# Does Public Debt Increase Inequality? Effects of the Primary Deficit and Nominal Interest Payments on the Wage Share in Brazil (2002–2019)

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**Abstract**: This paper investigates the impact of federal public debt on the wage share in Brazil from 2002 to 2019. Replicating the empirical framework of Canale and Liotti (2021) and Canale and De Siano (2024) to the Brazilian economy, we estimate the effects of the nominal budget balance — and its two underlying components, the primary balance and nominal interest payments — on the labor share of income. This disaggregation allows us to assess which component exerts the predominant influence on the relationship between the nominal balance and the wage share. Employing the local projections approach (Jordà, 2005), we find that an increase in the nominal deficit reduces the wage share, an effect predominantly driven by nominal interest payments. This dynamic operates primarily through the unemployment channel: positive shocks to the nominal interest payments-to-GDP ratio increase the unemployment rate, thereby squeezing workers' bargaining power and reducing their share of aggregate income. Conversely, shocks that widen the primary deficit (or reduce the primary surplus) are associated with a decline in unemployment and an improvement in the wage share. We conclude that fiscal consolidation policies aimed at stabilizing or reducing the nominal deficit-to-GDP ratio, while simultaneously seeking to preserve or improve income distribution, must account not only for the trajectory of the primary balance but also for the magnitude of nominal interest payments.

**Keywords:** Public Debt; Inequality; Wage share; Nominal Balance; Primary Balance.

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# 1. Introduction

Brazil's federal public debt reached BRL 8.6 trillion by the end of 2025, representing an 18% increase from 2024[3]. While this level reflects a persistent upward trend — notably since the 2008 financial crisis — the Brazilian experience is by no means unique. On a global scale, public indebtedness has grown, particularly following the massive fiscal response to the COVID-19 pandemic and the subsequent rise in interest rates, which pushed global debt-to-GDP ratios to record highs (Nguyen, 2025). Against this backdrop, debates concerning the social and economic impacts of rising debt have intensified, with a growing focus on its influence on income distribution (Canale & De Siano, 2024; Nguyen, 2025; Okeke & Alexiou, 2025).

On the one hand, it is argued that the expansion of public debt undermines government credibility and increases economic uncertainty (Pescatori et al., 2014; Souza Júnior & Santos, 2017). Consequently, domestic agents scale back their consumption and investment, while foreign investment flows and net exports also decline, leading to a contraction in economic activity and indirectly impacting public debt. Directly, rising public debt could exacerbate income inequality, since the ownership of government bonds is concentrated among the wealthiest. At the same time, the tax burden required to finance debt interest payments falls on the broader population (Mankiw, 2000) — a mechanism that is markedly regressive in the Brazilian case. Consequently, this dynamic effectively transfers resources from the bottom of the income distribution to the top.

Conversely, drawing on the Keynesian tradition, public expenditure provides vital support to aggregate demand and, through the multiplier effect, boosts employment and aggregate equilibrium income (You & Dutt, 1996). Therefore, if the increase in indebtedness is driven by debt-financed deficit spending for purposes such as funding public investments, income transfers, public services, and job creation, it can not only avert severe economic crises — as witnessed during the pandemic — but also stimulate growth and reduce inequality (Canale & Liotti, 2021; Canale & De Siano, 2024). In a demand-led growth framework — where income is distributed between wage-earning workers and capitalists who receive profits and interest — the ultimate outcome for the wage share depends heavily on the growth-enhancing effects of debt-financed fiscal policies (You & Dutt, 1996).

The debate surrounding public indebtedness should, therefore, be grounded in an understanding of how its level and fluctuations affect key macroeconomic variables. Given the complexity of these transmission channels, this paper focuses on how debt variation influences income inequality, specifically relying on a metric widely adopted in Post-Keynesian approaches: the wage share[4]. This indicator provides a robust basis for discussing the direct and indirect macroeconomic impacts of debt on employment and working-class income.

To examine these mechanisms, we build on the empirical studies by Canale and Liotti (2021) and Canale and De Siano (2024). Specifically, we disaggregate the evolution of government

[3]https://g1.globo.com/google/amp/economia/noticia/2026/01/28/divida-publica-federal-cresce-18percent-mais-do-que-na-pandemia-e-registra-maior-alta-desde-2015.ghtml

[4]The two most common approaches to measuring income inequality are the personal and functional distributions of income. The former analyzes how income is allocated among individuals or households, and is typically measured by indicators such as the Gini coefficient and the Palma ratio. The latter, which is the focus of this paper, refers to the division of national income between the factors of production — namely, labor and capital— and is generally assessed through the wage share and the profit share of total income.

debt into its underlying drivers to estimate the effects of the nominal budget balance — and its two components, the primary balance and nominal interest payments — on the Brazilian wage share. In doing so, we can identify how debt dynamics are associated with inequality and determine which component exerts the predominant effect. The empirical estimations employ the local projections approach (Jordà, 2005) and cover the period from 2002 to 2019[5].

