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THE POLITICAL OVERREPRESENTATION OF THE MOST DEVELOPED REGION: AN ELECTORAL GEOGRAPHY ANALYSIS OF MINAS GERAIS

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Abstract: Does the Brazilian electoral system produce equitable outcomes in the context of deep regional inequalities? The goal of this article is to address this question from the perspective of the "one person one vote" principle. While territorial constituencies are fundamental in Single Member Districts (SMDs), they tend to be overlooked in Multimember Districts (MMDs). To test this hypothesis, this study examines the socioeconomic disparities between the officially defined regions in the state of Minas Gerais. By identifying Belo Horizonte and Teófilo Otoni as the intermediate regions with the greatest disparity, a comparison was made of the number of elected representatives between 1998 and 2022. The results reveal the political overrepresentation of Belo Horizonte at the expense of Teófilo Otoni.
Keywords: regional inequalities; overrepresentation; underrepresentation; socioeconomic disparities; electoral systems; proportional representation.

A SOBRERREPRESENTAÇÃO POLÍTICA DA REGIÃO MAIS DESENVOLVIDA: UMA ANÁLISE DA GEOGRAFIA ELEITORAL DE MINAS GERAIS

Resumo: O sistema eleitoral brasileiro gera efeitos equitativos em contexto de profundas desigualdades regionais? O objetivo deste artigo é oferecer resposta a esta questão sob a perspectiva do princípio "uma pessoa um voto". Embora as *constituencies* territoriais sejam fundamentais em sistemas de inúmeros distritos, elas tendem a ser negligenciadas em modelos proporcionais de amplos distritos. Para testar essa hipótese, realizou-se o exame das disparidades socioeconômicas entre as regiões oficialmente definidas para o estado de Minas Gerais. Reconhecendo-se Belo Horizonte e Teófilo Otoni como as regiões intermediárias de maior disparidade, procedeu-se à comparação do número de deputados eleitos entre 1998 e 2022. Verificou-se a sobrerrepresentação política de Belo Horizonte em detrimento de Teófilo Otoni.
Palavras-chave: desigualdades regionais; sobrerrepresentação; sub-representação; disparidades socioeconômicas; sistemas eleitorais; representação proporcional.

LA SOBRERREPRESENTACIÓN POLÍTICA DE LA REGIÓN MÁS DESARROLLADA: UN ANÁLISIS DE LA GEOGRAFÍA ELECTORAL DE MINAS GERAIS

Resumen: ¿El sistema electoral brasileño genera efectos equitativos en un contexto de profundas desigualdades regionales? El objetivo de este artículo es dar una respuesta a esta pregunta, considerando el principio de «una persona, un voto». Aunque las circunscripciones territoriales son fundamentales en los sistemas multidistritales, tienden a ser ignoradas en los modelos proporcionales de los grandes distritos. Para comprobar esta hipótesis, se analizaron las disparidades socioeconómicas entre las regiones oficialmente definidas del estado de Minas Gerais. Reconociendo Belo Horizonte y Teófilo Otoni como las regiones intermedias con mayor disparidad, se comparó el número de diputados elegidos entre 1998 y 2022. Se constató que Belo Horizonte estaba sobrerrepresentada políticamente, en detrimento de Teófilo Otoni.
Palabras-clave: desigualdades regionales; sobrerrepresentación; infrarrepresentación; disparidades socioeconómicas; sistemas electorales; representación proporcional.

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Introduction

This article is structured into four parts: the introduction, which presents the theoretical foundations and the methodology to be applied; the development, divided into two sections – one discussing the regionalization and analyzing the socioeconomic data of the state of Minas Gerais, and the other presenting the spatial distribution of the federal deputies elected by Minas Gerais; and finally, the conclusion, where the results are addressed and pathways are suggested to support future researches on the topic.

In theory, proportional systems, as discussed by Bernard Manin (1997), aim to expand space for the representation of voters' ideological preferences, striving to reflect societal diversity in political institutions. In a similar sense, Nadia Urbinati (2006a, 2006b, 2011) examines the importance of interaction in political processes, offering a critical view on the quality of representation across various electoral systems. Her work highlights the relevance of studying electoral groupings, particularly considering electoral constituency formation (Urbinati, 2011).

Andrew Rehfeld (2005), by analyzing majoritarian systems, argues that constituencies should be sensitive to minority identities instead of only observing territorial connections. In the same sense, other scholars suggest that electoral systems should give voice to historically subjugated communities in advancing their interests (Beitz, 1989; Urbinati, 2006b; Saward, 2010).

Hanna Pitkin (1972), a pioneer in the field of political representation, recognized that the primary objective of an electoral system is to ensure equality through the protection of political liberty. This is achieved by creating a system characterized by equal participation in free and competitive elections, especially in diverse societies. This approach aligns closely with the principles of procedural democracy.

In turn, substantive democracy is concerned with the content and outcomes of political decisions. Within this framework, Saffon and Urbinati (2013, p. 442) caution that applying a substantive standard to democratic decisions may risk undermining the freedom of certain population segments by implying the existence of a "correct" or predetermined outcome. In this sense, while procedural democracy focuses on ensuring equal opportunities for participation, substantive democracy emphasizes whether the outcomes adhere to certain normative standards or truths (Saffon; Urbinati, 2013, p. 442).

From this standpoint, this study is positioned within the realm of procedural democracy, as it explores "how proportional representation systems address regional inequalities?"

To answer this question the principle of "one person one vote" is examined through the lens of spatial division[2]. In the English-language literature, the "one person one vote" principle reflects a concern with district-based representation in the formation of constituencies. The related concepts of "apportionment" and "reapportionment" (Auerbach, 1964; Karlan, 2017; Muller, 2016) involve the division and redistricting of electoral constituencies to ensure that each district elects a number of representatives proportionate to its population. It is thus recognized as a foundational element of U.S. democracy, as affirmed by a landmark Supreme Court decision[3] (Muller, 2016, p. 372). However, this

[2] A concept typically analyzed within the framework of multiple constituencies where a single representative is elected, commonly referred to as Single Member Districts (SMD). This model contrasts with those employed in democracies like Brazil, where multiple representatives are elected per district, a system conventionally known as Multimember Districts (MMD).

[3] In 1964, the U.S. Supreme Court addressed this issue in Reynolds v. Sims, which concerned the apportionment of electoral districts. The ruling reinforced the importance of "one person one vote" as a constitutional requirement for creating legislative districts. Prior to this case, many U.S. states had systems of district distribution that favored rural areas over urban ones, allocating a fixed number of seats based on geography without accounting for population shifts over time. This resulted in

principle is less commonly applied in democracies that employ pure proportional representation without dividing the territory into districts, such as Brazil.

It is important to clarify that this study does not advocate for the adoption of the U.S. model of district-based elections, nor does it call for a shift toward a majoritarian district system. Instead, its primary aim is to develop a critical framework for analyzing political representation through the lens of territoriality. A secondary objective is to challenge the prevailing assumption that globalization and transnational phenomena have diminished the significance of territoriality in current democracies.

While Urbinati and Warren (2008) contend that globalization and the increasing interconnectedness of communication and space have reduced the prominence of territorial constituencies in majoritarian systems, they do not argue for the complete replacement of such constituencies. Moreover, they did not explore the absence of territorial representation in proportional systems, leaving this vital aspect underexamined.

Proportional systems, by design, are rooted in the principle of diversity, and as such, they can and should incorporate territorial dimensions to ensure the inclusion of communities tied to territories. This enhances representational diversity, particularly for vulnerable and oppressed groups. Local territorialities often align with the realities of marginalized communities, indicating that Brazil's political system may require a theoretical adjustment to address these disparities. Therefore, territorial approach remains a relevant and increasingly debated concept in regions marked by deep inequalities, such as Brazil and the state of Minas Gerais.

