Debt Dynamics under the New Fiscal Framework of the Brazilian Economy: Evidence from Vector Autoregressions[a]

Dinâmica da dívida sob o novo arcabouço fiscal da economia brasileira: evidências a partir de vetores autorregressivos

Henrique Bárbaro Ontivero Martins[b]
Universidade Federal de Uberlândia, Graduação em Ciências Econômicas, Uberlândia (MG), Brasil

Guilherme Jonas Costa da Silva[c]
Universidade Federal de Uberlândia, Instituto de Economia e Relações Internacionais, Uberlândia (MG), Brasil

Abstract: The New Fiscal Framework (NAF) offers new possibilities for Brazilian fiscal management, standing out for its flexibility and ability to adapt to macroeconomic conditions. This paper analyzes the impact of the NAF on the Debt/GDP ratio in Brazil, using an econometric model of Vector Autoregressions (VAR). The analysis reveals that economic growth plays a key role in stabilizing public debt, surpassing the importance of the primary surplus and interest rates. In this regard, the effectiveness of the NAF is linked to the implementation of policies that encourage investment and increase the productivity of the Brazilian economy. Therefore, the combination of economic growth with fiscal responsibility is essential for achieving the desired macroeconomic stability.

Keywords: Public Debt Dynamics. Fiscal Policy. New Fiscal Framework. Public Investment. Brazil.

Resumo: O Novo Arcabouço Fiscal (NAF) oferece novas possibilidades para a gestão fiscal brasileira, destacando-se por sua flexibilidade e capacidade de adaptação às condições macroeconômicas. Este artigo analisa o impacto do NAF na relação

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[b] henrique.b.2002@gmail.com
[c] guilhermejonas@yahoo.com.br

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Dívida/PIB no Brasil, utilizando um modelo econométrico de Vetores Autorregressivos (VAR). A análise revela que o crescimento econômico desempenha um papel fundamental na estabilização da dívida pública, superando a relevância do superávit primário e da taxa de juros. Nesse sentido, a efetividade do NAF está atrelada à implementação de políticas que incentivem os investimentos e promovam o aumento da produtividade da economia brasileira. A combinação de crescimento econômico com responsabilidade fiscal se mostra, portanto, essencial para alcançar a estabilidade macroeconômica desejada.

Palavras-chave: Dinâmica da dívida pública. Política fiscal. Novo Arcabouço Fiscal. Investimento público. Brasil.

JEL: H60. O11. O40.

1. Introduction

This article aims to analyze the New Fiscal Framework (NAF), introduced by Complementary Law Nº 200/2023, and estimate its impacts on the Brazilian economy. The main change brought by the NAF lies in the greater flexibility in managing public expenditures by the federal government, allowing adjustments in essential spending in line with increases in revenues and Gross Domestic Product (GDP). In this way, the NAF seeks to reconcile the promotion of public investments, economic growth, and a commitment to fiscal responsibility.

The article aims to conduct an empirical assessment of the NAF, highlighting the implications of its implementation for the trajectory of the debt-to-GDP ratio. Additionally, the results contribute to public policy formulation, providing insights for refining strategies that promote fiscal responsibility without undermining investment capacity, which is essential for the country's growth.

However, there are exogenous factors outside the New Fiscal Framework model that directly affect its ability to fully achieve the objectives. Firstly, on the external front, major global economies have adopted contractionary monetary policies, prompting capital outflows from peripheral markets to central markets.

Domestically, in response to international interest rate policies, the Brazilian Central Bank (BACEN) is compelled to maintain interest rates higher than global levels. Consequently, the government allocates a larger share of its budget to debt interest payments, which constrains its capacity to undertake public investments. Given this context, there is a risk of debt unsustainability due to the considerable number of variables influencing the ability to achieve the fiscal rule's objectives.

To analyze the dynamics of public debt in the short term, an econometric estimation was conducted, linking the debt ratio to key macroeconomic variables, namely economic growth, interest rate, and primary balance. The methodology employed was the Vector Autoregression (VAR) model, chosen due to the inherent endogeneity of the variables in the model. This method is particularly suited to evaluating the dynamic effects of short-term shocks on the debt-to-GDP ratio.

The article is organized into four sections, in addition to this introduction, to achieve the proposed objective. The second section presents a review of the theoretical and empirical literature. The third section focuses on the

characterization of the Brazilian economy. Next, the new fiscal framework is detailed, highlighting critical points and current challenges. The fifth section outlines the methodology, data set, and empirical results. Finally, the last section provides the concluding remarks.