The remainder of this paper is structured as follows. Following this introduction, Section 2 provides a brief literature review on the relationship between public debt and inequality. Section 3 outlines the data and empirical methodology, followed by the analysis of the results and concluding remarks.

## 2. Public Debt and Inequality

Given the diverse transmission channels at play, the impact of public indebtedness on income distribution remains a highly debated topic, yielding controversial outcomes in both theoretical models and empirical evidence. Key moderators of this relationship include the allocation of debt-financed spending, the initial debt level, prevailing interest rates, and the progressivity of the tax system (Canale & De Siano, 2024; Nguyen, 2025; Rolim & Marins, 2022). In this paper, our analysis centers on debt fluctuations and the corresponding allocation of these resources.

With respect to resource allocation — that is, the specific types of expenditures financed by debt issue — a crucial distinction must be made between spending directed toward social policies and public investment, which by definition constitute the primary balance, and funds allocated to servicing public debt (Canale & Liotti, 2021; Canale & De Siano, 2024). In the former scenario, if a primary deficit is used to finance redistributive policies, for instance, it can foster economic growth and reduce inequality. Programs such as the "Auxílio Emergencial" and "Bolsa Família" are prime examples of this dynamic in Brazil. By immediately boosting the disposable income of the poorest households, these policies directly help narrow inequality (Nassif-Pires et al., 2021; Sanches et al., 2024). Indirectly, investments in infrastructure, health, and education, as well as the cash transfer programs themselves, tend to trigger a multiplier effect in the economy. This expansion in aggregate demand positively impacts employment levels (Marques et al., 2022; Bergamin et al., 2022; Sanches et al., 2024), thereby strengthening workers' bargaining power and potentially reducing inequality even further (Rugitsky, 2019).

On the other hand, rising debt levels can lead to higher interest payments, which tend to have adverse distributional effects. Typically, individuals at the bottom of the income distribution consume all of their income, whereas the wealthiest exhibit a higher marginal propensity to save (Kalecki, 1954; Toneto et al., 2021), often channeling these savings into government bonds. Consequently, by issuing debt, the government effectively borrows from the most affluent segment of the population. A debt expansion, therefore, entails a future transfer of income from the government to the wealthy via interest payments. Furthermore, the resources required to service

[5]The starting date of the sample is dictated by data availability for the primary balance, nominal interest payments, and the nominal budget balance, which have been published under a new methodology since December 2001. The sample ends in 2019 because the economic crisis triggered by the COVID-19 pandemic caused a structural break in the wage share series that could otherwise distort the empirical estimates.

these bonds are largely derived from tax revenues levied across society. Thus, interest payments operate as a net transfer of resources from taxpayers — the general public — to bondholders, who are predominantly the wealthiest individuals (Mankiw, 2000)

This upward transfer of income can also indirectly exacerbate inequality by dampening economic growth. Redistributing income toward a class with a high propensity to save depresses aggregate demand and, in turn, economic activity. Such a contraction drives up unemployment (Toneto et al., 2021) and erodes workers' bargaining power, undermining their capacity to negotiate higher wages. In the Brazilian case, this interest rate channel is particularly pronounced. Not only does the country maintain one of the highest real interest rates globally, but the structural features of its sovereign debt market (Selic) also dictate that policy rate hikes almost automatically translate into higher carrying costs for the public debt. Specifically, the Selic rate — the benchmark rate used as a monetary policy instrument — is the exact same rate that remunerates approximately 54% of Brazil's gross public debt[6] (Stumm et al., 2025).

Building on this theoretical framework, recent studies have sought to empirically estimate the relationship between public debt and inequality, examining both the functional and personal income distributions. In a closely related approach that informs the present study, Canale and Liotti (2021) and Canale and De Siano (2024) evaluate the impacts on the functional distribution of income — measured by the wage share — in the Eurozone (1999–2019) and Italy (1960–2019), respectively. Their analyses consider total public debt alongside its two main components: debt servicing (interest payments) and the primary deficit. In both cases, the results indicate that, overall, an increase in indebtedness was associated with a decline in the labor share of income. However, upon decomposing this effect, the authors found that rising debt service led to a reduction in the wage share, whereas the primary deficit component exerted the exact opposite effect, improving income distribution in favor of workers in both Italy and the broader Eurozone.

