

RETHINKING COMPETITIVENESS RANKINGS: GENDER GAPS IN THE ECONOMIC PERFORMANCE OF BRAZILIAN MUNICIPALITIES

REPENSANDO RANKINGS DE COMPETITIVIDADE: DIFERENCIAIS DE GÊNERO NO DESEMPENHO ECONÔMICO DOS MUNICÍPIOS BRASILEIROS

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Abstract: Gender disparities persist in the economy and the labor market. The non-neutrality of public policies becomes evident when gender inequalities are overlooked, penalizing women in various aspects. Public policies are usually based on data, and if these data do not consider gender bias, public policies may penalize women. The inclusion of gender perspectives in competitiveness assessments is imperative for promoting fairness and justice. Our analysis reveals significant disparities in economic performance between original and gender-adjusted rankings, emphasizing the need for nuanced considerations in conventional assessments. Understanding these nuances is essential for informed policymaking, resource allocation, and sustainable development efforts.

Keywords: Competitiveness; Gender; Brazilian municipalities.

Resumo: Desigualdades de gênero persistem na economia e no mercado de trabalho. A não neutralidade das políticas públicas torna-se evidente quando as desigualdades de gênero são ignoradas, penalizando as mulheres em diversos aspectos. As políticas públicas geralmente se baseiam em dados e, se esses dados não considerarem o viés de gênero, tais políticas podem prejudicar ainda mais as mulheres. A inclusão de perspectivas de gênero nas avaliações de competitividade é imprescindível para a promoção da equidade e da justiça. Nossa análise revela disparidades significativas no desempenho econômico entre os rankings originais e aqueles ajustados por gênero, destacando a necessidade de considerações mais sensíveis nas avaliações convencionais. Compreender essas nuances é essencial para a formulação de políticas públicas informadas, para a alocação adequada de recursos e para os esforços de desenvolvimento sustentável.

Palavras-chave: Competitividade; Gênero; Municípios brasileiros.



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Introduction

Since 2020, the Brazilian non-profit organization Public Leadership Center (Centro de Lideranças Públicas, CLP in portuguese) has been releasing a competitiveness ranking for a selection of Brazilian municipalities. According to CLP, the competitiveness index is crafted from the standpoint of public management, assessing the government's capability in planning, coordinating, and executing resources and public policies. This is done with the overarching goal of promoting social well-being and cultivating a conducive business environment. Consequently, the ranking serves as a valuable tool for public decision-makers, aiding them in identifying bottlenecks within counties and pinpointing areas where concerted efforts should be directed to enhance the overall status of the county.

With the growing recognition of the significance of gender equity and the pursuit of sustainable approaches to economic growth, it has become imperative for academia and public policies to analyze how policies impact both women and men. This examination extends to understanding the influence of these policies on the social, economic, and environmental dimensions of development, ultimately contributing to improved competitiveness.

Therefore, achieving enhanced competitiveness necessitates the implementation of public strategies aimed at improving the provision of public services, attracting productive businesses, as well as fostering an environment that encourages well-qualified workers and students to reside and prosper within a municipality. Importantly, these objectives must be inclusive, addressing the needs and contributions of both women and men.

The CLP's Competitiveness Ranking of Municipalities employs a comprehensive set of 65 indicators, categorized into three dimensions: institutions, social, and economic, with respective weights of around 20%, 40%, and 40%³. Each dimension encompasses various indicators. Institutions gauge fiscal sustainability and the operation of public administration. The social dimension encompasses factors such as access to healthcare and its quality, access to education and its quality, security, sanitation, and environmental aspects. The economic dimension encompasses economic inclusion, innovation, economic dynamism, human capital, and telecommunications. Notably, neither dimension nor any variable currently accounts for gender differences.

To address this gap, this article proposes the integration of a gender bias in select variables related to the economic dimension. Municipalities exhibiting

3 Only in 2020 the ranking considered 55 indicators.

greater gender disparities will face a competitiveness penalty. The ensuing analysis will delve into how the competitiveness ranking of municipalities evolves with the incorporation of a gender bias, shedding light on the impact of gender considerations on overall competitiveness.

The economic dimension is derived from the calculation of four pillars, of which three can incorporate a gender bias. The economic inclusion pillar evaluates the municipality's data on the vulnerable population, formality in the labor market, and the growth of formal employment, with this information available for both sexes. Additionally, certain indicators within the innovation and economic dynamism pillar are gender-specific, encompassing employment in the creative sector, average income from formal work, and the growth in average income from formal work for both women and men. Moreover, the human capital pillar is also amenable to a gender bias, considering factors such as the gross enrollment rate for technical, vocational, and college education, as well as the qualification of workers in formal employment. These data are sourced from the Annual Social Information Report (RAIS in Portuguese) provided by the Ministry of Labor and Employment and the Ministry of Development and Social Assistance, Family, and Hunger Combat.

Municipalities that fail to provide equitable economic conditions for both men and women will encounter impediments in their competitive capacity. This has the potential to reshape the perception of decision-makers, emphasizing the imperative for public policies to address gender disparities that negatively impact nearly half of the population.

The article is organized as follows. Section 2 considers the theoretical discussion of the article, while Section 3 presents the methodology. Section 4 provides the results, and Section 5 concludes the article.

1 Theoretical discussion

The Role of Women in Economic Development

The empowerment of women and economic development are closely intertwined. On one hand, economic growth can create favorable conditions for the population and enhance the inclusion of women in the workforce, reducing economic disparities between genders. On the other hand, greater gender equality can boost productivity, improve development outcomes for the next generation, and make institutions more representative (Mehra, 1997; Duflo, 2012). Gender inequalities in the labor market, although having

more direct impacts on the female population, are reflected in the country's production, consumption, and investment data as a whole, leading to increased costs for population well-being and poverty rates, as well as underutilizing skilled human resources for enhanced production and economic productivity (Kon, 2013).

Actions of this nature have benefits that extend beyond reducing gender inequality and reach the entire society. Studies have associated increased life expectancy with investment in human capital, linked to economic growth (Shastry and Weil, 2003; Lorentzen, McMillan, and Wacziarg, 2005). Research conducted in Brazil has shown that income in the hands of a mother had a greater effect on her family's health than income under the control of a father; for infant survival probabilities, the effect was almost twenty times greater (Thomas, 1990). Income in the hands of women, compared to men, has been associated with a larger increase in the portion of the family budget dedicated to human capital (domestic services, health, and education) as well as leisure (Thomas, 1993).

In addition to social aspects, promoting gender equity in the business environment also brings benefits to companies. Businesses that actively promote gender equity tend to cultivate more diversified teams, incorporating a variety of perspectives and ideas. This diversity often translates into innovative solutions, providing these businesses with a competitive advantage in the market. By fostering an inclusive working environment, companies attract talent from both genders, thereby expanding the pool of skilled labor candidates. Moreover, such firms are perceived as socially responsible, which can attract investors and clients alike (Duflo, 2012; Flabbi, Macis, Moro and Schivardi, 2019; Fine, Sojo and Lawford-Smith, 2020).

Building on the discussion of gender disparities in the economic sector, it is essential to explore the specific challenges faced by women entrepreneurs, particularly in relation to the scale and nature of their businesses. Within industrial and commercial enterprises, gender disparities become evident. Businesses led by women, in comparison to those led by men, tend to be smaller in scale, possess lower capitalization, and operate in easily accessible sectors such as retail, beauty, and food. In essence, enterprises led by women are more likely to be less profitable and face challenges in expanding into international markets (Klugman, 2016). Consequently, the small size of these businesses often hampers female entrepreneurs from engaging in high-value-added activities (ITC, 2015). Addressing these specific challenges is crucial to fostering an inclusive and equitable entrepreneurial landscape for women.