2. Literature Review

In an economy in which the financial system uses government bonds as a store of value, government default or an increased risk of nonpayment can lead to the insolvency of financial institutions within the credit circuit. This scenario negatively affects savers' income and heightens risks associated with economic activities. Additionally, external debt exacerbates the dangers of indebtedness, increasing the country's vulnerability to external shocks and undermining its fiscal independence (Blanchard, 2019).

According to Barro (1974), an increase in public debt tends to raise domestic interest rates. This phenomenon, known as the crowding-out effect, occurs when high public interest rates limit the scope for private investment. Eventually, reduced private investment can hinder economic development, as it is historically linked to productivity growth through innovation.

The understanding of the effect of the new theoretical framework on indebtedness and taxtion is directly related to Brazil’s fiscal management capacity, and economic conjecture.

Based on an analysis of various fiscal adjustments implemented by OECD countries, Alesina and Perotti (1996) concluded that contractionary fiscal adjustments, particularly structural ones such as reducing expenditures on public sector salaries and social programs, are the most sustainable approach to lowering public deficits. In contrast, cuts in expenditure such as public investments or increases in taxes tend to produce only temporary effects on fiscal balance and are more likely to have a pronounced recessive impact on output.

One way to enhance agents' confidence in the fiscal framework is by adopting fiscal rules that ensure transparency and predictability. Debrun and Kumar (2007) argue that these rules should include clear constraints on key fiscal health indicators, such as public debt levels and the primary balance. According to

the authors, these constraints help mitigate deficit bias, fostering a more stable fiscal environment.

The equation for public debt dynamics illustrates the relationship between the government's fiscal balance, the implicit interest rate on public debt, and economic growth in shaping debt evolution. Carlin and Soskice (2015) present this relationship through the following formula:

$$\dot{b} = d + b(r - \hat{y})$$

where:

- $\dot{b}$ represents the variation in the Debt-to-GDP ratio in the period;
- d represents the primary balance as a percentage of GDP;
- b represents the accumulated value of the Debt-to-GDP ratio;
- $\hat{y}$ represents the real growth of Gross Domestic Product (GDP); and
- r represents the real interest rate implicit in the debt.

Note that the relationship between macroeconomic variables and indebtedness is determined by the economic growth rate, real interest rates, and the primary surplus, with the coordination between fiscal and monetary policies being essential to control public debt.

3. Economic Outlook of the Brazilian Economy

3.1 From the Fiscal Responsibility Law to the Spending Cap

The fiscal rules in Brazil have a history marked by successive attempts to achieve fiscal and economic balance. Currently, the three main frameworks that structure this scenario are the Fiscal Responsibility Law (LRF), Spending Cap, and the New Fiscal Framework.

Implemented in 2000, the LRF introduced fiscal targets as a budgetary control tool, requiring the Budget Guidelines Law (LDO) to establish specific primary balance targets for the Union on an annual basis. Between 1999 and 2014, as a strategy to control public debt and mitigate inflationary risks, the Brazilian state adopted a conservative economic policy, known as the macroeconomic tripod, which prioritized, among other objectives, the achievement of primary surpluses. However, starting in 2014, the combination of an economic crisis, rising

uncertainty, and accelerating inflation led the country to record primary deficits. This shift was driven by the adoption of counter-cyclical policies aimed at mitigating the effects of the economic downturn.

In this context, in response to the fiscal crisis, Constitutional Amendment Nº 95/16 was approved in 2016, which established the Spending Cap. This constitutional amendment limited the growth of primary expenditures to the inflation rate of the previous year (Brazil, 2016). While the goal was to stabilize public finances, the Spending Cap faced criticism for its rigidity, especially during periods of low economic growth.

The Spending Cap established a strict regime for increasing primary expenditures, limiting the annual adjustment to the previous year's inflation rate (IPCA), and preventing real increases during its duration, with the goal of promoting, in the long term, the rebalancing of public finances. However, this rigidity was widely criticized, particularly in the recessionary context of 2016, when fiscal contraction may have exacerbated the negative economic cycle. The reorganization of public spending under this constraint focused primarily on reducing discretionary spending, significantly compromising the capacity for public investment (Gomes *et al.*, 2020).

Additionally, high public debt, common in advanced economies whose sustainability depends on market confidence and the high liquidity of their currencies, presents specific challenges for Brazil. Brazil's ability to sustain an elevated level of indebtedness is more limited compared to core countries due to the low liquidity of the real in global markets and the higher risk perception associated with Brazilian government bonds (Cintra, 2005).

