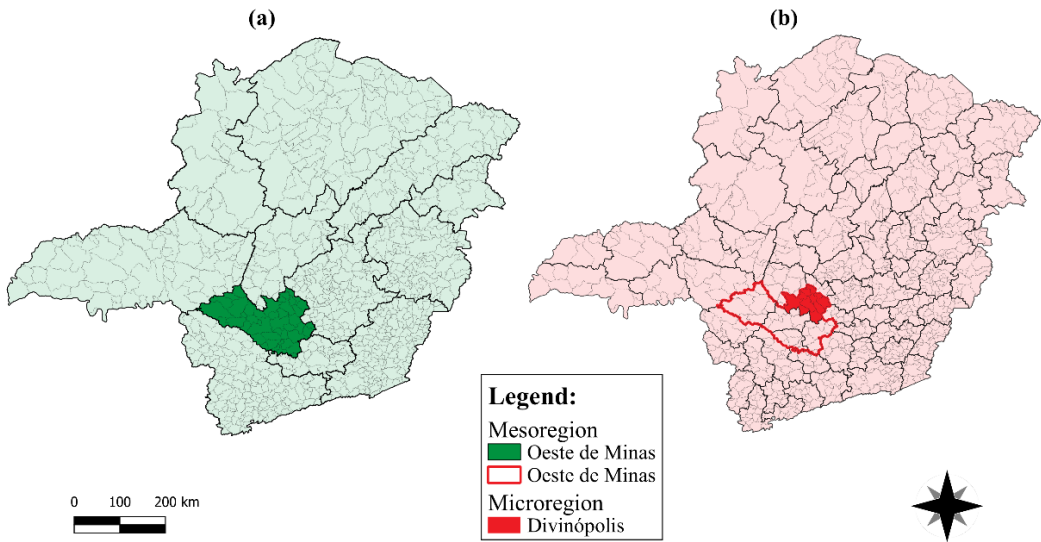
Figure 2: Municipalities of the Divinópolis Microregion

Legend:
1 - Conceição do Pará
2 - Nova Serrana
3 - Perdigão
4 - São Gonçalo do Pará
5 - Igaratinga
6 - Santo Antônio do Monte
7 - Divinópolis
8 - Carmo do Cajuru
9 - Itaúna
10 - São Sebastião do Oeste
11 - Cláudio

0   10   20 km

Source: own elaboration based on IBGE data.
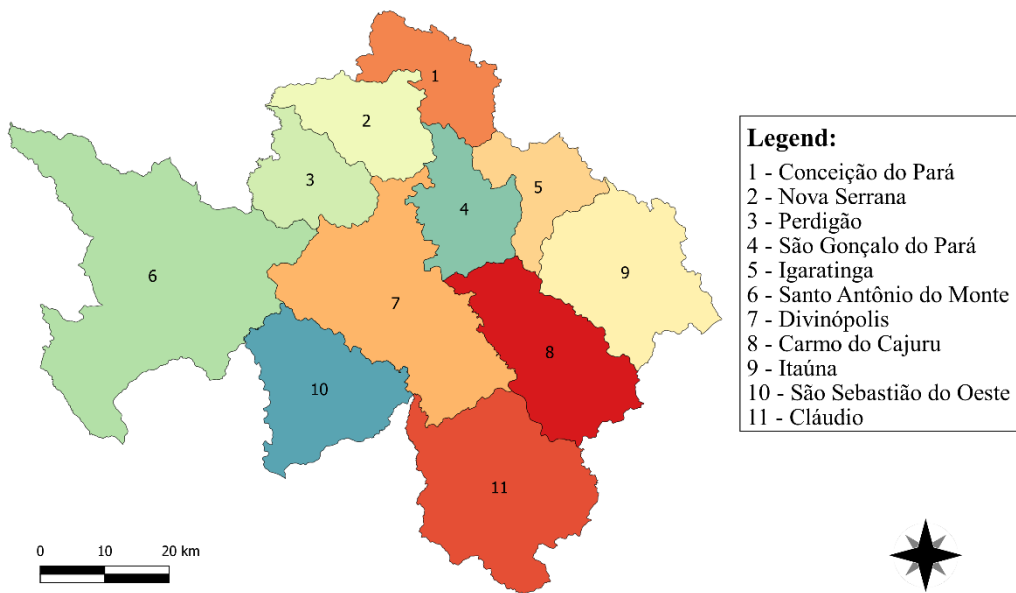
The Divinópolis Geographic Microregion is located within the Oeste de Minas Mesoregion and comprises 11 municipalities (Figure 2): Carmo do Cajuru, Cláudio, Conceição do Pará, Divinópolis, Igaratinga, Itaúna, Nova Serrana, Perdigão, Santo Antônio do Monte, São Gonçalo do Pará, and São Sebastião do Oeste. The Microregion has a population of 564,343, representing 2.75% of the population of Minas Gerais. Its total area spans 5,090 km², resulting in a population density of 110.87 inhabitants per km² (IBGE, 2023a).