In a related study, Nguyen (2025) compares the impacts of public debt on personal income inequality — measured by the Gini coefficient — across a panel of 30 advanced economies and 34 developing countries. The study identifies a favorable distributional effect (a reduction in inequality) following an increase in public debt for the former group, in contrast to an adverse effect (an exacerbation of inequality) for the latter. The proposed explanation is that rising indebtedness in developed economies tends to be coupled with the strengthening of social safety nets — primarily through expenditure on education, healthcare, and direct cash transfers to the poorest households. In emerging economies, conversely, debt expansion is more heavily associated with infrastructure spending, placing less emphasis on broad-based public services that benefit the wider population.

## 3. Methodology

### 3.1. Data

[6]For a discussion on the particularities of the Brazilian Selic system, see Brenck and Ribeiro (2025). For an analysis of why interest rates in Brazil are so high, see Martins (2025).

Table 1 outlines the dataset employed in this study. The dependent variable, serving as our primary indicator of income distribution, is the wage share[7]. The core explanatory variables are the primary deficit and nominal interest payments. We also include the nominal deficit[8], which, by construction, corresponds to the sum of the previous two variables. Including this aggregate measure allows us to assess which component — the primary balance or interest payments — exerts the predominant effect on the overall impact of the nominal deficit on the labor share.

To better understand the transmission channels at play, we also estimate regressions that include the unemployment rate as a control variable. Incorporating unemployment allows us to capture changes in the wage share stemming from fluctuations in economic activity, proxied here by the unemployment rate. Lower unemployment is associated with an increase in the wage share not only because it raises the total number of employed individuals but also because it potentially enhances workers' bargaining power, paving the way for higher wages. Therefore, by controlling for unemployment, we can isolate the effect on the wage share that is independent of business-cycle dynamics.

The period of analysis spans from the first quarter of 2002 (2002:Q1) to the fourth quarter of 2019 (2019:Q4), yielding a total of 72 observations per variable.

Table 1 – Descriptive Statistics and Data Sources

| Variable | Mean | Std. Dev. | Min. | Max. | Source |
|---|---|---|---|---|---|
| Wage Share | 0.556 | 0.018 | 0.523 | 0.585 | Denton interpolation using National Accounts data, PME (until 2012), and PNADc (from 2012 onwards). Methodology from Bastos (2012). |
| Unemployment rate | 0.115 | 0.032 | 0.068 | 0.181 | PME (until 2012) and PNADc (from 2012 onwards) |
| Primary balance (% of GDP) | 0.015 | 0.024 | -0.061 | 0.047 | BCB (2025) |
| Nominal interest payments (% of GDP) | 0.061 | 0.016 | 0.041 | 0.121 | BCB (2025) |
| Nominal balance (% of GDP) | 0.046 | 0.026 | 0.009 | 0.118 | BCB (2025) |

Note: The nominal balance variable has an inverted sign; positive values indicate a nominal deficit (e.g., the maximum value of 0.118 corresponds to a nominal deficit equivalent to 11.8% of GDP).

