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Article

Fiscal impact on the budget sensitivity to gender and race: a matrix analysis

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This study explores the public budget's sensitivity to gender and race in the context of the Brazilian fiscal structure, analyzing social spending and its impact on reducing inequality. The study analyzes the concept of the budget's relevance in mitigating inequalities and uses fiscal multiplier matrices as a methodology, based on detailed data on remuneration by gender and race, as well as observing participation in the labor market by occupation. From this application, the results indicate that despite the increase in spending on social portfolios, white people remain the most benefited. At the same time, the groups most affected by income inequality have less access to public services. This makes it imperative to rethink public budgets so that policies focused on black people guarantee greater access to income policies and other fiscal measures aimed at mitigating income disparities across different groups in society.

Keywords: public budget; fiscal policy; gender; race; impact matrix.

Impacto fiscal no orçamento sensível a gênero e raça: uma análise matricial

Este estudo explora o orçamento público sensível a gênero e raça no contexto da estrutura fiscal brasileira, analisando os gastos sociais e seus impactos na redução da desigualdade. O estudo tem como objetivo a análise do conceito do orçamento como peça relevante à mitigação de desigualdades e utiliza como metodologia as matrizes de multiplicadores fiscais, com base em dados detalhados de remuneração identificada por sexo e cor, além de observar a participação no mercado de trabalho por ocupação. A partir desta aplicação, os resultados obtidos indicam que, apesar do aumento de gastos em pastas sociais, as pessoas brancas permanecem como as mais beneficiadas, enquanto os grupos mais afetados pela desigualdade de renda têm menos acesso a serviços

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públicos. Isso torna imperativa a necessidade de repensar o orçamento público, de modo que políticas focalizadas em pessoas negras garantam maior acesso às políticas de renda e outras medidas fiscais direcionadas à mitigação da disparidade de renda entre os diferentes grupos da sociedade.
Palavras-chave: orçamento público; política fiscal; gênero; raça; matriz de impacto.

Impacto fiscal en el presupuesto con perspectiva de género y raza: un análisis matricial

Este estudio explora el presupuesto público con perspectiva de género y raza en el contexto de la estructura fiscal brasileña, analizando el gasto social y su impacto en la reducción de la desigualdad. El estudio busca analizar el concepto de presupuesto como elemento relevante para mitigar las desigualdades y utiliza matrices de multiplicadores fiscales como metodología, basándose en datos detallados de remuneración identificados por sexo y raza, además de observar la participación en el mercado laboral por ocupación. A partir de esta aplicación, los resultados indican que, a pesar del aumento del gasto en programas sociales, las personas blancas siguen siendo las más beneficiadas, mientras que los grupos más afectados por la desigualdad de ingresos tienen menor acceso a los servicios públicos. Esto hace imperativo repensar el presupuesto público para que las políticas centradas en la población negra garanticen un mayor acceso a las políticas de ingresos y otras medidas fiscales destinadas a mitigar la disparidad de ingresos entre los diferentes grupos de la sociedad.
Palabras clave: presupuesto público; política fiscal; género; raza; matriz de impacto.

1. INTRODUCTION

The discussion about the possibility of budget planning and execution of public resources focused on issues sensitive to specific groups in society is a rising agenda and, therefore, has recently gained notoriety. In recent years, there has been a growing interest among political representatives in the inclusion of what is called a "gender and race-sensitive budget". This is a proposal to include the allocation of resources for mitigating inequality among specific groups in the public budget, considering the social discrepancy between men and women, with a distinction also made for color.

Member countries of the Organization for Economic Cooperation and Development (OECD), such as Australia, France, and Canada, have already incorporated the concept into their budgets (OECD, 2023). By 2022, 63% of member countries had already introduced the concept into their budgetary plans. In Latin America, Mexico stands out for having allocated 508,727 million Mexican pesos to gender equality in 2025, equivalent to R$143,868.00 (Ramírez, 2025).

This proposal is based on assumptions that consider the analysis of the principle of equality between individuals "before the law and without distinction of any kind," as established in the Constitution (Constituição da República Federativa do Brasil de 1988). However, this advance in relation to legislation and constitutional law has not been reflected in efforts directed toward this end, especially in terms of budgetary resources, transfer of funds, or participation in decisions and the development of fiscal policy in general (McCandless et al., 2022).

In this context, it is important to note that, although the field of Public Administration has a century of studies on budget structure and planning, issues such as diversity, equity, and inclusion of marginalized groups have been left aside. Such issues have only recently begun to be addressed with greater interest, and consideration has been given to how institutions create and maintain structures that discriminate against different social groups (McCandless et al., 2020; Ruccucci, 2021).

From this point of view, the integration of public budgeting with gender and race issues considers legal and historical understandings, especially for the formation of rights. In the case of women, it is possible to analyze this issue in terms of formal and material equality. From a reading focused on aspects of the development of a fundamental right, it quickly becomes clear that, when it comes to women, this has been insufficient, slow, fragmented, and asymmetrical in comparison to men (Monteiro, 2024).

Inequality and asymmetry in the formation of rights is not limited to women, as it also affects the black population. The consequences are varied and become particularly significant when inequality and social mobility are discussed: the alarming aspect of income concentration, whereby the richest 1% in Brazil have an average monthly income 39.2 times higher than the 40% of the population with the lowest incomes (Instituto Brasileiro de Geografia e Estatística, 2024). When linked to social profile and labor income analysis, this brings to light the fact that those most affected by inequality are black women who, despite making up the largest share of the population (28.5%), receive only 16% of total income (Programa das Nações Unidas para o Desenvolvimento, 2024) This not only exacerbates inequality but also worsens the prospects for social mobility.