Table 1 presents information on the economic performance of the Divinópolis Geographic Microregion for the period from 2011 to 2020.

Table 1: Total GDP and GDP by Economic Activity in the Divinópolis Geographic Microregion (MG), 2011–2020 (in R$ billion)

Variables [1]	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
GDP	8.71	9.27	9.83	9.99	9.29	9.27	10.13	10.09	10.43	10.47
Taxes	1.07	1.09	1.12	1.11	1.02	1.08	1.28	1.24	1.26	1.27
GVA [2]	7.64	8.18	8.71	8.88	8.26	8.19	8.85	8.85	9.17	9.20
Agricultural GVA	0.26	0.26	0.31	0.30	0.27	0.30	0.29	0.29	0.32	0.41
Agricultural GVA / GVA (%)	3.40	3.18	3.56	3.38	3.27	3.66	3.28	3.28	3.49	4.46
Industrial GVA [3]	2.47	2.64	2.71	2.77	2.38	2.32	2.59	2.55	2.74	2.80
Industrial GVA / GVA (%)	32.33	32.27	31.11	31.19	28.81	28.33	29.27	28.81	29.88	30.43
Services GVA [4]	3.63	3.95	4.25	4.32	4.15	4.08	4.39	4.43	4.53	4.46
Services GVA / GVA (%)	47.51	48.29	48.79	48.65	50.24	49.82	49.60	50.06	49.40	48.48
Public GVA [5]	1.27	1.33	1.43	1.49	1.47	1.49	1.58	1.58	1.57	1.52
Public GVA / GVA (%)	16.62	16.26	16.42	16.78	17.80	18.19	17.85	17.85	17.12	16.52

Source: own elaboration based on IBGE data (2023b).
(1) Data deflated using the IPCA (base year 2011).
(2) GDP minus taxes.
(3) Includes extractive industries, manufacturing, electricity and gas, water supply, sewage, waste management, and construction.

(4) Includes trade, transportation, storage and postal services, information and communication, financial and insurance activities, real estate, and other service activities.
(5) Includes public administration, defense, public education and health, and social security.

The data indicate that the total GDP of the Microregion experienced a real growth of 20.2% over the analyzed period, increasing from R$ 8.71 billion in 2011 to R$ 10.47 billion in 2020. Excluding taxes, the Gross Value Added (GVA) rose from R$ 7.64 billion to R$ 9.20 billion.

Considering the share of economic activities in the Microregion's GVA during the observed period, the services sector was the largest contributor, averaging 49.13%, followed by industry with an average contribution of 30.27%, and public services (administration, defense, public education and health, and social security) at around 17%. Agriculture accounted for only 3.49% on average. It is worth noting that the industry's share in GVA declined from 32.33% in 2011 to 30.43% in 2020, which may signal absolute deindustrialization based on industry's share in GDP, as suggested by Tregenna (2009).

Figure 3 compares the number of formal jobs in the manufacturing and extractive industries of the Divinópolis Microregion between 2011 and 2020.

Figure 3: Employed Personnel in the Manufacturing and Extractive Industries of the Divinópolis Microregion (MG), 2011–2020 (number of people)
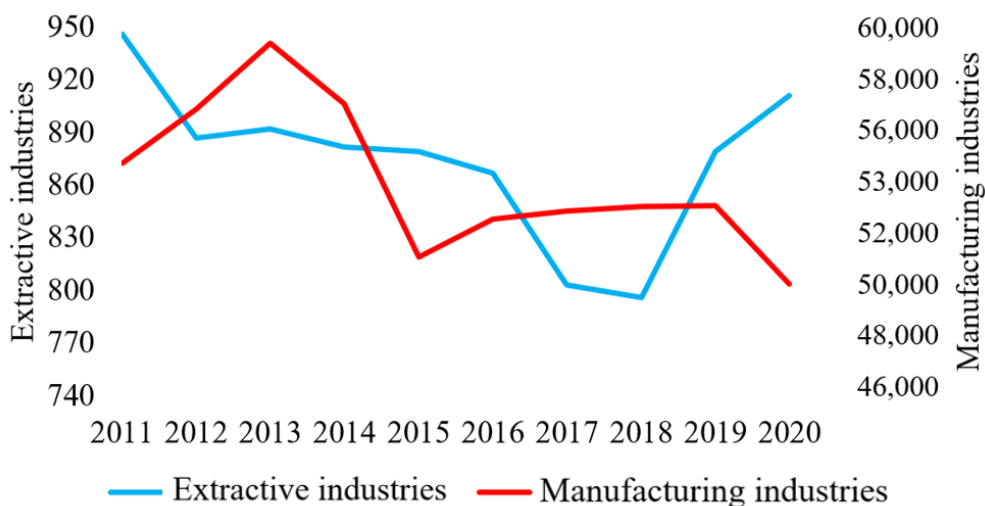
Source: own elaboration based on data from RAIS (2023).