Gender Discrimination in the Economy

In light of the disparities between women and men in terms of economic and social opportunities, wherein the environment tends to be more unfavorable for women, it is crucial to address the challenges they face. It is estimated that the active inclusion of women in the economy could boost the global GDP by 26% by the year 2025, equivalent to an additional \$28 trillion (McKinsey, 2015). Within the labor market, women encounter underrepresentation, particularly in high-level hierarchies, along with lower wages and a heightened vulnerability to precarious jobs (ILO, 2019). These issues underscore the urgency of implementing measures to rectify gender imbalances and enhance opportunities for women in various spheres of society.

The human capital literature offers a relevant analytical framework to interpret income and productivity disparities between men and women as expressions of discriminatory and structural exclusion mechanisms. In the Brazilian context, research shows that in sectors such as manufacturing, female participation remains low, especially in more productive firms. Even when men and women exhibit similar productive attributes, women tend to receive lower wages than men and have limited access to leadership positions, highlighting the existence of the glass ceiling phenomenon in the Brazilian manufacturing industry (Campos, Silva, and Cardoso, 2021). Men are more present in more productive industries and in leadership positions, and therefore tend to receive higher wages than women. This points to the existence of institutional barriers – such as occupation segregation, bargaining power, and glass ceiling phenomenon – that penalize women's labor and undermine the efficiency of the labor market.

Even when variables such as occupation, work experience, and human capital are controlled for, significant wage disparities between men and women persist, often widening when they should narrow. According to Castro, Staduto, and Kreter (2022), sectoral segregation contributes to gender disparities. Women receive lower wages because they are usually engaged in activities related to the reproduction of the labor force, while men work in roles directly associated with management and the production of wealth. Conversely, even in fields with a female majority, such as the sciences, the degree of discrimination remains high. The highest levels of inequality are found precisely in the most prestigious and best-paid occupations, such as executive roles in the public sector (higher proportion of men) and managerial positions in the private sector, which are traditionally dominated by men. These inequalities are further exacerbated by labor market segmentation, which

restricts women's access to prestigious, well-paid jobs with opportunities for upward mobility. There are gender wage differences among occupational categories at the top of the distribution, which also tend to have high average levels of education. Despite the positive correlation between wages and education, even though women have reversed the educational gender gap, this indicates that women's productive attributes are still not valued to the same extent as men's.

Similar results were found by Gomes Mantovani, Inforzato de Souza, and Gomes (2020). Data reveal that gender-based wage discrimination is most pronounced in high-status, high-paying roles, particularly among executives and company presidents. In contrast, the lowest levels of discrimination are found among workers in service and production sectors, which are characterized by lower wages and lower educational requirements. Wage gap decomposition indicates that in leadership-related occupations, the penalization of women is more intense, even when they possess higher qualifications. Therefore, wages are determined by factors beyond an individual's education.

Blau and Kahn (2017) argue that as women enhance their productivity, human capital variables become less capable of explaining the gender wage gap, also pointing to evidence of occupational segregation. Among the factors that affect the gender wage gap, the authors highlight the penalty associated with motherhood, as women tend to seek family-friendly jobs and reduce their availability for travel and long working hours. Women are then perceived as less committed to their jobs and more likely to interrupt their careers. Employers may anticipate this behavior and consequently reduce opportunities and investment in training for women. Jaumotte (2003) points to family-friendly and flexible work arrangements as factors that can improve female participation in the labor market and allow for career progression. However, these arrangements require institutional support to be effective and should not be perceived as detrimental to women's professional advancement, further worsening gender wage disparities (Aláez-Aller, Longás-García, and Ullibarri-Arce, 2011).

In this context, competitiveness indexes used to guide government planning, such as the Municipal Competitiveness Index developed by the Center for Public Leadership (CLP), reveal a critical gap: although they aim to identify bottlenecks and guide public policy for economic development, they fail to incorporate variables that capture gender inequalities. Overlooking this dimension means neglecting factors that directly affect half of Brazil's population and undermining the effectiveness of territorial development strategies.

As noted by Aláez-Aller, Longás-García, and Ullibarri-Arce (2011), the graphical and analytical representation of wage disparities and career advancement opportunities between men and women makes visible the inequalities that aggregate indicators often conceal. Incorporating a gender perspective into competitiveness indexes, particularly in the economic dimension, not only contributes to more accurate diagnostics, but also aligns these instruments with the principles of sustainable development, which assert that no one should be left behind.

Development of Gender-Responsive Public Policies

Considering the discussion on gender-inclusive economic dimensions and the importance of addressing gender disparities in public policies, it is relevant to consider the role of organizations like the Brazilian Public Leadership Centre (CLP) in shaping these perspectives and advocating for comprehensive and sustainable development.

The CLP is a Brazilian organization committed to engaging society and developing public leadership to tackle the most pressing issues in Brazil. Their focus extends to both the functioning of public institutions and the provision of public services within the public sector.

Since 2015, the CLP has been producing various rankings. The Competitiveness Ranking of Brazilian States has been available since 2015, followed by the municipality ranking introduced in 2020. In 2023, they expanded their scope by releasing the Sustainability Rankings of Brazilian States and Municipalities. The rationale behind these new rankings is to offer a reinterpretation of the competitiveness ranking, providing a fresh perspective on the performance of Brazilian states and municipalities with an emphasis on holistic and sustainable development. This underscores the CLP's commitment to fostering comprehensive and inclusive approaches to addressing the multifaceted challenges facing Brazil.

In the book “Invisible Women: Exposing Data Bias in a World Designed for Men (2019)”, Caroline Perez highlights the existence of a gender data gap, which refers to the lack of sex-disaggregated data and the omission of women's experiences in various areas, including healthcare, transportation, the workplace, and public policy. As economic decisions and policies have significant impacts on gender equity, a lack of gender diversity among economists can result in the neglect of important issues such as gender pay gaps, gender-based discrimination, and unequal access to resources and opportunities.

In other words, public policies, when formulated without considering gender inequalities, often perpetuate and exacerbate social disparities, penalizing women in various ways. The absence of a gender-sensitive approach can result in measures that overlook the specific realities faced by women, ranging from wage gaps to inequalities in access to educational and professional opportunities. Furthermore, policies that fail to consider the specific needs of women can reinforce gender stereotypes and contribute to the maintenance of discriminatory social structures. It is imperative to recognize that the apparent neutrality of policies often conceals a systemic bias, and adopting a proactive approach that considers gender inequalities is necessary to ensure that public policies promote equity and social justice.

Transitioning to the economic dimension explored in this article, the indicators considered inherently incorporate an innovative perspective. Beyond conventional metrics like employment and income, our analysis encompasses elements such as creative employment, research and development expenditure, and education in both higher and technical institutions. This expanded framework aligns with our objective to delve into the multifaceted aspects of innovation within the economic landscape. It is essential to note that our intention is not to criticize the valuable work conducted by CLP, which plays a pivotal role in data collection, organization, and the production of rankings that guide policymakers. Rather, we leverage their methodology and results to underscore another critical dimension – gender gaps. By integrating a gender bias into our analysis, we aim to shed light on the importance of addressing gender disparities within the broader context of innovation and economic development. This holistic approach aims to contribute to a more comprehensive understanding of the challenges and opportunities inherent in fostering innovation within municipalities and states.