3.2 Financing Development: The Challenges of Fiscal Policy in Brazil

During the period from 1930 to 1980, debt played a key role as a source of funding for infrastructure investments promoted by the state, as well as stimulating industrial growth by creating an environment favorable to such productive activities. However, this process led to a reduction in the economic growth rate, as evidenced in the last decades of the 20th century.

According to Canuto (2014), the commodity boom cycle enabled successive trade surpluses, which helped reduce dependence on external capital.

This favorable period allowed the Brazilian economy to make progress in stabilization and reduce interest rates compared to the 1990s. However, Canuto argues that, during this positive scenario, the necessary reforms were not made to prepare the domestic production structure to face the end of this favorable cycle. As a result, the end of the commodity boom brought a significant challenge for the government to maintain the level of spending previously practiced.

Thus, the elevated level of indebtedness in Brazil leads to an increase in the risk premium required by the market for purchasing government bonds. This, in turn, exerts pressure on the cost of borrowing in the public budget, compromising the state's ability to make productive expenditures.

Since 2014, Brazil's public debt has shown a consistent upward trend, reaching 79% of GDP in 2024. This increase is primarily due to the persistence of primary deficits and high interest rates, which raise the cost of debt and create a feedback loop (National Treasury, 2024).

Historically, public indebtedness in Brazil has been closely tied to the need to control inflation through interest rates, which amplifies the volatility of debt costs during periods of rate increases (Faria, 2010). This dynamic limits the autonomy of Brazil's fiscal policy, increasing debt burdens during monetary contraction. In contrast, developed countries often issue debt with fixed rates and longer terms, which provides greater stability for their public budgets.

The current scenario in Brazil reflects this trend, highlighted by the significant increase in the share of post-fixed bonds over time. On the other hand, the Brazilian economy faces another critical challenge: the low investment rate, which hinders the development of a competitive and sustainable domestic production structure. In 2022, the investment rate as a percentage of GDP was 17.8% in Brazil, significantly lower than the global average of 26.2% and the average of developed countries, which was 33.7% (Faria, 2024). This situation reflects the historical lag in gross fixed capital formation (GFCF).

Political and economic instability significantly impacts investment decisions, creating an adverse environment for the private sector. Luporini and Alves (2016) argue that both political instability and indebtedness function as barriers to private investment in Brazil, highlighting the need for government policies that promote greater macroeconomic stability to increase investor confidence.

According to Orair (2016), the Brazilian budget has a rigid structure, and the limitations imposed by fiscal rules worsen this scenario, restricting the ability to make significant public investments. In this context, in 2016, with the implementation of the Spending Cap, the Brazilian state's capacity to expand public investments was further reduced (Ferreira; Bertussi, 2024).

One of the main obstacles to achieving the goal of a zero primary deficit is the mandatory spending of the Union, especially those related to social security and welfare. This structure has shown constant growth in recent years due to structural factors, such as demographic aging and economic policy, with the accumulated appreciation of the minimum wage standing out. In 2023, the total deficit of public pension systems reached 428 billion reais, representing a 9.1% increase compared to 2022 (Costanzi, 2023).

This evolution of expenditure limits the state's ability to expand public investments while striving to maintain fiscal sustainability. Medes and Costanzi (2024) project that social security expenses under the General Social Security Regime (RGPS) and the Continuous Cash Benefit (BPC) will exceed the 2024 budget by 20 billion reais, requiring significant cuts in other areas to meet spending targets. A reflection of this budgetary pressure is the 6.8% growth, which exceeds the real increase in primary expenditure projected by the New Fiscal Framework.

4. The New Fiscal Framework (NAF) of the Brazilian Economy

4.1 The Logic of the New Fiscal Framework

The New Fiscal Framework (NAF), established by Complementary Law Nº 93/2023, replaces the Spending Cap introduced by Constitutional Amendment Nº 95/2016, aiming to overcome limitations such as long-term spending rigidity and restrictions on adapting public expenditures during periods of economic recession (Brazil, 2023). The NAF sets a target for public spending growth between 0.6% and 2.5% per year to prevent unbalanced expansions that could jeopardize fiscal sustainability. If the primary balance target is met, public spending growth may reach up to 70% of revenue growth. In cases of non-compliance, spending growth will be limited to 50% of the real growth in primary revenue, encouraging gradual achievement of fiscal targets over time (Brazil, 2023).