In 2013, employment in the manufacturing industry reached its peak for the decade, with 59.4 thousand workers. However, by 2020, this figure had fallen to 50.2 thousand—a decline of 8.4% compared to 2011. This outcome reflects the slowdown in economic activity, rising unemployment, and an increase in informal work, particularly as a result of the COVID-19 pandemic. In contrast, the extractive industry followed an opposite trend.

The decade began with the highest employment levels in the period, but from 2013 onward, a decline was observed, which persisted until 2018. Unlike manufacturing, the extractive sector showed a slight recovery in 2019 and 2020, ending the decade with 3.7% fewer formal workers than in 2011.

Table 2 shows the performance of employment in the main industrial activities of the Divinópolis Microregion in 2011 and 2020.

Table 2: Sectoral Share of Industrial Employment in the Divinópolis Microregion (MG), in %

CNAE 2.0 Section			CNAE 2.0 Division	2011	2020
B	Extractive Industries	5	Coal Mining	0.00	0.00
		6	Oil and Natural Gas Extraction	0.00	0.00
		7	Metal Ore Mining	1.17	1.27
		8	Non-Metallic Mineral Extraction	0.47	0.51
		9	Support Activities for Mineral Extraction	0.05	0.00
C	Manufacturing Industries	10	Food Products Manufacturing	6.96	11.48
		11	Beverages Manufacturing	0.29	0.64
		12	Tobacco Products Manufacturing	0.00	0.00
		13	Textile Products Manufacturing	6.85	6.53
		14	Apparel and Accessories Manufacturing	11.39	8.81
		15	Tanning and Manufacturing of Leather, Luggage, and Footwear	32.13	26.32
		16	Wood Products Manufacturing	0.41	0.38
		17	Pulp, Paper, and Paper Products Manufacturing	1.94	1.77
		18	Printing and Reproduction of Recorded Media	0.47	0.50
		19	Coke, Petroleum Products, and Biofuels Manufacturing	0.04	0.00
		20	Chemical Products Manufacturing	4.10	4.74
		21	Pharmaceutical and Pharmaceutical Chemical Products Manufacturing	0.10	0.13
		22	Rubber and Plastic Products Manufacturing	2.28	2.12
		23	Non-Metallic Mineral Products Manufacturing	3.47	3.45
		24	Metallurgy	15.70	14.67
		25	Fabricated Metal Products Manufacturing (except machinery and equipment)	4.29	7.37
		26	Computer, Electronic, and Optical Products Manufacturing	0.13	0.56
		27	Electrical Equipment Manufacturing	0.28	0.42
		28	Machinery and Equipment Manufacturing	1.04	0.98
		29	Motor Vehicles, Trailers, and Semi-Trailers Manufacturing	1.27	1.45
		30	Other Transport Equipment Manufacturing (except motor vehicles)	0.00	0.39
		31	Furniture Manufacturing	4.35	3.96
		32	Miscellaneous Manufacturing	0.53	0.70
		33	Repair, Maintenance, and Installation of Machinery and Equipment	0.27	0.85

Total	100	100

The data show that the leading industrial activity in terms of employment generation in the Microregion was leather preparation and manufacturing of leather goods, travel accessories, and footwear. At the beginning of the decade, this sector accounted for approximately 32% of formal employment in the manufacturing and extractive industries but saw its share decrease to 26.32%, representing a decrease of 5.81 percentage points (p.p.). The municipality that contributed most to this activity was Nova Serrana, responsible on average for 85% of jobs in this category and recognized as a national hub of the footwear industry.

The second-largest employer by CNAE 2.0 division was metallurgy, which experienced a slight decline in share from 15.7% to 14.67% over the decade. The municipalities of Divinópolis, Cláudio, and Itaúna together concentrated around 90% of employment in this sector.

The apparel and accessories manufacturing sector, despite also losing participation from 11.39% to 8.81%, ranked third in employment generation. Divinópolis accounted for 72% of workers in this sector on average, while Itaúna represented 23%. Together, these two municipalities accounted for 95% of employment in this activity in the Microregion.

Following these, food product manufacturing and textile products manufacturing showed divergent trends, with the former increasing its share in formal employment by 4.51 p.p. and the latter declining by 0.32 p.p. The municipalities of São Sebastião do Oeste (swine, poultry, and small animal slaughter), Divinópolis (bakery products manufacturing), and Itaúna (feed manufacturing) together accounted for 80% of employment in the food manufacturing subsector. In textile manufacturing, Itaúna and Divinópolis stood out, collectively accounting for 85% of employment.

Regarding other industrial activities, their combined share remained below 30% on average during the 2011–2020 period. Thus, the five major activities mentioned above continued to account for roughly 70% of industrial employment in the Microregion.

Table 3 presents the share of each municipality in the GDP and gross value added (GVA) of the Divinópolis Microregion for the selected years (2011 and 2020). Divinópolis was the leading contributor to the Microregion's GDP, accounting for 45.41% of total output in 2011, though this share fell to 41.22% in 2020. The second-largest contributor was Itaúna, which lost 0.65 p.p. in GDP share over the period. Nova Serrana held the third position, increasing its share by nearly 0.2 p.p.

