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Essays on Fiscal Rules, Polarization and Inequality

Orientadora: Profa. Laura de Andrade Karpuska Santos

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Linhas de Pesquisa: Macrofinanças

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Dedico este trabalho aos meus pais, que me deram muito além do que eles próprios tiveram.

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RESUMO

Essa tese é composta por dois artigos, todos explorando as interconexões entre regras fiscais e desigualdade social e polarização política.

O primeiro capítulo investiga o impacto que a adoção de regras fiscais tem na desigualdade de renda, polarização política e outras variáveis sociais para um painel de quase 200 países ao longo de 30 anos. Adota-se uma estimação por local projections com instrumento (LP-IV) para endereçar a questão da endogeneidade e é encontrado que a adoção de regras fiscais reduz a desigualdade de renda, com a desigualdade de renda antes de impostos e transferência tendo uma melhora maior do que a desigualdade de renda após impostos e transferências. Isso sugere que as regras fiscais inicialmente contribuem para a estabilidade macroeconômica e o crescimento da atividade econômica, o que, posteriormente, fortalece o poder redistributivo do governo. As regras fiscais estão associadas a aumentos significativos no risco político e na polarização. Esses resultados fornecem novas evidências sobre os efeitos heterogêneos das regras fiscais, enfatizando a importância de considerar suas consequências estabilizadoras, distributivas e políticas ao avaliar sua eficácia geral, especialmente em economias com alta desigualdade ou quando as regras fiscais enfrentam resistência por parte dos eleitores.

O segundo capítulo examina o cumprimento da Lei de Responsabilidade Fiscal do Brasil pelos municípios, utilizando um novo painel de indicadores de “descumprimento de fato” que captura violações diretas e manobras contábeis (“restos a pagar”, reclassificação de despesas) para mais de 2.000 municípios entre 2015 e 2024. Analisamos três casos: o cumprimento fiscal geral, o cumprimento da Regra de Caixa de fim de mandato e o cumprimento do teto de 60% para despesas com pessoal, com foco na capacidade fiscal, na concentração política e no desenvolvimento social. A receita per capita surge como o preditor mais forte: um aumento de R\$ 1.000 reduz o descumprimento em cerca de 2,6 pontos percentuais. Embora a concentração política geral não tenha efeito consistente sobre o cumprimento, no caso da regra de despesa com pessoal ela está associada a maior descumprimento em municípios com níveis mais altos de desenvolvimento socioeconômico. O componente de renda do desenvolvimento humano, ao contrário da educação ou da saúde, condiciona essas relações, indicando que a capacidade econômica sustenta tanto o cumprimento direto quanto interage com as estruturas de poder local para moldar a aplicação das regras.

Palavras-chave: Política Fiscal. Regras Fiscais. Desigualdade. Polarização Política.

ABSTRACT

This dissertation comprises two papers, both exploring the interconnections between fiscal rules, social inequality, and political polarization.

The first chapter investigates the impact of fiscal rule adoption on income inequality, political polarization, and other social variables for a panel of nearly 200 countries over a 30-year period. The analysis employs local projections with an instrumental variable (LP-IV) to address endogeneity concerns and finds that fiscal rule adoption reduces income inequality, with pre-tax-and-transfer income inequality improving more than post-tax-and-transfer inequality. This suggests that fiscal rules initially contribute to macroeconomic stability and economic activity growth, which subsequently strengthens the government's redistributive capacity. Fiscal rules are also associated with significant increases in political risk and polarization. These findings provide new evidence on the heterogeneous effects of fiscal rules, underscoring the importance of considering their stabilizing, distributional, and political consequences when assessing their overall effectiveness, particularly in economies with high inequality or when fiscal rules face voter backlash.

The second chapter examines municipal compliance with Brazil's Fiscal Responsibility Law using a novel panel of "de facto non-compliance" indicators that capture outright violations and accounting maneuvers ("restos a pagar," expenditure reclassification) for over 2,000 municipalities from 2015 to 2024. We analyze three cases: general fiscal compliance, compliance with the end-of-term Cash Rule, and compliance with the 60% personnel-expenditure cap, focusing on fiscal capacity, political concentration, and social development. Per-capita revenue emerges as the strongest predictor: a R\$ 1,000 increase reduces non-compliance by about 2.6 percentage points. While overall political concentration has no consistent effect on compliance, for the personnel-expenditure rule it is associated with higher non-compliance in municipalities with higher levels of socioeconomic development. The income component of human development (unlike education or health) conditions these relationships, indicating that economic capacity both underpins direct compliance and interacts with local power structures to shape rule enforcement.

Keywords: Fiscal Policy. Fiscal Rules. Inequality. Political Polarization.

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INTRODUCTION

This thesis is composed of two self-contained chapters in macroeconomics and political economy, each exploring the connection between fiscal rules and inequality and polarization.

The first chapter investigates the impact of fiscal rule adoption on income inequality, political polarization, and other social variables for a panel of nearly 200 countries over a 30-year period. The analysis employs local projections with an instrumental variable (LP-IV) to address endogeneity concerns and finds that fiscal rule adoption reduces income inequality, with pre-tax-and-transfer income inequality improving more than post-tax-and-transfer inequality. This suggests that fiscal rules initially contribute to macroeconomic stability and economic activity growth, which subsequently strengthens the government's redistributive capacity. Fiscal rules are also associated with significant increases in political risk and polarization. These findings provide new evidence on the heterogeneous effects of fiscal rules, underscoring the importance of considering their stabilizing, distributional, and political consequences when assessing their overall effectiveness, particularly in economies with high inequality or when fiscal rules face voter backlash.

The second chapter examines municipal compliance with Brazil's Fiscal Responsibility Law using a novel panel of "de facto non-compliance" indicators that capture outright violations and accounting maneuvers ("restos a pagar," expenditure reclassification) for over 2,000 municipalities from 2015 to 2024. We analyze three cases: general fiscal compliance, compliance with the end-of-term Cash Rule, and compliance with the 60% personnel-expenditure cap, focusing on fiscal capacity, political concentration, and social development. Per-capita revenue emerges as the strongest predictor: a R\$ 1,000 increase reduces non-compliance by about 2.6 percentage points. While overall political concentration has no consistent effect on compliance, for the personnel-expenditure rule it is associated with higher non-compliance in municipalities with higher levels of socioeconomic development. The income component of human development (unlike education or health) conditions these relationships, indicating that economic capacity both underpins direct compliance and interacts with local power structures to shape rule enforcement.

Overall, this thesis contributes to the understanding of how fiscal rules shape economic, social, and political outcomes. By combining cross-country evidence with detailed municipal-level analysis, it highlights the heterogeneous effects of fiscal frameworks—showing that while fiscal rules can promote macroeconomic stability and support redistributive capacity, they may also influence political dynamics and interact with local institutional and economic conditions. These findings provide novel insights for the design and evaluation of fiscal rules, particularly in contexts of high inequality or political polarization.

1 FISCAL RULES, INEQUALITY AND POLARIZATION: EMPIRICAL EVIDENCE

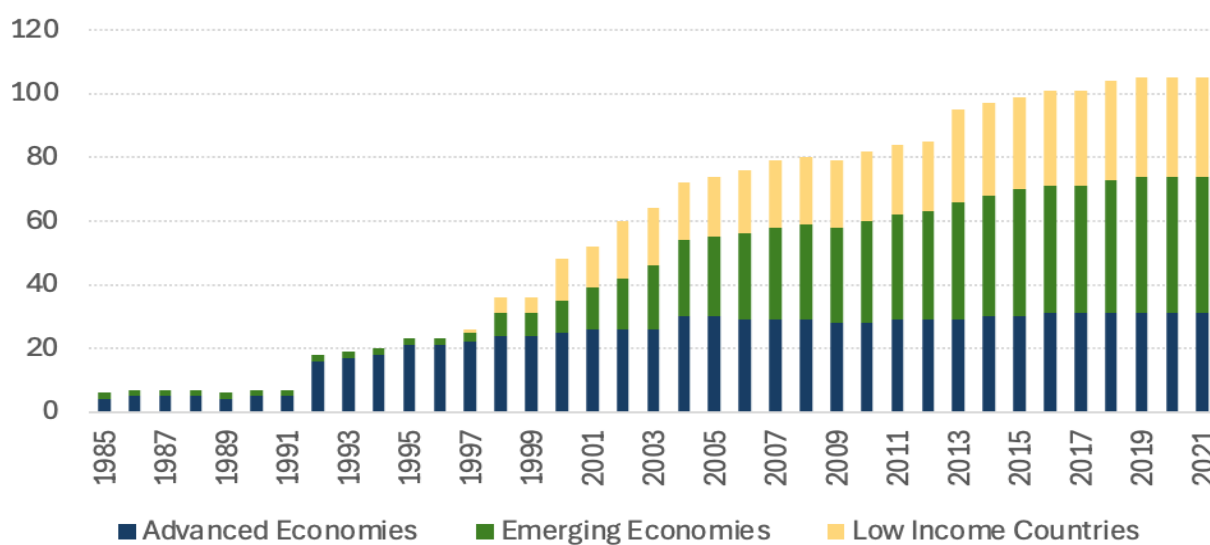
Resumo

This paper empirically investigates the impact of fiscal rules on income inequality, political risk, and polarization. Using the local projections method with an instrumental variable (IV) approach, we address endogeneity by leveraging neighboring countries' adoption of fiscal rules. Our findings show that fiscal rules reduce both pre-tax and post-tax income inequality, with pre-tax inequality improving more than post-tax inequality. This suggests that fiscal rules first contribute to macroeconomic stability and economic activity growth, which later strengthens the government's redistributive power. Fiscal rules are associated with significant increases in political risk and polarization. These results provide new evidence on the heterogeneous effects of fiscal rules, emphasizing the importance of considering their stabilizing, distributional, and political consequences when assessing their overall efficacy, particularly in economies with high inequality or when fiscal rules face voter backlash.

1.1 Introduction

In recent decades, the adoption of fiscal rules has become a central strategy for governments seeking to maintain fiscal discipline and contain public debt accumulation. By 2021, more than 100 countries had implemented some form of fiscal rule, ranging from debt ceilings to balanced budget and expenditure rules (Hamid R. Davoodi and Medas (2022)). While their macroeconomic effects (such as improving fiscal balances, reducing sovereign risk, and enhancing credibility) are well documented (Badinger and Reuter (2017), Grembi, Nannicini, and Troiano (2016), Halac and Yared (2018), Halac and Yared (2014)), far less is known about their broader societal and political consequences. This paper investigates whether fiscal rules systematically affect income inequality and political polarization, two outcomes increasingly central to economic stability and institutional resilience.

Figura 1.1 – Fiscal Rules Worldwide



Source: Own preparation using data from the IMF Fiscal Rules Dataset (1985–2021).

Understanding the political and distributive effects of fiscal rules is essential for at least two reasons. First, economic policies, especially those constraining public budgets, often have consequences that extend beyond efficiency and debt sustainability. Fiscal rules can alter the composition of government spending, restrict redistributive efforts, and affect social outcomes such as inequality. Second, the political economy of fiscal rules has become more visible in recent years: rules have triggered partisan conflict, constrained governments during crises, and become flashpoints in debates over legitimacy and economic fairness. By affecting the space for political bargaining and shifting distributive outcomes, fiscal rules may also influence political fragmentation, polarization, and perceptions of risk. Ignoring these dynamics risks

underestimating the political costs of fiscal consolidation or overestimating the institutional durability of rules-based governance.

This paper examines the impact of fiscal rules on both income inequality and political outcomes using a global sample of countries from 1990 to 2021. We estimate the dynamic causal effects of fiscal rule adoption on inequality, government fragmentation, political risk, and economic policy uncertainty using the local projections method (Jordà (2005)). To address the endogeneity of fiscal rule adoption, we apply an instrumental variable strategy that uses a weighted average of rule adoption in neighboring countries ((Caselli and Reynaud (2020)). This exploits regional diffusion effects as a source of plausibly exogenous variation in domestic adoption.

We document two key sets of findings. First, fiscal rules reduce both pre-tax (market) and post-tax (disposable) income inequality over time, with stronger and more persistent effects on pre-tax inequality. This suggests that fiscal rules promote macroeconomic stability that gradually improves income distribution even before taxes and transfers are applied. Second, and more novel, fiscal rules are associated with significant increases in political risk and polarization.

The implications of these results are nuanced. On one hand, fiscal rules can stabilize economies and reduce inequality over time, especially when they support sustained growth and discipline. On the other hand, rules may limit governments' ability to accommodate short-term political demands, potentially exacerbating polarization or destabilizing governance. These tensions are particularly evident in democracies with high fragmentation or low institutional trust, where rigid fiscal commitments can trigger conflict over constrained budgets.

Fiscal rules are associated with an increase in political risk, and we speculate that the mechanism driving this result may be related to the constraints these rules place on government flexibility in responding to economic shocks or political demands. While our paper does not directly model these mechanisms, it is plausible that fiscal rules (particularly those that limit spending or impose debt ceilings) could generate political friction. This friction may arise because such rules often require challenging policy adjustments, such as cuts to public spending or tax increases. These adjustments could increase political uncertainty and destabilize governance, especially when fiscal rules face resistance or are perceived as rigid or externally imposed. Therefore, while fiscal rules may contribute to macroeconomic stability, they may also introduce new sources of political risk, particularly in environments where their implementation encounters political opposition or challenges in balancing fiscal discipline with political demands.

By disaggregating results by rule type, we find that debt and expenditure rules have the strongest inequality-reducing effects. In contrast, budget balance rules and debt ceilings are most likely to increase political risk. These patterns are consistent with recent theoretical work

showing that different types of rules carry different trade-offs between efficiency, equity, and political legitimacy (Karpuska and Wang (2024)).

This paper contributes to a growing literature on the broader consequences of fiscal rules. Prior work has focused on their fiscal impacts and, more recently, on their redistributive consequences in specific regions or periods (Ulloa-Suárez (2021), Combes J.-L. (2019), Hartwig and Sturm (2019), Klein and Ribeiro (2024)). To our knowledge, this is the first study to jointly analyze the effects of fiscal rules on both inequality and political polarization using a global sample and a dynamic IV framework.

These findings have direct relevance for policy discussions at the national and supra-national levels, where fiscal rules are frequently recommended as part of fiscal consolidation programs. They underscore the importance of designing fiscal rules that not only enhance fiscal discipline but also safeguard equity objectives. Well-designed fiscal rules need not exacerbate inequality; under certain conditions, they may even contribute to reducing it. For policymakers, this highlights the need to consider not just the technical design of rules, but also the broader institutional and political environment in which they operate (International Monetary Fund (2018), Celasun, Debrun, and Ostry (2009), Ghosh, Kim, Mendoza, Ostry, and Qureshi (2013)). By explicitly linking fiscal rules to their potential distributional consequences, this study adds a new dimension to the assessment of fiscal governance frameworks, complementing the existing focus on fiscal sustainability and macroeconomic stability.

The rest of the paper is structured as follows. Section 2 reviews the literature on fiscal rules, inequality, and fiscal performance. Section 3 presents the data and key variables. Section 4 describes the identification strategy and estimation methods. Section 5 reports the main results for income inequality, while 6 reports political outcomes of fiscal rules, and Section 7 presents robustness checks. Finally, Section 8 concludes with a discussion of policy implications.

1.2 Literature Review

As fiscal rules have become a core feature of modern macroeconomic governance, research has extensively documented their effects on fiscal aggregates, sovereign risk, and macroeconomic volatility. This literature reflects the original motivation behind fiscal rules: to constrain fiscal discretion and safeguard debt sustainability. However, fiscal rules inevitably shape the distribution of income, both directly through changes in public spending and revenue collection, and indirectly by affecting macroeconomic stability and growth trajectories. Despite these clear channels, the empirical literature on fiscal rules and inequality remains far less developed, particularly in terms of identifying causal impacts and tracing dynamic responses over time.

A large body of work establishes that fiscal rules improve fiscal performance. Debrun, Moulin, Turrini, Ayuso-i Casals, and Kumar (2008) and Nerlich and Reuter (2013) show that fiscal rules foster more responsible fiscal behavior, lower budget deficits, and improve primary balances in EU countries. Badinger and Reuter (2017) extend this analysis globally, finding that stricter fiscal rules correlate not only with better budgetary outcomes but also with lower sovereign bond spreads and reduced GDP volatility. These fiscal and macroeconomic benefits are central to the IMF's long-standing support for fiscal rules, particularly in emerging markets where credibility and fiscal discipline are often fragile. Historical evidence from Asatryan, Castellón, and Stratmann (2018), spanning more than a century across 130 countries, shows that constitutional budget rules reduce sovereign default risk, primarily through curbing expenditure. However, Caselli and Reynaud (2020) remind us that this relationship weakens when controlling for the endogeneity of rule adoption: countries with stronger initial fiscal institutions are more likely to adopt fiscal rules. This observation directly informs our empirical strategy, where we also account for endogeneity using an instrumental variable (IV) approach.

Beyond fiscal aggregates, fiscal rules also influence the cyclical behavior of fiscal policy. Sacchi and Salotti (2015) show that fiscal rules reduce the procyclicality of government consumption in OECD countries, while Nerlich and Reuter (2015) demonstrate that fiscal rules enhance fiscal space, thereby limiting procyclical fiscal tightening in the EU. Combes, Minea, and Sow (2017), however, argue that this effect depends critically on debt levels: highly indebted countries often still exhibit procyclical fiscal behavior, even under fiscal rules. This nonlinearity, where the effects of rules depend on initial conditions, guides our decision to explicitly test for heterogeneity in our empirical analysis. Moreover, Reuter, Tkačevs, and Vilerts (2022), emphasizes that not all rules are created equal: only strong and well-designed rules significantly reduce fiscal volatility, which we account for by differentiating rules in our dataset.

Concerns about the equity implications of fiscal rules have also gained traction, especially regarding their effects on public investment and social spending. Empirical evidence from Delgado-Téllez, Gordo, Kataryniuk, and Pérez (2020) shows that fiscal rules are negatively associated with public investment in OECD countries, especially during consolidation episodes. However, flexibility clauses mitigate this effect. Ardanaz, Hallerberg, and Scartascini (2020) confirm this finding for a broader set of economies, where rigid fiscal rules significantly cut investment during fiscal adjustments, while flexible rules preserve investment levels. These findings motivate our decision to assess whether different types of rules (balanced budget, debt, expenditure, and revenue rules) have distinct effects on inequality, recognizing that spending composition and investment behavior respond differently depending on rule design.

The evidence on social spending is more ambiguous. Dahan and Strawczynski (2013) find no systematic reduction in public investment due to fiscal rules in OECD countries, but

they do show that fiscal rules reduce social transfers unless strong legal commitments to social protection are in place. Similarly, Vinturis (2023) find that fiscal rules reduce public consumption across a large global sample, with debt and balanced budget rules having the strongest effects on overall spending but increasing the investment-to-consumption ratio. This further motivates our focus on both pre- and post-tax income inequality, allowing us to distinguish between the pre-redistribution and post-redistribution effects of fiscal rules. If rules primarily affect redistribution through reduced social transfers, we should expect larger impacts on post-tax income inequality than on pre-tax income inequality – an important distinction that our analysis explicitly tests. To the best of our knowledge, this is the first work to disentangle the macroeconomic effect from the redistributive effect of fiscal rules in order to identify their impact on income inequality.

Procyclicality in public investment itself is also shaped by fiscal rules, as shown byürgens (2022), who finds that investment is procyclical, particularly in downturns, and that fiscal rules without flexibility clauses amplify this procyclicality. This is particularly relevant for developing economies, where public investment often plays a key role in infrastructure and human capital formation. The broader social consequences of fiscal rules are further highlighted by Schakel, Jeurissen, and Glied (2017), who document negative effects of fiscal rules on public health spending in OECD countries. These sectoral impacts highlight the potential for fiscal rules to generate not only macroeconomic but also social and political trade-offs, precisely the broader welfare dimension that motivates our analysis.

While the typology of fiscal rules (covering debt, budget balance, expenditure, and revenue rules) helps to categorize their formal characteristics, a growing body of research emphasizes that the institutional mechanisms underpinning these rules are just as important for understanding their economic and distributional effects. Rules that are well-designed, with clear enforcement provisions, credible monitoring, and appropriately calibrated flexibility clauses, tend to exert stronger fiscal discipline without fully constraining governments' ability to respond to shocks. Conversely, rules that lack enforcement credibility, rely on weak institutional oversight, or leave excessive room for discretion are often either circumvented or poorly enforced, limiting their economic and distributional impact. As shown in Ardanaz et al. (2024), the probability of compliance varies with the type of rule in place and strong institutional frameworks increase the probability of compliance with fiscal policy rules, which in turn leads to lower sovereign bond spreads and improved credit ratings for emerging economies.

International Monetary Fund (2018) and Hamid R. Davoodi and Medas (2022) show that fiscal rules with independent monitoring bodies, legally binding provisions, and well-defined escape clauses perform better in terms of improving fiscal balances, particularly when supported by complementary institutional frameworks such as fiscal councils. Yet, stronger enforcement can amplify the equity-efficiency trade-off by forcing sharper spending cuts during downturns,

often affecting social programs. On the other hand, more flexible rules (especially those that allow temporary deviations under predefined circumstances) can mitigate some of these equity costs, although at the potential expense of weaker credibility. This trade-off between credibility and flexibility is a central theme in the IMF's work on the design of fiscal rules, particularly in the context of emerging economies, where institutional capacity and social vulnerabilities often interact.

For the purposes of this paper, these institutional considerations highlight that the effects of fiscal rules on inequality likely depend not only on the type of rule adopted, but also on the broader institutional architecture within which they operate. In settings where fiscal councils, public financial management systems, and political institutions reinforce the credibility of rules, fiscal adjustments may be sharper, affecting redistribution capacity, but the credibility gain itself may improve macroeconomic stability, indirectly benefiting labor markets and pre-tax income distribution. Conversely, in contexts where rules are symbolic or easily circumvented, their impact on inequality may be muted, with redistribution outcomes driven more by ad-hoc political choices than by the formal existence of fiscal rules themselves.