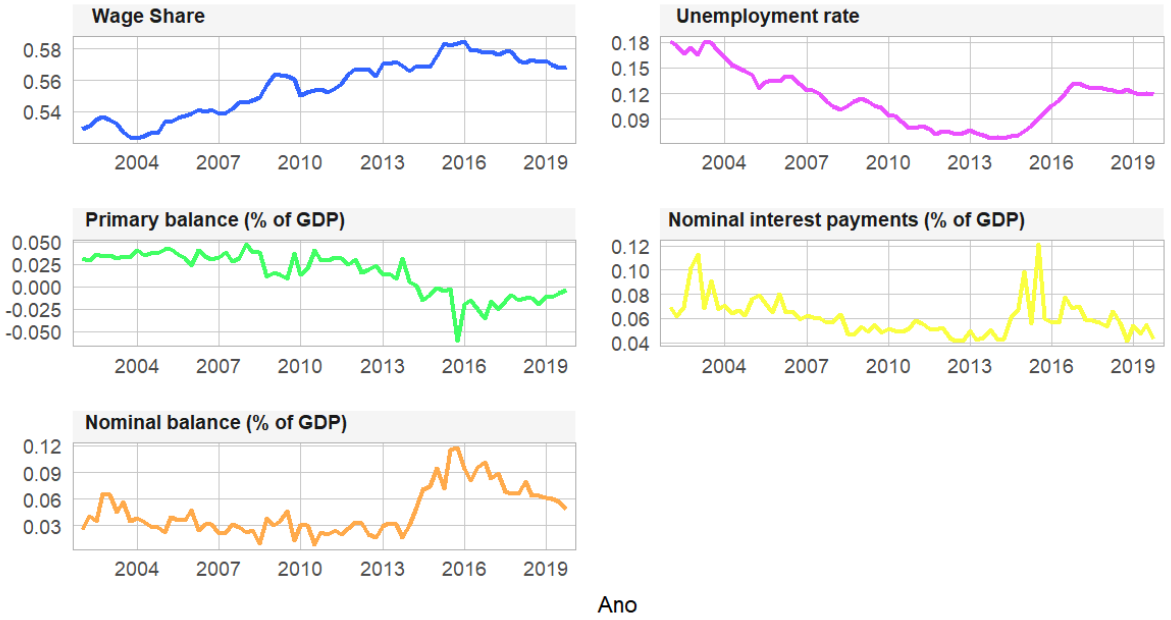
Fonte: Authors' elaboration

[7]This measure includes the income of self-employed workers. For the underlying methodology, see Bastos (2012).
[8]Given that Brazil's nominal budget balance is consistently in deficit, we use the terms 'nominal deficit' and 'nominal balance' interchangeably.

It is worth noting that the nominal balance variable is presented with an inverted sign, meaning that positive values indicate a deficit. This convention was adopted to facilitate economic interpretation, given that a nominal deficit implies, *ceteris paribus*, an increase in public debt. Because we employ quarterly data, all variables were seasonally adjusted using the X-13ARIMA method. Furthermore, the series for nominal interest payments, as well as the primary and nominal deficits, are expressed as a percentage of GDP to ensure accurate comparability over time.

Figure 1 illustrates the evolution of these variables throughout the period of analysis. Broadly speaking, a stark contrast can be observed between the years spanning 2002 to 2014 and the subsequent period, which encompasses the 2015–2016 economic crisis and the sluggish economic recovery that followed.

Figure 1 – Evolution of the study variables (2002–2019)




Source: Authors' elaboration based on BCB (2025)

Regarding the wage share and unemployment, as theoretically expected, an inverse relationship is observed between 2002 and 2014: a steady decline in the unemployment rate (from 18.11% in 2002:Q1 to 6.75% in 2014:Q2) occurred concurrently with an increase in the share of total income allocated to wages (from 52.90% to 56.93%). Thereafter, however, unemployment began to rise significantly, reaching 13.18% by 2017:Q1 and subsequently leveling off at a higher plateau. Meanwhile, the share of income accruing to labor began a downward trajectory in 2016:Q1, maintaining a declining trend through the end of the series.

Turning to the study's explanatory variables, near-continuous — albeit decreasing — primary surpluses were observed between 2002:Q1 (3.10% of GDP) and 2014:Q3 (0.06% of GDP); from that point onward, however, primary deficits accumulated. Nominal interest payments, in turn, remained consistently above 4% of GDP throughout the entire period. This trajectory is highlighted by a substantial drop from 11.29% of GDP in 2003:Q1 to 4.23% in 2014:Q1, followed by a sharp reversal that peaked at 12.10% in 2015:Q3, before retreating to 4.32% by the end of 2019. Finally, the nominal balance evolved from a deficit of 6.60% of GDP in 2002:Q4 to 1.62% in 2013:Q4, before hitting a peak deficit of 11.77% in 2015:Q4. From then on — despite ongoing primary

deficits — the nominal deficit fell back to 4.87% of GDP in 2019:Q4, driven largely by a steep reduction in the monetary policy rate.

## 3.2. The Local Projections Method

For the estimation, we employ the Local Projections (LP) method, originally proposed by Jordà (2005). As a more robust alternative to specification errors than traditional macroeconometric models — such as Vector Autoregressions (VAR) — local projections have gained significant prominence in recent literature (Montiel Olea et al., 2025). Macroeconometric analysis often relies on the interpretation of impulse-response functions (IRFs), which map the trajectory of one variable in response to a shock in another variable. The robustness to misspecification stems from the fact that local projections directly estimate the coefficients for each horizon to construct the impulse-response function. Formally, we estimate the following equation via Ordinary Least Squares (OLS):

$$y_{(t+h)} = \alpha^{h} + \beta^{h} x_{t} + \sum_{i=1}^{p} \gamma_{y}^{i} y_{t-i} + \sum_{j=1}^{q} \gamma_{x}^{j} x_{t-j} + \varepsilon_{t+h}$$

Where $h$ represents the time horizon considered for the response of variable $y$ to a shock in variable $x$. Thus, the coefficient $\beta^{h}$ is our impulse response coefficient. The model can also incorporate lags of the variables of interest, y and $x$, as controls — represented in the equation by terms lagged up to $p$ periods for $y$ and up to $q$ periods for $x$. Finally, $\varepsilon_{t+h}$ is the error term.