Table 3: Municipal Share of GDP and Sectoral GVA in the Divinópolis Microregion (MG), in %

Municipality	GDP	Agriculture	Industry	Services	Public

	2011	2020	2011	2020	2011	2020	2011	2020	2011	2020
Carmo do Cajuru	2.82	3.02	6.22	10.46	3.01	2.35	1.97	2.54	3.94	4.25
Cláudio	3.98	4.73	8.50	6.90	2.91	4.43	4.01	4.43	4.98	5.02
Conceição do Pará	2.28	1.94	2.88	3.03	4.64	3.97	1.07	1.00	1.36	1.33
Divinópolis	45.41	41.22	16.87	13.36	36.31	31.75	54.11	49.80	44.93	40.37
Igaratinga	1.18	3.23	7.86	6.18	0.43	4.98	1.00	2.19	1.90	2.10
Itaúna	22.32	21.67	7.17	5.21	25.98	27.76	21.08	19.23	17.77	17.48
Nova Serrana	13.85	14.03	2.85	1.74	19.32	15.29	10.87	13.53	14.82	18.68
Perdigão	0.96	1.26	3.33	1.99	0.81	1.32	0.75	0.97	1.74	2.17
Santo Antônio do Monte	3.48	4.08	30.15	36.83	1.14	1.04	3.15	3.37	4.92	4.80
São Gonçalo do Pará	1.33	1.32	3.02	3.40	1.64	1.10	0.81	1.01	2.22	2.29
São Sebastião do Oeste	2.40	3.50	11.15	10.92	3.81	6.00	1.19	1.93	1.41	1.51

Source: own elaboration based on IBGE data (2023b).

In sectoral terms, in the agricultural sector, the municipality of Santo Antônio do Monte accounted for just over 30% of the Microregion's agricultural VA in 2011, increasing its share to approximately 37% by the end of the period. Divinópolis, the second-largest contributor to value generation in this activity, saw a decline of 3.51 p.p. in its share, while Carmo do Cajuru increased its share by 4.23 p.p.

In the industrial sector, three municipalities stood out—Divinópolis, Itaúna, and Nova Serrana—which together accounted for around 75% of the Microregion's industrial VA. While Divinópolis and Nova Serrana lost relative importance between 2011 and 2020, Itaúna registered a slight increase of 1.77 p.p.

The services and public administration sectors showed a similar pattern to that of industry. Once again, Divinópolis, Itaúna, and Nova Serrana stood out, jointly accounting for more than 80% of the services VA and approximately 77% of the public sector VA in the Microregion.

An analysis of the economic activities in the Divinópolis Microregion (Table 3) reveals that the services sector made the largest contribution to the regional GDP, followed by industry, public administration, and agriculture. However, the sectoral composition of some municipalities deviated from this general pattern. Table 4 presents how the four major economic sectors contributed to the GDP of each municipality in 2011 and 2020.

Table 4: Sectoral GVA Share in the GDP of Municipalities in the Divinópolis Microregion (MG), in %

Municipality	Agriculture		Industry		Services		Public Administration	
	2011	2020	2011	2020	2011	2020	2011	2020
Carmo do Cajuru	6.67	13.59	30.29	20.82	29.11	35.73	20.39	20.46
Cláudio	6.45	5.73	20.74	25.05	42.04	39.88	18.25	15.44
Conceição do Pará	3.82	6.12	57.83	54.60	19.58	22.01	8.69	9.96
Divinópolis	1.12	1.27	22.67	20.61	49.71	51.50	14.42	14.26
Igaratinga	20.14	7.53	10.24	41.30	35.46	28.96	23.49	9.47
Itaúna	0.97	0.94	33.02	34.26	39.42	37.83	11.61	11.74
Nova Serrana	0.62	0.49	39.57	29.16	32.75	41.11	15.59	19.38
Perdigão	10.43	6.21	23.81	28.04	32.44	32.77	26.40	25.17
Santo Antônio do Monte	26.19	35.53	9.31	6.80	37.86	35.23	20.63	17.15
São Gonçalo do Pará	6.83	10.11	34.90	22.30	25.21	32.56	24.31	25.14
São Sebastião do Oeste	14.03	12.25	45.02	45.83	20.63	23.53	8.57	6.26

Source: own elaboration based on IBGE data (2023b).