2 Methodology

Since 2020, CLP annually calculates a competitiveness ranking of Brazilian municipalities, including a complete database and technical reports. Although a more recent edition (2024) is now available, the analysis was based on the 2023 edition, which was the latest release at the time of writing. The 2020 index was calculated using 55 variables, while in 2023, they used 65 variables. All the variables are divided in three main dimension: institutions, society and economy. Each dimension, in turn, has several pillars in which each is composed by a number of variables.

Considering the 2023 ranking, for example, the dimension institutions has 10 variables divided in the pillars fiscal sustainability and operation of the public administration. The society dimension is calculated from 36 variables divided in the pillars access to healthcare, quality of healthcare, access to education, quality of education, security, sanitation and environment. Finally, the economic dimension has 19 variables divided in the pillars economic insertion, innovation and economic dynamism, human capital and telecommunications. The 2020 ranking has 10 fewer variables: one in the institution dimension and nine in the society dimension. The variables are from multiple Brazilian sources such as National Treasury, Ministry of Labor and Employment, Ministry of Health, National Health Agency, Ministry of Education, Ministry of Cities, MapBiomass, Central Bank, Brazilian Institute of Geography and Statistics, National Council for Scientific and Technological Development, National Telecommunications Agency, among others.

According to CLP (2023), the variables were selected based on the academic literature that identifies which characteristics are important in determining municipal competitiveness. The report also lists several criteria for including an indicator, such as publicly available and open-access databases from government institutions or well-known organizations, geographical and temporal coverage, quantitative indicators, and the avoidance of duplication.

After collecting the data, each variable is normalized using the min-max method (Chowdhury e Squire, 2006; OCDE, 2008; Barros, 2003; apud CLP, 2023). Therefore, each variable of the original data is converted to a scale that varies between 0 and 100, making sure to adjust indicators depending on whether higher values mean better or worse municipal quality, as well as accounting for outliers.

CLP gives a weight for each pillar and, as a consequence, for each dimension. The weights were defined based on five criteria: relevance and quality of the indicator, temporal availability, redundancy, and penalization for missing data. The weights assigned to each pillar and dimension were derived from the sum of the weights of their respective indicators. The ranking is then calculated as a weighted average of the normalized variables with their corresponding weight.

Geographically, the ranking is calculated to a sample of Brazilian municipalities. For 2023, the ranking considers 410 Brazilian municipalities (7,36% of the total), where all have a population greater than 80 thousand inhabitants, based on the 2022 Demographic Census. These 410 municipalities correspond to 60,2% of the Brazilian population. In the 2020 edition, using the same criteria, data are collected from 405 municipalities.

More information on how the rankings are calculated can be found in the technical reports available on the website of the institution (CLP 2020, 2023). Chart 1 shows the number of municipalities in each Brazilian state as a percentage of the total considered in the 2023 sample.

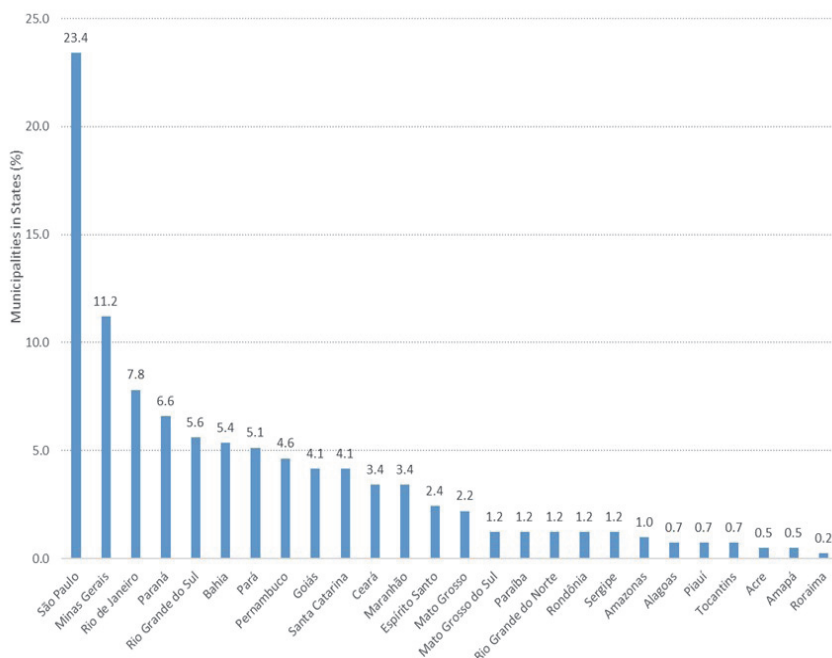


Chart 1. Participation of municipalities per Brazilian states (2023, %)

Source: CPL (2023); authors' own elaboration.

Since we want to include the gender gap as a factor of sustainable competitiveness of the rankings, not all the variables are available for women and men. For instance, the dimension institutions consider factors related to public administration. Despite some variables of the society dimension being also available to women and men, we decide to focus only in the variables of the economic dimension, as discussed in the previous sections.

Henceforth, the ultimate index of the competitiveness ranking, amalgamating all dimensions, will not be employed in our analysis. Instead, we will utilize the competitiveness score derived solely from the economic dimension for municipalities. Our modification involves a reevaluation of the methodology used in calculating this dimension, incorporating data specific to both women and men. Subsequently, a new economic competitiveness ranking is computed. Finally, we undertake a comparative analysis between the original ranking and the gendered ranking that we have formulated.

Despite efforts to use the most up-to-date data, the variables are not usually from the same year as the ranking. The 2023 economic ranking uses mostly data from 2022 and 2021. Just two variables are collect with data from 2020. For the 2020 edition, most variables are from 2019 and 2018 and again, only two from 2017. In this sense, the 2020 ranking can be considered as pre-pandemic, while the 2023 still may contain some reflections of the COVID-19 pandemic years.

The economic dimension is organized in four pillars, as described in Table 1. Each pillar is composed with a set of three to eight variables. All variables of the economic insertion and human capital pillars can be collected for both women and men. Three variables of the innovation and economic dynamism are also gendered. The telecommunication pillar was the only one that was not gendered. Hence, we work with nine variables.

To collect data for both women and men, we use the same sources as described in the CLP rankings methodology, taking into account the indicated years. The data was compiled from the Inep (National Institute for Educational Studies and Research Anísio Teixeira) and Rais (Annual Report of Social Information), from the Brazilian Ministry of Education and Ministry of Labor and Employment, respectively.

Table 1 – Composition of the Economic Competitiveness Ranking

Pillar	Variable	Gender data available?
Economic Insertion	Vulnerable population	Yes
	Formality in the labor market	Yes
	Growth of formal jobs	Yes
Innovation and economic dynamism	Resources to scientific P&D	No
	Creative sector jobs	Yes
	Credit per capita	No
	GDP per capita	No
	GDP per capita growth	No
	Economic complexity	No
	Average income of formal job	Yes
	Growth of average income of formal job	Yes
Human Capital	Gross enrollment rate – Technical and vocational education	Yes
	Gross enrollment rate – Tertiary education	Yes
	Qualification of workers in formal employment	Yes
Telecommunication	Mobile phone accesses	No
	4G mobile phone accesses	No
	Broadband accesses	No
	Broadband accesses – Fiber optics	No
	Broadband accesses – High speed	No

Source: CPL (2023); authors’ own elaboration.