Taken together, these studies suggest that fiscal rules enhance fiscal performance and reduce macroeconomic volatility, but at the cost of potentially lower public investment and social spending, highlighting a potential trade-off between efficiency and equity. This trade-off is also central in theoretical models. Ilzetzki and Thysen (2024) develop a framework where fiscal rules restrain impatient governments, preventing excessive deficits, but at the same time penalize prudent governments by restricting their flexibility to respond to shocks or pursue productive investments. This tension helps explain the mixed empirical evidence on fiscal rules and inequality: while some governments may leverage the fiscal space created by rules to improve redistribution, others use fiscal rules to justify austerity measures that disproportionately burden lower-income groups, ultimately worsening inequality.

The theoretical framework developed by Karpuska and Wang (2024) offers an approach to understanding the trade-offs between fiscal rules, inequality, and efficiency. Their model incorporates political bargaining over public goods, private transfers, and debt issuance, demonstrating that fiscal rules can either mitigate or exacerbate inequality depending on the type of rule imposed. Specifically, they find that spending limits on entitlement programs have the strongest effect in reducing inequality but come at the highest efficiency cost, as they restrict the primary channel through which political actors ensure redistribution across periods. Debt ceilings, on the other hand, generate relatively lower efficiency losses while still reducing inequality by limiting future expropriation incentives. Importantly, their results emphasize that the equity-efficiency trade-off is amplified when political bargaining is considered: fiscal rules, rather than simply constraining fiscal discretion, alter the bargaining process itself, influencing the distribution of

resources over time. This insight aligns with our empirical approach, which examines how fiscal rules influence both pre- and post-tax income inequality, highlighting the channels through which these rules interact with redistribution and economic stability.

Compared to this extensive literature on fiscal rules and fiscal performance, the empirical literature on fiscal rules and inequality remains much thinner and more fragmented. Among the few existing studies, Ulloa-Suárez (2021) uses synthetic control methods to study Latin American countries, finding no significant effect of fiscal rules on inequality trajectories. Combes J.-L. (2019), using propensity score matching for developing countries, find that fiscal rules (especially balanced budget and debt rules) reduce inequality, while expenditure rules exacerbate it. Evidence from advanced economies paints a different picture: Hartwig and Sturm (2019) find that fiscal rules increase inequality in EU countries, using lagged rules to address simultaneity. Finally, Klein and Ribeiro (2024), using local projections on a global sample, find that fiscal rules reduce inequality in developing economies but increase it in advanced economies. These mixed findings suggest that the effects of fiscal rules on inequality are highly context-dependent and shaped by both rule design and broader institutional and economic environments.

This paper builds directly on these contributions but addresses several key gaps. First, we cover a much broader sample, combining advanced, emerging, and low-income countries, allowing us to test for heterogeneity in fiscal rule effects across development levels. Second, we use a dynamic approach, local projections, to explicitly trace the evolution of inequality after fiscal rule adoption, capturing both short- and long-term effects. Third, by combining local projections with an IV strategy based on neighboring countries' rule adoption (following Caselli and Reynaud (2020)), we directly address the endogeneity of rule adoption, which has been a persistent challenge in this literature. Finally, by distinguishing between pre- and post-tax income inequality, we explicitly separate the macroeconomic and redistributive channels through which fiscal rules shape inequality. This richer empirical strategy allows us to provide a more comprehensive and policy-relevant assessment of the equity consequences of fiscal rules, bridging the gap between the literature on fiscal performance and the emerging literature on fiscal rules and inequality.

1.3 Data

1.3.1 Fiscal Rules

Our primary data source is the IMF Fiscal Rules Dataset compiled by Hamid R. Davoodi and Medas (2022), which offers a comprehensive overview of fiscal rule adoption and design across 106 countries between 1985 and 2021. The dataset tracks whether a fiscal rule exists, its type, and details about its design – including coverage (national or supranational), the level of government to which it applies (central, general, or public sector), the presence of escape clauses, and enforcement mechanisms. This institutional heterogeneity is essential for understanding the diverse economic and political effects of fiscal rules, including their potential implications for income inequality.

Fiscal rules are broadly categorized into four types: Budget Balance Rules (BBR), Debt Rules (DR), Expenditure Rules (ER), and Revenue Rules (RR). While these rules share the common goal of promoting fiscal sustainability, they target distinct budgetary aggregates and constrain fiscal policy in different ways. As a result, they are likely to generate different impacts on inequality, depending on the composition of fiscal adjustment and the distributional profile of affected spending and taxation.

Budget Balance Rules (BBR) set limits on fiscal deficits over a specific period, typically requiring governments to maintain a balanced or nearly balanced budget. By constraining deficits, BBRs restrict governments' ability to use borrowing to smooth economic shocks or finance redistributive spending during downturns. This can create a procyclical bias, where governments are forced to cut spending or raise taxes precisely when economic conditions deteriorate, disproportionately affecting vulnerable groups who rely more heavily on public services and transfers. In the medium term, however, if BBRs enhance macroeconomic stability and lower risk premia, they may improve financing conditions for social spending, partially offsetting their initial redistributive costs.

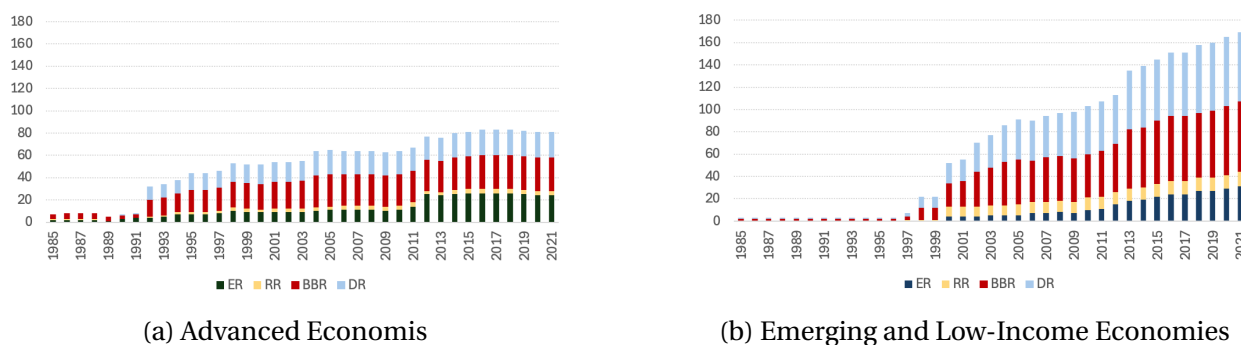
Debt Rules (DR) impose a ceiling on the stock of public debt, usually expressed as a ratio to GDP. These rules aim to prevent unsustainable debt accumulation, reducing sovereign risk and borrowing costs. However, their effect on inequality depends heavily on the policy mix chosen to achieve compliance. Governments can meet debt ceilings either by raising taxes or cutting spending, and the distributional consequences of these choices differ significantly. In highly indebted economies, front-loaded fiscal consolidation required to meet debt limits can fall disproportionately on spending programs that benefit lower-income groups. At the same time, if credible debt rules lower interest rates and reduce debt service costs, they may create fiscal space for future redistributive spending.

Expenditure Rules (ER) directly cap the growth of public spending, either in absolute terms, relative to GDP, or relative to revenue. Compared to BBRs and DRs, these rules place the adjustment burden squarely on the expenditure side of the budget. Whether ERs exacerbate or mitigate inequality depends on which categories of spending are constrained. Rules that protect public investment while compressing current transfers may reduce redistribution, while rules that allow for more flexible reallocation within the spending envelope can mitigate adverse equity impacts. The design of escape clauses and expenditure classification thus plays a critical role in shaping the inequality effects of expenditure rules.

Revenue Rules (RR), which are less common, set floors or ceilings on revenue collection, often in terms of tax-to-GDP ratios. Revenue floors can help ensure stable financing for social programs, particularly in economies with volatile revenues or weak tax administration. However, revenue ceilings can limit governments' ability to mobilize progressive taxation in response to rising inequality or new spending needs. In practice, revenue rules often reflect broader political preferences about the desired size of government, which influences their distributional impact.

The historical evolution of fiscal rule adoption also offers clues about their potential inequality effects. In developed countries, fiscal rules expanded rapidly in the 1990s, particularly in the context of the Maastricht Treaty and the fiscal convergence criteria for entry into the European Monetary Union. This process emphasized debt and balanced budget rules, reflecting Europe's focus on debt sustainability. In contrast, developing countries adopted fiscal rules somewhat later, often in response to sovereign debt crises in the late 1990s and early 2000s. In these cases, expenditure rules gained prominence, as governments sought to contain spending pressures while preserving fiscal flexibility for development programs. This variation underscores the importance of both rule design and broader economic context in understanding the inequality effects of fiscal rules.

Figura 1.2 – Fiscal Rules Adoption by Country and Type of Rule



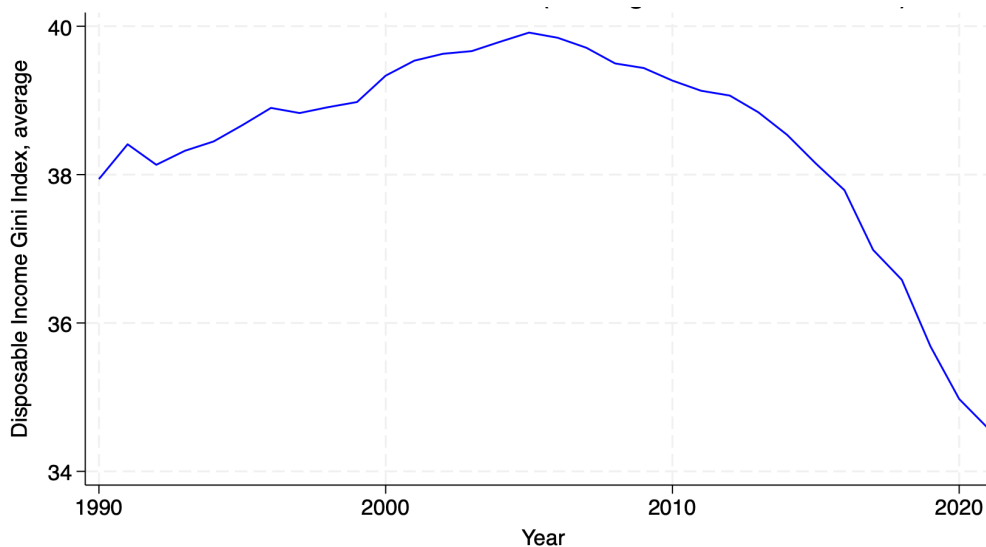
Source: Own preparation using data from the IMF Fiscal Rules Dataset (1985–2021).

1.3.2 Inequality

Income inequality data comes from the Standardized World Income Inequality Database (SWIID), which combines data from multiple sources—including the Luxembourg Income Study—and applies Bayesian techniques to harmonize and estimate posterior distributions for Gini indices. This approach allows for consistent cross-country comparisons of both pre-tax (market) income and post-tax (disposable) income inequality across 199 countries from 1960 onward. A full description of the methodology and coverage can be found in Solt (2020).

For the purpose of this study, we focus on the period from 1990 to 2021, which covers the broad wave of fiscal rule adoption worldwide and offers sufficiently reliable inequality data for most countries. Over this period, global income inequality, measured as the simple average of national Gini indices, exhibited a distinct pattern. As shown in Figure 1.3, inequality rose steadily throughout the 1990s and early 2000s, before declining somewhat in the years that followed. This broad trend reflects a combination of domestic policy shifts, structural economic changes, and global economic conditions, including the commodity boom of the 2000s, which particularly benefited commodity-exporting emerging markets.

Figura 1.3 – Evolution of the Gini Index (Average Across Countries)

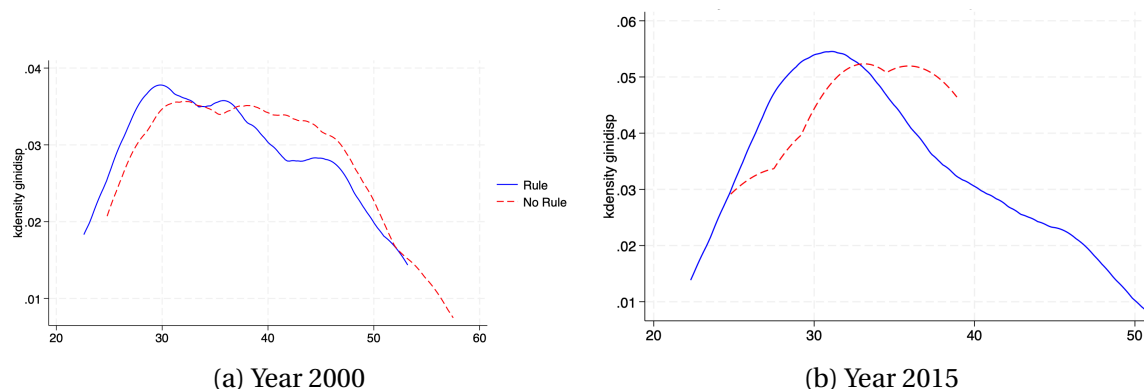


Source: Own preparation using data from Solt (2020).

Our primary goal is to assess whether the adoption of fiscal rules played any role in shaping these inequality dynamics. To begin exploring this relationship, we compare the distribution of post-tax income inequality in two distinct years (2000 and 2015), separating countries into those that had adopted fiscal rules and those that had not. In 2000, as shown in Figure 1.4, there is no clear visual difference between the inequality distributions of the two groups, suggesting

that fiscal rules had not yet emerged as a meaningful explanatory factor. By 2015, however, the picture changes: countries without fiscal rules systematically display higher levels of income inequality compared to those with rules in place.

Figura 1.4 – Income Inequality Index by Fiscal Rule Adoption



Source: Own preparation using data from Solt (2020).

While this descriptive evidence is far from conclusive, it offers a first indication that fiscal rules could be linked to income inequality outcomes over time. This motivates the more formal econometric analysis that follows, where we aim to isolate the causal effect of fiscal rules on both pre- and post-tax income inequality, while accounting for confounding factors such as economic development, political institutions, and global economic shocks.

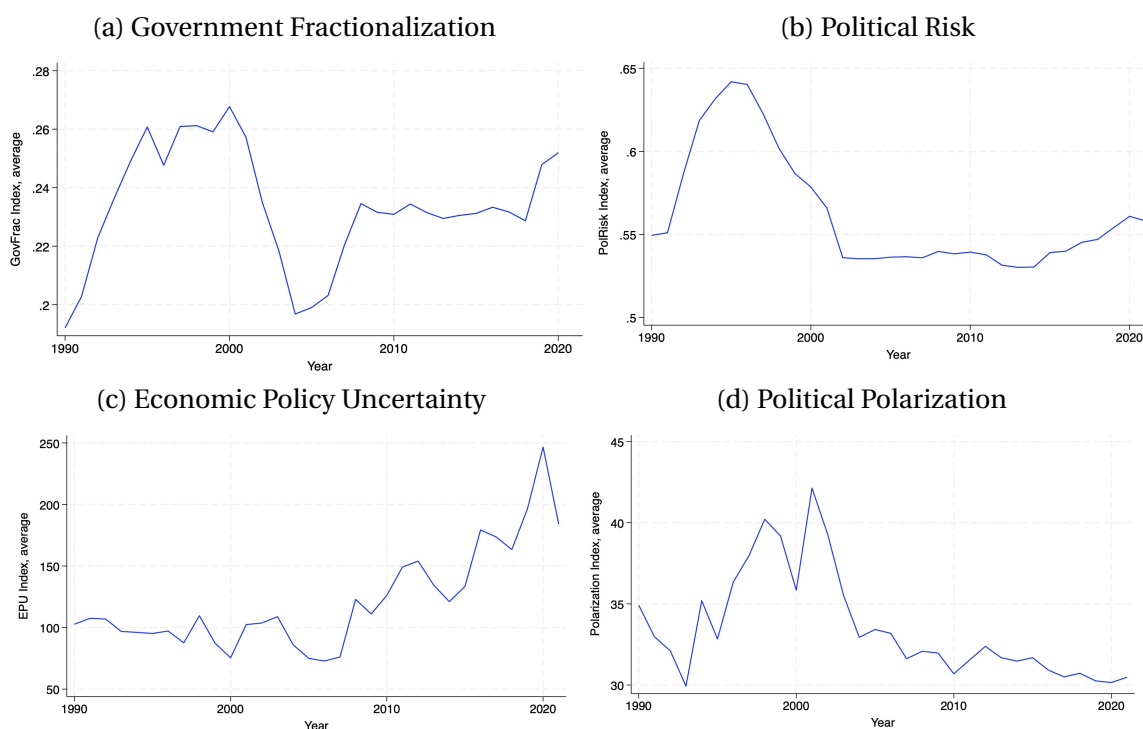
1.3.3 Political variables

The adoption and effectiveness of fiscal rules are intertwined with the political factors of a country. Fiscal rules can impact political polarization, risk, and fragmentation by altering the resources available to the government in power – particularly in the case of debt ceilings and balanced budget rules, which constrain fiscal discretion. Similarly, spending rules can disproportionately affect different social groups, shaping political dynamics and electoral incentives. By limiting governments' ability to use fiscal policy as a tool for coalition-building or redistribution, fiscal rules can contribute to changes in political alignment and the intensity of policy disputes.¹

Political risk, broadly defined as the uncertainty surrounding governance, regulatory stability, and institutional credibility, can also be affected by fiscal rules. On the one hand, well-designed and effectively enforced fiscal rules may enhance confidence and institutional stability, thereby reducing political risk. On the other hand, if fiscal constraints exacerbate policy disagreements or limit governments' ability to respond to economic shocks, they may contribute

¹For a more detailed discussion on this, see Karpuska and Wang (2024).

Figura 1.5 – Average across countries of Political Variables



to heightened political uncertainty. In particular, if fiscal rules are perceived as overly rigid or externally imposed, they may trigger political backlash and erode trust in economic governance.

Our measure of political risk comes from Researchers (2013) is a composite index that captures the overall quality of governance, including the integrity of institutions, bureaucratic efficiency, and rule of law. Higher values indicate stronger governance, while lower values suggest higher levels of political instability or institutional fragility. As shown in Combes J.-L. (2019), political risk is associated with a lower probability of adopting fiscal rule by a country. We wonder if, once fiscal rules are established, how this variable behaves.

Government fragmentation, measured by the probability that two randomly selected members of the governing coalition belong to different parties, can also evolve in response to fiscal rule adoption. Fiscal constraints may lead to increased political bargaining as governments struggle to allocate resources within tighter fiscal frameworks, potentially resulting in greater fragmentation. In multiparty systems, fiscal rules may also change coalition dynamics by reducing the scope for discretionary spending, which often serves as a key tool for maintaining political alliances. Conversely, in some cases, fiscal rules may encourage political cohesion by forcing governments to commit to long-term fiscal discipline, thus reducing opportunistic shifts in policy. We study the impact of fiscal rules on government fragmentation using Scartascini et al. (2021) dataset and following Combes J.-L. (2019), that showed this variable is related to higher

probability of a country adopting fiscal rule.

Economic policy uncertainty (EPU) captures the unpredictability associated with government policy decisions, regulatory changes, and macroeconomic management. The implementation of fiscal rules can shape EPU in several ways. By constraining discretionary fiscal policy, fiscal rules may reduce uncertainty by signaling a credible long-term commitment to fiscal discipline, thereby providing clearer expectations for investors and economic agents. However, if fiscal rules are poorly designed, frequently circumvented, or subject to political disputes, they may instead heighten policy uncertainty. For instance, stringent debt ceilings that trigger repeated fiscal standoffs (such as those seen in the U.S. debt ceiling debates) can create uncertainty about future government actions, fueling financial market volatility and undermining economic decision-making. Additionally, the rigidity of fiscal rules may limit governments' ability to implement countercyclical policies during economic downturns, increasing uncertainty regarding fiscal responses in times of crisis.

To measure policy-related economic uncertainty, Baker, Bloom, and Davis (2016) construct an index that relies on three underlying components. The first and most flexible component quantifies newspaper coverage of policy-related economic uncertainty, based on a search index from ten major U.S. newspapers, including *The Wall Street Journal*, *The New York Times*, and *The Washington Post*. The second component uses data from Congressional Budget Office (CBO) reports on temporary federal tax code provisions, generating a measure of tax policy uncertainty based on scheduled expirations. The third component draws from the Federal Reserve Bank of Philadelphia's Survey of Professional Forecasters, utilizing the dispersion in economic predictions regarding key macroeconomic variables such as inflation and government expenditures to quantify uncertainty in fiscal and monetary policy. By combining these three dimensions, the EPU index provides a comprehensive measure of policy-related economic uncertainty.

The Polarization Index, constructed by the World Bank, measures the extent of ideological and political polarization within a country. Unlike traditional measures of political fragmentation, which focus on the number and relative size of political parties, the polarization index captures the degree of divergence in policy preferences and ideological distances between groups. High levels of polarization are associated with increased political instability, lower government effectiveness, and heightened difficulties in achieving consensus on fiscal policies. In the context of fiscal rules, polarization can influence both their adoption and effectiveness. Highly polarized environments may lead to greater resistance against fiscal constraints, as different factions push for competing fiscal agendas. Conversely, fiscal rules could also exacerbate polarization if they become a contentious political issue, particularly in cases where spending cuts or tax policies disproportionately affect certain groups. Understanding the interaction between fiscal rules and polarization is essential for assessing their broader political and economic implications.

1.3.4 Controls

Following the literature, we include a set of control variables capturing macroeconomic and political factors that are potentially related to both the adoption of fiscal rules and income inequality outcomes. The choice of controls builds directly on the framework proposed by Combes J.-L. (2019), which itself synthesizes insights from earlier studies on fiscal rules, particularly Debrun, Moulin, Turrini, Ayuso-i Casals, and Kumar (2008) and Combes, Minea, and Sow (2017). The full description of these variables, along with the details of data sources and cleaning procedures, is provided in Appendix A.