Milton Santos (2001, 2004, 2006) emphasizes the spatial dimension of Brazilian social formation in the context of technical, scientific, and informational aspects. He describes a transition from a natural environment to a technical-scientific-informational environment driven by globalization. Santos' Critical Geography highlights a dialectical relationship between global and local forces, fostering technical and organizational homogenization. This distinction is fundamental to understanding Brazilian socio-spatial formations (Brito et al., 2019).

Similarly, Haesbaert (2005) argues that territory is not a neutral space but a locus of power struggles, whether through land control or the imposition of norms. He (Haesbaert, 2011, p. 365) rejects the notion that globalization and fluidity have made deterritorialization the central dilemma of the 21st century. Instead, he argues that the real challenge lies in the "inequality between the multiple speeds, rhythms, and levels of de-re-territorialization" (Haesbaert, 2011, p. 365, own translation). This inequality distinctly separates a "minority that fully accesses and benefits from the global capitalist network territories, ensuring their multiterritoriality" (Haesbaert, 2011, p. 372, own translation) from the vast majority, who lack resources and experience "the most precarious territorialization or, in more incisive terms, the most violent socio-spatial exclusion and/or reclusion" (Haesbaert, 2011, p. 372, own translation). Haesbaert (2011) also warns of the exclusion of territories and communities that have not yet fully integrated into transnational networks. These groups, often in less developed regions, remain attached to their territories and lack the same level of technological and communicative connectivity.

significant disparities in voting power between rural and urban voters, disproportionately favoring rural areas. The Reynolds case, initiated by Alabama citizens, challenged this system under the Equal Protection Clause of the 14th Amendment. Chief Justice Earl Warren, leading the majority opinion, concluded that the equal weight of each vote must be reflected in the formation of electoral districts, ensuring that populations are as equal as possible across districts (United States, 1964). This decision established that substantial disparities in district population sizes, leading to unequal representation, are unconstitutional, and further solidified the "one person one vote" principle as a key element of U.S. electoral law.

For these reasons, Brazil – and specifically the state of Minas Gerais[4], which serves as the case study – provides an ideal context for examining the concentration of political representation. As Nicolau (2004) points out, Brazil is the largest democracy to employ pure proportional representation at all federal levels. Minas Gerais, with its significant regional inequalities, juxtaposes traditional territorial attachments with fluid, transnational realities.

Additionally, the temporal scope of this study is defined by the availability of data from Brazil's Superior Electoral Court (TSE, 2024), covering elections from 1998 to 2022. This period begins with the adoption of electronic voting systems and includes subsequent updates to auditing processes (TSE, 2023). The analysis aims to assess, objectively, whether Brazil's proportional multimember district system (MMD), with a focus on Minas Gerais, tends to favor the overrepresentation of the most developed area to the detriment of the least developed region. This will be analyzed using Brazil's official Intermediate Geographic Regions (RGINT) as the spatial framework for the study.

Regional Inequalities in Minas Gerais and The Profound Socioeconomic disparities between Belo Horizonte and Teófilo Otoni

To offer a more nuanced exploration of the issues surrounding the distribution of political representation within the context of Minas Gerais, this study leverages the sub-state regional divisions established by the Brazilian Institute of Geography and Statistics (IBGE, 2017).

This Institute updated the official framework of Brazilian regionalism (IBGE, 2017, p. 9) to reflect changes not only in the productive and social space but also in the political-administrative sphere. The previous division dated back to the 1980s and did not capture the transformations that occurred over the course of three decades (IBGE, 2017, p. 19). During that time, IBGE (2017, p. 9) observed that the processes of change had amplified differences and inequalities. Since the prior regional division, there has been an intensification of the processes of "occupation and expansion of productive spaces" (IBGE, 2017, p. 9, own translation), as well as the creation of new municipalities following the promulgation of the Constitution (Brasil, 1988).

Due to this "greater heterogeneity", IBGE focused on the urgent need to revise sub-state units, previously known as mesoregions and microregions, which, after new study and reformulation (IBGE, 2017), are now recognized as Intermediate Geographic Regions and Immediate Geographic Regions, respectively. The Immediate Geographic Regions are primarily based on the "urban network", structured around urban centers, allowing the population to meet their immediate needs, such as "purchasing durable and non-durable goods, seeking employment, accessing healthcare and education services, and receiving public services" (IBGE, 2017, p. 20, own translation).

In turn, the Intermediate Geographic Regions are defined as "an intermediate scale between the Federal Units and the Immediate Geographic Regions" (IBGE, 2017, p. 20, own translation). The definition of Intermediate Geographic Regions involves the inclusion of Metropolises or Regional Capitals, based on the hierarchy of urban centers from the study on the Regions of Influence of Cities (IBGE, 2008, 2020), in which the influence of cities follows a descending order: Metropolises (subdivided into: National Metropolis, Large National Metropolis, and Metropolis); Regional Capitals

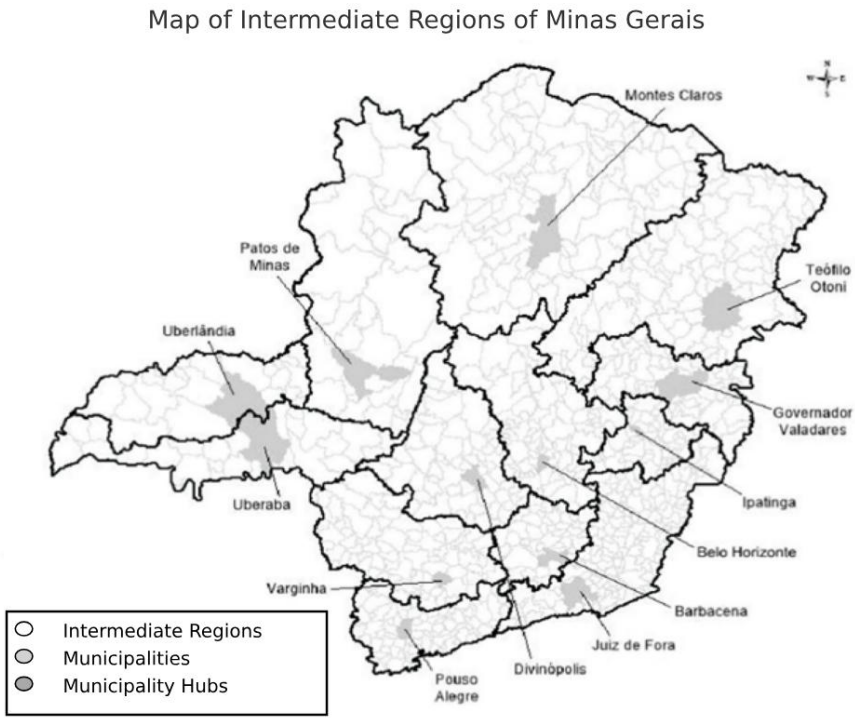
[4] Brazil, much like the state of Minas Gerais, exhibits a high degree of regional inequalities and diversity. Minas Gerais borders states from the Midwest and Northeast and is situated in the most populous region of the country, the Southeast. It is also the second-largest electoral district, trailing only São Paulo, and holds a substantial number of seats in both the Legislative Assembly (77) and the Federal Chamber of Deputies (53). This composition allows for an evaluation of the proportionality in the regional distribution of deputies across the state.