In our estimation, we consider the impact — represented by variable $x$ in the equation — of three fiscal measures: (i) the nominal deficit as a percentage of GDP, (ii) the primary deficit as a percentage of GDP, and (iii) nominal interest payments as a percentage of GDP. The outcome variables — represented by variable $y$ in the equation — include our primary measure of functional income inequality (proxied by the wage share) and the unemployment rate.

# 4. Results

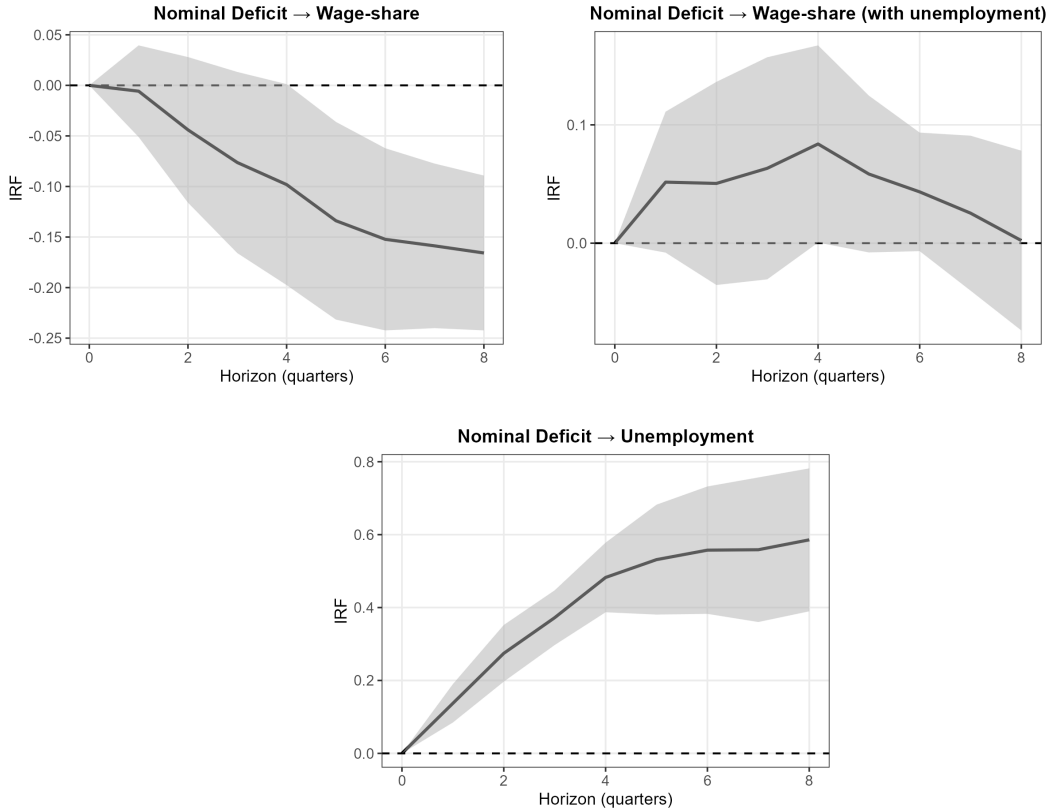
In this section, we first estimate the impact on the wage share of a 1 percentage point increase in each of the three selected fiscal measures. Subsequently, to further clarify these findings, we repeat the estimation including the unemployment rate as a control variable. Additionally, we analyze the response of unemployment itself to shocks in these fiscal variables to better identify the transmission channels at work.

## 4.1. Nominal Balance

An increase in the nominal deficit is associated with rising public indebtedness. We first examine how unemployment and the wage share respond to an expansion in the nominal deficit.

The shock consists of a 1 percentage point (p.p.) increase in the nominal deficit-to-GDP ratio at the initial period. The figures depict the response of unemployment and the wage share — both with and without controlling for unemployment — to this initial shock across various quarterly horizons.

Figure 2 – Impulse-Response Functions for Nominal Deficit Shocks




Source: Authors' elaboration.