Our final sample spans 196 countries over the period 1990 to 2021. Table 1.1 presents the descriptive statistics for all key variables. The average pre-tax income inequality Gini index is 46.00, reflecting relatively high baseline inequality across the sample. As expected, the average post-tax income inequality Gini index is lower, at 38.72, highlighting the role of tax-and-transfer systems in mitigating inequality. Both indicators exhibit substantial variation, underscoring the importance of controlling for country-specific characteristics when estimating the effects of fiscal rules.

Tabela 1.1 – Descriptive Statistics of the Database

Variables	Num. Obs.	Mean	Sd.	Min	Max
Gini index (pre-tax)	4,215	46.00	6.15	32.10	72.30
Gini index (post-tax)	4,215	38.72	8.47	18.70	65.20
Fiscal Rule dummy	3,124	0.65	0.48	0.00	1.00
Contiguity IV	5,206	1.15	1.61	0.00	10.00
Government Fractionalization	4,448	0.23	0.28	0.00	1.00
Political Risk index	3,927	0.56	0.21	0.06	1.00
EPU	559	124.39	70.53	27.00	542.77
Polarization	1198	32.70	10.44	15.09	64.69
GDP pc (Real, local currency, annual growth, %)	5,348	2.07	6.21	-64.43	150.43
General Government Gross Debt (% GDP)	4,612	54.76	42.46	0.00	600.12
Inflation per year (CPI, %)	5,379	11.33	45.78	-16.86	951.96
Dependency ratio (%)	5,379	63.38	19.26	16.17	116.93
Capital Openness index	4,993	0.52	0.37	0.00	1.00
Human Capital index	4,037	2.42	0.70	1.03	4.35
Inflation target regime dummy	5,379	0.13	0.34	0.00	1.00
Central Bank governor regular turnover dummy	5,379	0.04	0.19	0.00	1.00
Currency Union dummy	3,124	0.38	0.48	0.00	1.00
External debt default dummy	2,690	0.19	0.39	0.00	1.00
Resource Rich country dummy	3,124	0.21	0.41	0.00	1.00

The control variables reflect the multifaceted determinants of both fiscal rule adoption and inequality dynamics. They capture macroeconomic performance (GDP growth, inflation, debt levels), demographic pressures (dependency ratios), political institutions and environment

(government fractionalization, political risk, EPU, and polarization), and structural features such as resource wealth and participation in currency unions. In addition, we account for policy frameworks that may shape fiscal conduct, including the presence of inflation targeting regimes and regular turnover of central bank governors. Together, these controls allow us to isolate the effect of fiscal rules from broader economic and institutional forces that could simultaneously influence inequality outcomes.

This comprehensive set of controls reflects the central challenge of this study: fiscal rules do not emerge in a vacuum. Countries with more stable macroeconomic environments, better institutions, or stronger fiscal histories are more likely to adopt and successfully enforce fiscal rules. At the same time, these same characteristics directly shape inequality through their effects on economic growth, labor markets, and redistributive capacity. Controlling for these factors is essential to avoid conflating the effects of fiscal rules with the broader characteristics of countries that adopt them. The next section lays out our identification strategy, which further addresses these endogeneity concerns through the use of instrumental variables.

1.4 Estimation

1.4.1 Methodology

Estimating the causal effects of fiscal rules on income inequality presents a series of econometric challenges, ranging from endogeneity and self-selection to the dynamic nature of the relationship itself. These challenges are particularly relevant given that fiscal rules are not randomly assigned across countries, but rather emerge from specific economic and political conditions that are themselves often linked to inequality dynamics. Ignoring these issues would risk conflating the independent effect of fiscal rules with the broader characteristics of the countries that adopt them.

Endogeneity is one of the most immediate concerns. Fiscal rules are typically introduced in response to pre-existing fiscal imbalances, rising debt, or growing political polarization — all of which may independently shape inequality outcomes. This simultaneity problem can lead to biased estimates if these underlying drivers are not adequately controlled for. To address this, we adopt an instrumental variables (IV) approach, leveraging external sources of variation in fiscal rule adoption. Specifically, following Caselli and Reynaud (2020), we construct an instrument based on the weighted average of fiscal rule adoption among neighboring countries. This instrument captures regional diffusion (the tendency for countries in close geographic proximity to adopt similar fiscal frameworks), which provides a source of exogenous variation in fiscal rule adoption that is unlikely to be directly correlated with domestic inequality shocks.

Endogeneity is not the only identification challenge. Self-selection into fiscal rules is also a concern. Countries with stronger institutions, better governance, or more stable economies are systematically more likely to adopt fiscal rules. This creates a risk of selection bias: if these same characteristics also influence income inequality, any observed relationship between fiscal rules and inequality could reflect pre-existing institutional quality rather than a causal effect of the rules themselves. By combining local projections (LP) with instrumental variables (IV), we address this concern directly. The LP-IV approach estimates the dynamic response of inequality to fiscal rule adoption, using the contiguity-based instrument to isolate exogenous variation in treatment. This method allows us to trace how inequality evolves in the years following fiscal rule adoption, while mitigating the bias introduced by endogenous selection into treatment.

Another crucial aspect is the dynamic nature of the relationship between fiscal rules and inequality. Fiscal rules may have immediate distributional effects by constraining government spending, particularly during fiscal consolidations. However, over time, the same rules could contribute to macroeconomic stability, which in turn affects economic growth, employment, and the government's capacity for redistribution. These evolving effects cannot be captured by static

estimators that focus on average treatment effects over a fixed period. Instead, we employ local projections, introduced by Jordà (2005), to estimate impulse response functions that map out the evolution of inequality up to 15 years after the adoption of fiscal rules. This approach captures both short-term fiscal consolidation effects and longer-term impacts through growth, stability, and redistribution channels.

An additional complication stems from serial and spatial dependence. Fiscal conditions are inherently persistent, meaning that inequality outcomes today are influenced by fiscal policies implemented years before. At the same time, economic policies and shocks are often transmitted across borders, particularly in regions with deep trade or financial integration. Ignoring these dependencies could bias standard errors and distort inference. To mitigate these risks, we use specifications that allow for both serial and spatial correlation, ensuring that our estimates reflect the independent effect of fiscal rules rather than broader regional dynamics or persistence in inequality trends.

The choice of local projections over traditional Vector Autoregressions (VAR) reflects the advantages LP offers in settings like ours, where structural breaks, heterogeneous effects across countries, and uncertain data-generating processes are all relevant concerns. VARs impose a fixed parametric structure across all forecast horizons and assume that all variables evolve according to the same system. This rigidity can lead to misspecification in environments with policy regime changes or country-specific dynamics. In contrast, local projections estimate the response at each horizon directly, allowing for different functional forms at different time horizons. This flexibility is particularly valuable when studying fiscal rules, whose effects may evolve non-linearly as governments adjust to new budget constraints or fiscal rules gradually reshape institutions and expectations.

Compared to standard VAR-based impulse response estimation, local projections offer additional advantages. They are more robust to model misspecification, provide more reliable confidence intervals in small samples, and are less prone to autocorrelation problems at longer horizons, as shown in Kilian and Kim (2011) and Montiel Olea and Plagborg-Møller (2021). The main trade-off is that local projections are estimated independently for each horizon, which reduces the effective sample size compared to a fully specified system. However, the flexibility gained from allowing each horizon to have its own equation outweighs this cost in our setting, where heterogeneous responses and evolving effects are core to the analysis.

In summary, our preferred specification uses the Local Projection method with Instrumental Variables (LP-IV), combining the flexibility of local projections with the causal identification advantages of instrumental variables. The contiguity-based IV from Caselli and Reynaud (2020) allows us to isolate the exogenous component of fiscal rule adoption, while the local projections

framework maps out the dynamic response of both pre- and post-tax income inequality over time. As a robustness check, we also estimate a simpler LP model using ordinary least squares (LP-OLS), which serves as a useful benchmark to gauge the importance of addressing endogeneity. Together, this empirical strategy is designed to provide credible, policy-relevant estimates of how fiscal rules affect inequality, tracing not only their immediate consequences but also their medium- and long-term implications for the fiscal and social contract.

1.4.2 Model

The baseline specification used to estimate the dynamic impact of fiscal rules on inequality follows the local projections framework introduced by Jordà (2005):

$$\Delta_h Y_{i,t+h} = Y_{i,t+h} - Y_{i,t-1} = \alpha_{i,h} + \beta_h FR_{i,t} + \delta_h X_{i,t} + v_{i,t+h}, \quad h = 0, 1, 2, \dots, 15 \quad (1.1)$$

In this expression, $\Delta_h Y_{i,t+h}$ captures the cumulative change in the dependent variable at horizon h relative to its value at $t-1$, before the fiscal rule adoption. The variable $FR_{i,t}$ is a dummy indicating the introduction of a fiscal rule in country i in year t , while $X_{i,t}$ is a vector of control variables intended to account for other confounding factors that might influence inequality. The term $\alpha_{i,h}$ denotes country fixed effects, and $v_{i,t+h}$ is the error term. The coefficient of interest, β_h , traces the dynamic response of inequality to fiscal rule adoption. At $h = 0$, this coefficient captures the immediate, contemporaneous impact of adopting a fiscal rule, while for $h > 0$, it reflects the cumulative effect over the following years.

The dependent variable $Y_{i,t}$ represents two distinct measures of income inequality: the Gini coefficient for pre-tax income and the Gini coefficient for post-tax income. Pre-tax income inequality measures income dispersion before any government intervention (pre-tax, pre-transfer), while post-tax income inequality reflects income dispersion after taxes and transfers. This distinction allows us to examine not only the overall inequality trajectory but also how fiscal rules shape the government's redistributive role. The difference between the two indices can be interpreted as a rough measure of the redistributive effect of government policy, with a larger difference indicating stronger redistribution.

To address potential endogeneity in fiscal rule adoption, we extend the baseline model by implementing the local projections method with instrumental variables (LP-IV), as proposed by Jordà and Taylor (2016). The fiscal rule adoption dummy is instrumented using a contiguity-based instrument developed by Caselli and Reynaud (2020), which exploits the geographical diffusion of fiscal rules across neighboring countries. This instrument leverages the idea that fiscal rules tend to spread regionally due to peer effects, learning, and external pressures, while the adoption

of fiscal rules in neighboring countries is plausibly exogenous to domestic income inequality dynamics.

The contiguity-based instrument is constructed as:

$$FR_{i,t}^{\text{contiguity}} = \sum_{j \neq i}^{n-i} FR_{j,t} \cdot B_{j,i,2000} \quad (1.2)$$

where j denotes a neighboring country of country i , and $FR_{j,t}$ is a dummy variable indicating whether country j has a fiscal rule in year t . The contiguity indicator $B_{j,i,2000}$ equals one if countries i and j shared a border in the year 2000 and zero otherwise. Importantly, this spatial link is fixed in 2000 to ensure that the instrument's variation comes only from changes in fiscal rule adoption in neighboring countries, not from shifts in territorial borders.

The resulting LP-IV specification is:

$$\Delta_h Y_{i,t+h} = Y_{i,t+h} - Y_{i,t-1} = \alpha_{i,h} + \beta_h \hat{FR}_{i,t} + \delta_h X_{i,t} + v_{i,t+h}, \quad h = 0, 1, 2, \dots, 15 \quad (1.3)$$

where $\hat{FR}_{i,t}$ denotes the predicted value of fiscal rule adoption from the first-stage regression:

$$\hat{FR}_{i,t} = \alpha + \beta FR_{i,t}^{\text{contiguity}} + \gamma X_{i,t} + v_{i,t} \quad (1.4)$$

Unlike the original binary fiscal rule adoption dummy, $\hat{FR}_{i,t}$ is a continuous variable capturing the estimated probability that country i adopts a fiscal rule in year t . This probability varies as neighboring countries adopt fiscal rules themselves, generating quasi-random variation in domestic fiscal rule adoption. This approach leverages external influences on fiscal rule adoption, helping us isolate the causal effect of fiscal rules on inequality.

This empirical strategy allows us to estimate the dynamic cumulative response of income inequality to fiscal rule adoption over a 15-year horizon. The use of local projections provides the flexibility to model potentially nonlinear and time-varying responses, while the instrumental variable addresses the endogeneity inherent to fiscal rule adoption decisions. Together, this approach balances the need for credible identification with the need to capture long-run dynamics, offering a comprehensive view of the distributional consequences of fiscal rules.

1.5 Results: Inequality

1.5.1 *Instrument Relevance*

The results from the first-stage regression confirm the relevance of the contiguity-based instrument, as shown in Table 1.2. The adoption of fiscal rules by neighboring countries significantly increases the probability of fiscal rule adoption in the domestic economy. Specifically, each additional neighboring country with a fiscal rule raises the likelihood of adoption by approximately 14 percent, a result that is statistically significant at the 1 percent level. This effect size is slightly larger than the estimates reported in Caselli and Reynaud (2020), reflecting the longer time span covered in our sample, which extends from 1990 to 2021, an era in which fiscal rules became increasingly prevalent.

Beyond confirming the strength of the instrument, the first-stage regression also sheds light on broader factors influencing fiscal rule adoption. Several economic and institutional characteristics emerge as significant determinants of fiscal rule adoption. Higher debt levels are associated with a lower likelihood of adopting fiscal rules, which could reflect political reluctance to impose binding fiscal constraints when debt sustainability is already under pressure. Similarly, higher inflation reduces the probability of fiscal rule adoption, likely capturing the fact that countries experiencing macroeconomic instability may prioritize immediate stabilization measures over the introduction of formal fiscal rules.

In contrast, greater capital openness is positively associated with fiscal rule adoption, consistent with the argument that governments exposed to global capital markets may adopt rules to signal fiscal responsibility to investors. Political fractionalization also increases the probability of adoption, which could indicate that fiscal rules are seen as useful coordination devices in fragmented political environments, helping stabilize policy expectations. Meanwhile, higher political risk is negatively associated with fiscal rule adoption, suggesting that governments facing greater political uncertainty may avoid binding constraints on fiscal discretion.

Overall, these results emphasize that fiscal rule adoption is not driven solely by domestic economic fundamentals but also by external influences and political dynamics. Regional diffusion effects, as captured by the contiguity instrument, play a particularly strong role, highlighting how fiscal governance reforms can spread across borders through peer pressure, imitation, and policy learning. These findings underscore the need to account for both domestic and regional factors when analyzing fiscal rule adoption, strengthening the case for the instrumental variable strategy employed in our main analysis.

Tabela 1.2 – First Stage Regression

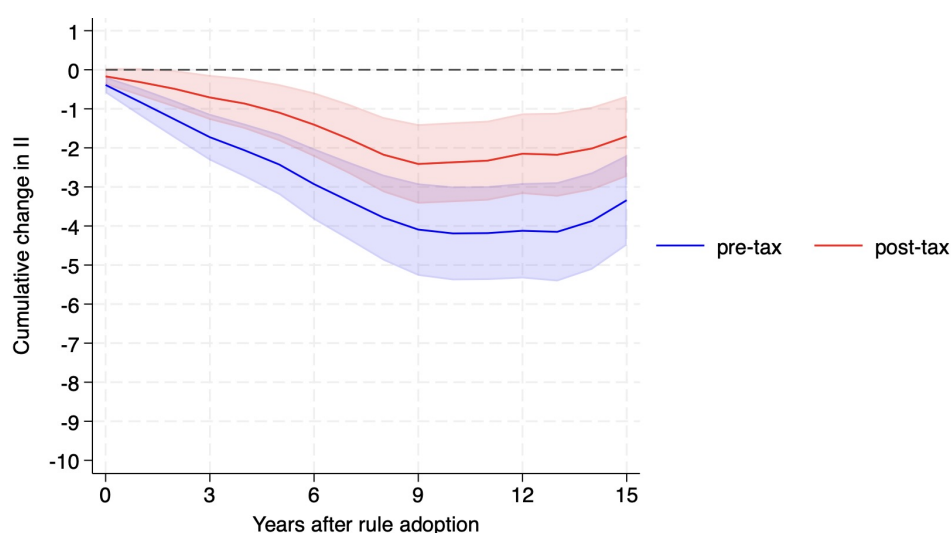
	FR
Contiguity IV	0.1372*** (0.0112)
Debt	-0.0014*** (0.0003)
Inflation	-0.3295 (0.2347)
GDP growth	0.0008 (0.0030)
Human Capital Index	0.5379*** (0.0965)
Dependency ratio	-0.0085** (0.0027)
Capital openness	0.2301*** (0.0654)
Government Fractionalization	0.1333** (0.0493)
Political Risk	-0.2202 (0.1683)
Inflation Target regime dummy	0.2381*** (0.0413)
CBI regular turnover	0.0427 (0.0399)
Currency union	-0.1029* (0.0489)
Default	0.0393 (0.0467)
Resource rich	0.5183** (0.2043)
Constant	-0.6014 (0.3763)
Observations	1,165
R-squared (Within)	0.4148
R-squared (Between)	0.0128
R-squared (Overall)	0.0744
F(14, 1089)	55.14
Prob > F	0.0000

Notes: Standard errors in parentheses. Significance levels: * p<0.1, ** p<0.05, *** p<0.01.

1.5.2 Overall Effects: LP-IV Estimates

Figure 1.6 presents the estimated cumulative response of income inequality to the adoption of fiscal rules, based on the local projection method with instrumental variables (LP-IV). The figure highlights two distinct patterns for pre-tax and post-tax income inequality, reflecting the differing channels through which fiscal rules may affect pre- and post-tax income distribution. As a reference, given the average levels of these indices reported in Table 1.1, a change of 1 point in either index corresponds to roughly a 2 percent deviation from its average value.

Figura 1.6 – IRF of Pre- and Post-Tax Income Inequality Using LP-IV



Source: Own elaboration.

The response of pre-tax income inequality to fiscal rule adoption shows a sustained and statistically significant decline over the 15 years following the rule's introduction. By the end of the period, market inequality is reduced by approximately 3 points, equivalent to a 6 percent reduction relative to its historical average. This result suggests that fiscal rules may foster macroeconomic environments that support improved labor market conditions, potentially through lower inflation, reduced risk premia, and enhanced investment and real wages prospects. This, in turn, translates into a more equitable distribution of pre-tax income.

Post-tax income inequality also declines following the adoption of fiscal rules, but the magnitude is smaller. By year 15, the cumulative reduction reaches roughly 2 points, or 4 percent below the historical average. This more muted response reflects a key trade-off inherent to fiscal rules: while they may enhance macroeconomic stability and indirectly foster better labor market outcomes, they can simultaneously constrain governments' capacity to actively pursue redistributive policies through the tax and transfer system. In other words, fiscal rules appear to reduce inequality primarily through market channels rather than through direct redistribution.

The confidence intervals, shown as shaded areas around the response curves, also provide important information. The estimates for market income inequality exhibit wider confidence bands, especially in later periods, reflecting the fact that fiscal rules were adopted earlier in developed economies than in emerging markets, resulting in more limited long-run observations for developing countries. This feature of the sample highlights the need to account for heterogeneity across countries, which motivates the disaggregated analysis by type of rule presented next.

1.5.3 Heterogeneous Effects by Type of Rule

The fiscal rule category, whether it constrains the budget balance, public debt, expenditure, or revenue, matters for understanding how rules shape income distribution. Each type of rule imposes different restrictions on fiscal policy, thereby influencing the government's ability to stabilize the economy and conduct redistribution in distinct ways. To explore these heterogeneous effects, we estimate a set of impulse response functions for each type of fiscal rule, using the same LP-IV framework applied to disaggregated rule adoption:

$$\Delta_h Y_{i,t+h} = Y_{i,t+h} - Y_{i,t-1} = \alpha_{i,h} + \beta_h r\hat{u}le_{i,t} + \delta_h X_{i,t} + v_{i,t+h}, \quad h = 0, 1, 2, \dots, 15 \quad (1.5)$$

In this specification, $r\hat{u}le_{i,t}$ denotes the predicted probability of adopting a particular type of fiscal rule (debt rules (DR), budget balance rules (BBR), expenditure rules (ER), or revenue rules (RR)), as estimated from a first-stage regression using the contiguity-based instrument. This approach allows us to trace how the adoption of each type of rule affects income inequality over time, while controlling for the same set of covariates used in the baseline analysis.

Figure 1.7 shows that Debt rules (DR), which impose ceilings on public debt levels, are associated with a significant reduction in both pre- and post-tax income inequality. By the end of the horizon, pre-tax income inequality declines by nearly 4 points, and post-tax income inequality falls by roughly 2 points. These findings are consistent with the view that debt rules signal fiscal commitment, reducing risk premia and supporting macroeconomic stability, which indirectly benefits labor market conditions. However, the smaller reduction in post-tax inequality suggests that fiscal space for active redistribution may still be constrained under debt rules.

Budget balance rules (BBR) exhibit a broadly similar pattern, reducing pre-tax income inequality by just over 3 points and post-tax income inequality by slightly more than 1 point. These results are intuitive: by directly limiting budget deficits, BBRs promote fiscal sustainability, but they do so in a way that can restrict governments' flexibility in responding to shocks, including those that disproportionately affect lower-income households.

Figure 1.7 – IRF of Income Inequality by Type of Fiscal Rule



Source: Own elaboration.

The effects of expenditure rules (ER) are more gradual but eventually lead to a pronounced reduction in inequality: nearly 9 points for pre-tax income inequality, with smaller but still meaningful gains for post-tax income inequality. Expenditure rules focus directly on limiting public spending growth, which might constrain redistributive expenditures in the short term. However, if well-designed, expenditure rules can help avoid disruptive fiscal consolidations, allowing for a smoother and more stable trajectory of public spending over time, ultimately benefiting income distribution. It is important to note that the confidence intervals for ER estimates are considerably wider for longer analysis horizons. This is attributed to the relatively smaller number of observations for longer horizons, a consequence of the fact that expenditure rules (ER) are predominantly adopted by emerging economies, which have implemented these fiscal rules more recently.