(levels A, B, and C); Sub-Regional Centers (levels A and B); Zone Centers (levels A and B); and Local Centers (IBGE, 2008, p. 11-12, 2020, p. 11).

The choice to focus on intermediate geographic regions rather than immediate ones stems from their preference in studies conducted by research institutions, such as the João Pinheiro Foundation (FJP, 2023a), affiliated with the State Secretariat of Planning and Management of Minas Gerais. Additionally, the intermediate level offers greater complexity compared to the immediate level, which justifies a broader debate on the political representation of constituencies that surpasses municipal boundaries and involves a population and electorate size that could potentially elect members to Parliament or the Legislative Assembly.

From this standpoint, the regional classification adopted since 2017 organizes the state into 13 territories based on a central city, as follows: Belo Horizonte; Montes Claros; Teófilo Otoni; Governador Valadares; Ipatinga; Juiz de Fora; Barbacena; Varginha; Pouso Alegre; Uberaba; Uberlândia; Patos de Minas; and Divinópolis (IBGE, 2017). The map below (Figure1) illustrates this regionalization:

Figure 1 - Map of the Thirteen Intermediate Regions (RGINT) of Minas Gerais



Source: João Pinheiro Foundation (FJP, 2019)

It is also important to note that, although the nomenclature for Intermediate Geographical Regions (RGINT) was only introduced in 2017, this research employs a retrospective selection of municipalities[5] within each RGINT, rather than applying two distinct grouping standards – one valid prior to 2017 and another implemented thereafter. The exclusive use of RGINT as the regional division is intended to harmonize the areas analyzed within a single framework across the entire temporal period considered. Besides, as demonstrated in this section, the methodological updates of this new

[5] This approach is consistent with the methodology adopted by the João Pinheiro Foundation, which employs RGINT in retrospective analyses, as demonstrated by the figures and maps produced by the institution and presented in this study.

regionalization stem from observations that were, in the first instance, applied in practice and consolidated by History, before being formally recognized by IBGE in the configuration of RGINT.

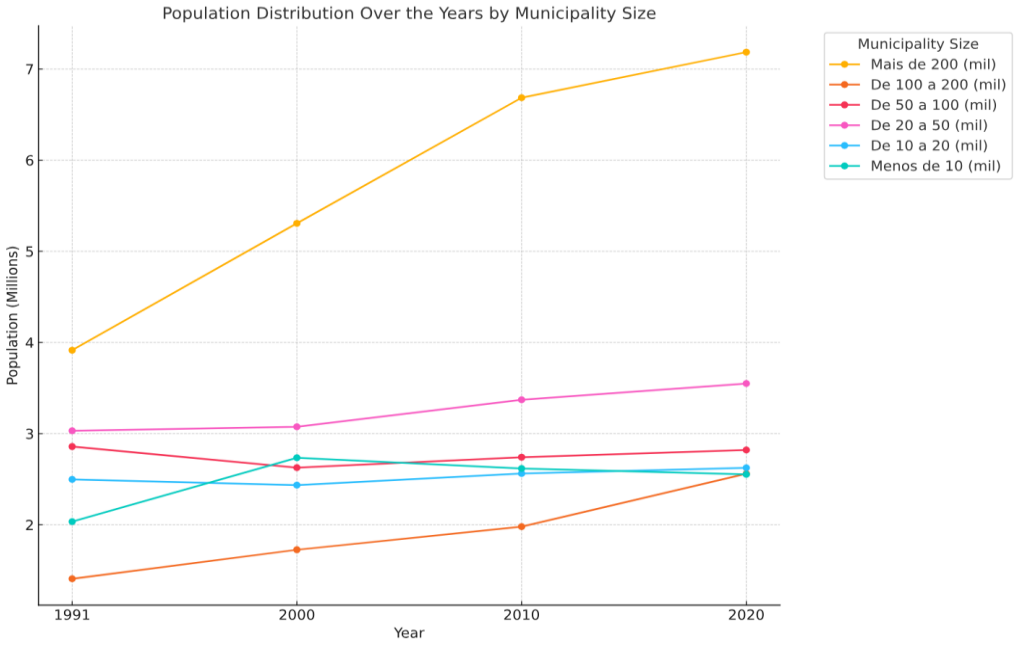
The contradictions within the state of Minas Gerais, which mark its intermediate regions, are evident both in historical records and contemporary indicators of economic activity and wealth production. The state presents a wide range of challenges, from rural agricultural primariness to complex issues arising from the formation of large cities and their peripheries. While the state boasts a highly developed economy, with modern agriculture and a diversified industrial base, it also exhibits significant socioeconomic disparities between its regions.

In analyzing developmental disparities, the study confronts socioeconomic data with distinct and unsynchronized publication intervals. Notably, the regionalization established in 2017 followed nearly 30 years of validity for the previous division into mesoregions and microregions, which in turn updated the regional frameworks established in the 1960s and 1970s (IBGE, 1990). Demographic censuses, another set of long-term data, are conducted by IBGE every 10 years. However, the 2020 census was delayed by two years due to budgetary constraints and the pandemic, with the first results only published in 2023. Furthermore, the national aggregated data is typically released with shorter intervals than the specific data for individual municipalities and regions, which often requires more time due to its greater detail.

From this perspective, recognizing that historical and infrastructural issues, as well as urban mobility dynamics, tend not to change significantly in a few years, the data grouped in this section do not follow a uniform timeline. Instead, they aim to provide a multidimensional portrait of regional inequalities, without adherence to a single set of indicators.

In analyzing the distribution of the state's total population, data from the João Pinheiro Foundation (Figure2) reveal that, over the past three decades (2000, 2010, and 2020), the number of municipalities in Minas Gerais with populations between 10,000 and 200,000 inhabitants has increased. Meanwhile, the number of municipalities with populations below 10,000 has significantly decreased, and the group of municipalities with over 200,000 inhabitants has remained stagnant since the 2010s.

Figure 2 - Distribution of Municipalities, according to population size



Source: João Pinheiro Foundation, 2023. Source: Basic data: FJP, 2023a; IBGE, 2022.

Regarding the share of the state's total population, it becomes evident that only municipalities with populations exceeding 100,000 have increased their proportion. This trend can be attributed to two primary factors: (1) smaller municipalities, with populations below 100,000, experienced growth that transitioned them into higher population brackets, and (2) cities with populations over 100,000 attracted significant inflows of new residents, further solidifying their dominance in the state's demographic distribution.

The participation of cities with fewer than 10,000 inhabitants (represented by the green line) experienced a marked decline in their contribution to the state's overall population. This reduction, as previously noted, can be attributed to several factors, including the declining number of such cities. Between the 2000s and 2020, the number of municipalities in this category decreased from 514 to 474. This was the only group of municipalities to register a decline during the period under analysis.

Conversely, cities with larger populations demonstrated notable increases in their proportional share of the state's population. The yellow line, representing municipalities with more than 200,000 inhabitants, and the orange line, representing municipalities with populations between 100,000 and 200,000 inhabitants, exhibited the most significant growth. However, while the yellow line shows a deceleration in recent years, the orange line maintains a consistent upward trajectory, highlighting sustained growth in medium-sized municipalities.

These numbers point to the population’s gravitation toward larger cities, likely driven by a search for better living conditions. Larger urban centers, despite social inequality, generally offer greater potential for the development of essential services such as healthcare, education, communications, and transportation infrastructure. However, the 2022 IBGE Census shows a shift from historical patterns, with cities boasting more than 500,000 inhabitants starting to lose population to cities in the 100,000 to 500,000 range (Jorge, 2023). Belo Horizonte, for instance, saw its population decrease by 2.5% between 2010 and 2022 (IBGE, 2023).