With data compiled for both women and men, we calculated the gender gap as the absolute value of the difference between men minus women for each variable. Following the CLP methodology, we normalized the gender gap variables. As the CLP methodology explains, all variables are computed so that the closer the municipality is to 100, the better it performs in that variable. Variables that have it means inverted, like Vulnerable population (higher value refers to higher vulnerable population in the municipality), are inverted in the normalization calculation. The gender gaps calculated from the original variables also follow this logic. Higher gender gaps values are indications of greater inequality. Therefore, in the normalization process, all the gender gap variables were inverted, in which higher values means lower gender inequality in the municipality.

With the nine normalized gendered variables we recalculated the weights for the gender gap analysis. In the original methodology, (e.g.in 2023), the pillars economic insertion, innovation and economic dynamism, human capital and telecommunication had respective weights of 15.6%, 42.2%, 20.0% and 22.2%, respectively. Since gender disaggregated data are not available for the telecommunication pillar, we excluded it and rescaled the weights so that the sum of the remaining three pillars equal to 100%. The new gender gap weights became 20.0%, 54.3% and 25.7%, for 2023 ranking.

We also applied these new gender gap weights to recalculate the original competitiveness score, using only the three pillars for which gender-disaggregated data are available, that is, excluding the telecommunication pillar. This adjustment allows us to compare both rankings on the same basis, that is, using the same set of pillars and weights, once with gender-related variables and once with the original (non-gendered) variables,

The economic gender gap dimension of each municipality was calculated from a simple average of the variables within each pillar, and using the new gender gap weights to aggregate the pillars. The final step was to penalize the original economic competitiveness ranking with the economic gender gap dimension, resulting in the new gendered economic competitiveness score, as shown in expression (1), where i denotes the i -th municipality.

$$\begin{aligned} & \text{new gendered economic competitiveness score}_i \\ &= \frac{\text{original economic competitiveness dimension}_i}{\frac{100}{\text{economic gender gap dimension}_i}} \end{aligned} \quad (1)$$

If the municipality does not have gender inequality, its economic gender gap dimension is equal to 100, and its new gendered score is simply the original score. If the calculated economic gender gap dimension is low (meaning that the municipality has a high gender inequality), the denominator of the expression is high, and the new gendered economic competitiveness score is lower than the original economic ranking. In other words, municipalities with high gender gaps have their score penalized. The new gendered ranking is equal to the original one when we assume that does not exist gender inequality in the municipality. In other words, the original ranking presumes that the gender gaps of the municipalities are equal to zero.

3 Results

The analysis of the results will be based on the 2023 ranking. The 2020 ranking will be used only to evaluate the evolution of the municipalities. The main argument of the paper is about the importance of consider a gender bias in the computation of competitiveness rankings. Therefore, the analysis will focus on the changes between the original and the gendered economic dimension competitiveness ranking.

Since having a perfect equality between men and women in all variables is not a reality, the new gendered score will necessarily be lower than the original ranking. Therefore, the comparison of the score values is not interesting, but the positions of the municipalities in the ranking are.

Maps from Chart 2 report the municipalities according to their placement. On the left, there are the municipalities in the original economic competitiveness ranking. On the right, the municipalities in the gendered ranking. The darker the green, the better the municipality's ranking; the darker the red, the worse the municipality's ranking.

A general overview of the results shows that there is a clear division of Brazil between the north and the south, both in the original and in the gendered ranking. In general, municipalities from the center-south are better positioned, that is, have higher economic competitiveness, when compared to the municipalities from the north, with lower economic competitiveness.

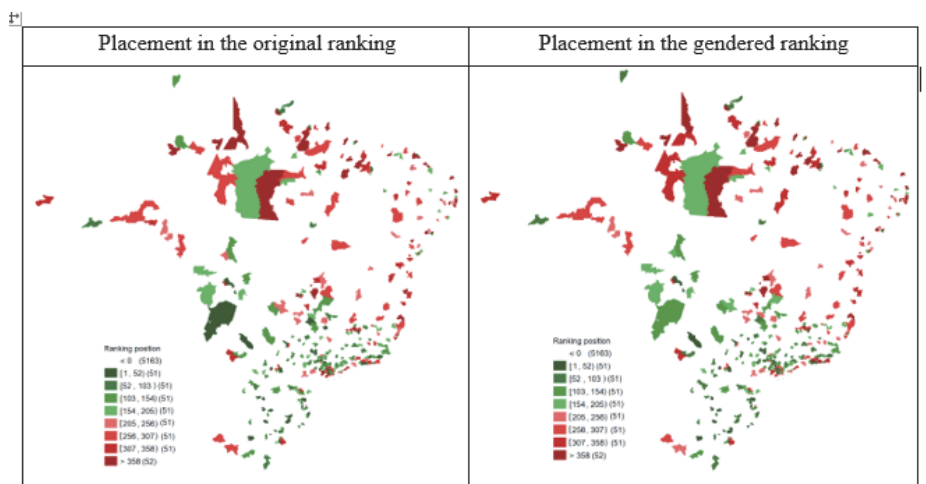


Chart 2. Placement in the economic competitiveness ranking - 2023

Note: the darker the green, the better the municipality's ranking; the darker the red, the worse the municipality's ranking. **Source:** CPL (2023); authors' own elaboration.

To facilitate the visualization of the results, we calculated the difference between the original position of the municipality in the ranking minus its position in the new gendered ranking, as detailed in expression 2. Hence, positive values of this delta means that the municipality is more competitive when gender equality is considered. Negative values mean that the municipality loses competitiveness because of the high gender inequality in its economic variables.

$$\text{delta}_i = \text{position in the original ranking}_i - \text{position in the gendered ranking}_i$$

(2)

Chart 3 shows the municipalities according to this difference in the ranking positions. Darker red (green) values mean higher loss (gain) of positions, that is, the municipality is less (more) competitive when considering gender inequality. The standard deviation of delta is equal to 23.6, meaning that there is a considerable change of municipality's positions between the two rankings.

Only 13 municipalities did not change their positions in the rankings. So despite being penalized in its score due to gender disparities, they do not changed positions in relation to its competitors. These municipalities are not colored in the map from Chart 3, even though they are part of the sample. Within this group, the highlight goes to Florianópolis, a city of the Santa

Catarina state, in the South region of Brazil. This city is the most competitive of the country in terms of the economic dimension. And even considering the presence of gender inequality as a punishment, Florianópolis is still the most competitive municipality.

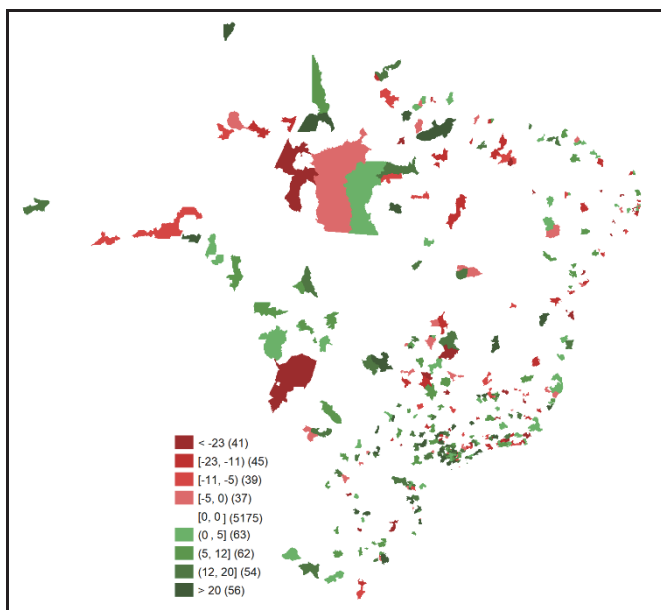


Chart 3. Difference of positions between the original and gendered rankings

Note: Darker red (green) values mean higher loss (gain) of positions.