The NAF's main objectives are to promote macroeconomic stability, control public debt, and direct strategic investments in areas such as infrastructure and social programs. The New Fiscal Framework was designed to replace the spending cap by combining limits on the growth of primary expenditures with fiscal targets, aiming to stabilize public debt and foster economic growth. However, the framework's success depends on long-term economic growth acceleration, while the resources required for its viability remain constrained.

Although the proposal offers greater flexibility and places economic growth as a central variable, the resources available for investment are insufficient and restricted by the fiscal rule itself. The PAC III program, deemed strategic for economic acceleration, faces limitations imposed by the fiscal rule. To overcome these challenges, improved coordination among federal government programs is recommended to align fiscal targets with economic growth.

The New Fiscal Framework is groundbreaking in linking fiscal sustainability to economic growth. However, it faces a dilemma: its success hinges on resources that it simultaneously restricts, highlighting the need for adjustments to ensure its feasibility.

4.2 Public Spending, Fiscal Flexibility and Primary Result Targets

The New Fiscal Framework has faced substantial criticism and challenges, particularly due to uncertainties regarding the fulfillment of the established fiscal targets (Marques *et al.*, 2023). One of the main difficulties lies in the ongoing pressure to increase revenue, as it is necessary to sustain the growth of public spending. If revenue does not keep pace with the expansion of expenditure, the model's viability comes into question, risking its credibility (Castelar; Matos, 2023).

This challenging scenario is reflected in the initial results of 2024, which indicate difficulties in meeting fiscal targets and controlling debt indicators. From January to July 2024, the accumulated primary deficit was R$ 76.9 billion, surpassing the R$ 68.7 billion deficit recorded in the same period of 2023. This increase in the deficit, coupled with the pressure for revenue growth, reinforces the need for structural adjustments and effective coordination between fiscal and monetary policies to ensure the long-term sustainability of the model.

The challenge faced by the federal government in containing the expansion of public spending has intensified with a 10.5% increase in expenses in the first half of 2024, while revenue grew only 8% during the same period. To meet the spending cap established by the NAF and the target of a zero primary deficit, a reduction of R$ 36 billion in expenses would be required between August and December 2024 (Federal Senate, 2024).

The persistent fiscal deficit, coupled with the increase in gross public debt, which rose from 76.7% of GDP in 2023 to an estimated 78.6% in October 2024 (Central Bank of Brazil, 2024), is exacerbated by high real interest rates, which significantly raise the cost of debt. This combination results in growing pressure on the public budget, making it even more challenging to achieve a sustainable fiscal trajectory overall.

However, there was a favorable update in the GDP projection. According to the Central Bank, the GDP growth forecast was revised to 3.49% for 2024, driven by the increase in domestic demand, particularly household consumption. Despite this improvement, unforeseen events during 2024 exacerbated the fiscal crisis, such as the impact of the emergency in the state of Rio Grande do Sul and the cost of early settlement of *precatórios*, which required an additional budget adjustment to meet the targets set by the NAF.

4.3 Criticisms of the New Fiscal Framework: Challenges and Perspectives

The New Fiscal Framework (NAF) in Brazil faces significant challenges in the interaction between fiscal policy and the monetary guidelines set by the Central Bank of Brazil (BACEN). The enactment of Complementary Law No. 179 of 2021, which granted greater autonomy to BACEN, led to substantial changes in the management of fiscal policy. However, Rodriguez (2024) points out that the effectiveness of monetary policy can negatively impact fiscal policy by creating financial hegemony, making BACEN's decisions more vulnerable to the demands of the financial market. The influence of speculative fluctuations in the financial sector undermines the long-term planning required for the implementation of the fiscal rule, making it more difficult to achieve its fiscal objectives.

Alves (2024) complements this analysis by highlighting that the lack of coordination between the objectives of fiscal and monetary policies reduces the

government's ability to adapt in adverse scenarios. Although the autonomy of the Central Bank (BACEN) is beneficial for monetary stability, it is essential that monetary policy takes national development needs into account. Decisions regarding the benchmark interest rate directly affect the financing of social policies and public investments, reflecting on the NAF, where the balance between fiscal and monetary policies results in a larger portion of the budget being allocated to public debt payments.

Furthermore, the rise in interest rates in major international markets, especially in the United States, contributes to the high-interest rate policy in Brazil. This intensifies capital outflows due to the opportunity cost, putting pressure on the Central Bank (BACEN) to increase the Selic rate. Rey (2015) emphasizes that the global monetary contraction scenario makes it difficult to harmonize internal strategies with external demands, increasing the cost of financing investments, slowing down the economy, and raising public debt servicing costs.