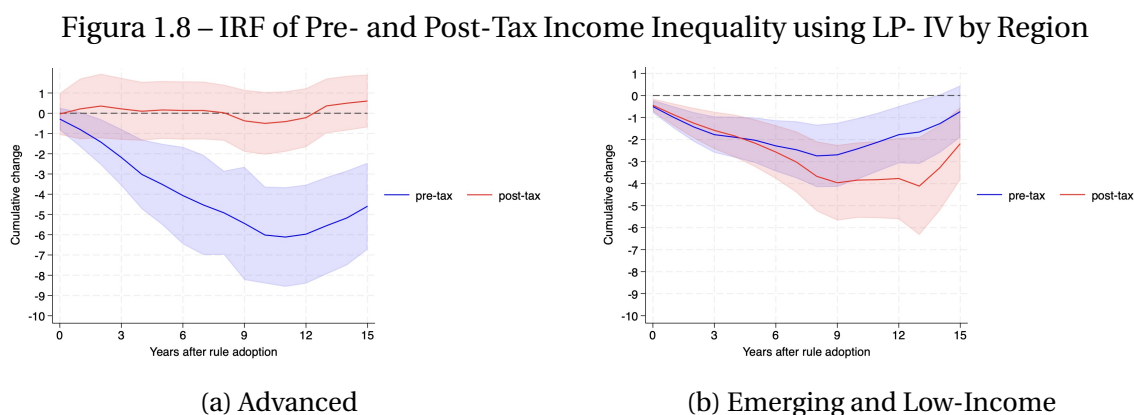
Finally, revenue rules (RR) also contribute to reducing both pre- and post-tax income inequality, with pre-tax income inequality falling by roughly 6 points and post-tax income inequality by around 3 points. Revenue rules, by constraining tax policy, could limit governments' ability to engage in direct redistribution through the tax system. However, these rules can also incentivize improvements in the efficiency of revenue collection, reducing evasion and broadening tax bases, which can contribute to a more equitable income distribution. As with expenditure rules, the

estimates for revenue rules exhibit wider confidence intervals due to smaller sample sizes.

In sum, all types of fiscal rules appear to contribute to reducing income inequality, but through different channels and with varying magnitudes. Debt and budget balance rules seem to exert their effects primarily through macroeconomic stability and reduced sovereign risk, indirectly improving labor market outcomes. Expenditure and revenue rules, on the other hand, appear to operate more directly through their impact on fiscal policy composition, influencing the allocation of public resources and the equity of tax systems. These heterogeneous effects underscore the importance of considering rule design when assessing the broader economic and social consequences of fiscal governance reforms.

1.5.4 LP-IV by economic status

To further investigate the heterogeneous effects of fiscal rules, we split our sample according to the IMF classification of countries into advanced and emerging and low income economies and reestimate the LP-IV specification separately for each group. This exercise also allows us to revisit and extend the findings of Klein and Ribeiro (2024), who examine the relationship between fiscal rules and post-tax income inequality using a local projections approach (LP-OLS). Their results indicate that fiscal rules tend to reduce or have no effect on inequality in developing economies, while in advanced economies, fiscal rules are associated with increased inequality.



Source: Own preparation

Figure 1.8 presents our results. Using the LP-IV approach, we find some important differences relative to Klein and Ribeiro (2024), particularly in terms of the timing and magnitude of the effects. Overall, both pre- and post-tax income inequality indices decline following fiscal rule adoption, but the patterns vary across income groups.

In advanced economies, the effect of fiscal rules on pre-tax income inequality is significant and shows a marked decline over time. By the 15th year after adoption, pre-tax income

inequality decreases by more than 4 points, which represents a reduction by more than 8% relative to the sample average. However, the response of post-tax income inequality follows a different trajectory, with a slight increase of about 1 point (or roughly 2% of the average) by the 15th year. This divergence highlights a critical point: while fiscal rules may enhance macroeconomic stability and indirectly improve pre-tax income distribution through their effects on employment and economic growth, they can simultaneously constrain governments' ability to pursue redistributive policies, particularly in contexts where budgetary processes are rigid or where political pressures for low taxation prevail.

In emerging and low income countries, both inequality indices decline following fiscal rule adoption, but the relative magnitudes are reversed compared to advanced countries. The drop in post-tax income inequality exceeds the reduction in pre-tax income inequality. By the 15th year, post-tax income inequality declines by approximately 2 points (or 4% of the average), while pre-tax income inequality falls by about 1 point (2%). This result suggests that in developing economies, fiscal rules can complement redistributive efforts rather than restrict them. This may reflect the fact that developing countries often adopt fiscal rules in tandem with broader institutional reforms aimed at improving governance and fiscal transparency, which can create space for more effective social policies.

These results point to an important asymmetry in the equity effects of fiscal rules, shaped by countries' developmental stages and institutional capacities. In developed countries, fiscal rules may contribute to greater efficiency and macroeconomic stability but at the cost of limiting the scope for redistribution, particularly when fiscal rules are embedded in austerity-oriented frameworks. In contrast, in developing economies, fiscal rules may play a dual role, fostering both stability and more effective redistributive policies, as these countries often begin from higher levels of inequality and weaker fiscal institutions.

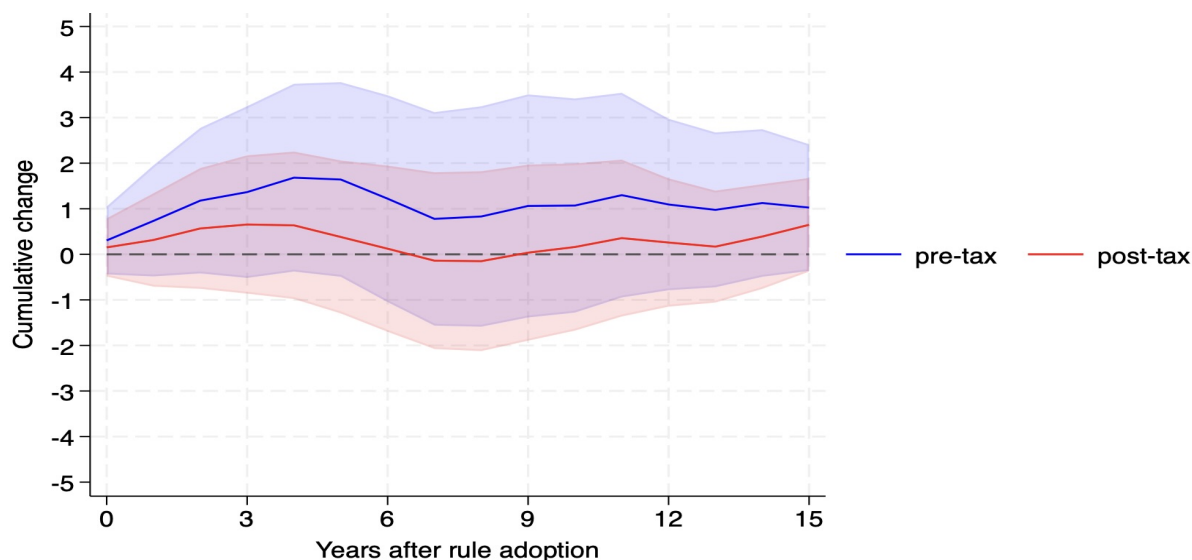
Taken together, these findings underscore the need to tailor fiscal rule design and accompanying policies to country-specific contexts. In advanced economies, greater flexibility in rule design, such as allowing for social spending floors or countercyclical adjustments, could mitigate some of the regressive impacts on disposable income inequality. In developing countries, the emphasis should be on ensuring that fiscal rules support broader institutional reforms that strengthen both fiscal responsibility and the delivery of public services. By considering these nuances, policymakers can better align fiscal governance with equity objectives, ensuring that fiscal rules contribute not only to sustainable public finances but also to inclusive growth.

1.5.5 LP-IV for Latin American Countries

We also conduct a complementary analysis focusing on Latin America, revisiting the results originally presented by Ulloa-Suárez (2021). Their study, which applied a synthetic control method to four Latin American economies (Brazil, Chile, Colombia, and Mexico) found that fiscal rules were associated with higher income inequality, though their estimates were not statistically significant. By restricting our sample to the same four countries and re-estimating the effects using the LP-IV framework, we offer a new perspective on this specific regional experience.

Given the small sample size, we adopt a more parsimonious specification, limiting the set of controls to core macroeconomic variables linked to fiscal stability: debt levels, inflation, and GDP growth. Figure 1.9 presents the results for both pre- and post-tax income inequality.

Figura 1.9 – IRF of income inequality to Fiscal Rules in Latin American countries



Source: Own elaboration.

Consistent with Ulloa-Suárez (2021), our estimates suggest that fiscal rules are associated with a deterioration in income inequality in these countries, although the results remain statistically insignificant across horizons. Both pre- and post-tax income inequality increase over time following the adoption of fiscal rules, reinforcing the idea that fiscal discipline may come at a distributional cost in this regional context.

The trajectory of pre-tax income inequality, shown by the blue line, suggests a more pronounced increase relative to post-tax income inequality. This widening gap highlights that pre-tax income disparities may respond more directly to the economic adjustments triggered by fiscal rules. By the 15th year after adoption, pre-tax income inequality increases by more than 1

point, equivalent to roughly a 2% rise relative to the sample average. This pattern suggests that the economic adjustments fostered by fiscal rules (potentially through labor market rigidities, public wage freezes, or changes in the composition of economic activity) disproportionately affect pre-tax income distribution.

Post-tax income inequality, shown by the red line, also trends upward, but the increase is more muted, remaining below 1 point over the same period. This smaller effect points to some degree of cushioning provided by fiscal transfers and redistributive policies. However, the fact that the trend remains upward, albeit with less intensity than for pre-tax income, suggests that these redistributive policies are not strong enough to fully offset the pressures placed on income distribution by fiscal rule adoption.

Overall, the results for Latin America suggest that, in the absence of complementary policies aimed at safeguarding equity, fiscal rules may contribute to rising inequality. While the statistical insignificance limits strong causal claims, the qualitative pattern is consistent with broader concerns about the potential regressive impacts of fiscal consolidation strategies in middle-income economies with relatively high baseline inequality. This reinforces the need for careful design and accompanying measures when fiscal rules are implemented in contexts where income disparities are already pronounced.

1.6 Results: polarization, fractionalization and political risk

Fiscal rules shape not only macroeconomic outcomes but also the strategic behavior of political actors (Karpuska and Wang (2024)), influencing government stability, policy uncertainty, and fiscal governance. By constraining fiscal discretion, these rules can alter political dynamics, affecting the incentives of governments, opposition parties, and interest groups. In contexts of high political fragmentation, fiscal rules may limit excessive spending commitments and reduce fiscal volatility. However, they may also intensify political disputes, particularly when fiscal constraints require politically costly adjustments, such as expenditure cuts or tax increases. These mechanisms highlight how fiscal rules interact with political institutions, shaping both short-term policy decisions and long-term fiscal sustainability.

Political risk and economic policy uncertainty are also central to understanding the broader effects of fiscal rules. In theory, well-designed rules can enhance credibility and reduce uncertainty by committing governments to stable fiscal paths, lowering the risk of sudden policy shifts. However, if fiscal rules are rigid, inconsistently applied, or frequently overridden, they may instead contribute to political instability and uncertainty, particularly in environments where fiscal policy is a contentious issue. To analyze these channels, we examine three key political indicators: government fractionalization, political risk, and economic policy uncertainty. This allows us to assess whether fiscal rules contribute to more predictable and stable governance or whether they amplify political frictions and uncertainty.

To examine the impact of fiscal rules on these three political variables, we employ the same empirical framework used in our analysis of inequality, as expressed by equation 1.1.

1.6.1 Government Fractionalization

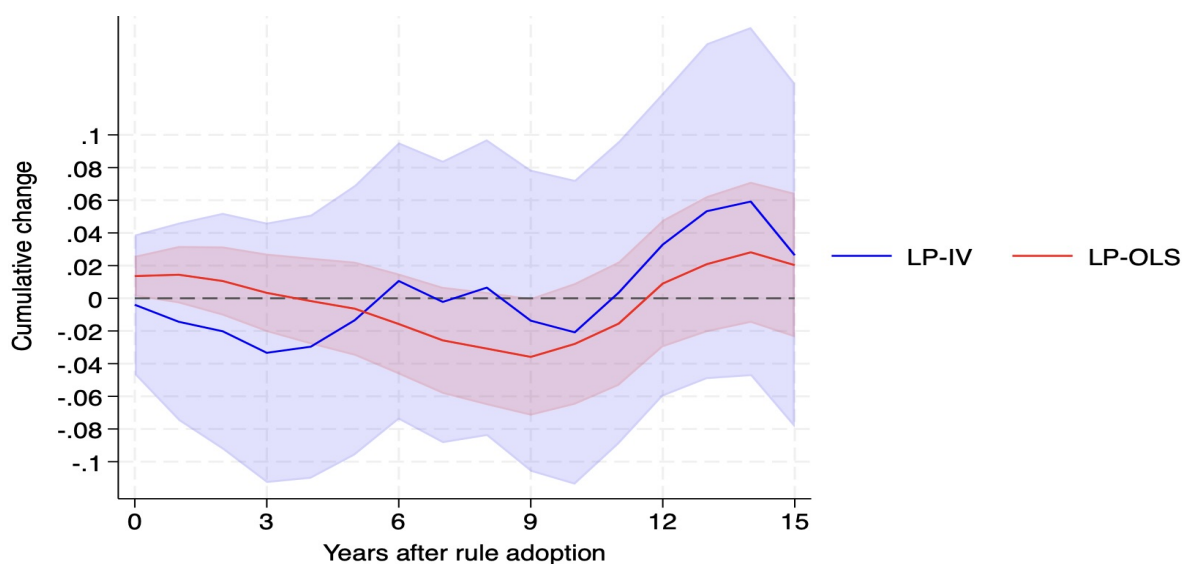
Government fractionalization captures the degree of political fragmentation within a governing coalition or legislature, reflecting the number and relative strength of competing political parties. Higher fractionalization implies a more divided government, where decision-making is subject to negotiation among multiple parties with potentially divergent fiscal priorities. In such settings, fiscal rules can serve as a commitment device, limiting excessive spending and deficit accumulation by imposing binding constraints on fiscal policy. However, the effectiveness of fiscal rules in highly fractionalized governments is not straightforward. While rules may help coordinate fiscal policy and reduce the risk of unsustainable debt accumulation, they can also exacerbate political gridlock if coalition members disagree on how to allocate constrained resources.

The interaction between fiscal rules and government fractionalization has important

implications for both fiscal outcomes and political stability. In fragmented political environments, fiscal rules may increase the likelihood of policy deadlock, leading to delays in budget approval and fiscal adjustments. Conversely, when effectively enforced, fiscal rules can foster greater fiscal discipline even in divided governments by limiting the scope for opportunistic fiscal expansions. Understanding these dynamics is essential for assessing whether fiscal rules contribute to stabilizing fiscal governance or whether they merely reflect underlying political fragmentation. To explore these issues, we analyze the evolution of government fractionalization across countries and its relationship with fiscal rule adoption.

The result of the estimation of equation 1.1 focused on government fractionalization can be seen in the plot below:

Figura 1.10 – IRF of Government Fractionalization to Fiscal Rule



Source: Own elaboration.

The results presented in Figure 1.10 suggest that the adoption of fiscal rules is associated with a slight increase in government fractionalization over time. However, this effect is not statistically significant, indicating that fiscal rules do not systematically lead to greater political fragmentation. One possible interpretation of this finding is that while fiscal rules may impose constraints on fiscal policy, their impact on political cohesion depends on broader institutional and economic contexts. In some cases, fiscal rules may reinforce existing political divisions by constraining fiscal maneuverability, particularly in coalition governments where spending negotiations are already contentious. In others, they may serve as a stabilizing force, providing a common framework that facilitates fiscal agreements among political actors. The lack of a significant effect suggests that, on average, fiscal rules do not decisively shift the degree of

government fractionalization in either direction, highlighting the need for further analysis on the conditional effects of fiscal rules in different political environments.

1.6.2 Political Risk

Political risk reflects the overall stability and quality of governance, incorporating factors such as corruption, the rule of law, and bureaucratic effectiveness. A well-functioning government with low political risk fosters investor confidence, enhances policy credibility, and reduces economic uncertainty. The introduction of fiscal rules may influence political risk in different ways. On one hand, fiscal rules can serve as a commitment device that signals responsible macroeconomic management, potentially improving perceptions of governance quality and reducing political risk. On the other hand, if fiscal rules are rigidly enforced or lead to political disputes over fiscal adjustments, they could exacerbate governance challenges, particularly in countries with already weak institutions. The relationship between fiscal rules and political risk is thus not straightforward and requires empirical investigation.

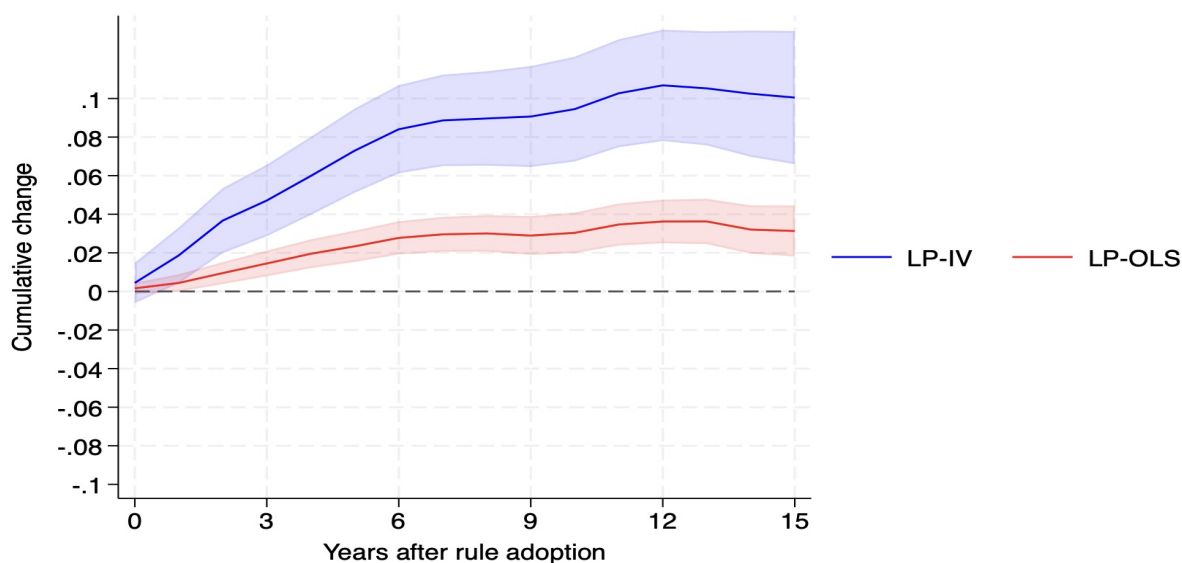
To assess this relationship, we use the "political risk" variable from The Quality of Government (QoG) Institute, which uses the mean value of the ICRG (International Country Risk Guide) variables 'Corruption', 'Law and Order' and 'Bureaucracy Quality,' scaled from 0 to 1, and higher values indicate higher quality of government.

To estimate the effect of fiscal rule adoption on political risk, we use the same local projection framework applied in the previous sections. Specifically, we estimate equation 1.1, replacing income inequality with political risk as the dependent variable while controlling for government fractionalization and key macroeconomic variables such as debt, inflation, and GDP growth. The results are presented in Figure 1.11.

The results in Figure 1.11 indicate that fiscal rule adoption is associated with a statistically significant improvement in political risk over time. This suggests that fiscal rules may reinforce political stability, particularly in contexts where they enhance policymakers' ability to adhere to sound economic practices. One plausible explanation is that fiscal rules, especially those imposing clear guidelines on budgetary discretion, can reduce political tensions by providing a transparent framework for fiscal decision-making. In politically fragmented environments or in countries with stronger institutional frameworks, these guidelines may mitigate conflicts over resource allocation, leading to lower perceptions of instability.

The observed improvement in political risk may also reflect the political benefits of fiscal rule enforcement. Implementing fiscal rules often requires measures such as spending cuts, tax adjustments, or constraints on public sector expansion, which, if well-communicated and perceived as fair, can enhance the credibility of government actions. If fiscal rules are perceived

Figura 1.11 – IRF of Political Risk to Fiscal Rule



Source: Own elaboration.

as self-imposed, thoughtfully designed, and consistently enforced, they may foster stability rather than uncertainty. Moreover, in countries where fiscal rules are upheld and respected, their presence may signal robust institutional strength rather than deeper institutional fragilities. These findings highlight the need to assess not only the macroeconomic effects of fiscal rules but also their broader implications for political stability and governance.

1.6.3 EPU

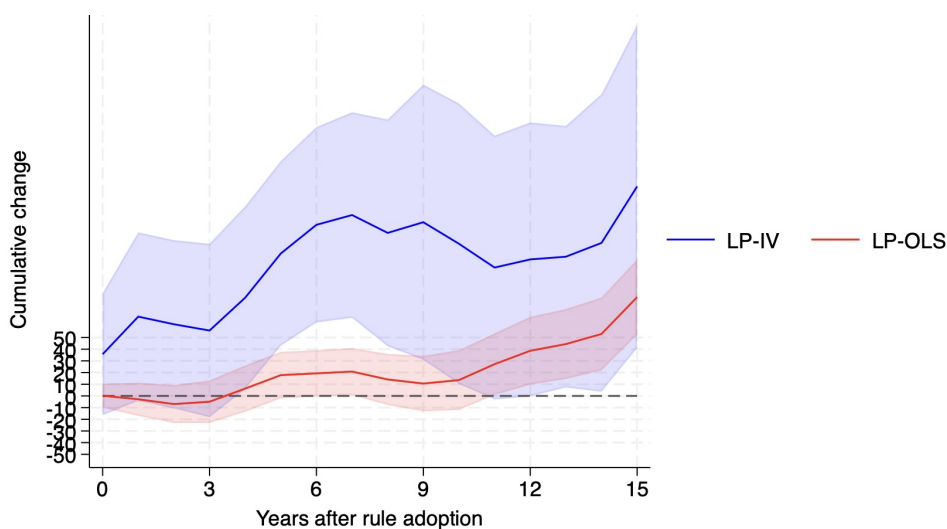
Economic policy uncertainty (EPU) captures the unpredictability surrounding government economic policies, regulatory changes, and fiscal decision-making. Higher levels of uncertainty can lead to delayed investment, reduced consumption, and slower economic growth as businesses and households adjust their expectations in response to ambiguous policy signals. Fiscal rules, designed to impose constraints on government finances, can play a dual role in shaping policy uncertainty. On one hand, well-designed and consistently enforced fiscal rules can provide a clear policy framework, reducing uncertainty by signaling long-term fiscal discipline and stability. On the other hand, if fiscal rules create political disputes, force rigid fiscal adjustments, or lead to frequent renegotiations, they may increase policy uncertainty by making future fiscal policies less predictable.