Source: CPL (2023); authors' own elaboration.

Despite all municipalities being penalized in their scores due to gender inequality of the economic variables, in general, more municipalities gained positions than lost. For instance, considering states with more than 10 municipalities in the sample, 71 municipalities of São Paulo (74% of the total São Paulo municipalities in the sample) conquered placements in the gendered ranking while 24 lost. São Paulo is followed by the South state of Rio Grande do Sul, where 23 of its municipalities (74%) gained positions and 6 lost, and by the Northeast state of Ceará, where 10 (71%) municipalities gained positions while only 2 lost⁴. In total, when gender disparities are considered, 235 municipalities (57%) moved up positions in the ranking, showing an improvement compared to its competitors, while 162 municipalities (40%) moved down and 13 (3%) remained unchanged.

⁴ Considering states with less than 10 municipalities in the sample, the North State of Roraima had his only municipality gaining position (100%), followed by the Center-West state of Mato Grosso, where 8 municipalities (89%) conquered positions.

Considering again states with more than 10 municipalities in the sample, Rio de Janeiro was the state where the most municipalities lost positions. Only 11 (34% of the state's municipalities) cities conquered positions, while 21 lost. Pernambuco and Bahia also had more negative deltas. In the Northeast state of Pernambuco, 7 (37%) municipalities gained positions while 12 lost. In the Northeast state of Bahia, 10 (45%) municipalities conquered positions and 12 lost⁵. Chart 4 shows for each state, the percentage of municipalities (in relation to the total sample) that gained and lost positions in the gendered ranking compared with the original one.

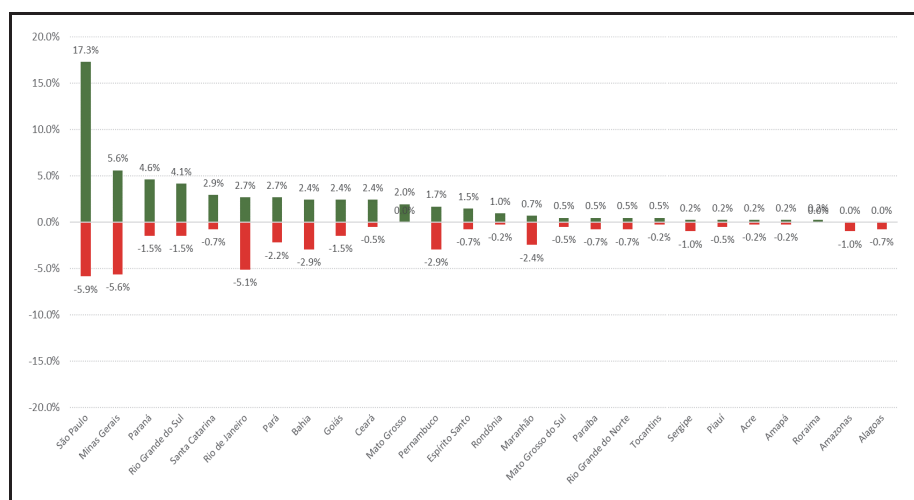


Chart 4. Percentage of municipalities that gained and lost positions by state (2023, %)

Note: positive values (negative) refer to the percentage of municipalities that gained (lost) in position, considering the whole sample.

Source: CPL (2023); authors' own elaboration.

From that total of 57% (235) municipalities which moved up positions in the gendered ranking, 17,3% (71) corresponds to municipalities of the Southeast São Paulo state; 5,6% (23) from Minas Gerais, also in the Southeast region of Brazil, and 4,6% (19) from Paraná, a state from the South region. These three states concentrate almost 50% of the municipalities that moved up in the ranking. On the other hand, São Paulo (5,9%; 24) and Minas Gerais (5,6%; 23) are also the ones that have more municipalities losing position in the ranking, but this time, together with Rio de Janeiro (5,1%; 21). But differently from São Paulo and Minas Gerais, Rio de Janeiro has a negative balance, as there are more municipalities losing positions than gaining. This

⁵ Considering states with less than 10 municipalities in the sample, the North state of Amazonas and the Northeast state of Alagoas had all their municipalities (4 and 3, respectively) losing ranking positions.

lost also occurs in the states of Bahia, Pernambuco, Maranhão, Paraíba, Rio Grande do Norte, Sergipe, Alagoas, Amazonas, and Piauí, mostly states of the Northeast region. Table 2 details the number of municipalities that gained and lost positions for each state.

Table 2 – Number of municipalities that gain/lost positions by state

State	Number of municipalities			Comparing ranking
	Gain A	Loss B	Difference A-B	
São Paulo	71	24	47	more competitive
Paraná	19	6	13	more competitive
Rio Grande do Sul	17	6	11	more competitive
Santa Catarina	12	3	9	more competitive
Ceará	10	2	8	more competitive
Mato Grosso	8	0	8	more competitive
Goiás	10	6	4	more competitive
Espírito Santo	6	3	3	more competitive
Rondônia	4	1	3	more competitive
Pará	11	9	2	more competitive
Tocantins	2	1	1	more competitive
Roraima	1	0	1	more competitive
Minas Gerais	23	23	0	
Mato Grosso do Sul	2	2	0	
Acre	1	1	0	
Amapá	1	1	0	
Paraíba	2	3	-1	less competitive
Rio Grande do Norte	2	3	-1	less competitive
Piauí	1	2	-1	less competitive
Bahia	10	12	-2	less competitive
Sergipe	1	4	-3	less competitive
Alagoas	0	3	-3	less competitive
Amazonas	0	4	-4	less competitive
Pernambuco	7	12	-5	less competitive
Maranhão	3	10	-7	less competitive
Rio de Janeiro	11	21	-10	less competitive

Source: CPL (2023); authors' own elaboration.

Therefore, when gender disparities are considered in the economic competitiveness ranking, we observe that the results among the municipalities are different. Aggregating the results, 12 states should be reported as more competitive than they were by the original ranking, and 10 state that should be reported as less competitive. Chart 5 depicts the aggregated movements in between the rankings. The green states are the ones gaining positions from the original to the gendered ranking, while the red are the ones losing positions.

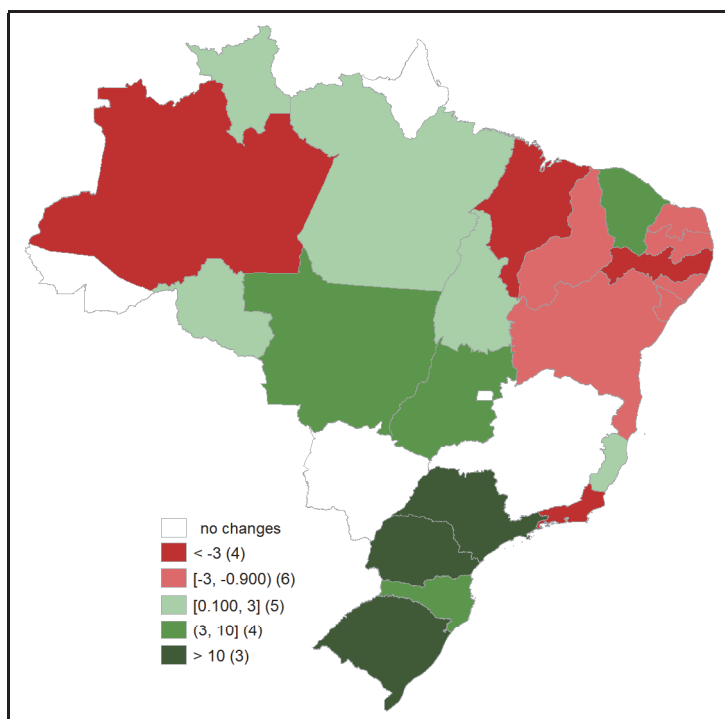


Chart 5. Changes in the competitiveness ranking

Note: Darker red (green) values mean higher loss (gain) of positions.