The tax reform proposed by PEC 45/2019 also has a direct impact on the NAF by influencing economic growth potential and tax revenue. According to the Federal Court of Accounts (2023), simplifying the tax system and reducing exceptions could increase Brazil's GDP by 12% in the long term, contributing to the sustainability of public debt.

Although the NAF has the potential to increase public investments, its viability depends on a substantial increase in economic growth and revenues. The fiscal deadlock arises due to the growth of budgetary expenditures and the rise in public debt costs. Even with the definition of a minimum limit for investments, the restriction on discretionary spending makes it difficult for the state to implement a more assertive economic policy.

Finally, the analysis of long-term interest rate curves in Brazil indicates an increase in rates, reflecting recurring primary deficits in 2024. Uncertainties persist regarding the implementation of an adjustment package that ensures the achievement of fiscal targets for 2024 and the continuation of the NAF implementation until 2026.

5. Econometric Analysis

5.1 Description of Data and Variables

In this paper, the data were obtained from official sources of the Brazilian Federal Government. Information on Gross Debt as a percentage of GDP and primary fiscal result as a percentage of GDP was extracted from the Brazilian Central Bank portal. Data on the implicit interest rate of the general government's gross debt and GDP growth were collected from the IPEADATA portal. The main variable to be analyzed is the debt/GDP ratio. All explanatory variables have a monthly frequency and cover the period from January 2007 to August 2024.

5.2 Econometric Methodology (VAR)

The Vector Autoregressive (VAR) Model stands out for its ability to capture the temporal interdependence between the variables in the model. The results are explained by the lags of the variable itself and the lags of the other variables included in the model (Lütkepohl, 2005). This characteristic differentiates the VAR from other commonly used methods, as it allows capturing of simultaneous and dynamic relationships over time between the analyzed variables (Enders, 1995).

5.3 Results

The existence of a unit root in the variables was analyzed using the Augmented Dickey-Fuller (ADF) test. The variables examined were GDBGGPIB, GPIB, GRPRIM, and JUROSREAL. All variables showed significantly negative t-statistics and p-values equal to zero, indicating the rejection of the null hypothesis of a unit root. Therefore, it is inferred that all series are stationary at levels and can be used in the estimations without the need for differencing.

Table 1 – Augmented Dickey-Fuller Stationarity Test

Discrimination	Lag	Constant	Trend	T-statistic	Probability
GDBGGPIB	1	No	No	-6.910872	0.0000
GPIB	0	Yes	No	-5.412892	0.0000
GRPRIM	0	No	No	-14.59625	0.0000
JUROSREAL	0	Yes	No	-9.735318	0.0000

Source: Own Elaboration Based on Eviews 13 Output.

The Wald test for block exogeneity highlights the relevance of the variables in the statistically consistent ordering of the VAR equations. According to the Chi-square result, the correct order for entering the variables into the model is JUROSREAL, GDBGGPIB, GPIB, and GRPRIM.

Table 2 – Wald Test for Variable Exclusion (Granger Causality)

Dependent Variable	Chi-sq	df	Prob.
JUROSREAL	33.55103	3	0.0000
GDBGGPIB	19.96908	3	0.0002
GPIB	9.896460	3	0.0195
GRPRIM	0.813068	3	0.8463

Source: Own Elaboration Based on Eviews 13 Output.

The lag order was determined by the Akaike, Schwarz, and Hannan-Quinn criteria. The results point to the use of one lag, according to the SC and HQ criteria. The use of this specification is crucial to ensure the correct fitting of the model to the properties of the variables.