Income inequality is one of the factors concerning the critical perspective of the Brazilian state structure. It is known that, although there are public administration practices considered "technical and neutral," they are not exempt (Melo, 2020, p. 12). As described by Melo (2020), it is possible to observe such issues by noticing the discursive strategies of silencing and neutrality in racial issues, aligned with distortions in justice and the differential impact of policies.

Based on the scenario described above, this study is based on the understanding that incorporating gender and race perspectives into the preparation and execution of the public budget is a step forward in the pursuit of greater social equity. It is also considered that the impact of a cash transfer on those with lower social stratification will be greater, acting as an income multiplier through increased consumption by workers (Kalecki, 1983; Miglioli, 2004). The expected result is a positive return for both society and the economy. To this end, a methodology based on a matrix analysis is used, whose theoretical basis is supported by the Principle of Effective Demand (Kalecki, 1983).

The sections are listed as follows: in addition to this introduction, the first section provides a theoretical review of the topic of gender- and race-sensitive budgets. The following section describes the budgetary legislation in force in Brazil, in order to establish the terms under which the budget is prepared and executed – a factor of fundamental importance for understanding the context in which gender- and race-sensitive budgeting can be applied. Finally, the methodology of the model used and the results are presented. Considerations are provided at the end.

2. GENDER- AND RACE-SENSITIVE BUDGETING IN LITERATURE

Gender-sensitive budgeting, specifically, is based on the premise that "budgetary decisions generally have different impacts on men and women" (Martínez Guzmán, 2024, p. 329), causing unequal scenarios, even if unintentionally.

This analysis highlights a crucial and decisive factor in understanding Brazilian society: alarming income inequality has an extrapolated social classification, affecting mainly black women. This is a phenomenon known in academic literature as the "feminization of poverty" (Costa et al., 2005; Pearce, 1978; Souza et al., 2020). Although the term originated in the 1970s, the phenomenon is not recent, nor is it disconnected from other historical variables that date back to the valorization of masculinity and social formation based on patriarchy.

This is a problem that stems from two other socioeconomic elements: i) when the increase in female leadership indicates poverty; and ii) the insertion of women into the labor market is done in a subordinate manner, that is, when they occupy lower-paying positions with income differentials in relation to men, indicating the precariousness of the female labor market, which is particularly pronounced in middle-income countries. (Greenstein & Anderson, 2017; Lavinas & Nicoll, 2006).

In the last two decades, although poverty has fluctuated in Brazil, women – especially black women – continue to benefit less from variations in income. Souza et al. (2020) highlight that the increase in female-headed households is a change that requires understanding how autonomy reflects on material conditions. Between 2001 and 2015, the authors observe a reversal: previously, most of the poorest households were headed by men. At the end of the period, women occupy this position: something that highlights the feminization of poverty.

The mitigation of such problems stems from effective public policies in terms of budget planning, participation, and fiscal citizenship, recognizing that the non-neutrality of economic and budgetary policies remains a determining factor in the development of fiscal measures. According to McCandless et al. (2020), accessibility to public policies that promote equity for all groups requires three steps: recognizing and identifying problems – such as inequality; taking responsibility and understanding the causes of problems; and positioning oneself to solve them, also proposed by Gooden's (2014) method entitled name, blame, and claim.

Part of recognizing the problems includes understanding the tensions that implementing a sensitive budget generates. For Kavanagh et al. (2023), tensions can range from understanding equity and a sense of fair distribution to how local governments decide to address inequalities. The search for a solution must first consider the interests of those who have been marginalized and left unprotected by the system and the public budget. This goes beyond the technical barriers of drafting the budget, as it also requires connections with members of unprotected communities, demanding a change in the power dynamic. Finally, it is necessary to give greater weight to the participation of these communities (Karavagn et al., 2023) – something that is directly in line with participatory budgeting proposals.

In this context, the public budget becomes a central element and a tool in the quest for greater equality between women and men (Martínez Guzmán, 2024), but above all, black women. This is necessary based on the recognition of a major problem: the current budgetary structure and common practices of the Brazilian Public Administration already empirically expose racial non-neutrality and hierarchization. The problem appears in areas such as public budget and finance, in the framework and other tax regimes, as well as in public law (Melo, 2020).

Furthermore, the current structure does not allow for the development of budgetary policies based on principles that seek to mitigate inequalities. Such principles should include the recognition and correction of historical biases – of which Brazilian history and economics are still full – increasing the participation of non-dominant groups and disrupting the status quo to ensure equity (Martínez Guzmán et al., 2024).

To address this issue, key points are considered in the process of developing a sensitive budget, such as the inclusion of gender and race perspectives in the budget process, along with budget evaluation during and after execution, and political representation – another factor that is still under-explored in the Brazilian context, although it is impactful and necessary.

Martínez Guzmán (2024), in analyzing Ecuador, mentions that gender equity should become a decision-making factor. It is a variable that enables the process of implementing reforms and ensures the advancement of internal processes based on gender equity. In his analysis, an influential factor in this context is leadership and civil servants trained to implement such equity-based reforms. On the other hand, barriers are exacerbated when leadership and civil servants tend to skew decisions and privilege specific groups, preventing changes aimed at equity (Martínez Guzmán, 2024).

The incorporation of a gender and race perspective at all levels of the budget process is equally necessary, as it maintains the importance of restructuring revenues and expenditures to promote gender equality. For Elson (2005), this is one of the formats capable of ensuring less disparity between participation and consultation in the formation of new policies, legislation, and the allocation of public resources. However, for this to have real social impacts, two channels must be ensured: the first is the use of a gender-oriented perspective in the development of public policies, while the second refers to increased transparency and accountability in such policies (Martínez Guzmán, 2024).

In addition, identifying the impacts that the budget has on each social group should guide the act of designing and monitoring the means by which public resources reach ordinary society (Elson, 2005; Monteiro, 2024). In this case, it is also important to highlight the relevance of creating and maintaining participatory decision-making processes, especially regarding the exercise of full democracy and respect for the first clauses of the Federal Constitution.