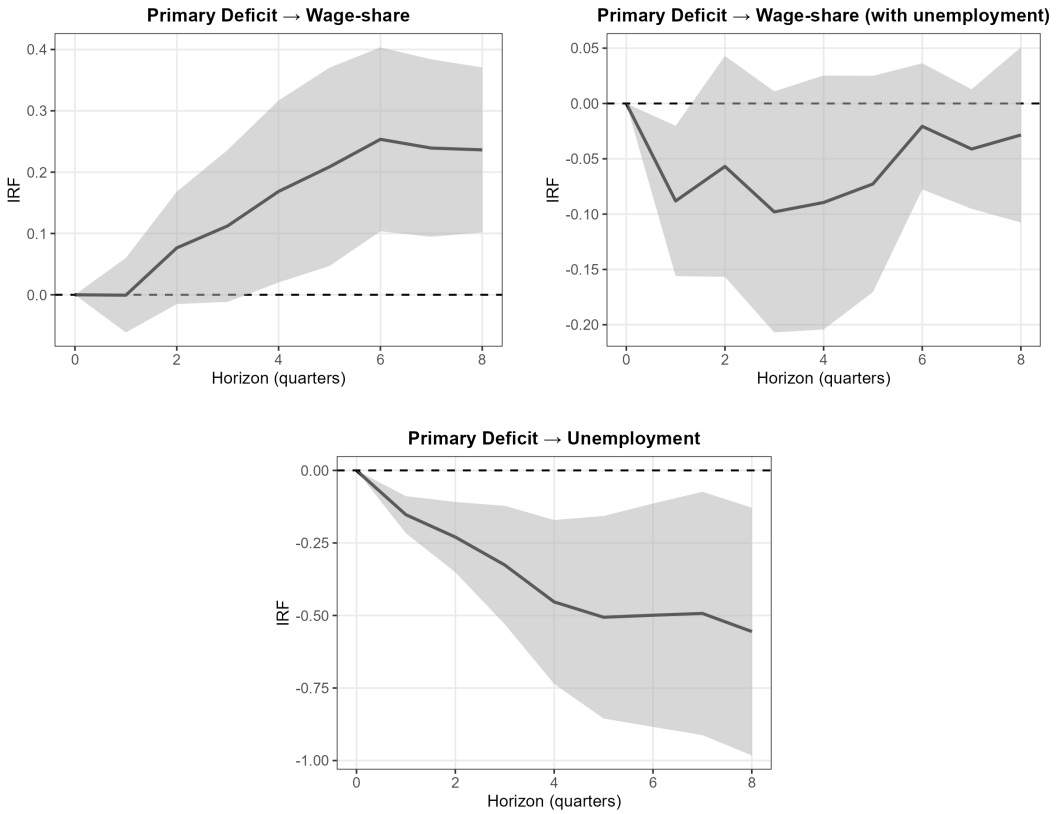
A one-percentage-point increase in the nominal deficit-to-GDP ratio initially reduces the wage share after four quarters: by the fourth quarter, the wage share declines by 0.1 p.p., and after eight quarters, it falls slightly further to 0.15 p.p. However, an increase in the nominal deficit is also associated with rising unemployment. Consequently, once unemployment is included as a control variable, the effect of the nominal deficit on the wage share loses statistical significance. This suggests that the decline in the wage share is, in this context, attributable to the increase in unemployment.

An increase in the nominal deficit may stem from either higher interest payments — driven by rising interest rates or a larger stock of public bonds — or from a primary deficit, as well as a combination of both. Hence, as previously discussed, the impact of the nominal deficit on the wage share may involve distinct mechanisms. On the one hand, rising nominal interest payments are associated with an income transfer to the wealthy, potentially increasing inequality and dampening economic activity. On the other hand, a primary deficit represents a government-led demand injection into the economy; this can act as a direct transfer to low-income households, affecting inequality, or an indirect one, by stimulating economic activity and reducing unemployment. The combination of these two seemingly opposing effects leads us to split the analysis into two components: nominal interest and the primary balance. The results are described below.

## 4.2. Primary balance

As depicted in Figure 3, a 1 p.p. decrease in the primary balance (i.e., an increase in the deficit or a reduction in the surplus) is associated with an increase of approximately 0.25 p.p. in the wage share from the sixth quarter onwards. The unemployment rate, in turn, exhibits a decline starting from the first relevant horizon and maintains a downward trajectory throughout the analysis, reaching a reduction of roughly 0.5 p.p. by the fifth quarter. These results corroborate the hypotheses put forward by Canale and Liotti (2021) and Canale and De Siano (2024), which posit that a primary deficit (or a shrinking surplus) can entail a direct distribution of income to workers, in addition to stimulating economic activity, reducing unemployment, and thereby boosting the wage share.