Source: CPL (2023); authors' own elaboration.

Appendix A details the results. It shows the original and gendered ranking by municipalities, as well as deltas calculated based on the position in the two rankings for 2023 data. As mentioned earlier, Florianópolis leads the gendered ranking, without changes with the original ranking. It is followed by São Paulo and Curitiba. Like many others, these two municipalities are good examples of the importance of considering gender inequality within (sustainable) competitiveness indexes. In the original ranking, São Paulo hosted the 6th place of economic competitiveness, while Curitiba the 8th. Table 3 gives an example of the difference between the rankings considering the changes in positions of the capitals of the Brazilian states.

Without gender disparities, Belo Horizonte (12th) could be considered as competitive as Rio de Janeiro (15th), for instance. However, when we allow gender disparities to influence the economic competitiveness ranking, Rio de Janeiro moves up to the 9th position, while Belo Horizonte falls to the 15th position. It is an important evidence to policymakers to consider when designing public policies concerned with sustainable competitiveness.

Table 3 – Original and gendered rankings to capital of Brazilian states

State	Municipality	Original ranking		Gendered ranking		Delta
		Score	Position	Score	Position	
SC	Florianópolis	66.7	1	54.2	1	0
SP	São Paulo	52.0	6	42.4	2	4
PR	Curitiba	49.0	8	41.6	3	5
ES	Vitória	53.6	4	41.2	4	0
RS	Porto Alegre	55.9	3	40.3	5	-2
RJ	Rio de Janeiro	45.6	15	39.5	9	6
MG	Belo Horizonte	46.8	12	37.8	15	-3
PE	Recife	48.0	9	36.9	19	-10
MT	Cuiabá	41.9	27	36.5	20	7
MS	Campo Grande	39.2	45	33.8	36	9
CE	Fortaleza	39.2	44	33.2	44	0
TO	Palmas	37.8	57	32.8	53	4
RN	Natal	37.8	58	32.6	54	4
GO	Goiânia	36.7	72	31.8	66	6
AP	Macapá	35.0	95	31.3	76	19
PA	Belém	36.0	79	31.1	78	1
AC	Rio Branco	36.3	77	30.9	84	-7
PB	João Pessoa	34.9	96	30.6	89	7
RR	Boa Vista	33.8	119	30.4	92	27
PI	Teresina	35.0	94	30.1	101	-7
MA	São Luís	34.9	98	29.2	117	-19
BA	Salvador	34.1	114	29.2	118	-4
AL	Maceió	33.2	127	28.6	133	-6
SE	Aracaju	32.5	137	28.1	138	-1
AM	Manaus	32.0	146	27.6	150	-4
RO	Porto Velho	25.9	271	21.9	281	-10

Source: CPL (2023); authors' own elaboration.

The five municipalities that most gained positions were Praia Grande (from São Paulo state, +51), São Bento do Sul (Santa Catarina, +46), Barra do Piraí (Rio de Janeiro, +44), Navegantes (Santa Catarina, +41), and Birigui (São Paulo, +38). On the other hand, the five municipalities that most lost positions were São Lourenço da Mata (Pernambuco, -129), Corumbá (Mato Grosso do Sul, -129), São Pedro da Aldeia (Rio de Janeiro, -118), Magé (Rio de Janeiro, -105) and Limeira (São Paulo, -102). In Table 4 we show the municipalities with the best and worst rankings, organized by state. The standard deviation of their delta is equal to 14.5, reinforcing the existence of several position changes between the rankings.

Table 4 - Original and gendered rankings – higher and lower delta by state

State	Original ranking				Gendered ranking				Original ranking				Gendered ranking			
	Municipality	Score	Position	Delta	State	Municipality	Score	Position	Delta	State	Municipality	Score	Position	Delta		
AC	Cruzeiro do Sul	23.8	328	13	PB	Bayeux	18.7	397	-2	15.4	399					
AC	Rio Branco	36.3	77		PB	João Pessoa	34.9	96		30.6	89					
AL	Rio Largo	25.9	275		PE	Gravatá	16.1	407		14.5	404					
AL	Maceió	33.2	127		PE	Recife	48.0	9		36.9	19					
AM	Manacapuru	20.1	389		PI	Parnaíba	27.7	224		24.4	209					
AM	Manaus	32.0	146	-4	PI	Teresina	35.0	94	30.1	101	-7					
AP	Santana	20.9	376	-14	PR	Almirante Tamandaré	22.5	349	20.1	332	17					
AP	Macapá	35.0	95	19	PR	Curitiba	49.0	8	41.6	3	5					
BA	Serrinha	20.4	383	7	RJ	Belford Roxo	17.9	399	13.8	406	-7					
BA	Salvador	34.1	114	-4	RJ	Rio de Janeiro	45.6	15	39.5	9	6					
CE	Maranguape	16.3	406	1	RN	Macaíba	21.7	366	17.2	383	-17					
CE	Fortaleza	39.2	44	0	RN	Natal	37.8	58	32.6	54	4					
ES	São Mateus	21.0	374	4	RO	Ariquemes	23.7	331	21.3	297	34					
ES	Vitória	53.6	4	0	RO	Cacoal	28.1	216	24.3	212	4					
GO	Águas Lindas de Goiás	15.1	408	0	RR	Boa Vista	33.8	119	30.4	92	27					
GO	Goiânia	36.7	72	6	RS	Viamão	22.9	341	20.8	311	30					
MA	Barra do Corda	5.3	410	0	RS	Porto Alegre	55.9	3	40.3	5	-2					
MA	São Luís	34.9	98	-19	SC	Navegantes	26.9	249	24.4	208	41					
MG	Esmeraldas	21.2	371	-6	SC	Florianópolis	66.7	1	54.2	1	0					

MG	Nova Lima	44.3	18	38.8	12	6	SE	Lagarto	20.3	384	17.9	373	11
MS	Ponta Porã	23.2	339	19.6	343	-4	SE	São Cristóvão	43.0	22	33.7	37	-15
MS	Campo Grande	39.2	45	33.8	36	9	SP	Poá	21.8	361	19.1	355	6
MT	Várzea Grande	23.7	332	20.2	329	3	SP	São Paulo	52.0	6	42.4	2	4
MT	Cuiabá	41.9	27	36.5	20	7	TO	Gurupi	25.4	289	22.4	269	20
PA	Moju	11.5	409	9.7	409	0	TO	Palmas	37.8	57	32.8	53	4
PA	Belém	36.0	79	31.1	78	1							

Source: CPL (2023); authors' own elaboration.