Given these contrasting mechanisms, it is crucial to assess the impact of fiscal rule adoption on EPU. If fiscal rules reduce uncertainty, they may enhance economic stability and improve investor confidence. However, if they increase policy unpredictability, whether due

to enforcement issues, economic shocks, or political bargaining, this could undermine their intended stabilizing effects. To analyze this, we estimate the local projection model using EPU as the dependent variable, allowing us to capture how uncertainty evolves following fiscal rule implementation.

The results in Figure 1.12 indicate that fiscal rule adoption is associated with a statistically significant increase in economic policy uncertainty (EPU) over time. This suggests that, rather than reducing uncertainty by signaling fiscal discipline, fiscal rules may introduce new sources of policy unpredictability, potentially due to their rigidity, enforcement challenges, or political contention. One possible explanation is that fiscal rules, particularly those that impose strict budgetary constraints, can lead to frequent political debates and policy adjustments, increasing uncertainty about future government actions. Additionally, the potential for rule overrides or the use of escape clauses in times of crisis may contribute to uncertainty by making fiscal policy responses less predictable.

Figura 1.12 – IRF of EPU to Fiscal Rule



Source: Own elaboration.

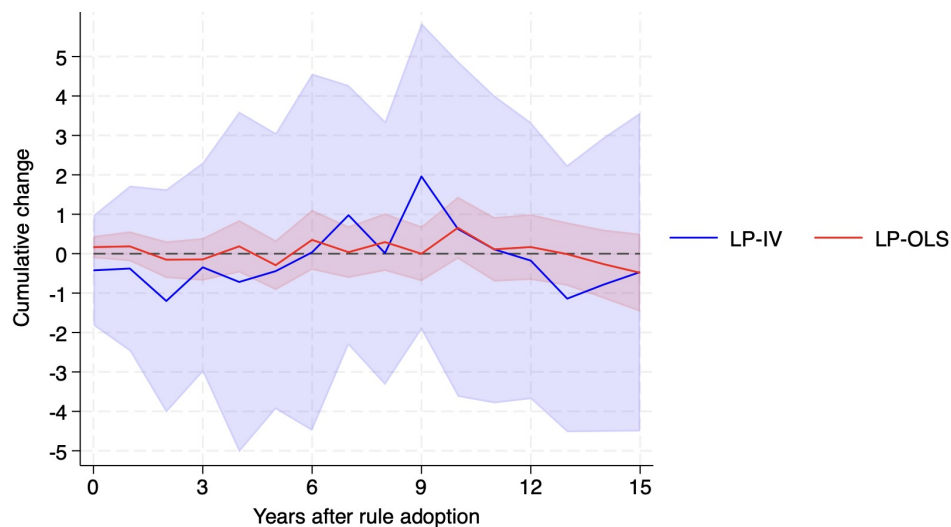
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1.6.4 Polarization

The World Bank's Polarization Index measures the degree of income-based polarization within a country. It quantifies how populations are distributed across various income levels, focusing on the emergence of significant clusters or groups that dominate at the low, middle, and high ends of the income spectrum. This index is particularly concerned with the extent to which these groups are economically separated and isolated from each other, reflecting the degree of societal division or polarization.

The index ranges from 0% to 100%, where higher values indicate greater polarization. A high value on the index suggests severe polarization, implying that there are large, distinct groups within the society that are economically disparate. This condition can lead to social conflicts and political instability, as these groups may have very different economic interests and perspectives. Conversely, lower values indicate a more homogeneous income distribution, suggesting less economic division and potentially more social cohesion.

Figure 1.13 – IRF of Polarization to Fiscal Rule

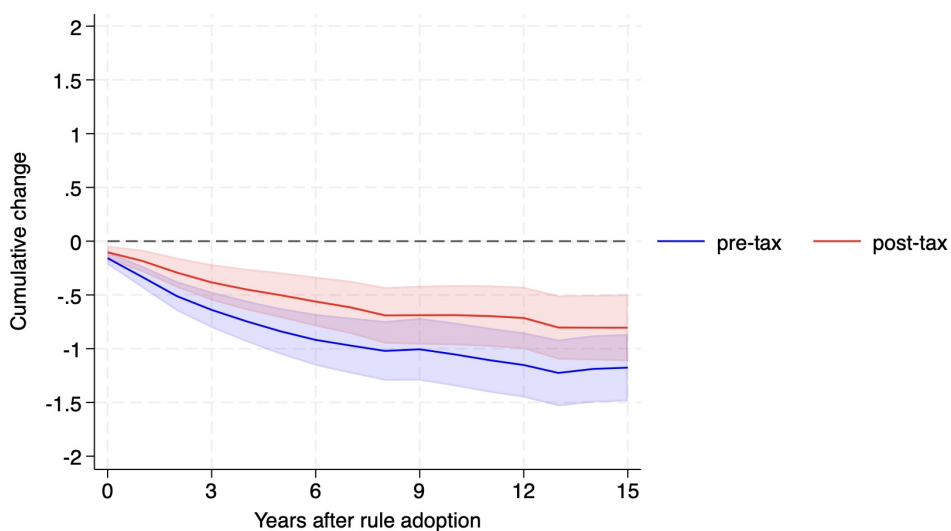


Source: Own elaboration.

1.7 Robustness: LP-OLS

As a robustness exercise, we re-estimate the local projection analysis without the use of instrumental variables, relying instead on the simpler specification given by Equation 1.1. This approach, commonly referred to as LP-OLS, provides a useful benchmark by capturing the dynamic relationship between fiscal rule adoption and inequality, but without explicitly correcting for potential endogeneity in the adoption decision. The results of this analysis are presented in Figure 1.14, which plots the cumulative changes in both pre- and post-tax income inequality in the years following the implementation of a fiscal rule.

Figura 1.14 – RF of Pre- and Post-Tax Income Inequality Using LP-OLS



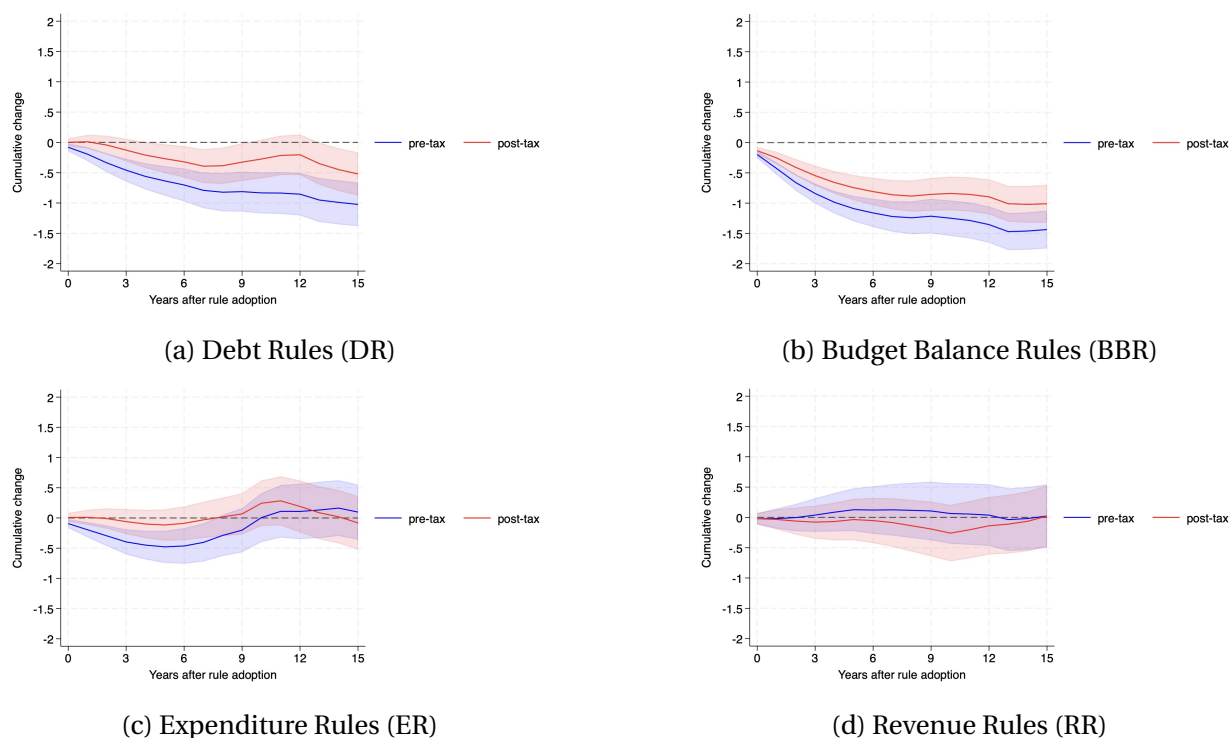
Source: Own elaboration.

The general patterns observed with LP-OLS are qualitatively similar to those documented in the baseline LP-IV estimation: both pre- and post-tax income inequality tend to decline over time after fiscal rule adoption. However, the magnitude of these effects is considerably smaller when no instrument is used. Fifteen years after the introduction of a fiscal rule, the pre-tax income inequality index decreases by roughly 1.2 points, while the post-tax income inequality index declines by approximately 0.7 points. These effects are less pronounced than the corresponding declines of 3 and 2 points observed in the LP-IV estimates, reinforcing the importance of addressing endogeneity when assessing the causal impact of fiscal rules on inequality.

We also break down the analysis by type of fiscal rule, as shown in Figure 1.15. This disaggregated analysis highlights the heterogeneous effects of different fiscal rule types, underscoring the importance of rule design in shaping income distribution dynamics.

Debt Rules (DR) and Budget Balance Rules (BBR) show the most pronounced reductions in both pre- and post- income inequality. For DR, pre-tax income inequality decreases by around

Figura 1.15 – IRF of income inequality according to the type of rule



Source: Own elaboration.

1 point after 15 years, while post-tax income inequality declines by roughly 0.5 points. BBR delivers even larger reductions, with pre-tax income inequality falling by 1.5 points and post-tax income inequality by 1 point over the same period. These patterns suggest that rules directly constraining fiscal aggregates (such as debt levels and overall budget balances) may facilitate broader fiscal discipline and, in turn, generate conditions conducive to a more equitable income distribution.

Interestingly, BBR's stronger effect on post-tax income inequality, relative to DR, suggests that balanced budget rules may afford governments slightly more flexibility to pursue redistributive policies within a constrained fiscal envelope. By allowing for more predictable fiscal planning, these rules may enable the maintenance of targeted social transfers or progressive taxation mechanisms, even under fiscal constraints.

In contrast, Expenditure Rules (ER) and Revenue Rules (RR) show more muted and less stable effects on inequality. For ER, the initial years after adoption show a decline in inequality, particularly in pret-tax income inequality, but this effect fades over time, converging to near-zero after roughly a decade. This suggests that while expenditure ceilings may constrain fiscal profligacy in the short run, they do not systematically enhance the government's capacity for progressive redistribution in the long run. For RR, the effects are even weaker: pret-tax income

inequality exhibits an almost flat response, while post-tax income inequality shows only a modest decline over the 15-year period.

These results highlight the importance of distinguishing between fiscal rules that shape broad fiscal aggregates and those that target specific components of the budget. Rules that directly constrain total deficits or debt stocks appear more likely to produce durable reductions in income inequality, either by fostering greater macroeconomic stability or by creating conditions that preserve fiscal space for redistributive interventions. In contrast, rules that narrowly target spending or revenue flows appear less transformative in terms of income distribution, as they primarily influence the composition of fiscal policy rather than its overall redistributive stance.

1.8 Conclusion

The adoption of fiscal rules has become a cornerstone of macroeconomic governance over the past few decades, as governments seek to maintain fiscal discipline and control public debt accumulation. By 2021, more than 100 countries had introduced some form of fiscal rule, including debt ceilings, balanced budget requirements, and expenditure limits. While the macroeconomic effects of these rules, particularly their ability to enhance budgetary stability, are well documented, their implications for income inequality remain far less understood. This paper contributes to filling this gap by empirically examining how fiscal rules affect income inequality, distinguishing between pre-tax income inequality and post-tax income inequality. This distinction allows us to disentangle the forces that act following the adoption of a fiscal rule, namely the dynamics of market-driven inequality and the redistributive capacity of governments.

To estimate the dynamic causal effect of fiscal rules, we apply the local projection method. Given the non-random nature of fiscal rule adoption, we address potential endogeneity concerns using an instrumental variable (IV) approach, where the instrument captures fiscal rule diffusion from neighboring countries. This contiguity-based instrument, following Caselli and Reynaud (2020), helps isolate exogenous variation in fiscal rule adoption, allowing for more credible causal inference.

Our findings indicate that, over the long term, both pre-tax income inequality and post-tax income inequality decline after fiscal rules are introduced. The reduction is more pronounced for pre-tax income inequality, suggesting that fiscal rules enhance macroeconomic stability and economic growth in ways that improve the primary income distribution. This process strengthens the government's redistributive capacity over time, even if the short-run effects on redistribution are more constrained. When disaggregating by rule type, Budget Balance Rules emerge as the most effective in reducing income inequality, with more balanced fiscal management facilitating both improved market outcomes and preserved redistribution mechanisms.

We also revisit the literature's main findings by comparing advanced and emerging economies, allowing us to place our results in a broader context. In advanced economies, pre-tax income inequality declines sharply (by more than 4 points within 15 years of fiscal rule adoption) while post-tax income inequality slightly increases by about 1 point. The latter result, however, is not statistically distinguishable from zero, indicating that redistribution in advanced economies may be constrained by fiscal rules, particularly when stringent budget constraints limit the scope for discretionary transfers. In emerging economies, both pre- and post-tax income inequality improve after the introduction of fiscal rules. Post-tax income inequality exhibits a slightly larger decline than pre-tax income inequality, suggesting that fiscal rules in these economies might facilitate redistributive policies by enhancing fiscal credibility and stabilizing macroeconomic

conditions, which is broadly consistent with prior findings.

Turning to the case of Latin America, where we replicate the analysis for the four countries studied by Ulloa-Suárez (2021), we find that fiscal rules are associated with a modest increase in both pre- and post-tax income inequality. However, in line with the original study, these effects are not statistically significant. In this restricted sample, the deterioration in pre-tax income inequality is somewhat larger than for post-tax income inequality, which is consistent with results for emerging economies and with the idea that redistributive policies may partly offset worsening pre-tax income inequality.

As an additional robustness check, we repeat the local projection analysis without the use of instruments, relying instead on standard LP-OLS estimation. The patterns observed in the LP-OLS results are broadly consistent with those obtained using LP-IV: both pre- and post-tax income inequality improve after fiscal rule adoption. However, the magnitudes of the estimated effects are considerably smaller, highlighting the importance of addressing endogeneity when identifying the causal impact of fiscal rules.

In summary, by employing a comprehensive panel covering a large set of countries and explicitly modeling the dynamic effects of fiscal rules over a 15-year horizon, this paper provides new evidence on the channels through which fiscal rules affect income inequality. The results highlight the heterogeneous impacts of fiscal rules on pre- and post-tax income inequality, underscoring the need to consider both stabilizing and distributional consequences when evaluating their overall efficacy, particularly in economies characterized by high initial levels of inequality. In particular, we reconcile the literature on the efficiency of fiscal rules, which generally points to benefits for macroeconomic stability, with the literature on equity, whose results are more ambiguous. Future research should further explore the role of rule design, compliance, and the broader institutional context, including the presence of fiscal consolidation programs, escape clauses, and rule enforcement mechanisms. A deeper understanding of how these factors interact with the dual channels of market forces and redistributive policies will be critical for designing fiscal frameworks that balance fiscal sustainability with social equity.

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1.10 Appendix: Data Sources

Raw data comes from the following sources:

Variable	Source	Number of countries	Data range	Description
Income Inequality	Standardized World Income Inequality Database, from Solt (2020) (link).	199	1960-2023	Estimate of Gini index of inequality in equivalized (square root scale) household disposable (post-tax, post-transfer) income, using Luxembourg Income Study data as the standard, values between 0 and 1.
Fiscal Rule	IMF Fiscal Rules Dataset 1985-2021, from Davoodi et al (2022) (link).	106	1975-2021	Dummy variable for the existence of a fiscal rule.
Contiguity	Authors' construction based on Rose (2005, 2007) (link).	214	1948-2000	Binary variable which is equal to 1 if countries i and j share a land border.
Real GDP pc growth	World Economic Outlook, April 2024 edition (link).	196	1980-2022	Annual growth rate of Gross Domestic product per capita, constant prices, units of national currency.
Gross Debt to GDP	World Economic Outlook, April 2024 edition (link).	196	1980-2022	General government gross debt in percent of GDP
Dependency ratio	World Development Indicators (link).	226 (includes data for regions)	1960-2022	Age dependency ratio (% of working-age population)
Continued on next page				

Variable	Source	Number of countries	Data range	Description
Inflation	World Development Indicators (link).	226 (includes data for regions)	1960-2022	Inflation, consumer prices (annual %)
Capital Openness	Chinn and Ito (2006) (link).	184	1970-2021	Index measuring a country's degree of capital account openness.
Political Risk	The International Country Risk Guide (ICRG), (link).	146	1984-2023	Composite measure of the quality of governance. The mean value of the ICRG variables 'Corruption', 'Law and Order' and 'Bureaucracy Quality', scaled from 0 to 1. Higher values indicate higher quality of government.
Government Fractionalization	DPI2020 Database of Political Institutions (link).	183	1975-2020	Index measuring the probability that two deputies picked at random among from the government parties will be of different parties.
Inflation Target	Authors' construction based on Bhalla et al. (2023), Duncan et al. (2022), Roger (2009), and Roger and Stone (2005).	47	1988-2023	Binary variable taking the value 1 if in a given year a country operates under IT (formally or informally), zero otherwise.

Continued on next page

Variable	Source	Number of countries	Data range	Description
CBI Regular Turnover	Dreher et al. (2008, 2010), Sturm and Haan (2001) (link).	162 (includes 4 regional central banks)	1970-2018	Proxy of central bank independence, dummy variable equal to 1 if the change of Central Bank's governor takes place at the end of the official mandate and 0 otherwise.
Debt Default	Reinhart and Rogoff (2009) (link).	128	1800-2014	Dummy equal to 1 if a country defaulted its external debt or restructured it with a loss for investors, and 0 if there was no payment default or debt restructuring.

1.10.1 Income Inequality

Measure of income inequality from the Standardized World Income Inequality Database (SWIID). It incorporates data from many sources (collected by the Luxembourg Income Study) and uses bayesian estimation to obtain the posterior distribution of income inequality (Gini indices of disposable and market income inequality) of for 199 countries from 1960 to the present. A full description of the SWIID dataset is presented in Solt (2020).

It was downloaded version 9.6, December 2023 from Harvard Dataverse (link).

From the csv file *swiid9_6_summary* we split data text into columns (delimited by commas) and save as xslm file named *swiid*. We get a 6174 lines x 10 columns dataset matrix.

Countries are identified by name. We have 199 countries and yearly data from 1960 to 2023, but not every country has observations for every year.

Data are originally from 0 to 100, we divide by 100 to make it between 0 and 1 and comparable to other studies.

Important: the dta file contains the inequality estimates and their associated uncertainty (standard deviations), represented by 100 draws from the posterior distribution (more details on Solt (2020)); the csv file contains the means of these posterior distributions.

1.10.2 Fiscal Rules

The dataset includes information about national and supranational fiscal rules across the IMF membership. The dataset covers four types of rules: budget balance rules, debt rules, expenditure rules, and revenue rules, applying to the central or general government or the public sector. The dates indicate the year when a rule was implemented (latest available information is end-December 2021).

The dataset includes descriptions of the rules as well as codified information about the following characteristics: (i) Type of rule; (ii) Year of implementation and year of major revisions; (iii) Number of rules; (iv) Legal basis; (v) Coverage—level of government; (vi) Monitoring procedures; (vii) Enforcement procedures; (viii) Institutional supporting features (Multi-year expenditure ceilings; Fiscal responsibility laws; independent body providing budget assumptions; independent body monitoring implementation); (ix) Stabilization features (Budget balance rule accounting for the cycle; investment excluded); (x) Activation of Escape Clause/Suspension of Fiscal Rules.

The dataset is downloaded from IMF website ([link](#)). It was downloaded the *January 2022 rev Dec 21* version. Countries are identified by name. We have 106 countries and yearly data from 1985 to 2023.

1.10.3 Contiguity

Binary variable which is equal to 1 if countries *i* and *j* share a land border. Author's calculation based on data from Rose (2005), downloaded from Andrew Rose's website ([link](#)).

Countries are identified only by IFS code (a three-digit country code, from The International Financial Statistics (IFS) of the International Monetary Fund (IMF)). We merge with *World Economic Outlook database: October 2023* ([link](#)) to obtain the name and WDI code (ISO Alpha-3 Code) of the countries in Andrew Rose's dataset.

There are 214 country entries in Andrew Rose's dataset. From that, 32 are not identified in WEO ISO codes.

1.10.4 Real GDP per capita growth

Annual growth rate of Gross Domestic product per capita in constant prices and in units of national currency.

Data comes from World Economic Outlook, April 2024 edition ([link](#)). We calculate the annual growth rate from the Gross Domestic product per capita in constant prices and in units of national currency series.