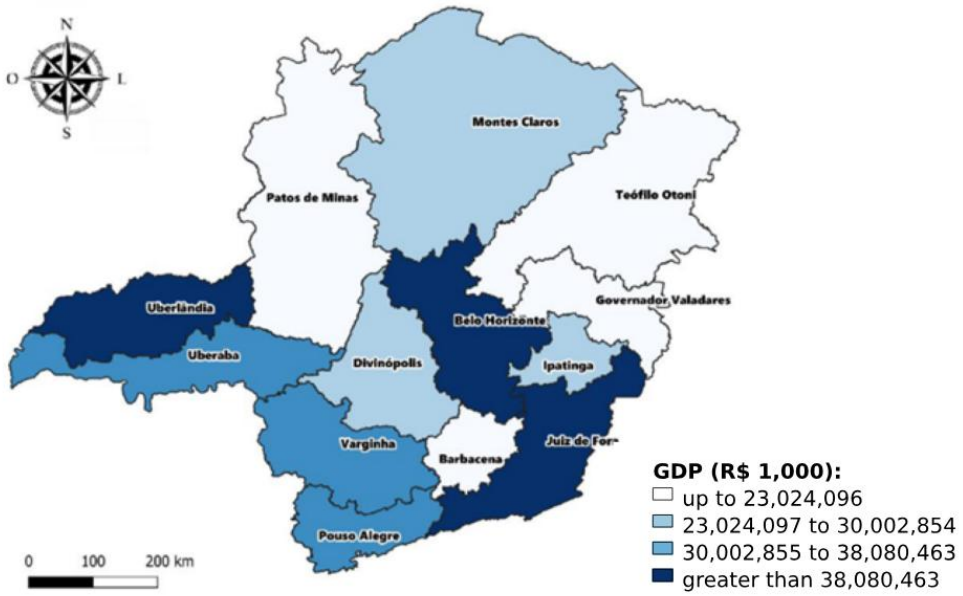
Even though the concentration of cities in the South-Central regions reflects not only proximity but also population density, corresponding to historically denser infrastructure. These populations are interconnected by transportation networks, leaving fewer sparsely covered areas compared to the northern regions. In contrast, the city of Barbacena shows the smallest population among the central cities of a RGINT (Intermediate Geographical Region) in the state. In the most recent census (IBGE, 2023), Barbacena recorded a population of 125,317 inhabitants, followed by Varginha with 136,467 inhabitants.

Next is the principal city of the Teófilo Otoni RGINT, which stands out negatively in this respect: according to IBGE panorama (2023), Teófilo Otoni has experienced stagnating population growth for decades. This stability is unmatched by any other municipality with a population between 100,000 and 200,000 inhabitants (IBGE, 2023) in the state. Teófilo Otoni had a population of 133,017 in 1970 and reached 137,418 in the 2022 Census (IBGE, 2023).

In summary, and as evidenced by the selected demographic data, since 1991, Belo Horizonte and Teófilo Otoni have experienced contrasting patterns in migrant attraction. While Belo Horizonte has significantly expanded its population, Teófilo Otoni has maintained a stable number of residents.

With respect to economic activity, the total economic output, as calculated by the João Pinheiro Foundation in 2016 reveals the following GDP figures across the state:

Figure 3 - Distribution of Intermediate Geographic Regions according to Gross Domestic Product values – Minas Gerais – 2016



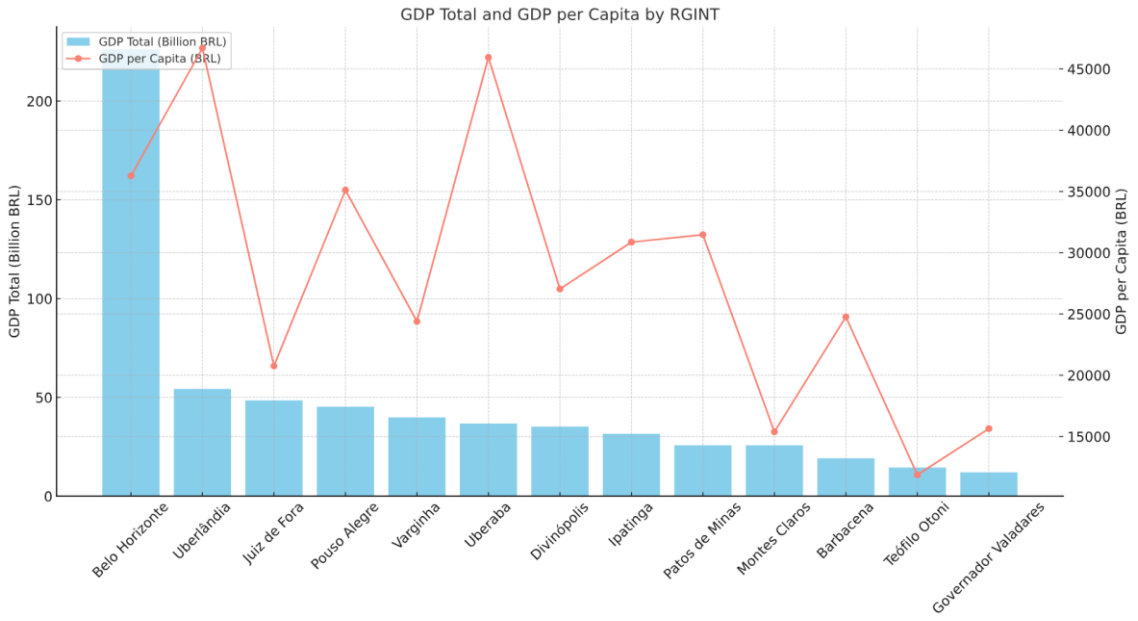
Source: João Pinheiro Foundation; Brazilian Institute of Geography and Statistics, 2020.

Considering the lighter shades (Figure3), Patos de Minas, Teófilo Otoni, Governador Valadares, and Barbacena are the regions that reported the lowest GDP figures. In contrast, Belo Horizonte, Uberlândia, and Juiz de For a showed the highest figures.

By 2018, aggregated data reveal that Patos de Minas had surpassed Montes Claros in economic performance. Belo Horizonte remained significantly ahead of the second-ranked region in terms of wealth generation (Figure4), solidifying its position as the leading contributor to the state's overall GDP. In contrast, Governador Valadares and Teófilo Otoni occupied the bottom two positions in this ranking.

Given that GDP data do not account for population size, per capita GDP (Figure4) offers a more nuanced perspective on economic development, better reflecting the diverse realities across the state. A regional analysis of the 2018 data ranks GDP and per capita GDP in the following order:

Figure 4 - Data on GDP and GDP per capita for Minas Gerais RGINT

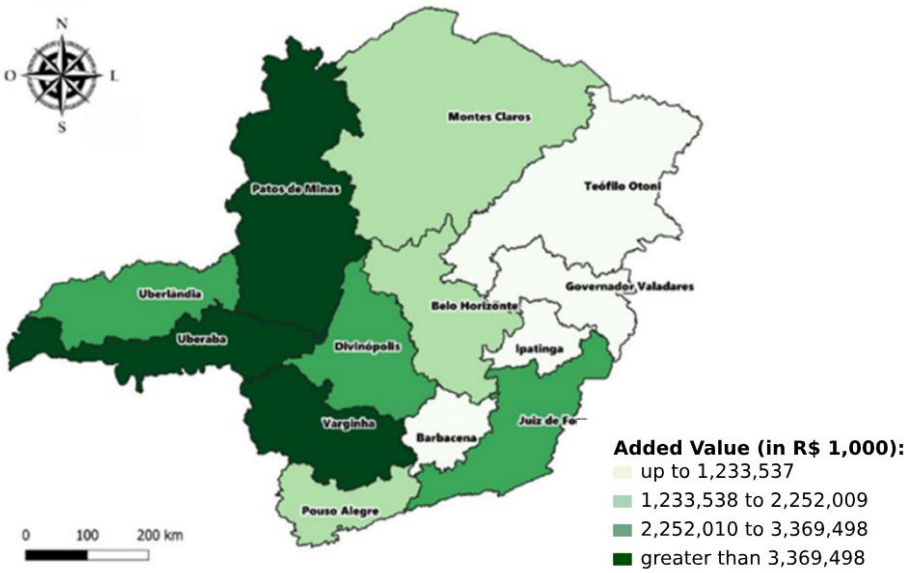


Source: Prepared by the author based on IBGE data, 2018 (GDP); data from the FJP, 2023b (GDP per capita).