There are other technical and economic aspects that make up the formalization of the budgetary structure, such as the breakdown by gender and race in the collection and use of public resources and the assessment of the budget's impact on economic growth and inflation. In other words, understanding the public budget as an instrument that is not only purely technical and accounting, but also socioeconomic, which has effects on society in a more or less sensitive way, depending on its profile and position in the social stratification.

The economic perspective in this scenario is based on the understanding that economic/budgetary policy must define its priorities – such as mitigating inequalities, for example – and execute them accordingly. A purely fiscalist logic, then, is a clear impediment to this objective. This is a scope that also requires recognition of the economic contribution of domestic work, which is mostly done by women and still unpaid (Soares, 2008).

It is therefore appropriate to illustrate the technical nature of the gender- and race-sensitive budget initiative proposal. According to Elson (2005, p. 162), this initiative "[…] does not aim to produce a separate budget." In fact, it is a way of analyzing any public expenditure or revenue collection method from a gender and race perspective, making it possible to identify the impacts on women and black people, in comparison to men. It is an initiative that puts equity into perspective in order to understand whether the fiscal measure reduces, increases, or is indifferent to inequalities.

However, although there is a practical means of developing a sensitive budget, the functional structure for relating budgets to equity must consider the specificities of the country, especially characteristics related to knowledge about inequality and public finances (Elson, 2005).

For this reason, the following section explains how the legislation covering the preparation and execution of the public budget in Brazil was formed, with the aim of establishing the current format of public finances focused on the Brazilian context. This exercise provides guidance for methodological analysis in section 3.

3. CURRENT LEGISLATION IN BRAZIL AND THE GENDER AND RACE SENSITIVE BUDGET

The legal framework governing public finances in Brazil was initially established with the enactment, by President João Goulart, of Law No. 4,320/1964 (Lei nº 4.320, de 17 de março de 1964), which is characterized as an instrument for managing the general rules of financial law, which still serve today to guide the preparation and control of budgets, as well as establishing cash management and annual balance sheets for the Union, states, and municipalities. This law represents an important milestone in the process of standardizing and homogenizing budgetary expenditures in all spheres of government, based on the introduction of the "functional-programmatic" classification, which contributes to facilitating the assessment of the implementation of work programs, resulting in a certain degree of progress in relation to the issue of transparency and control (Machado & Reis, 2001).

Law No. 4,320/1964 (Lei nº 4.320, de 17 de março de 1964) was created to improve budget control system techniques, putting into practice the "program budget," which is an instrument for interconnecting planning and finance to consolidate physical and financial plans of the most diverse natures, based on an concept program, which is an instrument for interconnecting planning and finance to consolidate physical and financial plans of the most diverse nature, based on a concept of a management-based budget that places agencies as central agents in decision-making responsibilities regarding the use of public resources and the execution of actions performed by the State.

Secondly, we observe the Federal Constitution of 1988 (Constituição da República Federativa do Brasil de 1988), which in articles 163, 165 to 169, establishes a set of guidelines for the organization, preparation, and validity of budgets, and financial and asset management rules that solidify the management of Brazilian public finances, ensuring that public managers at the federal, state, and municipal levels have the capacity to act transparently and prudently with their budgets.

The concept of planning addressed in the Federal Constitution of 1988 (Constituição da República Federativa do Brasil de 1988) associates "[...] planning and budgeting as links in the same system, by making it mandatory to prepare multi-year plans covering capital expenditures and other ongoing programs" (Giacomani, 2010, p. 53), this replaced the multi-year investment budget and guides the preparation of budget guidelines and the annual budget law.

Budgetary modernization, discussed since the 1990s, revolves around the expectation of the drafting of a complementary law provided for in art. 165, §9, of the Federal Constitution (Constituição da República Federativa do Brasil de 1988). To this end, there is tension in the National Congress regarding the need to update the general budget law, as it is understood that, over time, changes characteristic of the political and economic process itself has been observed, requiring changes to better adapt fiscal and financial management to the current times. For example: a reassessment of budget codifications to accommodate the need to insert a "Gender and Race Sensitive Budget" within the national budget structure.

As a result of this debate in recent decades, some bills have been presented to the National Congress with a view to filling this gap, but they have not reached the end of the legislative process. Of all of them, the one that has received attention in recent times is Complementary Bill No. 295/2016 (Projeto de Lei Complementar nº 295, de 21 de junho de 2016), which proposes the repeal of Law No. 4,320/1964 (Lei nº 4.320, de 17 de março de 1964) and establishes the modernization of Brazilian financial law and new accounting practices.

From the perspective of budgetary modernization, when reflecting on the role of government spending with a view to correcting historical problems of gender and racial inequality, the updating of Law No. 4,320/1964 (Lei nº 4.320, de 17 de março de 1964) and its regulations could include gender and race budget markers in the classification of government sub-functions to enter that public policy, established in a cross-cutting manner, be better identified, monitored, and evaluated from an *ex ante* and *ex post* perspective. That being said, it is important to emphasize that public policy evaluations should begin at the outset, through *ex ante* analysis, in order to verify whether the policy responds to a well-defined and relevant problem, whether there is a clear objective for state action, and whether this can be achieved through effective design (Casa Civil da Presidência da República & Instituto de Pesquisa Econômica Aplicada, 2018).

For example: The Dominican Republic has included the subfunction "Gender Equality" as a budget marker within the country's budget structure to cross-check all expenditures related to women and men. In Brazil, the codification of public expenditure by subfunction is incorporated into the Brazilian budget structure, but its alteration or increase will depend on the amendment of Ordinance No. 42/1999 (Portaria nº 42, de 14 de abril de 1999):

> Article 1 - § 3 The subfunction represents a partition of the function, aiming to aggregate a certain subset of public sector expenditure. § 4 Subfunctions may be combined with functions other than those to which they are linked, as set out in the Annex to this Ordinance.