Carmo do Cajuru saw the agricultural sector increase its share of local GDP from 6.67% in 2011 to 13.59% in 2020. Meanwhile, the industrial sector lost nearly 10 p.p., services became the main contributor to VA, and public services remained at similar levels. Cláudio recorded a decline in the shares of agriculture, services, and the public sector, while industry expanded from 20% to 25%. Conceição do Pará stood out for its strong industrial presence, which accounted for more than 50% of the municipality's GDP. The extractive sector contributed the most to its GVA. In the Microregion, Divinópolis was the most service-dependent municipality. Its services sector share rose from 49.7% in 2011 to 51.5% in 2020, while industry remained close to 20%. Igaratinga posted the most significant industrial VA growth during the period—approximately 300%—mainly due to manufacturing activities. The distribution of VA across the four major sectors remained stable in Itaúna throughout the decade. Nova Serrana followed a pattern similar to Divinópolis, with a decline in the industrial share and an increase in services. Perdigão experienced a 4.24 p.p. increase in industrial VA and a 4.22 p.p. decrease in agriculture, although services remained the dominant sector. Santo Antônio do Monte reached 35.5% of GDP from agriculture in 2020, but services continued to lead. In São Gonçalo do Pará, industry gave way to agriculture and services over the ten-year period. Finally, São Sebastião do Oeste remained the only municipality in the Microregion where industry continued to be the largest contributor to GDP.

It is also worth examining how employment is distributed across economic activities. Table 5 presents each municipality's contribution to total employment in the Divinópolis Microregion in 2011 and 2020.

Table 5: Municipal Share of Employed Personnel in the Divinópolis Microregion (MG), in %

Municipality	Agriculture		Industry		Services		Public Administration	
	2011	2020	2011	2020	2011	2020	2011	2020
Carmo do Cajuru	7.60	11.30	3.45	3.92	1.82	3.28	4.52	0.08
Cláudio	5.86	7.82	7.67	9.42	4.05	5.24	4.64	5.00
Conceição do Pará	3.11	4.43	1.79	2.29	0.13	0.20	2.13	2.33
Divinópolis	19.79	18.25	29.36	25.42	59.49	55.67	35.37	33.79
Igaratinga	13.94	10.48	2.14	2.71	0.85	1.22	2.78	3.16
Itaúna	9.36	12.86	16.52	19.93	20.71	18.70	18.84	19.49
Nova Serrana	7.86	5.94	28.07	23.44	8.61	10.56	18.00	21.65
Perdigão	1.96	2.46	1.94	2.32	0.46	0.63	2.34	3.94
Santo Antônio do Monte	7.68	12.25	4.17	3.10	3.04	3.30	6.27	7.53
São Gonçalo do Pará	3.82	3.61	2.18	2.10	0.61	0.66	3.10	1.64
São Sebastião do Oeste	19.02	10.60	2.70	5.34	0.23	0.53	2.00	1.39

Source: own elaboration based on data from RAIS (2023).

The municipalities of Divinópolis, Itaúna, and Nova Serrana jointly accounted for approximately 75% of total employment in the Microregion throughout the period. By contrast, Conceição do Pará, Perdigão, and São Gonçalo do Pará registered the lowest shares of regional employment. In the agricultural sector, nearly 20% of workers in the Microregion were concentrated in Divinópolis, despite agriculture contributing only marginally to the municipality's GDP. As previously noted, Divinópolis, Itaúna, and Nova Serrana were also the leading contributors to the region's industrial GVA, and the same pattern is observed in terms of industrial employment. In the services sector, Divinópolis alone was responsible for approximately half of all jobs in the Microregion. Lastly, in public services, the municipality accounted for around 35% of total employment, followed by Itaúna and Nova Serrana, each contributing over 18%.

4. The Regional Relative Deindustrialization Index (DRR) for the Municipalities of the Divinópolis Microregion (MG)

The economic literature does not identify a single indicator capable of confirming the occurrence—or absence—of a deindustrialization process. Instead, performance indicators of industrial activities are commonly employed (according to technological intensity or sector classification), such as: the share of manufacturing in Gross Domestic Product (GDP) and in Employed Personnel (EP), Industrial Value Added (VA), Gross Industrial Production Value (GIPV), Industrial Transformation Value (ITV), the GIPV/ITV ratio, productivity, and the share of industrial exports and imports in total foreign trade.

Based on these indicators, Pereira and Cario (2018) developed the DRR Index to assess the industrial performance of a given region (i) relative to a reference region (j). The DRR index is expressed by Equation 1 below:

$$DRR = \frac{\frac{GIPV_{i(t+n)}}{GIPV_{i(t)}}}{\frac{GIPV_{j(t+n)}}{GIPV_{j(t)}}} \qquad (1)$$

where: GIPV stands for Gross Industrial Production Value between period *t* and period *t + n*; *i* refers to the region under study; and *j* refers to the reference region.

If the DRR Index is lower than 1, the study region exhibits a lower growth rate in industrial output than the reference region, indicating a process of relative deindustrialization. If the DRR Index is greater than 1, the study region shows a higher growth rate in industrial output compared to the reference region, suggesting relative industrialization. Finally, a DRR value equal to 1 indicates that the growth rate of GIPV in the study region is the same as that of the reference region, implying neither relative gain nor loss (Pereira; Cario, 2018).