Table 3 – VAR Lag Order Selection Criteria

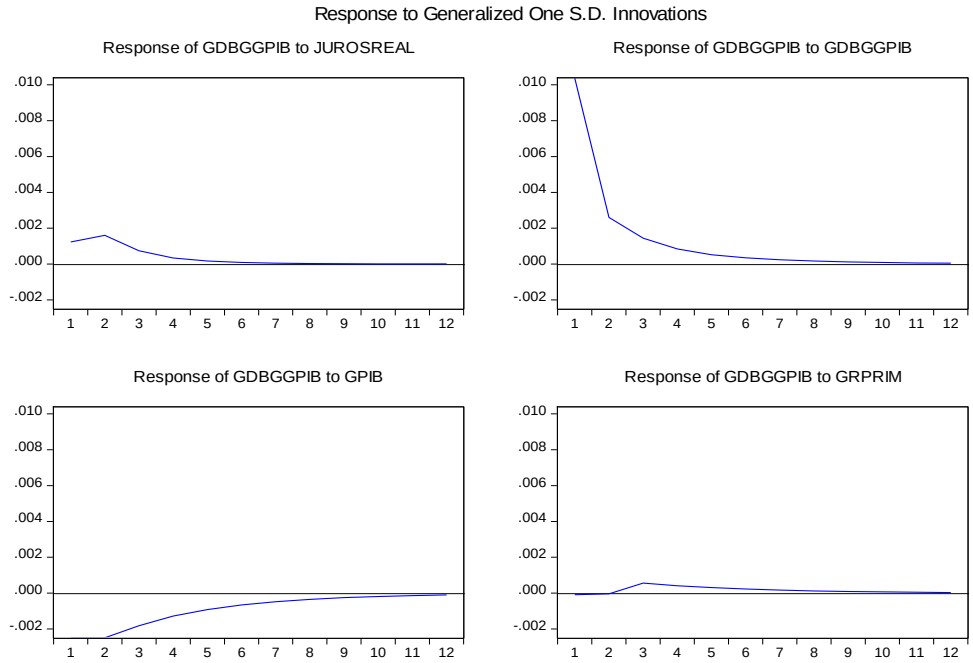
Lag	AIC	SC	HQ
0	16.25207	16.31604	16.27793
1	15.27889	15.59873*	15.40821*
2	15.27236*	15.84807	15.50512
3	15.36812	16.19971	15.70434
4	15.37930	16.46676	15.81897

Source: Own Elaboration Based on Eviews 13 Output.
Notes: (*) Indicates the lag order selected by the corresponding criterion.
AIC: Akaike Information Criterion.
SC: Schwarz Criterion.
HQ: Hannan-Quinn Criterion.

The results of the impulse-response function highlight the interactive effects on GDBGGPIB. Shocks to GDBGGPIB itself show a significant initial impact, which gradually diminishes and stabilizes near zero from the fifth month. In contrast, shocks to GPIB generate a negative initial impact that intensifies over the following periods, stabilizing only in the tenth period, indicating a more lasting

repercussion. Finally, the response of GDBGGPIB to shocks in GRPRIM reveals reduced impacts, with modest repercussions and rapid adjustment, indicating a weak relationship between these variables in the short term. Impulses from JUROSREAL show an immediate positive influence, though of small magnitude, which dissipates quickly and reaches stability by the end of the estimation. This indicates that its effects are temporary.

Figure 1 – Response Function of the DIV/GDP Growth Rate to a Shock in the Selected Variables



Source: Own Elaboration Based on Eviews 13 Output.

Table 4 presents the variance decomposition, revealing that GDP growth (GPIB) is the main explanatory variable of GDBGGPIB, accounting for 8.46% of the total in the twelfth month. This result highlights the importance of economic growth in the dynamics of debt, given its direct impact on production, demand, investment, and tax revenue. Policies that stimulate growth play a key role in the economy, as they can promote strategic public investments and contribute to the expansion of primary surpluses.

The results show that GDP growth (GPIB) has a more significant impact on debt growth compared to other determinants, such as the debt interest rate and the primary balance, reinforcing the thesis that a well-planned investment strategy is

essential to contain the increase in the debt-to-GDP ratio. In contrast, variables such as the implicit interest rate of gross debt (JUROS REAL), which reached 3.63% in the twelfth month, and the growth rate of the primary balance (GRPRIM), limited to only 0.69%, have less relevance in explaining the dynamics of the debt.

In summary, the strategic coordination of economic policy, focused on stability, must be aligned with the creation of a productive environment that promotes the sustainable growth of the Brazilian economy.

Table 4 – Variance Decomposition of GDBGGPIB (%)

Period	S.E.	JUROSREAL	GDBGGPIB	GPIB	GRPRIM
1	0.010379	1.398555	98.60145	0.000000	0.000000
2	0.011025	3.349496	92.22290	4.303918	0.123684
3	0.011265	3.636799	89.79193	6.382601	0.188665
4	0.011365	3.662932	88.72186	7.389931	0.225274
5	0.011412	3.654645	88.19590	7.903249	0.246209
6	0.011435	3.645922	87.92610	8.170152	0.257822
7	0.011447	3.640368	87.78513	8.310360	0.264146
8	0.011453	3.637202	87.71082	8.384420	0.267554
9	0.011456	3.635465	87.67150	8.423658	0.269380
10	0.011458	3.634528	87.65064	8.444480	0.270356
11	0.011459	3.634025	87.63956	8.455540	0.270876
12	0.011459	3.633757	87.63367	8.461418	0.271153

Source: Own Elaboration Based on Eviews 13 Output.