Comparing 2020 x 2023 Economic Competitiveness Rankings

We applied the same methodology for the 2020 ranking. Despite the release being in 2020, the data is mostly from 2019 and 2018, meaning it reflects a scenario before the coronavirus pandemic. The 2023 ranking still reflects some effects of the pandemic, since it uses data mostly from 2022 and 2021.

The 2020 and 2023 competitiveness rankings collected data for 405 and 410 municipalities, respectively. In common, they have 393 municipalities and this will be our sample for the analysis of temporal comparisons. Consequently, we assigned a new placement for each municipality, from 1 to 393, respecting the original ordering. This procedure was done for the CLP original and the gendered rankings for 2020 and 2023. Therefore, we have two moments of time (2020 and 2023) and two ranking (original and gendered). Municipalities can change positions through 2020 to 2023 in both rankings.

We detected six possible results displayed in Table 5. The cells show possible movements of the municipalities through time for both rankings. Comparing these movements, we can detect if a municipality should be considered gaining more competitiveness through time when we acknowledged gender disparity. In this case, the municipality is classified as “better”, meaning that it is more competitive through time when considering gender disparity in the competitiveness economic ranking. On the other hand, when gender is considered, the municipality is classified as “worse” if it lost more position (or gain less) between 2020 to 2023 than the original ranking indicated.

For example, Cuiabá (from Mato Grosso state) lost 8 positions in the original ranking between 2020 and 2023. In the gendered ranking, it lost 5 position. So considering gender disparities, this municipality is better, since it lost “just” 3 position through competitiveness rankings and years. This represents the first case of Table 5. Camaçari (Bahia) lost 21 position in the original ranking and gain 14 in the gendered ranking; therefore, it is better, since it conquered a total of 35 positions (case 2 from Table 5). Imperatriz (Maranhão) gained 38 position in the original ranking and 42 in the gendered; in total, it is better since it conquered 4 positions comparing both rankings and time (case 3 from Table 5).

Table 5 – Municipalities movements in ranking positions through 2020 to 2023

Original ranking		Gendered ranking		With gendered, the municipality is:	
A		B		B - A	
lost	-x-k	lost	-x	Better	$-x - (-x - k) = +k$
lost	-x	gain	+k	Better	$+k - (-x) = +k + x$
gain	x	gain	x+k	Better	$(x + k) - x = +k$
gain	x+k	gain	X	Worse	$x - (x + k) = -k$
gain	x	lost	-k	Worse	$-k - x$
lost	-x	lost	-x-k	Worse	$-x-k - (-x) = -k$

Note: 'x' and 'k' represent how many positions a municipality changed through 2020 to 2023. For instance, if $x=3$ and $k=5$, in the first line, in the original ranking, the municipality lost 8 positions; in the gendered ranking, the municipality "only, lost" 5 positions. So this municipality shows better competitiveness behavior when gendered variables are considered. In the second line, the municipality lost 3 position in the original ranking through 2020 to 2023, but gain 5 positions in the gendered ranking; with the gendered ranking the municipality conquered the 3 negative positions and gained 5 new positions. In the third line, the municipality gained 3 positions through time in the original ranking and 8 positions in the gendered ranking; so with the gendered ranking, the municipality is classified as better since it conquered 5 positions in comparison with the original ranking. The same logic is applied to the cases where the municipalities are worse off.

Source: CPL (2023); authors' own elaboration.

On the other hand, the municipalities can be worse in three cases. Case 4 from Table 5 happened with municipality Divinópolis (Minas Gerais): it gained 17 position in the original ranking between years, but only 5 positions considering gender; therefore, with gender disparities, it conquered less positions being classified as worse. Campina Grande (Paraíba) is another case (5) of getting worse, since it gained 24 positions with the original ranking, but lost 39 with the gendered, losing a total of 63 positions when gender disparity penalizes competitiveness. Finally, case 6 is led by municipality Palmas (Tocantis) for example: it lost 22 positions with the original ranking and 28 with the gendered, losing a total of 6 positions.

Chart 6 shows the map of municipalities that gained (green) and lost (red) economic competitiveness between 2020 and 2023 when considering gender disparities, compared to when gender is not recognized. From the 393 municipalities, 208 were better classified, while 173 got worse. Only 12 municipalities improved or worsened exactly the same amount of positions when the rankings consider or not gender disparities. This confirms the hypothesis of this paper, that the change in competitiveness through time of the municipalities is different if gender inequality is taking into account. To the 381 municipalities that showed different movements in rankings between 2020 and 2023 when gender is considered, we do not see, from Chart 6, a clear pattern across the Brazilian states.

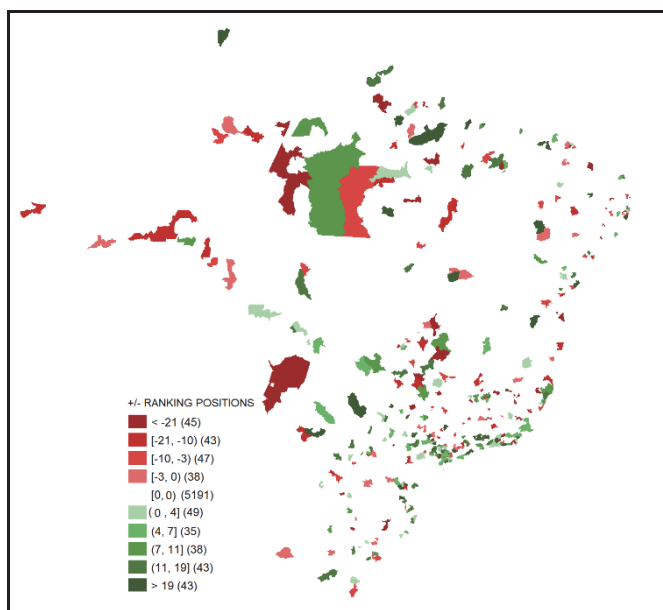


Chart 6. 2020 x 2023 gain/lose positions between original and gendered rankings

Note: Darker red (green) values mean higher loss (gain) of positions.

Source: CPL (2023); authors' own elaboration.

Chart 7 aggregates Chart 6 results from municipalities to states. It shows the proportion of municipalities that improved positions between 2020 and 2023 from the original to the gendered economic competitiveness index, within each state. All the municipalities of the states of Amapá, Piauí and Roraima (5 in total) show better competitiveness gains from 2020 to 2023 when gender disparities are considered in the ranking. On the other hand, all the four municipalities from Amazonas and two from Acre lost more (or gained less) positions between 2020 and 2023 when gender disparities were considered.

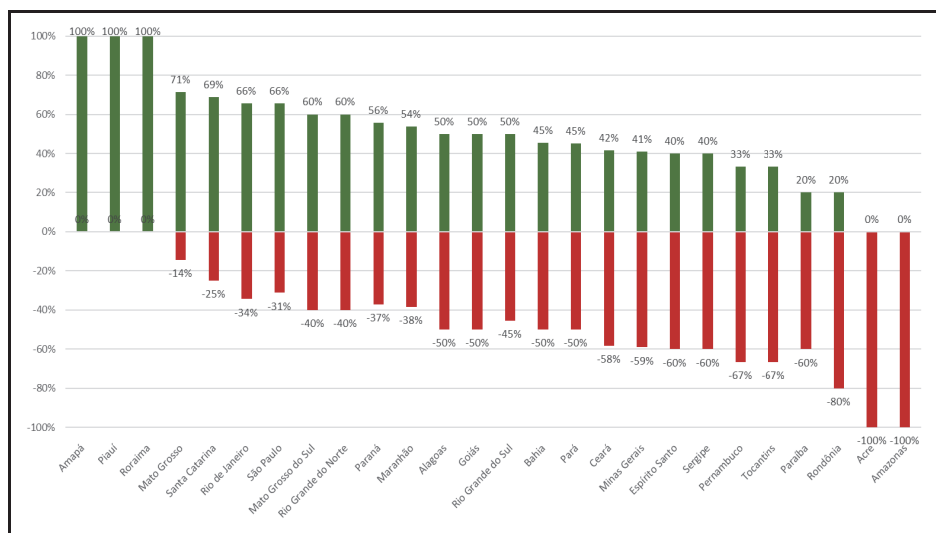


Chart 7. Competitiveness gains/losses (2020 x 2023) when gender is considered

Source: CPL (2023); authors' own elaboration.