This article constructs the DRR Index following Pereira and Cario (2018), with adaptations to assess industrial Value Added (VA) and Employed Personnel (EP). The study region (i) comprises the Divinópolis Microregion and its municipalities, while the reference regions (j) are the state of Minas Gerais and Brazil. Thus, Equation 1 of the DRR Index proposed by Pereira and Cario (2018) is rewritten by replacing VBPI with industrial VA (Equation 2) and with EP (Equation 3):

$$DRR_{VA} = \frac{\frac{VA_{i(t+n)}}{VA_{i(t)}}}{\frac{VA_{j(t+n)}}{VA_{j(t)}}} \qquad (2)$$

$$DRR_{EP} = \frac{\dfrac{EP_{i(t+n)}}{EP_{i(t)}}}{\dfrac{EP_{j(t+n)}}{EP_{j(t)}}} \qquad\qquad (3)$$

The DRR Index is calculated for three periods: i) the full period, with $t = 2011$ and $t + n = 2020$; ii) the first half of the decade, with $t = 2011$ and $t + n = 2015$; and iii) the second half of the decade, with $t = 2016$ and $t + n = 2020$. The aim is to capture potential variations in industrial performance during phases of greater economic instability, such as those observed in Brazil after 2015. The DRR Index for each municipality is calculated relative to the state of Minas Gerais, while the total DRR for the Microregion is calculated relative to both Minas Gerais and Brazil.

After obtaining data on industrial VA and EP for the municipalities, the Microregion, Minas Gerais state, and Brazil (see Tables A1 and A2 in the Appendix), the results for the DRR Index are presented in Table 6.

Analyzing the DRR Index based on industrial VA, the results suggest that in the first half of the decade, from 2011 to 2015, the Divinópolis Microregion and its municipalities outperformed the industrial sectors of Minas Gerais and Brazil, indicating a process of relative industrialization as defined by Pereira and Cario (2018). The exception was the municipality of Conceição do Pará, which showed a lower growth rate of industrial output compared to Minas Gerais, characterizing a process of relative deindustrialization with respect to the state. The municipality with the best performance was Perdigão, with an indicator value of 2.14 relative to the industrial VA growth in Minas Gerais. The Divinópolis Microregion presented a DRR of 1.24 relative to Minas Gerais, and 1.11 relative to Brazil.

In the period from 2016 to 2020, industrial performance in two-thirds of the municipalities within the Microregion was below that of the Minas Gerais industry. The municipality with the poorest result during this period was Nova Serrana, with a DRR of 0.62. Conversely, four municipalities showed positive performance, suggesting a trajectory of relative industrialization, notably São Sebastião do Oeste, which recorded a DRR of 2.26. The DRR value for the Microregion relative to Minas Gerais remained stagnant over the period, indicating no relative loss or gain in the industrial sector. Regarding the Microregion's indicator relative to Brazil, the obtained DRR suggests the existence of a process of relative industrialization compared to the country, with a value of 1.09.

Table 6: Regional Relative Deindustrialization Index (DRR) for the Municipalities of the Divinópolis

Municipalities	DRR Industrial VA			DRR Industrial EP		
	2011-2015	2016-2020	2011-2020	2011-2015	2016-2020	2011-2020
Carmo do Cajuru	1.11	0.93	1.01	1.04	1.16	1.14

Cláudio	1.46	1.32	1.97	0.95	1.18	1.23
Conceição do Pará	0.86	0.96	1.11	1.06	0.95	1.28
Divinópolis	1.16	0.99	1.13	1.04	0.84	0.87
Igaratinga	1.69	1.64	15.14	1.12	1.09	1.27
Itaúna	1.10	1.19	1.38	1.06	1.11	1.21
Nova Serrana	1.52	0.62	1.02	1.03	0.67	0.84
Perdigão	2.14	0.96	2.11	1.10	0.85	1.20
Santo Antônio do Monte	1.20	0.94	1.18	0.99	0.77	0.75
São Gonçalo do Pará	1.25	0.69	0.87	0.99	0.88	0.96
São Sebastião do Oeste	1.57	2.26	2.04	1.69	1.09	1.98
Microregion / MG	1.24	1.00	1.29	1.05	0.88	1.00
Microregion / Brazil	1.11	1.09	1.26	1.03	0.95	1.07

Source: own elaboration based on data from IBGE (2023b) and RAIS (2023).

Regarding the full period from 2011 to 2020, the results suggest a trajectory of industrialization. The exception was the municipality of São Gonçalo do Pará, which recorded a DRR of 0.87. A notable positive outlier was Igaratinga, with a DRR of approximately 15.1—the municipality's industrial VA experienced a real growth of 1,227% between 2011 and 2020. The DRR of the Divinópolis Microregion in relation to Minas Gerais was 1.29, and in relation to Brazil, it was 1.26. These positive results at the end of the decade can be explained by the industrial sector's recovery in production and growth from 2019 onwards, following years of contraction and low growth between 2015 and 2018.