This could be an alternative proposal from a legal point of view that impacts planning and execution.

Finally, Complementary Law No. 101/2001 (Lei Complementar Federal nº 101, de 4 de maio de 2000), which establishes rules for the structuring, systematization, and control of fundraising, budget management, and financial management, is characterized by a fiscalist view of public accounts. In general, the Fiscal Responsibility Law is concerned with the sustainability of fiscal policy in four areas: (i) limits on personnel expenses; (ii) control of indebtedness; (iii) the constant search for fiscal balance through responsible management of public resources; and (iv) balanced fiscal targets.

The Fiscal Responsibility Law, unlike the 1988 Federal Constitution (Constituição da República Federativa do Brasil de 1988), which presents a major challenge from the perspective of cooperative federalism to meet social rights and human dignity, needs to be updated to include in its rules and objectives a set of fiscal policy actions aimed at meeting the social demands of minority groups, particularly in terms of gender and race.

It is a fact that, within the legal framework of budgetary processes and instruments, which are supposed to be "technical and impartial," there are captures by interest groups and disputes between different spheres of government – whether municipal, state, or federal. In addition to the power struggles inherent in political action, the dominance of fiscal logic, aligned with normative overlap, prevents new changes from being made, even if such changes serve to mitigate structural inequalities that have been present in Brazilian society for centuries.

Evidently, past choices continue to determine current ones, characterizing path dependence in institutional decision-making (Pierson, 2000). Thus, institutional constraints and power struggles constitute real barriers to the implementation of equity-oriented reforms. The fiscal matrix exercise proposed below seeks to diagnose the consequences of this process.

4. FISCAL IMPACT OF THE SENSITIVE BUDGET AND THE PRINCIPLE OF EFFECTIVE DEMAND: ANALYSIS METHODOLOGY

According to Kalecki's Principle of Effective Demand (1983), an increase in government spending causes a more than proportional increase in income levels, positively affecting the level of employment in the economy. Originally, Kalecki (1983) emphasizes the role of government deficit spending, is self-financed by the surplus position of private agents (since, according to Social Accounting, a public deficit corresponds to a private surplus) who will seek a profitable alternative for their sur-plus, channeling these resources into the purchase of government securities (Kalecki, 1983; Miglioli, 2004).

However, we will not enter into the merits of the fiscal outcome itself, since our proposal is to consider, for the sake of simplicity, that there are no changes in the self-imposed fiscal rules of a surplus budget – even if the discussion on this leads to non-unanimous conclusions (Kelton, 2020; Lerner, 1943; Mattei, 2023; Wray, 2003, 2012). Thus, we can also consider, for the sake of simplicity, the ideas of Haavelmo (1945), where it is possible to predict an increase in income and employment from a balanced public budget via expansion of public spending conditional on an increase in taxes.

Nevertheless, we have chosen to adopt Kalecki's Principle of Effective Demand as our theoretical basis for two reasons: i) because it considers spending to be an autonomous decision (Kalecki, 1983) and emphasizes the role of government spending in achieving full employment (Kalecki, 1944); ii) for its seminal contribution to the analysis of the functional distribution of income, this gave rise to neo-Kaleckian growth models that consider the distributive element in income, as in wage-led growth models. The proposal is to assess the fiscal impacts considering an income distribution not between workers and capitalists, as originally presented in these contributions, but considering the distributive differences between gender and race.

In Brazil, many studies have demonstrated the striking difference in income between men and women, differences that are highlighted when race is added to the equation. The Ministry of Labor and Employment's Salary Transparency Report, produced to comply with Decree No. 11,795/2023 (Decreto nº 11.795, de 23 de novembro de 2023), which regulates Law No. 14,611/2023 (Lei nº 14.611, de 3 de julho de 2023), establishing equal pay between men and women, released results that still reveal the discrepancy between earnings when gender and race criteria are considered. The report points out, for example, that the average remuneration for women (Ministério do Trabalho e Emprego [MTE], 2022) is 80% of that for men, falling to 63% of men's salaries when considering black women.

Although some actions are being taken to maintain equal pay between men and women (such as Law No. 14,611/2023 itself), the problem of unequal income distribution considering gender and race cuts across the labor market issue, as it affects not only the wage structure within the labor market, but also the personal distribution of income, which considers other sources of remuneration besides wages.

However, overcoming this problem, from the perspective of the Principle of Effective Demand, can be successful if we consider corrective actions not only on the income itself (such as redistributive and corrective income policies), but also, to a large extent, actions on the demand side. In this sense, this paper aims to reflect on the role of government spending not only in promoting employment and income, but also in correcting historical problems of income inequality, considering gender and race. This is because, on the demand side, government spending also distributes income by allowing people access to government goods and services that they would otherwise have no means of obtaining.

Thus, following Kalecki (1983), spending decisions in a capitalist economy are autonomous and therefore precede income, and this is intensified if we consider that in a monetary economy, the possibility of creating purchasing power is sufficient to judge demand as an autonomous component of the economy.

Furthermore, in an economy where the government has sovereignty over the issuance of currency, government spending not only has no limits (i.e., it is autonomous in relation to its own form of financing) but also has different ways of impacting income and employment: directly on the gross income of the economy, and indirectly by inducing an increase in household consumption (through increased employment and disposable income of households caused by increased public spending), causing the multiplier effect of income.

If we take into account some Kaleckian assumptions, namely that public spending induces an increase in capitalists' investments and that workers spend all their income, any increase in public spending causes a more than proportional increase in income. It should be emphasized, once again, that we are dealing with the impact of government spending on income and, depending on the direction of this spending, on improving the country's income distribution.