While Belo Horizonte continues to rank among the regions with the highest per capita GDP, Teófilo Otoni remains at the bottom (Figure 4).

From the perspective of productive sectors, the following maps (Figure5 and Figure6) depict the RGINT with the highest agricultural and industrial productivity, measured by added value.

Figure 5 - Distribution of Intermediate Geographic Regions according to added value of agriculture – Minas Gerais – 2016

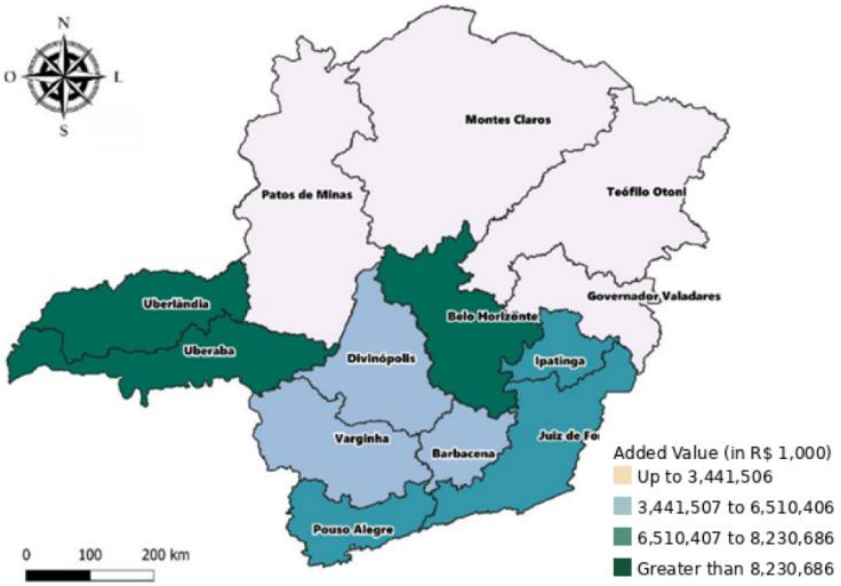


Source: João Pinheiro Foundation; Brazilian Institute of Geography and Statistics, 2020.

The data on added value in agricultural production highlights the greater complexity of agribusiness value chains in regions represented by darker shades on the map. Despite being in the northwestern and western part of the state, Patos de Minas shows strong results in terms of value-added capacity in agricultural production. The local economy is heavily oriented toward rural production, adding more value to agricultural products than Teófilo Otoni, Governador Valadares, Ipatinga and Barbacena. Alongside Varginha and Uberaba, it leads the state in value-added levels in agricultural production. Juiz de Fora, Divinópolis, and Uberlândia also exhibit high levels of agribusiness complexity, forming the second most developed group in this criterion.

The subsequent map illustrates the levels of added value in the industrial sector:

Figure 6 - Map of the distribution of the Intermediate Geographic Regions according to added value of the industry – Minas Gerais – 2016



Source: João Pinheiro Foundation; Brazilian Institute of Geography and Statistics, 2020.

Figure 6 highlights the contrast between regions historically tied to agricultural production, which have struggled to develop industrial solutions, and those that have successfully industrialized. The darker shades correspond to RGINT that generate high levels of added value in industrial production. These regions are primarily located in areas known as the “Triângulo Mineiro” in the western part of the state, encompassing the RGINT of Uberaba and Uberlândia, as well as the central region surrounding Belo Horizonte. The Metropolitan Region of Belo Horizonte remains the state’s industrial hub, concentrating the highest levels of production.

It is worth noting that while Patos de Minas demonstrates strong results in agriculture, its lack of industrial complexity indicates that the region still faces challenges in its production profile

compared to relatively more developed areas of the state, such as Uberlândia, Uberaba, and Belo Horizonte.

As a partial result, indeed, comparing regions and establishing a development ranking is an inherently complex task, often subject to imprecise conclusions due to the subjective nature of evaluating development levels and the wide range of factors that must be considered. As discussed by Santos and Silveira (2001), disparities in regional development can be understood through various lenses, such as productive capacity, mobility networks, economic activity, and quality of life, viewed both from contemporary and historical perspectives. They introduce the concept of density, which refers to the concentration of these attributes. Conversely, regions with a lower intensity of these characteristics are described as zones of rarefaction.

In this context, Belo Horizonte stands out as the most developed region. Nevertheless, this analysis does not delve into the internal divisions and disparities within the metropolis and peripherical areas, where significant challenges demand urgent attention. Socioeconomic conflicts persist as a notable issue across this RGINT. While these internal geographical disparities were not the primary focus of this study, the findings presented here may provide a foundation for further reflection on these pressing matters.

At the opposite end of the development spectrum lies the Teófilo Otoni RGINT, which consistently faces the most severe developmental challenges and social issues among all the regions analyzed.

Proportional Representation in The Context of profound Regional Inequalities Between Belo Horizonte and Teófilo Otoni

To analyze the proportionality of representatives by region in the state of Minas Gerais, the total number of elected officials from each region over the period from 1998 to 2022 were calculated focusing on state and federal legislative positions: state deputies and federal deputies.