The DRR results based on industrial EP showed stronger evidence of relative deindustrialization compared to the index based on industrial VA. Comparing the data from 2011 to 2015, three municipalities registered a decrease in industrial employment: Cláudio, Santo Antônio do Monte and São Gonçalo do Pará. In the remaining municipalities, DRR values were above 1, with São Sebastião do Oeste standing out with a DRR of 1.69. These municipalities can thus be characterized as undergoing a process of relative industrialization. This pattern was also observed for the Microregion relative to Minas Gerais and Brazil.

In the period from 2016 to 2020, the situation worsened for the Divinópolis Microregion. Only five municipalities exhibited industrial employment growth outperforming Minas Gerais, while six had DRR values below 1. The most negative case was Nova Serrana, with a DRR of 0.67, while Cláudio was the positive outlier with a DRR of 1.18. Finally, it is noteworthy that the Microregion showed relative deindustrialization compared to Minas Gerais (DRR = 0.88) and Brazil (DRR = 0.95).

When analyzing the full period, the DRR Index based on total industrial employment was below 1 for the municipalities of Divinópolis, Nova Serrana, Santo Antônio do Monte, and São Gonçalo do Pará. In the other municipalities, the DRR was above 1. No evidence of deindustrialization is observed in the Microregion relative to industrial employment in Minas Gerais (DRR = 1) and Brazil (DRR = 1.07).

Although the DRR indicators based on both VA and employment do not signal deindustrialization for the Divinópolis Microregion as a whole relative to Minas Gerais and Brazil during 2011–2020, two of the three main municipalities in terms of GDP contribution—Divinópolis and Nova Serrana—lost industrial shares in both VA and employment, and their respective DRRs are consistent with a deindustrialization process. It is worth noting that these municipalities concentrate important industrial activities within the state and national context, such as textile, apparel, and footwear manufacturing—sectors characterized by low technological content that were particularly affected by Chinese competition, losing product and employment generation potential throughout the 2000s.

On the other hand, the municipalities that showed evidence of relative industrialization were those that experienced significant growth in their respective municipal GDPs during the analyzed period. However, they still have a low contribution to the Microregion's overall GDP, such as Cláudio, Conceição do Pará, and Igaratinga. This suggests heterogeneity in the process under study. These municipalities are characterized by industrial structures based on medium-low technology sectors. Examples include foundry and metallurgy, extraction of precious metal ores, and manufacturing of ceramic artifacts. These sectors were less severely impacted by losses in GDP and employment shares. This resilience is explained by strong linkages with primary sectors that benefited from favorable international prices and external demand during the period.

5. Conclusion

This article analyzed the process of relative deindustrialization in the municipalities of the Divinópolis Microregion between 2011 and 2020, based on key economic data for the region and the construction of the Deindustrialization Relative Regional Index (DRR) for industrial Value Added (VA) and Employed Personnel (EP) in relation to the state of Minas Gerais and Brazil.

An analysis of the economic outcomes for the Divinópolis Microregion during the period reveals real GDP growth across all economic activities. However, the industrial sector experienced a decline in its share of total Gross Value Added (GVA). This shift may indicate a process of absolute deindustrialization in the Microregion, according to the extended concept by Tregenna (2009).

Moreover, the services sector was the largest contributor to GDP formation, followed by industry, public services, and lastly, agriculture. In 2011, six municipalities had services as the sector with the highest share of GVA; by 2020, this number had increased to eight

municipalities. Regarding industrial VA, six municipalities lost share relative to the Microregion's industrial VA, while five increased their participation.

The number of industrial workers decreased in the Divinópolis Microregion, while total employment increased, which may indicate deindustrialization based on the industry's share of total employment, according to the classical concept by Rowthorn and Ramaswamy (1999). Moreover, it is noteworthy that only three municipalities—Divinópolis, Itaúna, and Nova Serrana—accounted for nearly 75% of the Microregion's industrial employment during the period.

An analysis of the DRR Index calculated based on industrial VA suggests that, from 2011 to 2015, the Microregion and most of its municipalities experienced a process of relative industrialization. It is important to highlight that, according to the concept defined by Pereira and Cario (2018), evidence of "relative industrialization" does not imply that the analyzed municipalities actually industrialized. Rather, in many cases, the decline in the industry's share—whether in value added or employment—in the study region (municipality) was less pronounced than in the reference region. Between 2016 and 2020, two-thirds of the Microregion's municipalities exhibited relative deindustrialization. On the other hand, four municipalities followed a trajectory of relative industrialization. It is also worth noting that the Microregion's DRR Index relative to Minas Gerais remained stagnant during this period, indicating no relative loss or gain of industry compared to the state. Over the decade from 2011 to 2020, the results suggest a trajectory of relative industrialization in the municipalities and the Divinópolis Microregion as a whole.

The results of the DRR Index calculated based on industrial employment (EP) indicate that, from 2011 to 2015, three-quarters of the Microregion's municipalities experienced relative industrialization, while three municipalities underwent deindustrialization—a pattern similar to that observed for the Microregion relative to Minas Gerais and Brazil. In the period from 2016 to 2020, the situation became less favorable for the Microregion, which showed relative deindustrialization compared to Minas Gerais and Brazil. Over the entire time frame (2011 to 2020), the DRR Index based on industrial employment provided stronger evidence of relative deindustrialization compared to the index based on industrial VA.