To understand what we are proposing here, let us adapt some important elements: i) instead of considering the functional distribution of income between workers and capitalists as Kalecki (1983) did, we will assume the distribution of income between men and women and its subdivision by race, that is, white women and men and black women and men; ii) public expenditures that directly affect the income, employment, and welfare conditions of the general population, such as so-called social expenditures, will be weighted; iii) we recall that the budgetary expenditures provided for in the Law will be judged, that is, we are not proposing an increase in autonomous expenditures that affect the groups studied here, keeping the others constant, but rather the creation of an operator to assist in public expenditure decision-making that reorganizes the budget in such a way that these groups are privileged, making the budget sensitive to gender and race. Thus, the next step is to describe the analysis methodology.

4.1 Methodology of the fiscal impact of the sensitive budget

The premise that public policies can be adopted to promote greater social equity among specific demographic groups for a region or country considers, in this work, the differentiation of gender and race. Therefore, our first exercise will be to develop a demographic diagonal matrix for gender and race. A diagonal matrix is a square, symmetrical matrix where the main diagonal has elements other than zero and the other elements are zero.

In some cases, it can be said that the diagonal matrix is a particular case of the triangular matrix, which can be upper or lower. An upper triangular matrix has zero elements below the main diagonal and non-zero elements above the main diagonal – with the opposite being true for a lower triangular matrix. Algebraically, we have:

$$D = [d_{ij}]_{nxn} \; onde \; d_{ij} = 0 \; quando \; i \neq j$$

Or

$$D = \begin{bmatrix} d_{11} & 0 & 0 \\ 0 & d_{22} & 0 \\ 0 & 0 & d_{33} \end{bmatrix}$$

The diagonal matrix is important because it allows for selective scaling of matrices in the multiplication process. In this work, we chose to derive a transition matrix from a diagonal matrix given by:

$$D = [d_{ij}]_{6x6} \qquad (1)$$

Where the elements of the main diagonal $(d_{ij}, sendo\ i = j)$ are the demographic characteristics by gender and race, that is:

$$\text{D} = \begin{bmatrix} HB & 0 & 0 & 0 & 0 & 0 \\ 0 & HN & 0 & 0 & 0 & 0 \\ 0 & 0 & HO & 0 & 0 & 0 \\ 0 & 0 & 0 & MB & 0 & 0 \\ 0 & 0 & 0 & 0 & MN & 0 \\ 0 & 0 & 0 & 0 & 0 & MO \end{bmatrix}$$

Where the acronyms correspond to the following definitions: HB - White men, HN - Black men; HO - Others (for non-black and non-white men); MB - White women; MN - Black women; MO = Others (for non-black and non-white women)[1].

The data for this matrix will be extracted from the Annual Social Information Report for 2022, 2023, and 2024, based on the Labor Statistics Dissemination Program maintained by the Ministry of Labor and Employment (MTE, 2022).

Next, an income matrix will be constructed based on the Income Table, whose data is tabulated from income information received with distinction by gender and race, according to data co-opted from RAIS. The matrix originating from the income table, called the Income Matrix, will be a square matrix:

$$R = [r_{ij}]_{nxn} \qquad (2)$$

Schematically, the Income Table is based on information on real average income by occupation, separated by color and sex, considering men and women. Color is separated into white, black/brown, and others, for non-whites and non-black/brown.

In this study, we chose to consider the information on real average income by occupation. These are: Senior members, executives, and managers; Science and arts professionals; Industrial goods and services production workers; Miscellaneous service workers; Mid-level technicians; Others; Total. The data were taken from RAIS (MTE, 2022).

[1] Considering the acronyms in Brazilian Portuguese (HB for *"Homem Branco"*, for example).

The descriptive results of the income table already demonstrate the income disparity: white men, especially those linked to upper-level and managerial activities, earn about twice as much as the average income of male workers, while black and brown female workers in various services earn about 60% of the average income of black and brown women. This is a pattern that repeats itself in the three years under analysis (2022, 2023, and 2024).

The Income Matrix $R = [r_{ij}]_{nxn}$, will be as follows:

$$r_{ij} = {}^{w_{ij}}/_{w_j} \qquad (2')$$

Where:

w_{ij} is the element belonging to row i and column j of the income table.
w_j is the total income of men or women.
r_{ij} is the income coefficient by gender and race.

The next step will be to construct a social expenditure table based on total government expenditure. It is necessary to select data from the government's discretionary budget – that is, excluding data from the mandatory budget, such as the payment of salaries and pensions. This is done to ensure that the impact on social policy budget items is observed, considering their respective budgetary functions.

This table will consider expenditures related to Social Assistance and Welfare, Health, Labor and Employment, Education and Culture, and Basic Sanitation and Housing. The data are extracted from the Integrated Budget and Planning System, maintained by the Ministry of Planning and Budget. The data are from the Annual Budget Law for 2022, 2023, and 2024, and only discretionary expenditures allocated by the Federal Executive Branch are used (therefore, parliamentary amendments are disregarded). The total expenditure analyzed is R$ 129.9 billion in 2022, R$ 165.3 billion in 2023, and R$ 180.5 billion in 2024.

From the Government Expenditure Table, a Social Expenditure Vector is obtained,

$$g = [g_{ij}]_{nx1} \qquad (3)$$

Such that:

$$r_{ij} = {}^{gs_{ij}}/_{gs_j} \qquad (3')$$

Where:

gs_{ij} is the element belonging to row i and column j of the social expenditure table.
gs_j is the total government expenditure.
rs_{ij} is the social spending coefficient.

Once the matrices have been constructed, the next step is to derive a gender- and race-sensitive expenditure impact matrix by multiplying (2), (3), and (4):

$$DxRxg \qquad (5)$$

With the Expenditure Impact Matrix – These calculations are based on Miyazawa's (1976) original proposal –, the next step is to obtain the fiscal impact multipliers.