Figure 3 – Impulse-Response Functions for Primary Deficit Shocks




Source: Authors' elaboration

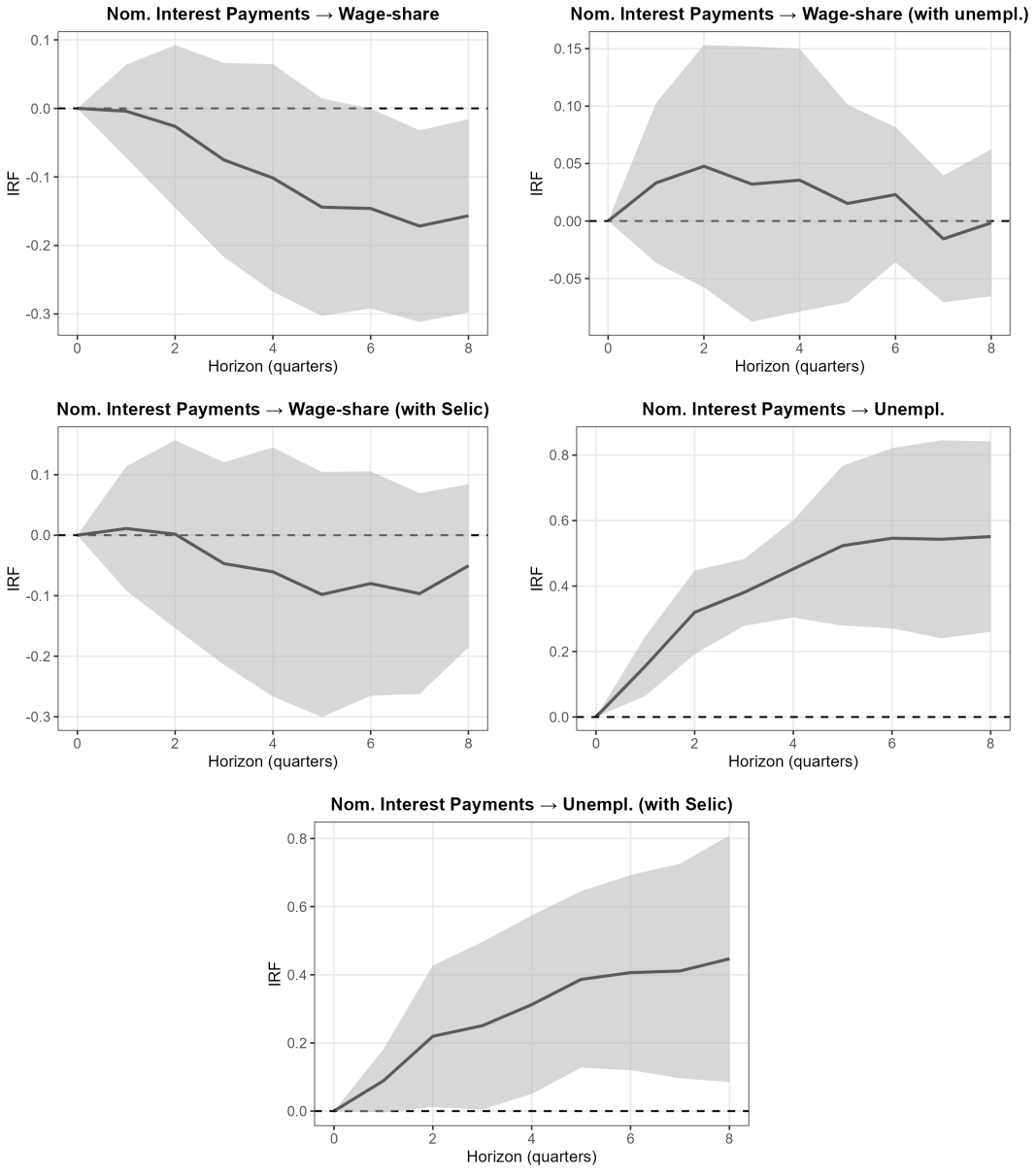
However, upon including unemployment as a control when estimating the impact of the primary balance on the wage share, a statistically significant opposite effect is observed in the quarter immediately following the shock: a reduction in the primary balance (i.e., an increase in the deficit) decreases the wage share by approximately 0.02 p.p. This effect, nevertheless, loses significance from the second quarter onwards. This dynamic can be explained by the entry of lower-income workers into the labor market. By controlling for unemployment, the employment level is effectively held constant in the model, meaning that the wage share can only fluctuate due to changes in productivity (typically a long-term phenomenon) or in the average wage. Thus, in the short term, an increase in government spending drives job creation in labor-intensive, low-wage sectors, pulling down the economy's average wage (Rugitsky, 2019). This finding further underscores the importance of the unemployment channel for wage share dynamics: the overall increase in the labor share following a 1 p.p. reduction in the primary balance is fundamentally driven by the primary balance's impact on the broader level of economic activity.