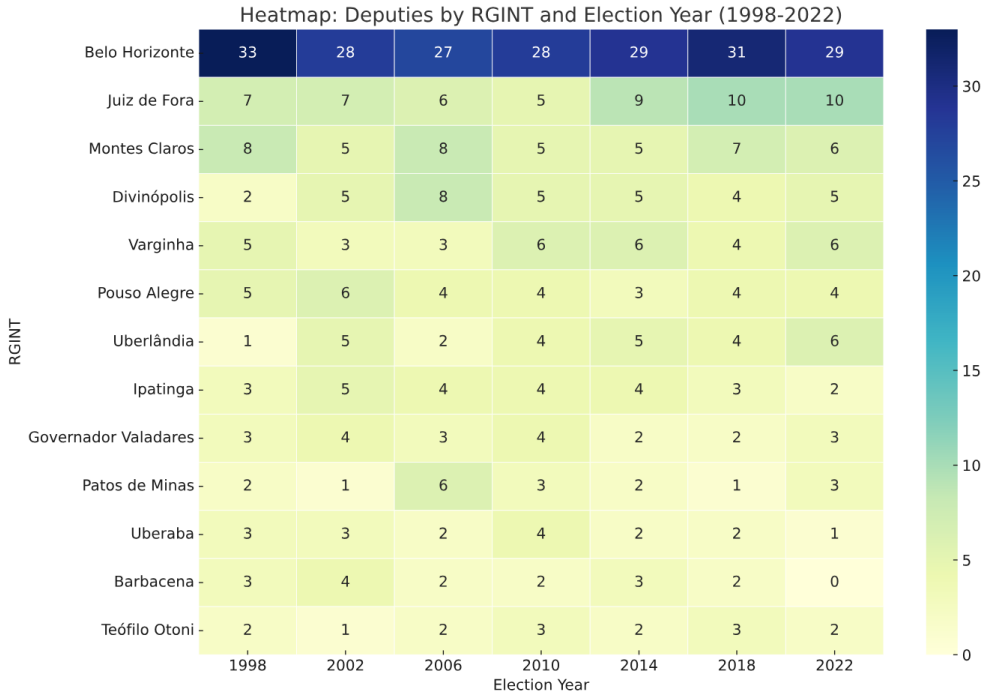
The concept of an electoral base[6] was employed to determine the distribution of elected representatives by region. It refers to the municipality where each deputy (state or federal) secured the highest number of votes. While related, this understanding differs from the definitions provided by Carvalho (2009, p. 374–375) and Farhat (1996, p. 71–72), who define the electoral base as the district in which a candidate received more than half of the votes necessary for election. Specifically, Carvalho (2009, p. 374–375) identifies the electoral base as the location where the candidate secured over 50% of their total votes. In contrast, this study defines the electoral base as the municipality where the candidate obtained the largest share of votes, as this area is likely where the candidate established the strongest implicit connection with voters. Following this identification, the representative is associated with the intermediate region corresponding to their electoral base.

From this perspective, it was accounted the electoral base of each elected for the Chamber of Deputies and the Legislative Assembly of Minas Gerais during the period considered (1998, 2002, 2006, 2010, 2014, 2018, and 2022), encompassing a total of seven elections for each of the offices considered.

The heatmap below illustrates the number of state deputies elected from each Intermediate Geographic Region (RGINT) between 1998 and 2022:

[6] The electoral domicile information was not considered since it does not adequately capture the territorial connection between representatives and voters, and it also raises issues related to personal data that are not accessible through the TSE platform (2023). The concept of electoral base is further explored and explained by Borges (2023).

Figure 7 - Distribution of state deputies from 1998 to 2022

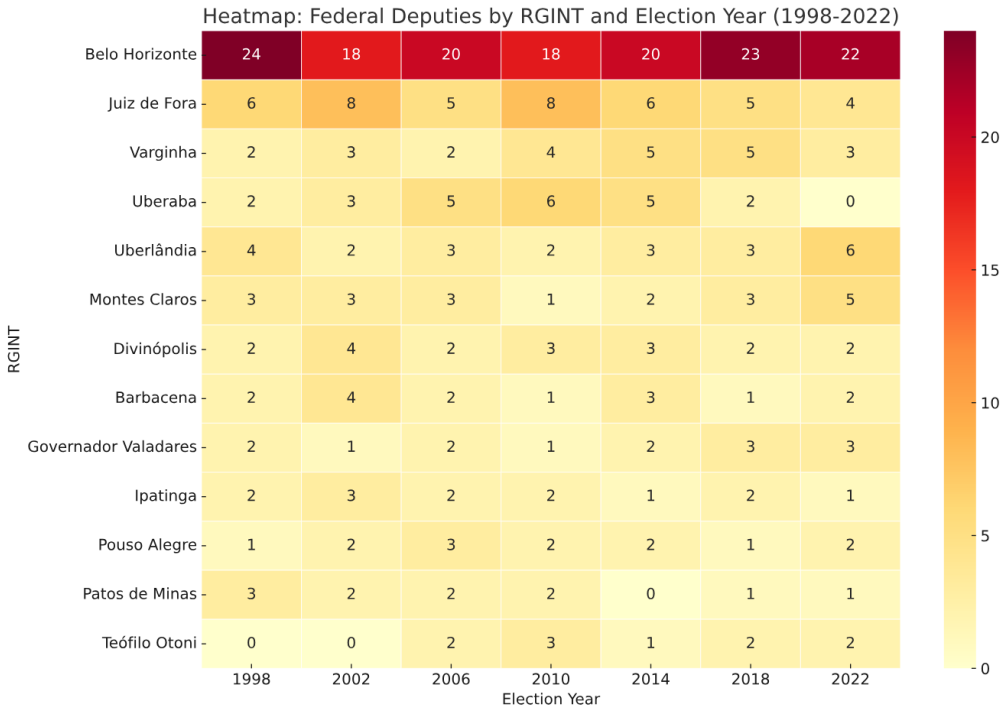


Source: Prepared by the author based on data from the Superior Electoral Court, 2023.

Regarding the total number of state deputies elected (Figure7), the RGINT of Teófilo Otoni (15) and Barbacena (16) recorded the lowest numbers over the analyzed period. Conversely, Belo Horizonte (205) and Juiz de Fora (54) exhibited the highest numbers.

The subsequent heatmap displays the corresponding data for federal deputy elections:

Figure 8 - Distribution of federal deputies from 1998 to 2022



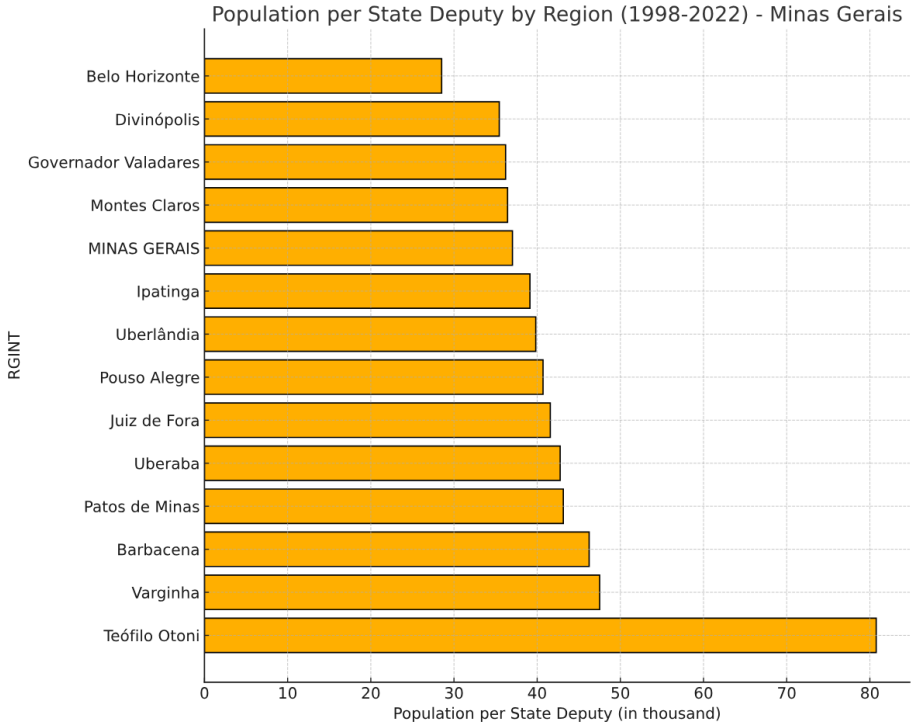
Source: Prepared by the author based on data from the Superior Electoral Court, 2023.

In absolute terms (Figure8), RGINT of Teófilo Otoni (10) and Patos de Minas (11) recorded the fewest federal deputies elected, while Belo Horizonte (145) and Juiz de Fora (42) registered the highest numbers.