Countries are identified by country name and ISO Alpha-3 Code.

1.10.5 *Gross debt to GDP*

General government gross debt to GDP in percent of GDP.

Data comes from World Economic Outlook, April 2024 edition ([link](#)).

Countries are identified by country name and ISO Alpha-3 Code.

1.10.6 *Dependency Ratio*

Age dependency ratio is the ratio of dependents—people younger than 15 or older than 64—to the working-age population—those ages 15-64. Data are shown as the proportion of dependents per 100 working-age population. World Bank staff estimates based on age distributions of United Nations Population Division's World Population Prospects: 2022 Revision.

Data comes from World Development Indicators, from the World Bank ([link](#)) using data updated on February 2024.

Countries are identified by country name and ISO Alpha-3 Code.

1.10.7 *Inflation*

Inflation in consumer prices (annual %). Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used.

Data comes from World Development Indicators, from the World Bank ([link](#)) using data updated on February 2024.

We transform the original series to the log transformation $\log(1+\text{inflation}/100)$.

Countries are identified by country name and ISO Alpha-3 Code.

1.10.8 *Capital Openness*

Index measuring a country's degree of capital account openness, initially introduced in Chinn and Ito (Journal of Development Economics, 2006). It is based on the binary dummy variables that codify the tabulation of restrictions on cross-border financial transactions reported in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER). Details on the construction of this index is explained with details in Chinn and Ito (2006, 2008).

Data comes from Hiro Ito's website ([link](#)), using 2023 version with data updated until 2021. In the dataset, **kaopen** refers to the Chinn-Ito index; and **ka-open** refers to the Chinn-Ito index normalized to range between zero and one.

Countries are identified by country name and ISO Alpha-3 Code.

1.10.9 Political Risk

This variable is the mean value of the ICRG variables 'Corruption', 'Law and Order' and 'Bureaucracy Quality', scaled from 0 to 1. Higher values indicate higher quality of government.

Data comes from The International Country Risk Guide (ICRG) available at The Quality of Government (QoG) Institute ([link](#)) using data updated on January 2023.

Countries are identified by country name and ISO Alpha-3 Code.

1.10.10 Government Fractionalization

This variable measures the probability that two deputies picked at random from among the government parties will be of different parties.

Data comes from the Database of Political Institutions 2020 ([link](#)), that presents institutional and electoral results data such as measures of checks and balances, tenure and stability of the government, identification of party affiliation and ideology, and fragmentation of opposition and government parties in the legislature.

It is the probability that two deputies picked at random from among the government parties will be of different parties. Equals NA if there is no parliament. If there are any government parties where seats are unknown (cell is blank), GOVFRAC is also blank. No parties in the legislature (0 in 1GOVSEAT) results in NA, just as in the Herfindahl.

Countries are identified by country name and ISO Alpha-3 Code.

1.10.11 Inflation Target

Binary variable taking the value 1 if in a given year a country operates under IT (formally or informally), zero otherwise

Hand-collected data from Bhalla et al (2023), Duncan et al (2022), Roger (2009), and Roger and Stone (2005).

From Roger and Stone (2005) we obtain date of effective adoption of full-fledged inflation targeting. From Stone (2009) we get effective IT adoption date. Duncan et al (2022) gives the year of IT adoption and, finally, Bhalla et al (2023) gives the IT adoption period and also if the country acknowledges IT explicitly.

We compile manually information from the PDFs and whenever it is recorded an IT regime (formal or informal) by any of the data sources, we put a value of 1 for the dummy variable.

Countries are identified by country name in the dataset.

1.10.12 Central Bank Independency (CBI Regular Turnover variable)

Proxy of central bank independence, binary variable taking the value 1 if in a given year a country operates under a specific central bank governor's turnover procedure, zero otherwise. We created series for regular turnover and for irregular turnover.

Data comes from *Data on Central Bank Governors*, available at KOF Swiss Economic Institute's website (link) and originally Dreher et al. (2008, 2010), Sturm and Haan (2001). We downloaded the latest data available (2018 edition) and use information from *data v2018* datasheet.

It contains information from 162 entities (157 countries and 5 regional central banks), including countries and central banks, and ranges from 1970 to 2018.

From the original file, we take two dummy variables: *regular turnover dummy* and *irregular turnover dummy*. These variables can take values of 1 (for the mentioned regime), 0 (for other regime), -999 (if there is no Central Bank) and "." (if no information is available). For the *irregular turnover* dummy, leaving outside this standard classification, values for "Russian Federation" in the period between 2015 and 2018 are empty.

Countries are identified by country name and ISO Alpha-3 Code in the dataset.

1.10.13 Debt Default

Dummy equal to 1 if a country defaulted its external debt or restructured it with a lost for investors, and 0 if there was no payment default or debt restructuring.

Data comes from Reinhart and Rogoff (2009), available at Kenneth Rogoff's website (link). Data are from *Figure 5.4 Inflation crises and external default, 1900-2008*, sheet *ExternalDefaultDummys*.

Countries are identified by country name.

1.10.14 Countries sample

We use the country sample of IMF WEO dataset and merge data by the ISO code² and end up with 196 countries in the sample.

The 196 countries are the following: Afghanistan (AFG), Albania (ALB), Algeria (DZA), Andorra (AND), Angola (AGO), Antigua and Barbuda (ATG), Argentina (ARG), Armenia (ARM), Aruba (ABW), Australia (AUS), Austria (AUT), Azerbaijan (AZE), Bahrain (BHR), Bangladesh (BGD), Barbados (BRB), Belarus (BLR), Belgium (BEL), Belize (BLZ), Benin (BEN), Bhutan (BTN), Bolivia (BOL), Bosnia and Herzegovina (BIH), Botswana (BWA), Brazil (BRA), Brunei Darussalam (BRN), Bulgaria (BGR), Burkina Faso (BFA), Burundi (BDI), Cabo Verde (CPV), Cambodia (KHM), Cameroon (CMR), Canada (CAN), Central African Republic (CAF), Chad (TCD), Chile (CHL), China (CHN), Colombia (COL), Comoros (COM), Costa Rica

²2 countries have the same name in WEO and WDI dataset but different ISO codes: Kosovo (UVK in WEO, XKX in WDI) and West Bank and Gaza (WBG in WEO, PSE in WDI). We keep WEO classification.

(CRI), Croatia (HRV), Côte d'Ivoire (CIV), Cyprus (CYP), Czech Republic (CZE), Democratic Republic of the Congo (COD), Denmark (DNK), Djibouti (DJI), Dominica (DMA), Dominican Republic (DOM), Ecuador (ECU), Egypt (EGY), El Salvador (SLV), Equatorial Guinea (GNQ), Eritrea (ERI), Estonia (EST), Eswatini (SWZ), Ethiopia (ETH), Fiji (FJI), Finland (FIN), France (FRA), Gabon (GAB), Georgia (GEO), Germany (DEU), Ghana (GHA), Greece (GRC), Grenada (GRD), Guatemala (GTM), Guinea (GIN), Guinea-Bissau (GNB), Guyana (GUY), Haiti (HTI), Honduras (HND), Hong Kong SAR (HKG), Hungary (HUN), Iceland (ISL), India (IND), Indonesia (IDN), Iraq (IRQ), Ireland (IRL), Islamic Republic of Iran (IRN), Israel (ISR), Italy (ITA), Jamaica (JAM), Japan (JPN), Jordan (JOR), Kazakhstan (KAZ), Kenya (KEN), Kiribati (KIR), Korea (KOR), Kosovo (UVK), Kuwait (KWT), Kyrgyz Republic (KGZ), Lao P.D.R. (LAO), Latvia (LVA), Lebanon (LBN), Lesotho (LSO), Liberia (LBR), Libya (LBY), Lithuania (LTU), Luxembourg (LUX), Macao SAR (MAC), Madagascar (MDG), Malawi (MWI), Malaysia (MYS), Maldives (MDV), Mali (MLI), Malta (MLT), Marshall Islands (MHL), Mauritania (MRT), Mauritius (MUS), Mexico (MEX), Micronesia (FSM), Moldova (MDA), Mongolia (MNG), Montenegro (MNE), Morocco (MAR), Mozambique (MOZ), Myanmar (MMR), Namibia (NAM), Nauru (NRU), Nepal (NPL), Netherlands (NLD), New Zealand (NZL), Nicaragua (NIC), Niger (NER), Nigeria (NGA), North Macedonia (MKD), Norway (NOR), Oman (OMN), Pakistan (PAK), Palau (PLW), Panama (PAN), Papua New Guinea (PNG), Paraguay (PRY), Peru (PER), Philippines (PHL), Poland (POL), Portugal (PRT), Puerto Rico (PRI), Qatar (QAT), Republic of Congo (COG), Romania (ROU), Russia (RUS), Rwanda (RWA), São Tomé and Príncipe (STP), Samoa (WSM), San Marino (SMR), Saudi Arabia (SAU), Senegal (SEN), Serbia (SRB), Seychelles (SYC), Sierra Leone (SLE), Singapore (SGP), Slovak Republic (SVK), Slovenia (SVN), Solomon Islands (SLB), Somalia (SOM), South Africa (ZAF), South Sudan (SSD), Spain (ESP), Sri Lanka (LKA), St. Kitts and Nevis (KNA), St. Lucia (LCA), St. Vincent and the Grenadines (VCT), Sudan (SDN), Suriname (SUR), Sweden (SWE), Switzerland (CHE), Syria (SYR), Türkiye (TUR), Taiwan Province of China (TWN), Tajikistan (TJK), Tanzania (TZA), Thailand (THA), The Bahamas (BHS), The Gambia (GMB), Timor-Leste (TLS), Togo (TGO), Tonga (TON), Trinidad and Tobago (TTO), Tunisia (TUN), Turkmenistan (TKM), Tuvalu (TUV), Uganda (UGA), Ukraine (UKR), United Arab Emirates (ARE), United Kingdom (GBR), United States (USA), Uruguay (URY), Uzbekistan (UZB), Vanuatu (VUT), Venezuela (VEN), Vietnam (VNM), West Bank and Gaza (WBG), Yemen (YEM), Zambia (ZMB), Zimbabwe (ZWE).

The grouping of countries according to economic status (IMF classification) follows Klein and Ribeiro (2024), and is provided in the following list:

Developed (32): Australia (AUS), Austria (AUT), Belgium (BEL), Canada (CAN), Croatia (HRV), Cyprus (CYP), Czech Republic (CZE), Denmark (DNK), Estonia (EST), Finland (FIN), France (FRA), Germany (DEU), Greece (GRC), Iceland (ISL), Ireland (IRL), Israel (ISR), Italy (ITA), Japan (JPN), Latvia (LVA), Lithuania (LTU), Luxembourg (LUX), Malta (MLT), New Zealand (NZL), Norway (NOR), Portugal (PRT), Singapore (SGP), Slovenia (SVN), Spain (ESP), United Kingdom (GBR), Sweden (SWE), Switzerland (CHE)

Emerging (124): Albania (ALB), Algeria (DZA), Angola (AGO), Argentina (ARG), Armenia (ARM), Aruba (ABW), Azerbaijan (AZE), Bahrain (BHR), Bangladesh (BGD), Barbados (BRB), Belarus (BLR), Belize (BLZ), Benin (BEN), Bhutan (BTN), Botswana (BWA), Brazil (BRA), Brunei Darussalam (BRN), Bulgaria (BGR), Burkina Faso (BFA), Burundi (BDI), Cabo Verde (CPV), Cameroon (CMR), Chad (TCD), Chile

(CHL), China (CHN), Colombia (COL), Comoros (COM), Costa Rica (CRI), Djibouti (DJI), Dominica (DMA), Dominican Republic (DOM), Ecuador (ECU), Egypt (EGY), El Salvador (SLV), Equatorial Guinea (GNQ), Eswatini (SWZ), Ethiopia (ETH), Fiji (FJI), Gabon (GAB), Georgia (GEO), Ghana (GHA), Grenada (GRD), Guatemala (GTM), Guinea (GIN), Guinea-Bissau (GNB), Haiti (HTI), Honduras (HND), Hungary (HUN), India (IND), Indonesia (IDN), Iraq (IRQ), Jamaica (JAM), Jordan (JOR), Kazakhstan (KAZ), Kenya (KEN), Kuwait (KWT), Lebanon (LBN), Lesotho (LSO), Liberia (LBR), Madagascar (MDG), Malawi (MWI), Malaysia (MYS), Maldives (MDV), Mali (MLI), Mauritania (MRT), Mauritius (MUS), Mexico (MEX), Mongolia (MNG), Montenegro (MNE), Morocco (MAR), Myanmar (MMR), Mozambique (MOZ), Namibia (NAM), Nepal (NPL), Nicaragua (NIC), Niger (NER), Nigeria (NGA), North Macedonia (MKD), Oman (OMN), Pakistan (PAK), Panama (PAN), Paraguay (PRY), Peru (PER), Philippines (PHL), Poland (POL), Qatar (QAT), Romania (ROU), Rwanda (RWA), Saudi Arabia (SAU), Senegal (SEN), Serbia (SRB), Seychelles (SYC), Sierra Leone (SLE), South Africa (ZAF), Sri Lanka (LKA), Sudan (SDN), Suriname (SUR), Tajikistan (TJK), Thailand (THA), Togo (TGO), Trinidad and Tobago (TTO), Tunisia (TUN), Turkmenistan (TKM), Uganda (UGA), Ukraine (UKR), Uruguay (URY), Uzbekistan (UZB), Yemen (YEM), Zambia (ZMB), Zimbabwe (ZWE).

2 FISCAL RULES, POLITICAL STRUCTURE AND MUNICIPAL COMPLIANCE: EVIDENCE FROM BRAZIL

Resumo

This paper examines municipal compliance with Brazil's Fiscal Responsibility Law using a novel panel of "de facto non-compliance" indicators that captures outright violations and accounting maneuvers ("restos a pagar", expenditure reclassification) for over 2,000 municipalities from 2015 to 2024. We study three cases: general fiscal compliance, the end-of-term Cash Rule compliance, and the 60% personnel-expenditure cap compliance, focusing on fiscal capacity, political concentration, and social development. Per-capita revenue emerges as the strongest predictor: a R\$ 1,000 increase reduces non-compliance by about 2.6 percentage points. While overall political concentration has no consistent effect on compliance, for the personnel-expenditure rule it is associated with higher non-compliance in municipalities with higher levels of socioeconomic development. The income component of human development, unlike education or health, conditions these relationships, indicating that economic capacity both underpins direct compliance and interacts with local power structures to shape rule enforcement.

2.1 Introduction

The credibility of fiscal rules depends not only on their formal design, but also on the political and economic conditions under which they are conceived and enforced. Although prior work has examined rule architecture (coverage, enforcement mechanisms, escape clauses, etc) and their impact on aggregate deficits, debt ratios, and macroeconomic stability (e.g., Debrun et al., 2008; Nerlich and Reuter, 2013; Caselli and Reynaud, 2020). However, there's been much less focus on how local political structures and social development actually affect whether these rules are followed. When you have highly centralized political power and uneven development, official constraints might only be observed sometimes, or they could be bypassed with accounting tricks, making the stated compliance rates misleading.

This paper investigates these dynamics at the municipal level in Brazil, where the 2000 Fiscal Responsibility Law (LRF) introduced a suite of numerical and procedural limits on personnel spending, cash availability, borrowing and debt, but left substantial discretion in implementation. Drawing on a novel panel database covering over 2,000 municipalities between 2015 and 2024, we document not only outright rule violations but also subtler forms of circumvention, such as postponing unpaid obligations and reclassifying revenues, observed on "Cash rule" and that we collectively label "de facto non-compliance".

Our empirical analysis shows three key findings. First, fiscal capacity, measured by current net revenue per capita, emerges as the most robust predictor of compliance: municipalities with higher revenues per inhabitant are significantly less likely to breach any fiscal rule or overshoot the personnel-expenditure cap. This finding is intuitive and straightforward: higher per-capita revenues give municipalities a financial buffer against shocks (revenue shortfalls or unexpected expenses), reducing the need for last-minute accounting tricks or outright rule breaches. Second, there are no conclusive marginal effects of political concentration on overall fiscal compliance, except for the personnel-expenditure rule, where greater legislative concentration is positively associated with non-compliance the higher the socioeconomic development of the municipality. Third, economic strength, reflected in both per-capita revenue and income development, plays a crucial role in meeting fiscal limits, likely by providing the resources and stability needed to absorb shocks

By linking political-economy models of distributive conflict (Alesina and Drazen (1991); Woo (2003); Alt and Lassen (2006); Timmons and Broid (2013)) to a rich menu of municipal-level outcomes, our study contributes a new perspective on power structures that underpin rule-based fiscal policy. We show that technical rule design and social development alone are insufficient: sustained compliance depends on plural political oversight and adequate revenue capacity. Our "*de facto non-compliance*" database – constructed from administrative records, audit flags and reclassification codes – provides the first systematic evidence of how local actors work around formal constraints in a large developing-country setting. The findings carry implications for rule design and monitoring, and capacity-building efforts: strengthening fiscal governance requires not only clear legal limits, but also robust local institutions and balanced legislative structures that can translate formal rules into real-world discipline.

The rest of the paper is structured as follows: Section 2 reviews the literature on fiscal performance

and political economy; Section 3 presents the institutional environment for local government fiscal rules in Brazil; Section 4 presents the data construction of fiscal rule compliance; Section 5 presents the estimation data and key variables; Section 6 describes the estimation methods; Section 7 reports the main results for fiscal rules compliance, while 8 presents robustness checks. Finally, Section 9 concludes with a discussion of policy implications and further research.

2.2 Literature Review

The study of fiscal rules has long occupied a central place in macroeconomic research. Early contributions demonstrated that binding limits on deficits and debt, whether through balanced-budget requirements or debt-brake mechanisms, tend to foster more disciplined public finances, lower borrowing costs, and improving macroeconomic stability (Debrun, Moulin, Turrini, Ayuso-i Casals, and Kumar (2008); Nerlich and Reuter (2013); Caselli and Reynaud (2020)). Subsequent work explored how these rules shape not just aggregate balances but also the composition of spending: for instance, rigid rules often force cuts in social transfers and public investment during consolidation episodes, whereas more flexible arrangements can cushion investment and preserve long-term growth potential (Dahan and Strawczynski (2013); Ardanaz, Cavallo, Izquierdo, and Puig (2021)). A smaller literature has turned its attention to the broader social consequences of fiscal constraints, yielding mixed findings on inequality: some studies find that balanced budget and debt rules reduce inequality while expenditure rules sometimes exacerbate it, but results vary across regions and rule designs (Ulloa-Suárez (2021); Combes J.-L. (2019); Hartwig and Sturm (2019); Klein and Ribeiro (2022); Borges and Karpuska (2024)). These heterogeneous outcomes highlight that the effectiveness of any fiscal rule depends critically on its technical design and the broader institutional environment in which it operates.

Parallel to this work, a rich tradition in political economy has examined how political fragmentation and distributive conflict shape fiscal behavior. Classic models show that coalitional bargaining and vote-seeking motives can delay necessary fiscal adjustments and lead to higher deficits (Alesina and Drazen (1991)). Empirical investigations confirm that more fragmented party systems and higher inequality often erode budgetary discipline, as governments cater to narrow interests rather than pursuing broad-based consolidation (Alt and Lassen (2006); Timmons and Broid (2013)). In this vein, recent studies have begun to explore the reverse channel - how the existence of fiscal rules influences political outcomes, including party polarization and the composition of local elites - but consensus remains elusive (Aaskoven (2020)).

Our research brings these two strands together at the municipal level. While fiscal rules establish formal constraints on deficits, debt and spending, their real-world effectiveness depends on the local political landscape and the capacity of subnational institutions. Drawing on the political-economy literature, we ask how legislative fragmentation moderates the impact of social and institutional development on rule compliance. In doing so, we build on evidence that human development, through education, health and income capacity, can enhance governance and accountability (Besley and Burgess (2002)), but only if

power is sufficiently dispersed to prevent capture by narrow interests Rodden ((2006); Martinez-Vazquez and McNab (2003)).

Specifically on fiscal rules compliance, a cross-country analyses in the Latin American and Caribbean region by Ardanaz et al. (2024) documents substantial variation in compliance rates and shows the importance of rule design features and institutional environment. For Brazilian municipalities, Santos (2024) provides a detailed case study of the Lei de Responsabilidade Fiscal's impact on municipal spending patterns, highlighting how discretionary accounting maneuvers can undermine rule enforcement.

By examining Brazil's ensemble of fiscal rules across thousands of municipalities, our study extends these insights and sheds new light on the complex interplay between formal constraints, local political structure, and social development in subnational fiscal governance.

2.3 The Fiscal Responsibility Law in Brazil: Context, Structure, and Municipal Challenges

The Fiscal Responsibility Law (*Lei de Responsabilidade Fiscal*, or LRF), enacted through Complementary Law No. 101 on May 4, 2000, marks a turning point in the history of public financial management in Brazil. Emerging during a period of democratic transition, macroeconomic stabilization, and increasing demand for transparency and accountability, the LRF seeks to impose discipline on the budgetary practices of all levels of government. Its main innovation lies in converting sound fiscal management practices into legally binding obligations, with administrative and criminal consequences for public officials who fail to comply.

2.3.1 Historical Context Behind the Creation of the LRF

Throughout the 1980s and 1990s, Brazil faced severe macroeconomic challenges, including hyperinflation, excessive public debt, and institutional fragility. The country's return to democracy and the decentralization process in the 1980s, culminating in the 1988 Constitution, expanded the fiscal and administrative responsibilities of states and municipalities without a corresponding strengthening of oversight and accountability mechanisms.

The post-Constitution period was characterized by growing financial autonomy at the subnational level, but with limited regulation and control. This freedom led to an explosion of expenditures, a rapid accumulation of debt, and declining quality in public service delivery. The federal government often absorbed subnational debt through refinancing and renegotiation schemes, exposing itself to substantial fiscal risks.