Between these extremes, we have the other states. On the negative side, more municipalities of Minas Gerais and Espírito Santo (from the Southeast Region), Pará, Tocantins and Rondônia (North), Bahia, Ceará, Sergipe, Pernambuco and Paraíba (Northeast) lost more (or gained less) positions between 2020 and 2023 when gender disparities were considered. On the positive side, more municipalities of all the states of the South region of Brazil (Santa Catarina, Paraná and Rio Grande do Sul) and Center-West region (Mato Grosso, Mato Grosso do Sul and Goiás) lost less (or gained more) positions between 2020 and 2023 when gender disparities were considered, together with some states of the Southeast region (Rio de Janeiro and São Paulo), Northeast (Rio Grande do Norte, Maranhão and Alagoas). These are important results that change the scenario of economic competitiveness when gender concerns are taken into account.

Discussion: Regional and Intra-regional Disparities in Gendered Competitiveness

The comparative results between the original and gendered economic competitiveness rankings reveal not only the importance of incorporating gender disparities into territorial analyses, but also significant regional and intraregional disparities across Brazilian municipalities. Brazil's historical and structural inequalities, particularly those that affect women's access to quality education, formal employment, and opportunities for economic

mobility (considered in the economic dimension), are mirrored in the changes observed when gender inequality is factored into competitiveness assessments.

A clear North-South divide is visible in both versions of the index, but the inclusion of gender inequality indicators exacerbates this gap in specific regions. Municipalities in the South and Southeast regions tend to improve or maintain their competitiveness positions when gender disparities are considered. Overall women have access to better economic conditions in these states. This may reflect stronger institutional capacity, greater urbanization, higher levels of formal employment, and broader availability of services that contribute not only to general competitiveness but also to more balanced opportunities for women. In contrast, municipalities from the North and Northeast regions, especially those outside state capitals, are more frequently penalized when gender inequality is included, indicating the persistence of structural inequalities that disproportionately affect women's economic participation.

When comparing capitals and interior municipalities, further disparities emerge. Capitals such as São Paulo, Curitiba, and Florianópolis maintain or improve their positions in the gendered ranking. This suggests that in larger urban centers, women are more likely to benefit from public infrastructure, labor market access, and educational and economic opportunities, contributing to a lower observed gender gap in economic indicators. Policies targeting the promotion of gender equity in smaller municipalities may be critical to improving both inclusion and competitiveness.

The analysis at the state level reveals its internal heterogeneity and calls attention to the intraregional differences that must be addressed in territorial development policies. For instance, while 74% of São Paulo's municipalities gain positions in the gendered ranking, it is also the state with one of the highest absolute numbers of municipalities that lose positions. This duality highlights the importance of analysis using disaggregated data: while São Paulo may appear competitive overall, many of its municipalities face hidden gender-related challenges that affect their long-term growth.

The temporal comparison between 2020 and 2023 indicates that municipalities with lower gender gaps are also those with more stable or improving competitiveness trajectories over time. This relationship suggests interdependence between gender equity and sustainable economic performance.

From a policy standpoint, these findings underline the necessity of designing public strategies that explicitly address gender disparities at the

municipal level, particularly in areas where the loss in competitiveness is driven by unequal access to economic resources and opportunities. Incorporating a gender lens into subnational competitiveness indexes like the CLP's offers a more accurate and inclusive tool for public planning. It encourages local governments to identify and address structural barriers to women's participation in the economy and signals to decision-makers that ignoring gender disparities is no longer compatible with long-term economic development.

Conclusion

Competitiveness indices, such as the one developed by the Brazilian non-profit organization Public Leadership Center (CLP), primarily aim at promoting social well-being and fostering a conducive business environment. These mechanisms are crafted from the perspective of public management, assessing the government's capability in planning, coordinating, and executing resources and public policies. Consequently, the CLP's ranking serves as a valuable tool for public decision-makers, aiding them in identifying bottlenecks within municipalities and pinpointing areas where coordinated efforts should be directed to enhance the overall status of the municipality. However, none of the dimensions or variables used in calculating this index consider gender differences, overlooking disadvantages that affect half of the Brazilian population.

Grounded in the principles of sustainable development, which assert that no one should be neglected or left behind in the process of economic development, we understand that public policies are not neutral and penalize women when gender inequalities are not considered at their core. Therefore, we argue that instruments guiding governmental planning, such as the CLP's competitiveness index, should incorporate a gender bias in their calculation.

Our analysis highlighted the importance of including gender bias when calculating competitiveness rankings, especially in the economic dimension. Overall, regional disparities persisted, with states in the North and Northeast being less competitive than those in the Southeast and South when the penalty for gender inequality was included. An exception is the state of Rio de Janeiro, located in the Southeast, where most municipalities lost positions in the ranking, resembling states in the Northeast and the Amazonas in the North. However, when examining the positions in a gender-inclusive ranking compared to the original ranking, significant variations in positions among municipalities were observed, with gains of up to 51 positions and losses of over 120 positions.

The inclusion of a gender bias perspective in competitiveness assessment is a crucial approach to promote equity and justice in economic rankings. Throughout this article, we underscore the importance of considering gender bias when analyzing competitiveness indices, especially in the context of the economic dimension. Through a comparative analysis between the original rankings and those incorporating a gender perspective, valuable insights emerge, highlighting substantial disparities that may be overlooked in conventional assessments. It is important to notice, however, that the presence of gender disparities, which are common to most municipalities, does not prevent those with stronger structural factors from maintaining high levels of competitiveness.

Upon examining the changes between the original rankings and the gender-adjusted economic competitiveness rankings, it became evident that certain indicators may underestimate or overestimate economic performance based on gender. These discrepancies can have significant implications for the formulation of economic policies and strategies, impacting resource allocation and sustainable development. If resources are directed toward the more competitive municipalities, economic regional inequality in Brazil tends to be perpetuated; and by failing to consider gender disparities, the country's social inequality is further reinforced.

Recognizing the critical role of gender bias in computing competitiveness rankings, we advocate for a more inclusive and equitable approach in formulating and interpreting these indices. The promotion of gender equality is not only a matter of social justice but also a sensible strategy to drive sustainable economic growth.

In conclusion, we argue that the consideration of gender bias in competitiveness assessment is essential for a more precise and comprehensive understanding of the economic landscape. The incorporation of these perspectives enriches the analysis, contributing to more informed decision-making and more effective policies aligned with the principles of equity and gender equality. Therefore, we urge the academic community, policymakers, and business leaders to embrace this enhanced approach, recognizing the importance of a competitiveness assessment that more fairly reflects the diversity and contributions of all segments of the population. Gender equity is not only a matter of social justice but also a key component of territorial economic efficiency and long-term competitiveness.

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