These results must be considered through the lens of the "one person one vote" principle, which posits that the percentage of representation should be proportional to the population size of each RGINT. Belo Horizonte is the most populous RGINT, and Juiz de Fora ranks second in population. It would be expected that these two RGINT would elect a larger number of representatives, without necessarily indicating disproportionality. However, determining proportionality or disproportionality based on the "one person one vote" principle requires an assessment of the population-to-representative ratio.

The comparison with population size is as follows:

Figure 9 - Representation of State Deputies in Relation to Population (2010 Demographic Data)



Source: Prepared by the author based on data from the Superior Electoral Court, 2023; IBGE, 2023; FJP, 2023a.

Three RGINT with similar populations in 2010 and 2020 – Divinópolis, Pouso Alegre, and Teófilo Otoni – exhibited markedly unequal outcomes in terms of the number of state deputies elected during this period. While Divinópolis (34) and Pouso Alegre (30) reported similar numbers of elected state deputies, Teófilo Otoni (15) recorded the worst performance among all RGINT. Despite being the sixth largest region by population in 2010 and the seventh in 2020, it ranked last in the number of elected representatives per capita.

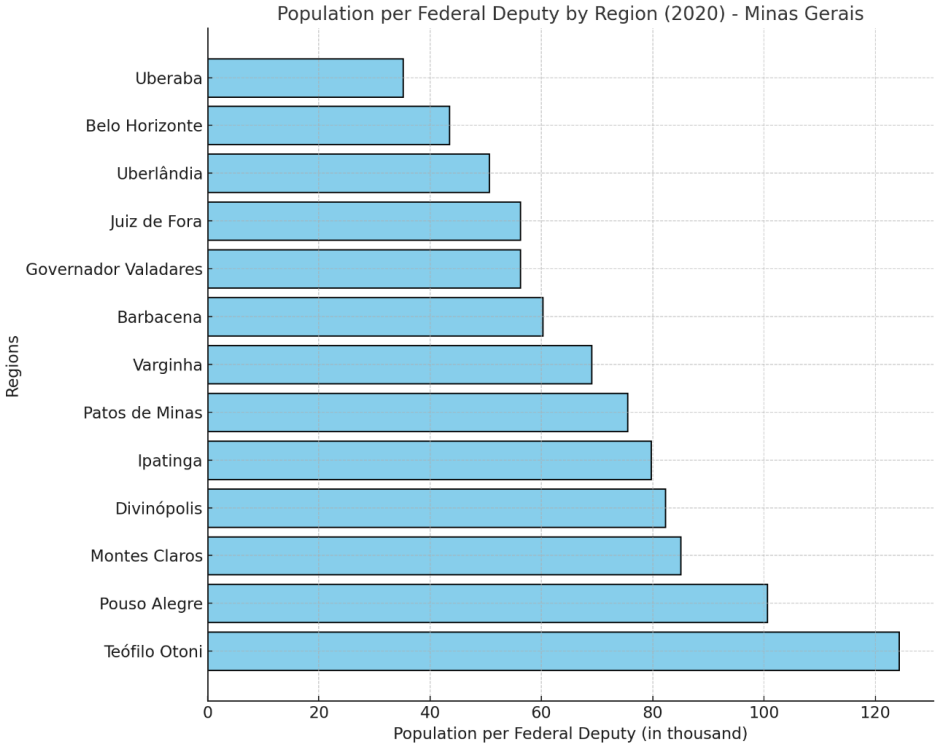
The distribution of inhabitants[7] per deputy is as follows, in ascending order: Belo Horizonte, with 28,516 inhabitants per deputy; Divinópolis, 35,444; Governador Valadares, 36,204; Montes Claros, 36,440; Ipatinga, 39,132; Uberlândia, 39,833; Pouso Alegre, 40,706; Juiz de Fora, 41,575; Uberaba, 42,764; Patos de Minas, 43,144; Barbacena, 46,250; Varginha, 47,512; and Teófilo Otoni, with a notably high 80,760 inhabitants per deputy.

The state average is 37,028 residents per state representative. This figure starkly contrasts with the numbers for Belo Horizonte, which benefits from the disproportionality in representation, and Teófilo Otoni, which is disadvantaged by this imbalance. The disparity reaches its peak at a factor of 2.82, representing the ratio between the population each state deputy represents in Teófilo Otoni and the population each deputy represents in Belo Horizonte. In other words, the democratic value of one person in Teófilo Otoni is only 35.46% of the democratic value of one person in Belo Horizonte considering all those dates of elections and highlighting the considerable disparity under the "one person one vote" principle.

Similarly to the distribution of representatives, Teófilo Otoni consistently ranks at the bottom in the maps, tables, and graphs analyzed in Section 2, particularly in relation to economic activity, production, and migrant attraction.

The analysis of federal deputies presents a not so different scenario:

Figure 10 - Federal deputies and population



Source: Prepared by the author based on data from the Superior Electoral Court, 2023; IBGE, 2023; FJP, 2023a.

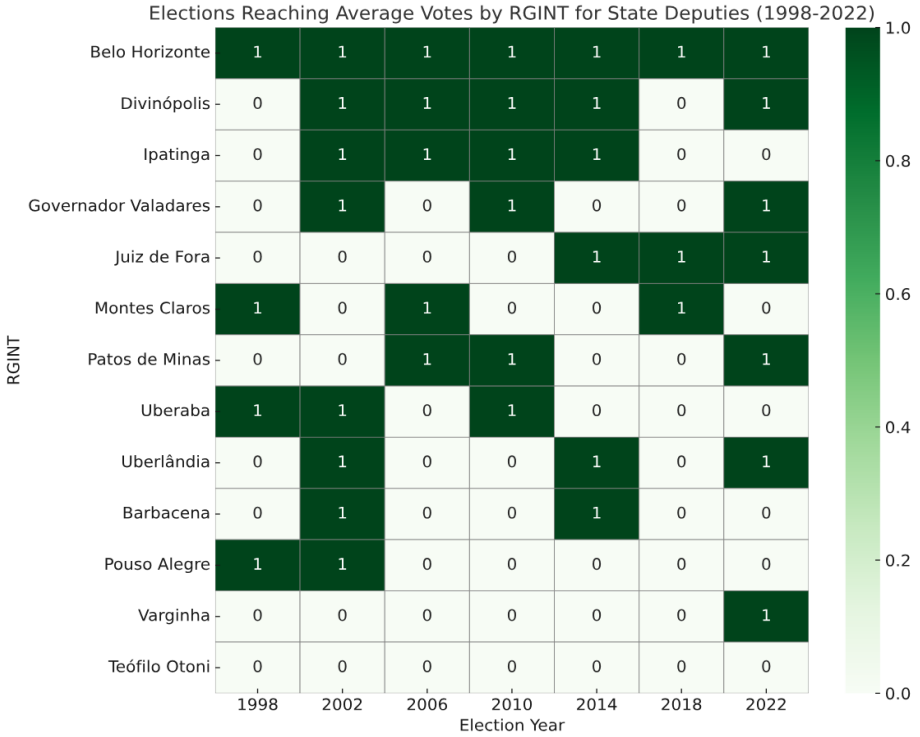
[7] Since the 2020 population is based on projection and estimation, for the calculations of state deputies per inhabitant, the 2010 populations were considered. The number of inhabitants per deputy corresponds to a value calculated specifically for this study. It was obtained by dividing the population of a single year (2010) by the total number of representatives summed across all years analyzed (1998 to 2022).