4.2 Fiscal impact multiplier

Associated with the Kaleckian multiplier effect, it will be possible to calculate the impact of increased government spending sensitive to gender and race using the income multiplier. Thus, income multipliers measure the impact of a government fiscal policy aimed at increasing spending on women and/or black people.

According to Miller and Blair (2009), multipliers refer to the initial effect and the total effect of changes in the initial matrix. The total effect reveals a) direct and indirect effects (open model) or b) direct, indirect, and induced effects (closed model). Multipliers that incorporate direct and indirect effects are known as simple multipliers. When direct, indirect, and induced effects are captured, they are called total multipliers.

The fiscal impact multiplier j is the value of individual income by gender and race that results from the response to a change in government social spending. Thus, the multiplier is the ratio of direct and indirect effects to the initial effect.

The initial effect is that obtained from the response of individual incomes to an exogenous increase in government spending. Considering the simplified gender- and race-sensitive Expenditure Impact transition matrix given by:

$$Transition\ Matrix = \begin{vmatrix} g_{11} & g_{12} \\ g_{21} & g_{22} \end{vmatrix}$$

Suppose there is an increase in Social Assistance spending of one monetary unit. This can be represented by:

$$\Delta g = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$$

Thus, we proceed by multiplying the Expenditure Impact Matrix by the expenditure vector:

$$Transition\ Matrix = \begin{vmatrix} g_{11} & g_{12} \\ g_{21} & g_{22} \end{vmatrix} * \begin{bmatrix} 1 \\ 0 \end{bmatrix} = \begin{bmatrix} g_{11} \\ g_{21} \end{bmatrix}$$

Thus, a monetary unit increase in Social Assistance spending, for example, causes an increase in income by gender and race of the order of . The total multiplier is obtained by summing the two values divided by the initial increase, i.e., $1.

5. RESULTS AND DISCUSSION

With the results of the diagonal demographic matrix (equation 1) for the years 2022, 2023, and 2024, our goal is to understand the participation of workers in income and job positions, broken down by sex, color, and occupation. In addition, the expanded time frame of three years helps to understand the inertia of spending in the results of the impact matrix.

In these results, black and brown men have the most significant participation in the workforce among men in total, although this changes in specific occupations. For example, among senior members, executives, and managers, white men are the majority, with 53%, while black men are 26%, with patterns that worsen in subsequent years and increase the percentage of white men in higher-paying positions.

Among women, those who participate most in the total workforce are black women, although the majority are in occupations such as industrial goods and services production and miscellaneous service workers (elaboration that sought to add up the results of the following occupations: Administrative service workers, Service workers, retail salespersons in stores and markets, and Repair and maintenance workers), with 40% of black women compared to 36% of white women in the former, and 38% compared to 32% in the latter, respectively. Meanwhile, occupations such as senior members, executives, and managers, and professionals in science and the arts are dominated by white women. This is a pattern that is repeated every year of the analysis.

To assess the share of labor in income, the income share matrix is used. This shows that white men employed in the highest-paying sector (senior staff and managers) have an income share of 2.036 on the website – a significant result when compared to black men (1.609) and others (1.904). Something similar occurs with women in the same area, with white women at 2.019, black women at 1.640, and others at 1.896, and the patterns are repeated in 2023 and 2024.

To arrive at the Income Matrix, we multiplied the matrix represented in Table 1 (demographic matrix, with frequencies) by the matrix in Table 2 (income share). The Income Matrix results in the income coefficient by gender and race, which is the main matrix of this study. Its results highlight the difference in remuneration between different social groups in the labor market.

The income matrix allows us to arrive at the Social Expenditure Vector, which shows the impact of spending in selected areas compared to income. This is the matrix that allows us to demonstrate the social group most affected by spending in the selected portfolios in different years.

Its main result falls on the importance of the magnitudes found in it. The social spending matrix brings substance to targeted policies, which may be based on mitigating gender and color inequalities. However, although social spending aims to mitigate inequalities, those with the highest multipliers are white men and women. This means that simply spending more in certain areas may not solve the problem of income inequality in Brazil, since access to public services may be limited. However, it is necessary to rethink access to publicly funded services in the way that the budget structure currently does.

One way to demonstrate this result is through the spending impact multiplier. This is because, when running tests with the social spending vector and the social spending impact matrix, the results show the imperative need to rethink the public budget based on women and black people: even though there is greater incentive in areas such as social assistance, education and culture, labor and employment, women – especially black women – are little affected and have the lowest fiscal multipliers.

Using the social assistance and social security portfolio as an example in 2022, if there is an increase of one monetary unit in the spending vector, it can be observed that white men (HB) and white women (MB) have a multiplier of 0.43 and 0.42, while black men (HN) and women (MN) have multipliers of 0.27 and 0.21, respectively. In the same year, the same increase in the education and culture portfolio would result in multipliers of 0.50 and 0.49 for HB and MB, while for HN and MN, the multiplier is 0.32 and 0.25. The same pattern is repeated in the health portfolio, since HB and MB have multipliers of 0.56 and 0.54, while HN and MN have 0.37 and 0.29, being the group with the least impact due to higher spending in the aforementioned portfolios.

In 2023, a one monetary unit increase in the social assistance and social security portfolio generates multipliers of 0.52 and 0.65 for HB and MB, respectively. For black men and women, the result is 0.40 and 0.41: slightly better than in the previous year, although it does not change the discrepancy between whites and blacks. In education and culture, the impact changes to 0.60 and 0.76 for HB and MB, while HN and MN are impacted at 0.48 and 0.49 – this is the only portfolio in which black women are more impacted than men.