Table 5 shows that, over the periods, the cumulative effect of JUROSREAL on GDBGGPIB is positive, although small and increasing, while the impact on GPIB is negative, with a progressive decrease, and the effect on GRPRIM is slightly positive, also showing an increasing trend. These results provide insights for analyzing the short-term dynamics between these variables in the model, allowing for a better understanding of how different shocks propagate over time.

Table 5 – Cumulative Impulse Response of GDBGGPIB

Period	JUROSREAL	GDBGGPIB	GPIB	GRPRIM
1	0.001227	0.010306	0.000000	0.000000
2	0.002829	0.012733	-0.002287	-0.000388
3	0.003566	0.014093	-0.003981	-8.93E-05
4	0.003907	0.014897	-0.005183	0.000138
5	0.004075	0.015406	-0.006047	0.000310
6	0.004164	0.015744	-0.006673	0.000438
7	0.004215	0.015978	-0.007126	0.000533
8	0.004247	0.016143	-0.007457	0.000603
9	0.004268	0.016261	-0.007697	0.000654
10	0.004283	0.016347	-0.007872	0.000691
11	0.004293	0.016408	-0.008000	0.000718
12	0.004300	0.016453	-0.008093	0.000738

Source: Own Elaboration Based on Eviews 13 Output.

The impact of a shock equivalent to one standard deviation in the variables JUROS REAL, GRPRIM, and GPIB on the debt-to-GDP ratio is assessed based on an initial reference value for this debt relationship. For this study, the value from October 2024, 78.6%, is used, which is then multiplied by the accumulated response coefficient to estimate the total shock effect.

The results presented in Table 6 indicate that the effect of GRPRIM on the debt-to-GDP ratio is small in the short term, corresponding to an increase of only 0.0580%. This result contradicts the initial hypothesis that an increase in the primary surplus would have a significant impact on the debt relationship. On the other hand, JUROS REAL shows a significant positive effect, increasing the debt-to-GDP ratio by 0.3106%. However, this impact is half of GPIB's effect, which moves in the opposite direction, presenting the largest effect among the analyzed variables, reducing the debt relationship by -0.6361%.

Thus, it is observed that, while the implicit real interest rate on debt (JUROS REAL) has a significant impact, GDP growth (GPIB) exerts a much stronger influence. In contrast, the growth of the primary surplus (GRPRIM) has made an insignificant contribution in the short run, according to the estimates made using the VAR model.

Table 6 – Cumulative Impact of Shocks on the Determinants of the Debt-to-GDP Ratio

Shock	Δ Debt-to-GDP Equation	Impact on Debt-to-GDP	Effect on the Relationship
JUROSREAL	78,6 + (0,004300 × 78,6)	0,3106	Increase to 78,9106%
GRPRIM	78,6 + (0,000738 × 78,6)	0,058	Increase to 78,6580%
GPIB	78,6 + (-0,008093 × 78,6)	-0,6361	Reduction to 77,9639%

Source: Own Elaboration Based on Eviews 13 Output.

The study conducted by Salomão and Silva (2019) provides a theoretical contribution that directly complements the empirical findings of this paper. According to the authors, economic expansion can be stimulated without the need for a strategy of excessive public spending, if the allocation of resources is done efficiently, particularly in high-quality government investments.

In this context, the evidence identified in this paper, which highlights GDP growth as the main variable controlling the debt-to-GDP ratio, finds theoretical support by suggesting that the dynamics of public debt do not depend solely on the scale of public spending, but rather on its configuration and effectiveness. In other words, the return on public spending in terms of economic growth must exceed the cost of raising additional resources through state borrowing.

Silva *et al.* (2024) developed a mathematical model capable of replicating the New Fiscal Framework (NAF) presented by the federal government, aiming to capture the effects of this fiscal rule on the dynamics of public debt. The authors concluded that the main factor in stabilizing the debt within the NAF is economic growth, as it is related to the government's revenue capacity and the consequent improvement in fiscal health. Furthermore, the resources allocated to PAC III were classified as essential and highly efficient expenditures, being crucial for boosting the growth of the Brazilian economy.