In relation to the 2010[8] population, the approximate distribution of inhabitants per federal deputy (Figure10) was as follows: Uberaba, 31,608 inhabitants per deputy; Belo Horizonte, 40,315; Uberlândia, 46,760; Juiz de Fora, 53,454; Governador Valadares, 54,307; Barbacena, 56,923; Varginha, 65,329; Patos de Minas, 70,600; Ipatinga, 75,253; Divinópolis, 75,318; Montes Claros, 80,170; Pouso Alegre, 93,938; and Teófilo Otoni, with the notably higher figure of 121,140 inhabitants per deputy.

The distribution of seats for federal deputies is even more disproportionate than that for state deputies. For the seats in the Chamber of Deputies, the disparity reaches a maximum factor of 3.83, representing the ratio between the population each federal deputy represents in Teófilo Otoni compared to Uberaba. The ratio between Teófilo Otoni and Belo Horizonte also remained significant, at a level three times higher. Consequently, the democratic value of a person in Teófilo Otoni equates to just 33% of the democratic value of a person in Belo Horizonte, highlighting once again the considerable disparity under the "one person one vote" principle.

Moving forward with the data analysis, the results for each RGINT, presented below for both state and federal deputies, include an indicator of whether the region achieved the state average (yes "1"; or no "0") in each election[9]. The state average represents the percentage that would be reached if all seats were distributed proportionally to the number of voters in each RGINT, approaching the ideal of "one person one vote" from the perspective of territorial constituencies.

Figure 11 - Elections in which each RGINT reached the average percentage of votes in the state



Legend: 1 (yes); 0 (no).

Source: Prepared by the author based on data from the Superior Electoral Court, 2023.

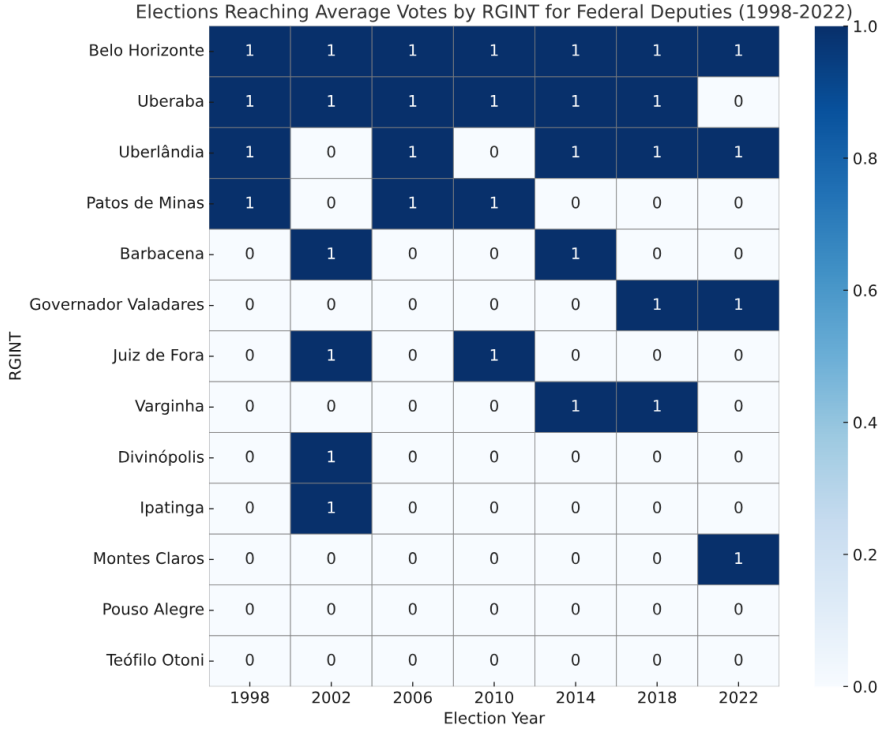
[8] Since the 2020 RGINT population is based on projection and estimation, for the calculations of federal deputies per inhabitant, the 2010 populations were considered. The number of inhabitants per deputy corresponds to a value calculated specifically for this study. It was obtained by dividing the population of a single year (2010) by the total number of representatives summed across all years analyzed (1998 to 2022).

[9] For this analysis, the number of voters per electoral cycle, as reported by the TSE (2023), was considered. Voter data is available for each election year, whereas population data lacks the same periodicity, given that censuses in Brazil are conducted every ten years.

Regarding the episodes where the percentage of state deputies matched the state average (Figure11), RGINT are ranked as follows: Belo Horizonte (7); Divinópolis (5); Ipatinga (4); Uberaba (3); Uberlândia (3); Patos de Minas (3); Juiz de Fora (3); Governador Valadares (3); Montes Claros (3); Barbacena (2); Pouso Alegre (2); Varginha (1); and Teófilo Otoni (0). In summary, positioned at opposite ends of the spectrum are Belo Horizonte, consistently exceeding the average in every election, and Teófilo Otoni, which failed to meet the average in any electoral year.

Similarly, the table below examines the results for federal deputies:

Figure 12 - Elections in which each RGINT reached the average percentage of votes in the state



Legend: 1 (yes); 0 (no).

Source: Prepared by the author based on data from the Superior Electoral Court, 2023.

An analysis of the data (Figure 12) reveals the following descending order of RGINTs based on the frequency with which they achieved a proportional number of federal deputies relative to their electoral size: Belo Horizonte (7), Uberaba (6), Uberlândia (5), Patos de Minas (3), Juiz de Fora (3), Governador Valadares (2), Montes Claros (2), Barbacena (2), Varginha (2), Divinópolis (1), Ipatinga (1), Pouso Alegre (0), and Teófilo Otoni (0). Once again, Belo Horizonte stands out for consistently exceeding the average in every election, whereas Teófilo Otoni failed to meet this standard in any electoral year.

Conclusions

Considering the critical model employed and the method of counting representatives grounded in the concept of electoral base, it becomes evident that the principle of proportional representation in the large district of Minas Gerais has failed to achieve the outcomes “one person one vote” framework particularly applied to a territorial context.

Despite proportional representation prerogative to ensure a fair distribution of seats across social strata, identity groups, and diffuse minority interests, in practice, it has shown signs of being consolidated into a regressive system through the lenses considered in this article. In Minas Gerais context, constitutional electoral rules have contributed to reinforce regional inequalities.

Socioeconomic, historical, cultural, and even political inequalities provided the foundation for explaining the concentration of elected representatives in relatively more developed, structured, connected, and dense regions. Conversely, less populated areas with lower socioeconomic and technical-informational development appear to have been disadvantaged by the multimember district (MMD).

The analysis of proportionality in the number of elected representatives across Minas Gerais highlights the overrepresentation of the most developed region, Belo Horizonte, which has consolidated as developed hub with dynamic production networks and strong flows of people and communication to the detriment of the least developed region, Teófilo Otoni. The most evident finding is that the greater the inequality, the more pronounced the representative distortion. Teófilo Otoni is the only RGINT that, at no point, exceeded the minimum number of representatives proportional to its population or electorate. In contrast, Belo Horizonte consistently had more representatives than would be expected given its population and electorate.

As an effective contribution, this article can give fundamentals to new studies focusing on regional inequalities and/or on electoral systems. It can be considered to promote electoral rules in new democracies or to give basis to electoral reform.

Understanding diversity in democracy requires addressing a wide range of social groups and demands with fairness, balancing legitimacy with equality. A democratic system must be capable of reflecting both the flexibility and fluidity of voters who may enjoy transnational environments, as well as the constancy and historical continuity required by those who need enduring support and reparative justice.

The argument that “one person one vote” principle is inadequate for contemporary societies does not hold upon deeper examination. By demonstrating that territorial fluidity disproportionately impacts populations, exacerbating existing socioeconomic disparities, this study strengthens the case for reinforcing a territorial dimension in political representation.

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