The stabilization of inflation, achieved through the Real Plan in 1994, exposed underlying fiscal imbalances that had previously been masked by high inflation. With price levels under control, it became harder for subnational governments to postpone expenditures or roll over debt without jeopardizing

their solvency. As a result, previously hidden patterns of irresponsible fiscal management became visible. Many states and municipalities operated with large primary deficits, seriously impairing their investment capacity and increasing their financial dependence on the central government.

Institutional responses to this scenario emerged gradually. Initially, emergency fiscal containment measures, such as the Fiscal Adjustment Programs (*Programa de Ajuste Fiscal*, or PAF), were negotiated between the federal government and individual states. However, these agreements were largely dependent on political will and often failed to yield lasting results. It was in this environment that the idea of a national legal framework - normative, permanent, and uniformly applicable across all levels of government - took shape. The LRF was conceived as a structural and long-term response to Brazil's chronic fiscal indiscipline.

2.3.2 Application of the LRF to Municipalities: Obligations, Rationale, and Historical Lessons

The LRF was conceived as a federal law with national reach and mandatory compliance by all levels of government, including municipalities. This institutional imposition represents an exogenous constraint on local governments. Although municipalities possess administrative and financial autonomy under the 1988 Constitution, the national fiscal framework binds them directly. Such central oversight is justified by past episodes of excessive indebtedness, weak local control capacity, and the systemic need to safeguard the solvency of the Brazilian state as a whole.

Among the main LRF rules applicable to municipalities, several stand out:

- **Personnel expenditure limits (Articles 19 and 20 of the LRF):** The cap of 60% of Net Current Revenue (*Receita Corrente Líquida*, RCL) for municipal personnel expenditures emerged in response to a recurring pattern of unsustainable payroll expansions, especially during election years. In the 1990s, many municipalities exceeded 70% of RCL in wage expenditures, undermining their ability to deliver basic services. The subdivision of the cap (54% for the Executive and 6% for the Legislative) was designed to curb fiscal imbalances, particularly in municipal councils that were more vulnerable to local political pressures.
- **Debt and credit operations control (Articles 28 to 32):** The explosive debt accumulation of the 1980s and early 1990s, exacerbated by repeated federal bailouts, prompted the establishment of borrowing ceilings and stricter loan conditions. Before the LRF, many municipalities entered into credit operations without the capacity to repay, ultimately shifting liabilities to the federal government. The LRF requires evidence of repayment capacity and prohibits credit operations involving financial institutions controlled by the borrowing entity.
- **Management of payables and cash availability (Article 42):** A common pre-LRF practice was for outgoing mayors to leave large volumes of outstanding payables (so-called *restos a pagar*, i.e., expenses committed but not paid), often without sufficient cash to cover them. This burdened incoming

administrations and disrupted service continuity. The LRF explicitly prohibits this behavior by mandating that any expenditure contracted in the last two quadrimesters of a mayor's term must be backed by available financial resources.

- **Fiscal targets and planning-execution alignment (Articles 4 and 5):** Drawing from international best practices, the LRF obliges municipalities to set annual fiscal targets for primary result, nominal result, and public debt in the Budget Guidelines Law (*Lei de Diretrizes Orçamentárias*, LDO). It also mandates consistency between the Multi-Year Plan (*Plano Plurianual*, PPA), the LDO, and the Annual Budget Law (*Lei Orçamentária Anual*, LOA), to ensure coherence in resource allocation and to prevent the budget from becoming a merely symbolic document.
- **Transparency and social oversight (Articles 48 and 49):** One of the most significant contributions of the LRF was to institutionalize transparency mechanisms by requiring the publication of the Fiscal Management Report (*Relatório de Gestão Fiscal*, RGF) and the Summary Budget Execution Report (*Relatório Resumido da Execução Orçamentária*, RREO). These reports detail revenues, expenditures, legal limits, and compliance with fiscal targets, enabling broader access and scrutiny.

These rules were designed in response to concrete governance failures experienced across Brazil's federative units. For instance, the repeated municipal debt refinancing episodes during the 1990s underscored the need to constrain subnational borrowing. Similarly, the frequent accumulation of payables without matching financial backing revealed a harmful legacy problem for incoming administrations, resulting in difficult-to-trace debts and fiscal paralysis.

By linking legal rules to external compliance mechanisms - especially the role of State Courts of Accounts (*Tribunais de Contas Estaduais*, TCEs), which are responsible for judging municipal accounts - the LRF created formal compliance incentives. However, as discussed in later sections, these same incentives also spurred the rise of so-called *creative accounting* practices: fiscal maneuvers designed to circumvent the rules without directly violating the letter of the law.

2.3.3 *The Municipal Budget Process and Its Stages*

The Brazilian municipal budget process is structured around three key planning instruments: the Multi-Year Plan (*Plano Plurianual*, PPA), the Budget Guidelines Law (*Lei de Diretrizes Orçamentárias*, LDO), and the Annual Budget Law (*Lei Orçamentária Anual*, LOA). These instruments are established in the Federal Constitution and further regulated by the Fiscal Responsibility Law (*Lei de Responsabilidade Fiscal*, LRF). Although municipalities enjoy relative autonomy, all must adhere to this basic planning cycle, which connects directly to budget execution and the fiscal limits defined by the LRF.

- **Multi-Year Plan (PPA):** A medium-term planning document that outlines the municipal administration's goals and targets over a four-year horizon. It includes government programs, strategic actions, and physical and financial targets. The PPA is essential to ensure policy continuity, particularly in key sectors like infrastructure, health, and education.

- **Budget Guidelines Law (LDO):** The LDO serves as the normative bridge between the PPA and the LOA, setting priorities and fiscal targets (e.g., primary balance, nominal balance, and public debt) for the upcoming fiscal year. It also outlines the rules for LOA preparation and assesses fiscal risks.
- **Annual Budget Law (LOA):** The LOA authorizes the collection of revenues and the execution of expenditures for a given fiscal year. It must be aligned with the PPA and the LDO and reflect realistic revenue projections and expenditure commitments.

Upon approval of the LOA by the municipal legislature, the budget execution phase begins. According to the LRF, this execution must comply with principles of responsibility, transparency, and fiscal prudence. All accounting records must be integrated, standardized, and follow the Public Sector Chart of Accounts (*Plano de Contas Aplicado ao Setor Público*, PCASP), supported by digital systems that ensure traceability and public oversight.

The main stages of expenditure execution are:

1. **Revenue forecasting and collection:** Before incurring any expenditures, revenue projections must be grounded in realistic assumptions. The LRF prohibits revenue overestimation aimed at authorizing fictitious expenditures. Effective revenue collection must be continuously monitored throughout the fiscal year based on the parameters defined in the LDO and LOA.
2. **Expenditure commitment (Empenho):** This stage marks the formal assumption of an obligation by the public administration, reserving budgetary funds for a specific expense. It is the first official accounting record and ensures that no expenditures are made without budgetary authorization. Commitments may be classified as global (for continuous contracts), estimated (for uncertain amounts), or fixed (for defined one-off expenses).
3. **Expenditure verification (Liquidação):** This stage involves verifying that the goods or services were actually delivered. It establishes the legal and financial basis for payment, supported by documentation such as invoices, contracts, and certifications. It is a critical step in determining the legitimacy of the debt.
4. **Payment:** The final stage, where the verified expense is settled via bank transfer, subject to cash availability and in accordance with legal and chronological payment order. The LRF prohibits any payment that was not previously committed and verified. Payments must adhere to principles of legality and cost-efficiency.
5. **Registration of Outstanding Payables (“Restos a Pagar”):** If committed expenses remain unpaid at year-end, they may be carried forward as payables, provided there is sufficient cash and, in the case of verified payables (“restos a pagar processados”), that liquidation has occurred. For unverified payables (“restos a pagar não-processados”), financial backing is mandatory, especially in the final year of a mayor’s term, to prevent hidden debt accumulation.

6. **Cancellation of Outstanding Payables:** Items carried forward may be cancelled in subsequent fiscal years if they are no longer valid or are not liquidated. Excessive or strategically timed cancellations may indicate poor planning or attempts to manipulate fiscal results. This behavior is closely monitored by audit authorities and may result in accountability proceedings.

Each stage of the expenditure cycle must be documented, audited, and made publicly available through transparency portals and mandatory reporting to Siconfi. Clear documentation of these stages is essential to evaluate LRF compliance and detect fiscal manipulation strategies such as under-commitments, fictitious liquidations, or fraudulent payables. Ultimately, each step is linked to the municipality's ability to operate within legal fiscal boundaries and uphold its commitments to responsible governance.

2.3.4 Fiscal Data Sources and the Construction of Microdata in Brazil

The empirical analysis in this study is based on administrative microdata drawn from the Brazilian Public Sector Accounting and Fiscal Information System (**Siconfi**), the digital platform through which all municipalities are required to submit their fiscal reports to the federal government in accordance with the *Lei de Responsabilidade Fiscal* (LRF). Siconfi is operated by the *Secretaria do Tesouro Nacional* (STN) and functions as the central repository for fiscal data produced at the subnational level.

Each municipality is responsible for preparing and submitting its own accounting records. These reports are drafted by certified local accountants, digitally signed by the mayor and an authorized technical officer, and transmitted in XBRL (eXtensible Business Reporting Language) format nowadays. Prior to public release, the submitted files are subjected to multiple layers of automated validation. This includes syntactic verification to ensure the technical integrity of the files, logical consistency checks such as verifying that assets equal liabilities plus net equity or ensuring coherence between payroll data across the *RGF* and *DCA*, and conformity with national accounting standards as prescribed by the *Plano de Contas Aplicado ao Setor Público* (PCASP) and the *Manual de Contabilidade Aplicada ao Setor Público* (Tesouro Nacional (2023)). Only after successful validation are the datasets marked as approved (*homologado*) and incorporated into the public microdata collection, which is accessible to oversight agencies, researchers, and the general public.

Municipalities are required to submit three main fiscal reports. The first is the *Declaração de Contas Anuais* (DCA), which consolidates the financial execution of the municipal budget, assets, and liabilities. Annex D of the DCA is especially relevant, as it includes a detailed breakdown of revenues and expenditures by stage of execution (committed, accrued, and paid). The DCA is due annually by April 30 and, in several states, must also be reviewed by the respective *Tribunal de Contas do Estado* (TCE). The second is the *Relatório de Gestão Fiscal* (RGF), submitted quarterly (or semiannually by municipalities with fewer than 50,000 inhabitants), which monitors compliance with legal limits on fiscal aggregates—especially personnel expenditure ceilings, as reported in Annex 1. The third is the *Relatório Resumido da Execução Orçamentária* (RREO), which is filed bimonthly and provides a short-run perspective on municipal finances, including data on tax collection, earmarked transfers, outstanding payables, and the

primary balance. All reports follow the PCASP and MCASP frameworks, ensuring comparability across jurisdictions.

Since the publication of STN Ordinance No. 634 in November 2013, digital submission has been mandatory. The ordinance introduced enforcement mechanisms, including the possibility of suspending voluntary federal transfers in the event of non-compliance. As a result, a high-quality, standardised national panel became available from 2013 onwards for the DCA and from 2015 for the RGF. Each record in the Siconfi database is disaggregated by municipality, report type, fiscal year, and accounting line item, and includes a consistent set of unique identifiers that permit longitudinal and cross-sectional analysis. The transformation of local administrative data into structured, anonymized microdata follows a clearly defined pipeline: (i) local data generation, (ii) submission via certified systems, (iii) automated validation by STN, and (iv) publication in the standardized microdata repository.

Currently, publicly available Siconfi microdata cover over 2,000 municipalities, offering a uniquely granular view of subnational public finances. Researchers can explore the data by economic category, functional classification, execution stage, and institutional level (executive or legislative branch). However, the dataset is not without limitations. Smaller municipalities may present lower data quality due to resource constraints; some values are self-reported and may be strategically biased; and the level of external auditing performed by *Tribunais de Contas Estaduais* varies significantly across states. Even so, the implementation of PCASP, combined with structured data formats and automated validation protocols, positions Siconfi as one of the most robust sources of subnational fiscal data in the developing world.

2.3.5 *Circumvention Mechanisms of the Fiscal Responsibility Law in the Municipal Budgetary Process*

Despite the robust legal framework established by the Fiscal Responsibility Law (LRF), many municipalities continue to adopt practices that, while technically or formally legal, undermine the core objectives of the law. These circumvention mechanisms are concentrated particularly in the manipulation of budget classifications, the postponement of obligations, the underreporting of data, and the use of parallel entities to evade legal limits. Below, we detail the main ways the LRF is bypassed in the day-to-day operations of municipal fiscal management.

- **Misclassification of personnel expenditures:** One of the most common ways to circumvent the legal personnel expenditure limits is to reclassify these costs under “Other Services from Third Parties” (individuals or legal entities), especially in the case of outsourced labor. Although the expense is clearly tied to labor remuneration, it is not counted under the official personnel expenditure calculation, allowing for apparent compliance with LRF limits.
- **Creation or use of Social Organizations (OSs) and Foundations:** Municipalities often sign management contracts with quasi-governmental entities to deliver public services, notably in health and education. By outsourcing activities to these entities, municipalities transfer payroll responsibilities

off their official balance sheets. While legally permissible, problems arise when these entities serve as mere fronts with direct control by the municipal administration and lack real autonomy, thus constituting disguised outsourcing.

- **Intentional delay in expense verification and payment:** To avoid exceeding legal limits during the fiscal year, some administrations postpone the verification (liquidation) or payment of expenses to the following year. This artificially reduces reported values in fiscal reports, delaying the actual accounting of obligations.
- **Overestimation of revenues in the Annual Budget Law (LOA):** By inflating revenue forecasts, municipalities create artificial fiscal space to authorize greater expenditures. This practice masks revenue insufficiency and enables spending beyond actual financial capacity. As the year progresses, revenue shortfalls may require contingency measures or increased borrowing.
- **Noncompliance with transparency requirements:** The failure to submit or the incomplete submission of RGF and RREO reports hampers the oversight capacity of external control bodies and civil society. In some cases, municipalities submit delayed reports or use vague and aggregated classifications, hindering technical analysis and the monitoring of fiscal targets.
- **Splitting of expenditures to bypass procurement rules or oversight:** Although more directly related to the Public Procurement Law, this practice affects the integrity of budget execution. By splitting contracts or expenditures, municipalities evade competitive bidding processes and complicate expenditure tracking.
- **Manipulation of outstanding payables (“Restos a Pagar”):** The LRF prohibits the registration of outstanding payables without sufficient cash availability. However, some municipalities record these obligations based on future revenue expectations or use earmarked revenues for unrelated purposes to generate an artificial cash surplus.

These mechanisms, while often technically defensible, violate the spirit of the LRF and compromise its effectiveness. They also pose additional challenges for State Audit Courts (TCEs), which often face operational and institutional limitations in ensuring full compliance with the law. The technical capacity and independence of TCEs vary significantly across states, resulting in asymmetries in LRF enforcement nationwide.

Addressing these practices requires not only improvements in control mechanisms but also the strengthening of a culture of fiscal responsibility at the municipal level. This involves technical training, incentives for voluntary compliance, and accounting data cross-checks, and coordinated action among federal, state, and local governments.

2.4 Fiscal Rule Compliance by Municipalities

A key contribution of this study is the original construction of a municipality-level panel that systematically tracks compliance with multiple fiscal rules established by the *Lei de Responsabilidade Fiscal* (LRF), including but not limited to the personnel expenditure and debt ceilings, and the cash rule. This dataset was developed by the author through the manual extraction, interpretation, and harmonisation of information available at Siconfi, from Annex 1 to Annex 5 of the *Relatório de Gestão Fiscal* (RGF), guided by the technical prescriptions laid out in the *Manual de Contabilidade Aplicada ao Setor Público* (MCASP, do Tesouro Nacional (2023)) and related accounting manuals. The process required resolving inconsistencies in format and reporting practices across municipalities and years, as well as establishing rule-consistent definitions where none were directly provided. The resulting indicators are not available from any existing centralised source and represent an original empirical contribution to the study of subnational fiscal compliance in Brazil.

2.4.1 Personnel Expenditure Rule

Articles 19 and 20 of the *Lei de Responsabilidade Fiscal* (LRF) impose binding ceilings on municipal spending with personnel. The total gross payroll including salaries, pensions, and other forms of compensation cannot exceed 60% of the municipality's net current revenue (NCR). This ceiling is split across branches: up to 54% of NCR may be allocated to the executive and 6% to the legislative. To encourage early adjustments, the law also sets two precautionary bands: an alert threshold and a stricter prudential threshold. For the executive, these are set at 48.6% and 51.3% of NCR, respectively. The legislative branch has lower thresholds, at 5.4% and 5.7%.

Crossing into these bands progressively restricts the government's ability to hire, increase salaries, or expand personnel spending. Persistent violations above the ceiling may result in sanctions, including the suspension of voluntary federal transfers, as determined by Article 23 of the law.

Table 2.1 shows how municipalities performed between 2015 and 2024 in relation to the executive-branch ceiling. In the first year of the sample, 294 municipalities (about 15% of reporters) exceeded the 54% limit, and another 487 were already in the prudential band. Only 35% were fully compliant and below the alert threshold. Over the following years, compliance improved steadily. By 2024, just 12 municipalities in the sample (0.6%) remained in breach, and most had moved to safer margins.

Tabela 2.1 – Compliance with Personnel Expenditure Rule – Executive Branch

Year	Compliant	Alert Threshold	Prudential Threshold	Non-Compliant	Reporting Municipalities
2015	667	451	487	294	1899
2016	958	401	303	128	1790
2017	621	440	629	232	1922
2018	901	469	548	195	2113
2019	1282	427	309	58	2076
2020	1388	433	295	77	2193
2021	1755	193	174	61	2183
2022	1780	258	189	22	2249
2023	1581	380	281	61	2303
2024	1626	168	72	12	1878

Table 2.2 shows that the legislative branch, although closer to its limit, maintained high compliance throughout the period. In most years, fewer than ten municipalities exceeded the 6% ceiling, and very few entered the prudential or alert zones. This stability likely reflects the relatively small and rigid nature of legislative payrolls.

Tabela 2.2 – Compliance with Personnel Expenditure Rule – Legislative Branch

Year	Compliant	Alert Threshold	Prudential Threshold	Non-Compliant	Reporting Municipalities
2015	1877	8	2	12	1899
2016	1778	4	2	6	1790
2017	1898	8	6	10	1922
2018	2091	8	6	8	2113
2019	2066	2	0	8	2076
2020	2178	2	1	12	2193
2021	2163	6	5	9	2183
2022	2246	2	0	1	2249
2023	2299	1	1	2	2303
2024	1869	1	3	5	1878

Table 2.3 brings together the results from both branches and shows the overall fiscal position of each municipality. In 2015, just over half (54%) of municipalities were compliant, with the remainder already close to or above the legal threshold. By 2024, non-compliance had dropped to only 0.2% of reporters, and both the prudential and alert zones had dropped significantly. This suggests not only a stronger adherence to the rule over time but also a better integration of legal limits into the fiscal planning routines of local governments.

Tabela 2.3 – Compliance with Personnel Expenditure Rule – Municipality (Consolidated)

Year	Compliant	Alert Threshold	Prudential Threshold	Non-Compliant	Reporting Municipalities
2015	1025	503	200	171	1899
2016	1273	350	92	75	1790
2017	963	552	270	137	1922
2018	1258	529	226	100	2113
2019	1649	331	65	31	2076
2020	1769	314	71	39	2193
2021	1956	162	22	43	2183
2022	2065	160	14	10	2249
2023	1986	251	48	18	2303
2024	1808	58	8	4	1878

Altogether, these figures show that the personnel rule has become increasingly consolidated at the municipal level. While the legislative branch consistently operated near its limit with few breaches, the executive showed a remarkable decline in non-compliance over time. This pattern suggests that the design of the rule, with its progressive bands, branch-specific limits, and real consequences for violations, has been effective in shaping local fiscal behaviour.

2.4.2 Debt Rule

Under Article 30 of the *Lei de Responsabilidade Fiscal* (LRF), municipalities are subject to a statutory ceiling on their *dívida consolidada líquida* (net consolidated debt), which may not exceed 120% of their net current revenue (NCR). Unlike the personnel expenditure rule, the debt ceiling does not include intermediate alert or prudential thresholds. Municipalities must report their debt-to-RCL ratio quarterly in Annex 2 of the *Relatório de Gestão Fiscal* (RGF), calculated as the stock of net consolidated debt at the end of the reference period divided by the accumulated NCR over the previous twelve months.

Table 2.4 summarizes the compliance with the debt rule between 2015 and 2024. Coverage varies from 1,720 to 2,291 municipalities, with a visible upward shift in 2017 following the revision of the RGF debt annex by the *Secretaria do Tesouro Nacional*. Despite these changes in reporting, compliance with the debt ceiling has remained virtually universal throughout the sample period. In 2015, the highest year for violations, only seven municipalities (0.3%) exceeded the legal limit. In the vast majority of years, the number of non-compliant municipalities was zero.

These figures confirm that the debt rule plays a limited role in driving cross-sectional variation in fiscal performance across Brazilian municipalities. While it serves as an important macrofiscal safeguard, the rule rarely binds in practice. This pattern is consistent with the general funding model of subnational governments in Brazil, which rely heavily on intergovernmental transfers and exhibit low levels of long-term borrowing. In accounting terms, municipalities seldom finance current expenditure through debt, which may reflect both regulatory constraints and limited access to credit markets.

Tabela 2.4 – Compliance with Debt Rule – Municipality

Year	Compliant	Non-Compliant	Reporting Municipalities
2015	1713	7	1720
2016	1827	0	1827
2017	2264	1	2265
2018	2279	1	2280
2019	2288	2	2290
2020	2291	0	2291
2021	2283	0	2283
2022	2277	0	2277
2023	2285	0	2285
2024	2289	0	2289

2.4.3 Guarantee Rule

Article 29 of the *Lei de Responsabilidade Fiscal* (LRF) establishes that municipal guarantees granted to third-party credit operations must not exceed 22% of the municipality's net current revenue (NCR). These guarantees refer to formal commitments by the local government to assume debt service in the event of default by another entity, such as a public company or consortium. The rule aims to limit contingent liabilities that may compromise future fiscal sustainability. Municipalities are required to report the value of such guarantees relative to NCR in Annex 3 of the *Relatório de Gestão Fiscal* (RGF).