Overall, analyzing the industrial VA and employment data for the Divinópolis Microregion from 2011 to 2020 reveals evidence of absolute deindustrialization, given the decline in the share of industrial employment within total employment and the reduction in the industry's share of value added. However, the Microregion increased its share of industrial VA relative to Minas Gerais and Brazil, while the state itself decreased its share relative to the country. Regarding industrial employment shares, the Microregion exhibited a slight increase relative to Minas Gerais and Brazil, mirroring the state's share increase in national employment.

Thus, an analysis of the DRR Index does not indicate a deindustrialization process for the Divinópolis Microregion as a whole relative to Minas Gerais and Brazil between 2011 and 2020, given that each municipality displays its own dynamics and specific characteristics. However, evidence of relative deindustrialization is more pronounced in

the region's most economically relevant municipalities, such as Divinópolis and Nova Serrana, which are major national hubs for the textile, apparel, and footwear industries. These sectors have been more directly affected by international competition, and the Brazilian economic crisis that began after 2015 hindered productive investment, contributing to the slowdown of industrial activity in the Microregion's leading municipalities.

Acknowledgements

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Appendix

Table A1: Industrial Value Added in the Municipalities of the Divinópolis Microregion (MG), 2011–2020

Municipalities	Industrial VA (R$ million) [1] [2]									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Carmo do Cajuru	74	63	67	85	64	59	65	51	72	66
Cláudio	72	73	87	95	82	78	98	112	123	124
Conceição do Pará	115	78	63	93	77	96	91	79	89	111
Divinópolis	897	919	982	973	813	744	764	821	866	889
Igaratinga	11	9	11	15	14	71	83	84	98	140
Itaúna	642	678	687	671	550	541	623	632	716	777
Nova Serrana	477	609	596	619	564	571	651	548	564	428
Perdigão	20	26	28	30	33	32	49	40	55	37
Santo Antônio do Monte	28	48	31	31	26	26	27	27	31	29
São Gonçalo do Pará	41	43	45	45	40	37	50	54	47	31
São Sebastião do Oeste	94	94	117	113	115	62	88	107	82	168
Microregion	2,470	2,640	2,715	2,770	2,379	2,317	2,589	2,555	2,742	2,801
Minas Gerais [3]	115.9	113.5	117.0	109.7	90.4	84.4	88.9	95.3	99.0	101.6
Brazil [3]	1,011.0	1,006.8	1,009.5	991.8	879.3	820.1	829.2	876.2	886.5	908.4

Source: own elaboration based on IBGE data (2023b).
(1) Includes extractive industries, manufacturing, utilities, and construction.
(2) Data deflated using the IPCA (base year 2011).
(3) Figures in billions of Brazilian reais.

Table A2: Employed Personnel in Industry in the Municipalities of the Divinópolis Microregion (MG), 2011–2020

Municipalities	Industrial EP [1]									
	2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Carmo do Cajuru	2,097	2,108	2,273	2,241	1,996	1,734	1,826	1,961	2,033	2,188
Cláudio	4,656	4,438	4,827	4,663	4,035	4,094	4,405	4,622	4,602	5,253
Conceição do Pará	1,089	921	889	1,123	1,049	1,233	1,201	780	1,286	1,275
Divinópolis	17,819	18,274	18,420	17,993	16,861	15,521	14,731	15,198	14,588	14,173
Igaratinga	1,301	1,278	1,377	1,427	1,332	1,282	1,315	1,271	1,497	1,512
Itaúna	10,028	10,542	11,278	10,659	9,660	9,220	10,027	10,608	10,368	11,113
Nova Serrana	17,037	17,852	18,607	18,267	15,992	18,074	17,787	16,890	16,796	13,067
Perdigão	1,178	1,412	1,446	1,395	1,185	1,399	1,553	1,621	1,603	1,292
Santo Antônio do Monte	2,529	3,025	3,046	2,647	2,292	2,070	1,961	1,921	1,782	1,727
São Gonçalo do Pará	1,325	1,468	1,416	1,300	1,197	1,221	1,225	1,351	1,220	1,169
São Sebastião do Oeste	1,639	1,733	2,190	2,297	2,530	2,523	2,736	2,669	2,830	2,978
Microregion	60,698	63,051	65,769	64,012	58,129	58,371	58,767	58,892	58,605	55,747
Minas Gerais [2]	1,253	1,293.2	1,300.0	1,276.2	1,142.0	1,058.5	1,058.1	1,080.2	1,109.9	1,148.3
Brazil [2]	11,508.1	11,663.5	11,891.3	11,694.4	10,677.4	9,784.2	9,581.9	9,610.7	9,652.2	9,842.1

Source: own elaboration based on data from RAIS (2023).

(1) Includes extractive industries, manufacturing, utilities, and construction.

(3) Figures in thousands of persons.