In turn, the impact of the primary balance on unemployment is positive and statistically significant, such that a 1 p.p. reduction in the primary balance is associated with a 0.5 p.p. decline in the unemployment rate by the seventh quarter.

## 4.3. Nominal interest payments

Figure 4 presents the responses of the wage share and unemployment to positive shocks in nominal interest payments. Nominal interest payments can be understood as an income transfer from the government to the wealthy, who are the primary holders of public bonds. This dynamic accounts for the negative effect on the wage share: a decline of 0.18 p.p. from the seventh quarter onwards.

Figure 4 – Impulse-Response Functions for Nominal Interest Payments Shocks




Source: Authors' elaboration

Furthermore, nominal interest payments were also associated with an increase in the unemployment rate: a rise of 0.32 p.p. as early as the second quarter, with the impact growing steadily thereafter. Consequently, when controlling for unemployment, the effect on the wage share loses statistical significance. This implies that the observed impact on the labor share of income stems from shifts in the broader level of economic activity: as unemployment rises, the employed population shrinks, and wages are potentially driven down due to the diminished bargaining power of the working class.

However, as previously discussed, given the institutional structure of the Selic market in Brazil, this estimation might also be capturing the broader effect that the interest rate level itself has on economic activity and, consequently, on income distribution. Thus, to better isolate and understand this channel, we include the Selic rate as a control variable in our estimations. Upon doing so, we observe that the effect on the wage share once again loses statistical significance, whereas the impact on unemployment remains significant from the fourth quarter onwards. The persistence of this effect on unemployment — even when controlling for the Selic rate — demonstrates that, beyond the direct impact of the interest rate level, nominal interest payments independently influence the level of economic activity. This occurs because these payments act as an income transfer to the wealthiest strata of the population (who are largely outside the working class, or represent only a tiny fraction of it), a group that saves a significant portion of this income.

## 5. Concluding Remarks

The findings of this article suggest that the impacts of public debt variations on income inequality in Brazil — measured by the wage share — depend fundamentally on the underlying components of this debt: nominal interest payments and the primary balance. Broadly speaking, we observe that an increase in the nominal deficit, which drives up indebtedness, is associated with a deterioration in the functional distribution of income. This adverse effect, however, is predominantly driven by nominal interest payments. Unemployment emerges as a central transmission channel: when controlling for the unemployment rate, the effect on the wage share loses statistical significance across most estimations. An increase in nominal interest payments can stem from a higher Selic rate, an expansion in the stock of public bonds, and from non-Selic-linked interest rates. Positive shocks to the Selic rate push up unemployment, which, in turn, diminishes workers' bargaining power and compresses the wage share. Nevertheless, the impact of nominal interest payments on inequality can go beyond this direct "Selic effect" on the labor market: since these payments effectively act as an income transfer to the wealthiest strata of the population — a group that tends to save a larger portion of its income — they dampen overall economic activity, thereby exacerbating functional income inequality.

Conversely, the results indicate that the other component of the nominal deficit — the primary balance — operates in the opposite direction. An expansion of the primary deficit (or a shrinking surplus) proved to be associated with an increase in the wage share and a decline in unemployment. Thus, rather than triggering a drop in domestic consumption and investment that hinders economic performance — the so-called crowding-out effect — our findings corroborate an alternative perspective: public spending, even when debt-financed, can stimulate economic activity

and improve income distribution, provided it is directed toward purposes other than nominal interest payments, such as public health, education services, and direct income transfers.

In light of this evidence, we conclude that fiscal adjustment policies aimed at stabilizing or reducing the debt-to-GDP ratio — while simultaneously seeking to preserve or enhance income distribution — must consider not only the trajectory of the primary balance but also the level and magnitude of nominal interest payments. Containing this latter component would require, for instance, a less restrictive monetary policy rate and a public debt profile that is less heavily indexed to the Selic rate.

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