In the following year, 2024, the pattern is repeated: HB and MB are the most affected by increases in social assistance, with multipliers of 0.57 and 0.61, compared to 0.40 and 0.42 for HN and MN. In education and culture, the multipliers are 0.68 and 0.73 for HB and MB, compared to 0.51 and 0.52 for HN and MN. In health, the multipliers are even higher than in previous years: 0.80 (HB) and 0.85 (MB), compared to 0.61 (HN) and 0.63 (MN).

This result challenges the existing budget structure. It is not enough for the government to spend more resources on specific portfolios, replicating the current structure – considering the high inertia of expenditures, which, although there is an increase in level year after year, has a considerable impact on the matrices that end up maintaining equivalent results: the same discrepancy in the multipliers.

We calculated the inertia of spending for 2022-2023 and 2023-2024 based on a correlation index whose result ranges from 0 (no inertia) to 1 (complete inertia, the budget was simply replicated). The results obtained were 0.988 and 0.991, respectively. This justifies maintaining the results in the spending impact matrix.

In this exercise, we clearly see the return of one of the issues widely discussed in the literature: the budget structure perpetuates inequalities, even if in an unpretentious way. This brings back the need to reformulate, regulate, and implement policies focused on black people, especially women, who continue to have access to a smaller share of income, even though they are the largest segment of the population and most of the total workforce. Mitigating the effects of social inequality will only be possible through budgetary restructuring that proposes the inclusion of this segment and guarantees access to quality public services.

REFERENCES

Casa Civil da Presidência da República & Instituto de Pesquisa Econômica Aplicada. (2018). *Avaliação de políticas públicas: Guia prático de análise ex ante* (Vol. 1). https://www.gov.br/casacivil/pt-br/assuntos/downloads/153743_analise-ex-ante_web_novo.pdf/view

Constituição da República Federativa do Brasil de 1988. (1988). https://www.planalto.gov.br/ccivil_03/constituicao/constituicao.htm

Costa, J. S. D. M., Pinheiro, L. S., Medeiros, M., & Queiroz, C. (2005). *A face feminina da pobreza: sobre-representação e feminização da pobreza no Brasil* (Texto para Discussão, nº 1137). Repositório Institucional do Instituto de Pesquisa Econômica Aplicada. http://repositorio.ipea.gov.br/handle/11058/1649

D'Araújo, P. J. S. (2015). *A regressividade da matriz tributária brasileira: debatendo a tributação a partir de nossa realidade econômica, política e social* [Dissertação de Mestrado, Universidade de Brasília]. Repositório Institucional da Universidade de Brasília. http://repositorio.unb.br/handle/10482/18748

Decreto nº 11.795, de 23 de novembro de 2023. (2023). Regulamenta a Lei nº 14.611, de 3 de julho de 2023, que dispõe sobre igualdade salarial e de critérios remuneratórios entre mulheres e homens. https://www.planalto.gov.br/ccivil_03/_ato2023-2026/2023/decreto/d11795.htm

Elson, D. (2005). Iniciativas orçamentárias sensíveis ao gênero: dimensões chave e exemplos práticos. *Revista do Serviço Público*, *56*(2), 161-178. https://doi.org/10.21874/rsp.v56i2.223

Fundação Tide Setubal. (2022). *Orçamentos sensíveis a gênero e raça: um guia prático para estados e municípios*. A Tenda. https://fundacaotidesetubal.org.br/wp-content/uploads/2022/04/guia-orcamento-sensivel-agenero-e-raca.pdf

Giacomoni, J. (2010). *Orçamento público* (15a ed.). Atlas.

Greenstein, J., & Anderson, B. (2017). Premature deindustrialization and the defeminization of labor. *Journal of Economic Issues*, *51*(2), 446-457.

Gooden, S. T. (2015). *Race and social equity: a nervous area of government*. Routledge.

Haavelmo, T. (1945). Multiplier effects of a balanced budget. *Econometrica*, *13*(4), 311-318. https://doi.org/10.2307/1906924

Instituto Brasileiro de Geografia e Estatística. (2024). *Pesquisa Nacional por Amostra de Domicílios Contínua 2019/2024: Rendimentos por todas as fontes de 2024*. https://www.ibge.gov.br/estatisticas/sociais/trabalho/9171-pesquisa-nacional-por-amostra-de-domicilios-continua

Kalecki, M. (1943). Political aspects of full employment. *Political Quarterly*, *14*(4), 322-331. https://doi.org/10.1111/j.1467-923X.1943.tb01016.x

Kalecki, M. (1944). *The economics of full employment* (Vol. 6). Blackwell Oxford.

Kalecki, M. (1971). *Selected essays on the dynamics of the capitalist economy*. Cambridge University Press.

Kalecki, M. (1983). *Teoria da dinâmica econômica*. Nova Cultural.

Kalecki, M. (1990). *Crescimento e ciclos das economias capitalistas*. Hucitec.

Kavanagh, S., Kleine, A. W., Fabian, C., & Fabian, E. (2023). *Budgeting for equity: Tensions, lessons, steps for success*. Government Finance Officers Association.

Kelton, S. (2020). *The deficit myth: modern monetary theory and how to build a better economy*. PublicAffairs.