However, Silva *et al.* (2024) highlight a significant discrepancy between the promised resources for PAC III and the budget allocated for investments under the NAF. Even in a favorable economic scenario, the difference between the PAC III budget (R$ 370 billion) and the investments allowed by the NAF (R$ 311 billion) ranges from R$ 60 billion to R$ 70 billion. This discrepancy becomes even more

evident as the annual growth of the product increases. Although PAC III is considered essential for driving long-term economic growth, the constraints imposed by the public budget and the NAF ceiling make it difficult to conduct public investments on the planned scale.

Gadelha *et al.* (2023) estimate that, with the moderate growth rate of the Brazilian economy and without a tax reform that significantly increases revenues, the DBGG/PIB ratio is expected to reach 84% by 2026, surpassing the initial targets set in the New Fiscal Framework (NAF). This suggests that, even with a reform of public spending, debt growth will persist due to low economic dynamism and inflationary pressure, which forces the Central Bank to maintain interest rates at elevated levels. In this scenario, meeting the NAF's targets appears unfeasible, as it relies on a set of favorable economic conditions, such as increased public investment, more robust economic growth, and higher public revenues.

The New Fiscal Framework (NAF), implemented by Complementary Law No. 200/2023, aims to provide a more flexible fiscal structure that adapts to the context of low investments in the Brazilian economy. However, the NAF faces a challenging scenario for controlling indebtedness due to the cycle of rising interest rates adopted to curb inflationary pressure. As a result, significant fiscal effort will be required, which may further restrict discretionary spending, especially those allocated to government investments. Furthermore, the autonomy of the Central Bank favors the implementation of a conservative monetary policy, potentially causing disharmony with fiscal policy and compromising the effectiveness of the economic plan. As demonstrated throughout the study, the increase in interest rates puts pressure on public debt expenditures, negatively impacting the budget.

The results obtained from the VAR model in this study contrast with those of Salomão (2023) regarding the importance of the primary result for the trajectory of public debt. The developed VAR model highlights economic growth as the main factor for reducing the debt-to-GDP ratio, suggesting that an increase in the primary surplus, on its own, is not sufficient to ensure the stabilization of indebtedness.

The approaches emphasize that fiscal conservatism should be practiced without excessive rigidity and that strategies need to be adopted to reconcile fiscal responsibility with sustainable long run growth. The divergence between the studies arises from the different methodologies used. The VAR model highlights

the predominance of the short-term effects of variables in determining the debt-to-GDP ratio, while Salomão, through the TAR and Markov models, estimates the optimal level of the primary result. Despite these differences, the results complement each other by highlighting that, in addition to the primary surplus, the credibility of fiscal policy, the ability to adapt to shocks, and the promotion of a stable economic environment are crucial elements for ensuring the long-term resilience of Brazilian public finances.

6. Final Remarks

This paper aimed to advance to the debate on the New Fiscal Framework (NAF) by integrating fiscal rules into the methodology of Vector Autoregressions (VAR). The application of VAR allowed for understanding the short-term connections between the variables debt/GDP, economic growth, fiscal balance, and interest rates, highlighting the impacts of these variables on the debt relationship, and capturing the dynamic repercussions of fiscal and monetary policies on public debt.

The analysis indicates that, despite the greater fiscal flexibility provided by the New Fiscal Framework (NAF), controlling the exponential trajectory of the debt/GDP ratio fundamentally depends on economic stability, public investments, and sustainable GDP growth. The latter is essential for increasing public revenue, becoming a central element for long run fiscal management.

The paper contributed to the evaluation of the NAF, highlighting its benefits and weaknesses, while also suggesting alternatives for achieving fiscal goals, always with a focus on sustainable growth. Moreover, primary results indicate that reforms aimed at controlling expenditure have a limited impact on slowing down the public debt cycle in the short term. In contrast, interest rate reductions, although beneficial, play a complementary and secondary role compared to the effect of economic growth on the debt/GDP trajectory.

Although challenges remain, the NAF demonstrates the ability to correct the flaws of the "Spending Cap," offering a more balanced structure adapted to the reality of the Brazilian economy. To achieve this, it will be crucial to ensure greater alignment between fiscal and monetary policies, enhancing the security of the country’s economic system and consolidating, institutionally, the Brazilian

government's competence to make public investments without compromising budgetary health.

In summary, these findings emphasize the importance of economic plans that encourage investment, labor productivity, and sustainable economic growth in Brazil. These factors are critical for overcoming recurring economic uncertainties and fiscal pressures, which are common in economies with incomplete productive development. For future research, it is recommended to expand the range of variables used in econometric estimation to identify the impacts of other parameters on public debt, such as exchange rate fluctuations, international commodity prices, growth rates of Brazil's main trading partners, and international interest rates.

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