Lavinas, L., & Nicoll, M. (2006). Pobreza, transferências de renda e desigualdades de gênero: conexões diversas. *Parcerias Estratégicas*, *11*(22), 39-75. http://biblioteca.ijsn.es.gov.br/Record/12470/Details

Lei Complementar Federal nº 101, de 4 de maio de 2000. (2000). Estabelece normas de finanças públicas voltadas para a responsabilidade na gestão fiscal e dá outras providências. https://www.planalto.gov.br/ccivil_03/leis/lcp/lcp101.htm

Lei nº 4.320, de 17 de março de 1964. (1964). Estatui normas gerais de direito financeiro para elaboração e controle dos orçamentos e balanços da União, dos Estados, dos Municípios e do Distrito Federal. https://www.planalto.gov.br/ccivil_03/leis/l4320.htm

Lei nº 14.611, de 3 de julho de 2023. (2023). Dispõe sobre a igualdade salarial e de critérios remuneratórios entre mulheres e homens; e altera a Consolidação das Leis do Trabalho, aprovada pelo Decreto-Lei nº 5.452, de 1º de maio de 1943. https://www.planalto.gov.br/ccivil_03/_ato2023-2026/2023/lei/l14611.htm

Lerner, A. P. (1943). Functional finance and the Federal debt. *Social Research*, *10*(1), 38-51. http://joseluisoreiro.com.br/site/link/f4a03d74be05d598ce39633e48604344996ea47d.pdf

Loredo Ramírez, I. (2025). *Mujeres en el presupuesto: distribución del gasto y desafíos*. Centro de Investigación Económica y Presupuestaria. https://ciep.mx/mujeres-en-el-presupuesto-distribucion-del-gasto-y-desafios/

Machado, J. T., Jr. (2001). *A Lei nº 4.320 comentada: com a introdução de comentários à Lei de Responsabilidade Fiscal* (30a ed.). Instituto Brasileiro de Administração Municipal.

Martínez Guzmán, J. P. (2024). Can gender-responsive budgeting change how governments budget? Lessons from the case of Ecuador. *Public Administration*, *102*(2), 388-404. https://doi.org/10.1111/padm.12926

Martínez Guzmán, J. P., Jordan, M. M., & Joyce, P. G. (2024). Towards inclusive public administration systems: public budgeting from the perspective of critical race theory. *Public Administration*, *102*(3), 797-814. https://doi.org/10.1111/padm.12956

Mattei, C. E. (2023). *A ordem do capital: como economistas inventaram a austeridade e abriram caminho para o fascismo.* Boitempo.

McCandless, S., Bishu, S. G., Gómez Hernándes, M., Eraso, E. P., Sabharwal, M., Santis, E. L., & Yates, S. (2022). A long road: patterns and prospects for social equity, diversity, and inclusion in public administration. *Public Administration*, *100*(1), 129-148. https://doi.org/10.1111/padm.12830

Melo, E. B. B. (2020). Branquitude e racismo institucional no planejamento e orçamento governamental. In E. M. Xavier (Org.), *Gênero e raça no orçamento público brasileiro* (Vol. 1, pp. 11-50). Assecor.

Miglioli, J. (2004). *Acumulação de capital e demanda efetiva.* T. A. Queiroz.

Miller, R. E., & Blair, P. D. (2009). *Input-output analysis: foundations and extensions* (2a ed.). Cambridge University Press.

Ministério do Trabalho e Emprego. (2022). *Relação Anual de Informações Sociais (RAIS) 2022*. https://www.gov.br/trabalho-e-emprego/pt-br/assuntos/estatisticas-trabalho/rais/rais-2022

Miyazawa, K. (1976). *Input-output analysis and the structure of income distribution.* Springer.

Monteiro, I. L. (2024). Apontamentos sobre orçamento e igualdade de gênero. *Revista Direito Tributário Atual*, (56), 352-367. https://doi.org/10.46801/2595-6280.56.15.2024.2088

ONU Mulheres. (2022). *Experiências em Orçamento com Perspectiva de Gênero na América Latina e no Caribe.* https://presupuestoygenero.net/experiencias/

Organization for Economic Co-operation and Development. (2023). *Gender Budgeting in OECD Countries 2023.* https://doi.org/10.1787/647d546b-en

Pearce, D. (1978). The feminization of poverty: women, work and welfare. *The Urban and Social Change Review*, *11*, 28-36.

Pierson, P. (2000). Increasing returns, path dependence, and the study of politics. *American Political Science Review*, *94*(2), 251-267. https://doi.org/10.2307/2586011

Portaria nº 42, de 14 de abril de 1999. (1999). Atualiza a discriminação da despesa por funções de que tratam o inciso I do § 1º do art. 2º e § 2º do art. 8º, ambos da Lei n.º 4.320, de 17 de março de 1964, estabelece os conceitos de função, subfunção, programa, projeto, atividade, operações especiais, e dá outras providências. *Diário Oficial da União*. http://www.orcamentofederal.gov.br/orcamentos-anuais/orcamento-1999/Portaria_Ministerial_42_de_140499.pdf/

Programa das Nações Unidas para o Desenvolvimento. (2024). *Relatório especial 2023: 25 anos de desenvolvimento humano no Brasil – Construir caminhos, pactuando novos horizontes*. https://www.undp.org/pt/brazil/publications/relatorio-especial-2023-25-anos-desenvolvimento-humano-no-brasil

Projeto de Lei Complementar nº 295, de 21 de junho de 2016. (2016). Estabelece normas gerais sobre planejamento, orçamento, fundos, contabilidade, controle e avaliação na administração pública. https://www.camara.leg.br/proposicoesWeb/fichadetramitacao?idProposicao=2088990

Riccucci, N. M. (2021). *Managing diversity in public sector workforces*. Routledge.

Soares, C. (2008). A distribuição do tempo dedicado aos afazeres domésticos entre homens e mulheres no âmbito da família. *Revista Gênero*, *9*(1), 9-29. https://ieg.ufsc.br/public/storage/articles/October2020/27042011-1224174artigo1soarescristiane.pdf

Souza, V., Penteado, C., do Nascimento, R., & Raiher, A. P. (2020). *A feminização da pobreza no Brasil e seus determinantes.* Informe Gepec, 24(1), 53.

Wray, R. L. (2003). *Trabalho e moeda hoje: a chave para o pleno emprego e a estabilidade dos preços.* Contraponto.

Wray, R. L. (2012). *Modern money theory: a primer on macroeconomics for sovereign monetary systems.* Palgrave Macmillan.

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DATA AVAILABILITY

The entire data set supporting the results of this study was published in the article itself.