Table 2.5 presents compliance data for the 2015–2024 period. Violations are extremely rare: in most years, no municipality exceeded the 22% cap, and only a handful ever came close. In 2015, the year with the highest number of breaches, only 7 out of 2,181 reporting municipalities were classified as non-compliant. From 2019 onward, compliance was near-universal.

Tabela 2.5 – Compliance with Guarantee Rule

Year	Compliant	Non-Compliant	Reporting Municipalities
2015	2174	7	2181
2016	1851	3	1854
2017	718	2	720
2018	2048	1	2049
2019	1976	0	1976
2020	2103	0	2103
2021	2159	0	2159
2022	2241	0	2241
2023	2291	0	2291
2024	2020	2	2022

These results, while reinforcing the idea that municipalities rarely engage in risky credit backing, also raise questions regarding data completeness. In most years, only 720 to 2,291 municipalities reported

Annex 3 information, despite there being over 5,000 active local governments. This suggests that either (i) most municipalities genuinely refrain from issuing guarantees, or (ii) a significant number fail to fill out the annex, particularly when the value of guarantees is zero. The latter interpretation would imply measurement error due to selective nonreporting. Thus, while compliance appears to be high, generalizations should be made with caution, as the data may capture only a narrow and fiscally conservative subset of municipalities.

2.4.4 Credit Operation Rules

Municipal borrowing is constrained by a set of ceilings outlined in Articles 32 and 33 of the *Lei de Responsabilidade Fiscal* (LRF), and detailed in Annex 4 of the *Relatório de Gestão Fiscal* (RGF). Two distinct categories are monitored: *Antecipação de Receitas Orçamentária* (AROs), which are short-term revenue-backed loans, and all other forms of credit operations, typically longer-term obligations.

(i) Anticipated Revenue Loans (ARO). These operations must not exceed 7% of a municipality's NCR, with an alert threshold set at 6.3%. Given their nature as cash-flow smoothing instruments that bring forward future revenue, AROs are strictly regulated and must be liquidated within the same fiscal year. Table 2.6 summarises compliance from 2015 to 2024. Non-compliance peaked in 2018, when 12 of 34 reporting municipalities (35%) exceeded the legal cap and a further 21 operated within the alert range. However, following the 2019 tightening of the national regulatory framework (notably the revision of Senate Resolution 43/2001), the use of AROs declined sharply. By 2024, no municipality violated the ceiling and only one remained close to it.

Tabela 2.6 – Compliance with Credit Rule – Anticipated Revenue Loans (ARO)

Year	Compliant	Near the Threshold	Non-Compliant	Reporting Municipalities
2015	2	6	4	12
2016	2	8	2	12
2017	2	10	8	20
2018	1	21	12	34
2019	1	14	7	22
2020	2	2	1	5
2021	3	2	1	6
2022	5	1	0	6
2023	3	0	2	5
2024	5	1	0	6

(ii) Ordinary Credit Operations. These include all borrowing arrangements other than AROs, such as medium- and long-term bank loans. The legal ceiling is 16% of RCL, with a prudential alert threshold set at 14.4%. Coverage expanded over time, rising from 388 municipalities in 2015 to 751 in 2023, before declining slightly to 684 in 2024. As shown in Table 2.7, statutory breaches have been rare throughout the

decade: fewer than ten municipalities per year exceeded the 16% limit. A temporary increase in cases near the alert range is observed in 2020 and 2023, likely reflecting revenue compression during the COVID-19 pandemic and the subsequent fiscal response.

Tabela 2.7 – Compliance with Credit Rule – Ordinary Credit Operations

Year	Compliant	Near the Threshold	Non-Compliant	Reporting Municipalities
2015	377	1	10	388
2016	414	5	2	421
2017	394	2	7	403
2018	308	1	1	310
2019	434	1	3	438
2020	641	11	3	655
2021	550	2	3	555
2022	470	2	1	473
2023	739	10	2	751
2024	673	5	6	684

Taken together, these indicators point to a conservative borrowing stance among Brazilian municipalities. While measurement gaps persist, particularly for AROs where coverage is limited, the overall data suggest that local credit operations remain both rare and tightly controlled, in line with the legal framework's aim of containing debt risks at the subnational level.

2.4.5 Cash Rule

Article 42 of the *Lei de Responsabilidade Fiscal* (LRF) prohibits municipal governments from incurring expenditure commitments in the final year of a mayoral term that cannot be fully paid by the end of that same term, unless there exists *suficiente disponibilidade de caixa* (sufficient cash availability). The rule is intended to prevent the accumulation of unpaid obligations (especially *restos a pagar* (payables rolled over to the next fiscal year)) that may undermine the fiscal sustainability of the incoming administration.

To enforce this principle, municipalities must disclose in Annex 5 of the *Relatório de Gestão Fiscal* (RGF) a disaggregated matrix matching available cash to outstanding commitments, broken down by the legal classification of resources: *vinculados* (earmarked) and *não-vinculados* (general-purpose). Crucially, the rule applies line by line: municipalities are not allowed to use surplus balances from earmarked revenues (e.g., health or education transfers) to cover obligations funded with unrestricted resources. This granular enforcement mechanism prevents the masking of deficits in discretionary accounts through cross-subsidisation.

Due to the structure of the RGF template, it is only possible to unambiguously identify the cash sufficiency condition for *recursos não-vinculados*, which are also the most relevant for assessing discretionary fiscal space. In line with Treasury guidance, we compute compliance separately for the executive

and legislative branches, as well as for the consolidated municipality, classifying a negative net balance of *recursos livres* as non-compliance. The result must be computed line by line for each resource classification to ensure that surpluses from earmarked funds are not used to offset deficits in discretionary accounts. In practice, due to the structure of the RGF reporting template, only the unrestricted portion (*recursos não-vinculados*) can be clearly and consistently extracted across all municipalities.

A municipality is classified as non-compliant with the cash availability rule if its balance of gross cash balance net of outstanding payables (“restos a pagar”) is negative in the final year of the electoral mandate (and election year the same time). This granular enforcement mechanism serves to prevent the rollover of unpaid obligations (*restos a pagar*) without the corresponding budgetary support, which would compromise the fiscal position of the incoming administration.

It is important to note, however, that the legal obligation imposed by Article 42 applies only during election years. While many municipalities report a negative cash position under the accrual regime in various years, these situations do not automatically imply a legal breach of the cash availability rule. Strictly speaking, non-compliance can only occur in years when the incumbent is approaching the end of their mandate. Thus, the indicators presented below capture accounting symptoms of cash insufficiency that are relevant for fiscal analysis, but only a subset of them would legally constitute a violation of the rule.

Tables 2.8 and 2.9 report compliance for the executive and legislative branches, respectively. Between 2015 and 2024, a non-negligible share of municipalities reported insufficient cash coverage, especially within the executive. In 2015, for example, 549 out of 1,365 executive-branch filers (40%) failed the cash test, and over 20% of units remained in violation in most recent years.

Tabela 2.8 – Compliance with Cash Availability Rule – Executive Branch

Year	Non-Negative	Negative	Reporting Municipalities
2015	816	549	1365
2016	861	366	1227
2017	922	449	1371
2018	1168	582	1750
2019	1210	680	1890
2020	1572	491	2063
2021	1784	311	2095
2022	1762	418	2180
2023	1557	659	2216
2024	1665	529	2194

Table 2.10 presents consolidated results at the municipal level, taking into account available data for both executive and legislative branches. Although the panel begins with only 321 reporting municipalities in 2015, coverage increases significantly over the years, reaching 1,150 municipalities by 2024. In 2020, year of the last municipal elections and when the rule must be complied with, 25% of

Tabela 2.9 – Compliance with Cash Availability Rule – Legislative Branch

Year	Non-Negative	Negative	Reporting Municipalities
2015	450	68	518
2016	462	65	527
2017	612	80	692
2018	676	133	809
2019	688	222	910
2020	825	196	1021
2021	830	255	1085
2022	810	257	1067
2023	870	266	1136
2024	927	261	1188

municipalities had their *recursos não vinculados* in a negative position at year-end, thereby violating the *regra da disponibilidade de caixa* in its most critical compliance period.

In 2024, 302 municipalities (26%) failed to demonstrate sufficient cash to cover payables financed by unrestricted resources. Despite legal prohibitions, such deficits persist cyclically and structurally, with minimal reduction even after successive improvements in accounting transparency.

Tabela 2.10 – Compliance with Cash Availability Rule – Consolidated Municipality

Year	Compliant	Non-Compliant	Reporting Municipalities
2015	219	102	321
2016	260	97	357
2017	357	161	518
2018	468	245	713
2019	521	324	845
2020	734	243	977
2021	864	184	1048
2022	824	208	1032
2023	730	361	1091
2024	848	302	1150

The persistent negative balances underscore a deeper issue: unpaid liabilities at the end of the mandate (*restos a pagar*) function as “fiscal skeletons” in the administrative budget. Although formally disclosed, these obligations are difficult to monitor and enforce and are passed on to the next administration with limited visibility and typically fall outside the scope of immediate political accountability. In this context, the cash availability rule represents a rare and critical safeguard against the deterioration of intertemporal fiscal solvency at the local level but its monitoring needs to be improved as compliance data shows.

2.4.6 Missing Data

While Brazil has 5,570 municipalities, the number of local governments with available and usable data for each fiscal rule falls well short of full coverage. Table 2.11 summarises the reporting scope for the 2015–2024 period. For the Personnel Expenditure Rule, by far the most consistently reported indicator, the sample ranges between 1,790 and 2,303 municipalities, representing roughly one-third to two-fifths of the national total. Coverage for the Debt Rule is higher in some years, exceeding 2,200 municipalities, but drops sharply in 2017 following changes in the RGF reporting templates, suggesting a temporary disruption in comparability.

Tabela 2.11 – Number of municipalities with available data by fiscal rule (2015–2024)

Fiscal Rule	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Personnel Expenditure (Executive)	1899	1790	1922	2113	2076	2193	2183	2249	2303	1878
Personnel Expenditure (Legislative)	1899	1790	1922	2113	2076	2193	2183	2249	2303	1878
Personnel Expenditure (Overall)	1899	1790	1922	2113	2076	2193	2183	2249	2303	1878
Debt	2181	1854	720	2049	1976	2103	2159	2241	2291	2022
Anticipated Revenue Loans	12	12	20	34	22	5	6	6	5	6
Credit operations	388	421	403	310	438	655	555	473	751	684
Cash Availability (Executive)	1365	1227	1371	1750	1890	2063	2095	2180	2216	2194
Cash Availability (Legislative)	518	527	692	809	910	1021	1085	1067	1136	1188
Cash Availability (Overall)	321	357	518	713	845	977	1048	1032	1091	1150

The gaps are even more pronounced for rules linked to infrequently used fiscal instruments. Anticipated Revenue Loans (*Antecipação de Receitas Orçamentária*) are reported by at most 34 municipalities in any given year, while ordinary credit operations seldom exceed 751 reporters (less than 15% of all municipalities). These patterns reflect a combination of genuine non-use and non-filing when values are zero, which may artificially inflate apparent compliance rates by excluding non-reporting jurisdictions from the denominator.

Cash Availability data show an intermediate pattern: while the executive branch reports in over 2,100 municipalities in recent years, consolidated figures combining both branches are available for only 1,150 municipalities in 2024 (about 21% of the national total). This gap reflects both differences in the internal completeness of the RGF annexes and the fact that legislative-branch data are often missing or filed separately from the executive accounts.

Overall, the incomplete coverage across all fiscal rules introduces potential sample selection bias. If non-reporting municipalities differ systematically from reporting ones (for example, in fiscal capacity, administrative quality, or political incentives), then aggregate compliance rates may not be fully representative of the universe of Brazilian local governments. These data limitations should be borne in mind when interpreting the results, particularly for rules with very low coverage, where the sample may reflect only a small and fiscally atypical subset of municipalities.

2.5 Panel Data

The estimation strategy relies on a novel panel dataset constructed at the municipal-mandate level, capturing the behavior of Brazilian local governments with respect to fiscal compliance. We add political structure, and development indicators. This dataset aggregates and transforms multiple sources of raw administrative microdata from the National Treasury (Siconfi), electoral authorities (TSE), and development databases (IBGE, IPEA, and others and consolidated by Firjan) into a harmonized and policy-relevant form.

The final structure follows the four-year electoral cycle and includes municipalities that reported consistent information throughout each mandate. The dependent variables are binary rule compliance indicators that indicate whether the municipality breached any specific fiscal constraint during the mandate. In addition to outcome variables, the dataset incorporates political, demographic, and economic controls.

What follows are descriptions of the three major data modules used in constructing the panel: fiscal rule compliance, political fragmentation, and local development metrics.

2.5.1 Fiscal Rule Compliance

The core of the panel is the set of indicators tracking compliance with multiple fiscal rules established by the *Lei de Responsabilidade Fiscal* (LRF). These include ceilings on personnel expenditure, limits on consolidated debt and credit operations (both short-term AROs and long-term loans), and the cash availability rule. For each rule, we constructed a yearly binary indicator of non-compliance: 1 if the municipality breached the rule in a given year, 0 otherwise, and NA if no data were reported. These indicators were then collapsed to the four-year electoral mandate level. A rule is marked as breached during the mandate if non-compliance occurred in at least one of the four years; if all annual values are missing, the corresponding mandate-level indicator is coded as missing.

To capture overall fiscal behavior, we also created a general non-compliance dummy that equals 1 if the municipality violated any of the fiscal rules during the mandate and 0 otherwise, conditional on data availability. This indicator serves as the primary outcome variable in the estimation and reflects broader adherence (or lack thereof) to the fiscal framework.

Tabela 2.12 – General Compliance with Fiscal Rules over Electoral Mandates

Term	Compliant	Non-Compliant	Reporting Municipalities
2013_2016	69.7	30.3	2610
2017_2020	60.2	39.8	2747
2021_2024	67.4	32.6	2558

For evaluation purposes, we compute additional mandate-level indicators for two specific rules: personnel expenditure and cash availability. The personnel rule is assessed cumulatively across all four

Tabela 2.13 – Compliance with Cash Rule over Electoral Mandates

Term	Compliant	Non-Compliant	Reporting Municipalities
2013_2016	81.9	18.1	536
2017_2020	83.6	16.4	1480
2021_2024	82.9	17.1	1761

Tabela 2.14 – Compliance with Expenditure Rule over Electoral Mandates

Term	Compliant	Non-Compliant	Reporting Municipalities
2013_2016	90.0	10.0	2271
2017_2020	89.4	10.6	2704
2021_2024	97.1	2.9	2543

years, and the mandate-level breach reflects any year in which the municipality exceeded the legal threshold. In contrast, the cash availability rule is legally binding only during election years (specifically, in the final eight months of the mandate, as per Article 42 of the LRF). Accordingly, non-compliance with the cash rule is assessed exclusively in the last year of each electoral term.

2.5.2 Political Concentration

To capture the degree of political concentration within municipal legislatures, we compute a Herfindahl-Hirschman Index based on vote concentration by party in municipal elections for councilors (*vereadores*). The variable, denoted HHI_{par} , is constructed using official electoral microdata from the *Tribunal Superior Eleitoral* (TSE), covering all councilor candidates and their respective vote totals in each municipality.

Formally, the HHI_{par} is calculated as:

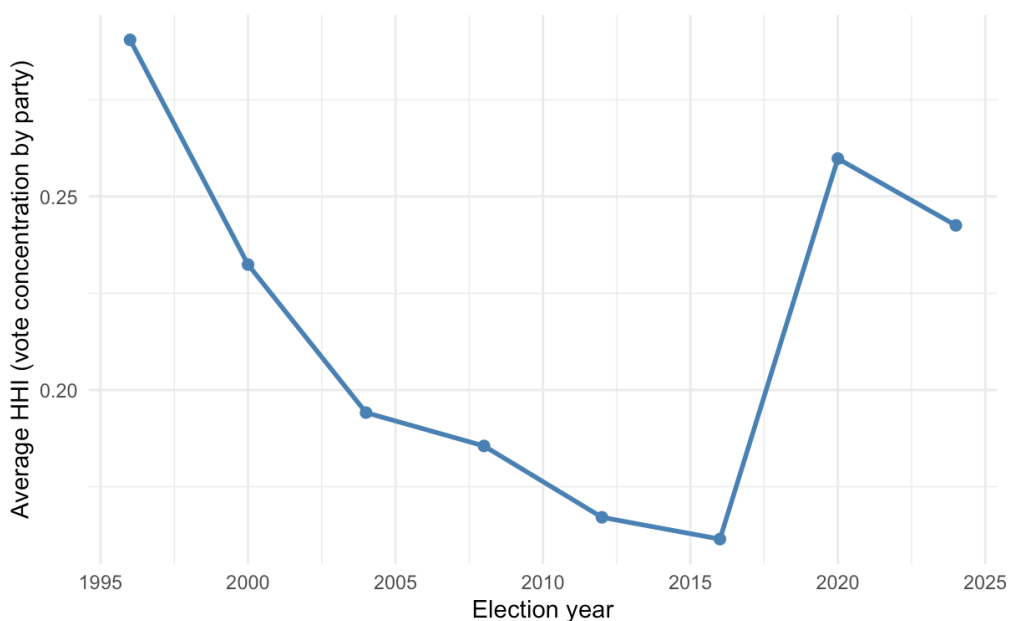
$$HHI_{par} = \sum_{p=1}^P \left(\frac{\sum_{c \in p} V_c}{\sum_{c=1}^C V_c} \right)^2 \quad (2.1)$$

where V_c denotes the number of nominal votes received by candidate c , and the term $\sum_{c \in p} V_c$ aggregates all votes received by candidates affiliated with party p . The denominator is the total number of nominal votes cast for councilor candidates in the municipality, and the index sums the squared vote shares of each party. Higher values of HHI_{par} reflect greater concentration of votes in fewer parties, indicating lower political fragmentation. Conversely, lower values suggest a more fragmented party landscape, where electoral support is dispersed across multiple party lists.

HHI_{par} provides a meaningful proxy for municipal-level political concentration, which may influence the local government's capacity and incentives to comply with fiscal rules. In the Brazilian institutional context, municipal councils play a constitutionally mandated role in fiscal oversight and

approval of budgetary instruments. A more fragmented council may face greater coordination challenges, potentially weakening its ability to enforce fiscal discipline or to negotiate cohesive budget plans with the executive. Conversely, when a few parties dominate the chamber, political alignment (or lack thereof) with the mayor may amplify incentives either for oversight or for fiscal leniency, depending on partisan dynamics. Therefore, there is not a clear directional expectation *ex ante*: concentration can either improve compliance, if the dominant bloc prioritizes institutional discipline, or facilitate non-compliance, if close alignment with the mayor leads to lenient oversight and negotiated budgetary concessions.

Figura 2.1 – Political Concentration variable



Source: Own elaboration.

Figure 2.1 plots the average HHIpar across all municipalities over time. The index exhibits a marked decline between 1996 and 2016, consistent with a long-term trend of increasing electoral fragmentation observed in Brazil post-democratization period. Notably, there is a sharp reversal in 2020 and 2024, with the average HHIpar rising significantly. This uptick reflects the institutional effects of Constitutional Amendment 97/2017, which prohibited party coalitions in proportional elections starting in 2020. The reform likely reduced the number of viable small parties and increased vote concentration among larger ones, partially reversing the previous trend.

2.5.3 Socioeconomic Development: Annual Human Development Proxy

Official measures of income inequality at the municipal level for all municipalities in Brazil, such as the Gini coefficient, are available only for census years, which occur every ten years. This low temporal frequency limits their applicability for policy evaluations conducted on an annual basis, especially those that seek to align socioeconomic indicators with fiscal and political data. To overcome this constraint,

we adopt the Firjan Municipal Development Index (IFDM), and specifically its *overall composite score*, as a high-frequency proxy for local social development. Throughout the paper, we refer to this variable as HDIm.

The IFDM data originate from the 2025 methodological revision carried out by Firjan, whose technical annex (Firjan (2025)) provides a harmonised time series for the period 2013 to 2023. The index is based on administrative microdata from four federal sources: RAIS (labour market outcomes), DataSUS (health system indicators), INEP (education statistics), and CadÚnico (social protection registries). Because these data sources are typically released with a two-year lag, Firjan publishes the IFDM at year $t + 2$. The most recent edition is for the 2023 indicator and includes data for 5,550 municipalities, covering 99.96% of Brazil's local governments.

The index is constructed through a multi-step process. For each municipality m and year t , Firjan computes three sub-indices (Employment & Income, Health, and Education) by first normalizing raw indicators to the unit interval based on policy targets or percentile-based cutoffs. These normalized values are then weighted using a combination of Principal Component Analysis and predefined policy priorities, and finally averaged with equal weights across the three pillars. The resulting HDIm score ranges from 0 to 1 and is directly comparable over time and across municipalities. Values above 0.8 correspond to the "very high human development" category used by the UNDP.

Figure 2.2 – Human Development Index variable



Source: Own elaboration.

Figure 2.2 presents the distribution of the general Human Development Index (HDIm) for all Brazilian municipalities from 2013 to 2023. The data show a clear historical trend of rightward displacement in the distribution, indicating gradual and broad-based improvements in municipal development indicators over the decade. In the early years of the sample, a substantial number of municipalities exhibited relatively

low HDIm scores, with the modal class clustered around the 0.4–0.5 range. Over time, this concentration shifted toward higher values, with 2022 and 2023 displaying a visibly denser distribution in the 0.6–0.7 interval.

This progression reflects both improvements in education, health, and income indicators at the local level and the effect of national policies aimed at promoting inclusive development. The distribution narrows slightly in the later years, suggesting a modest reduction in the dispersion of human development outcomes across municipalities. Overall, the figure supports the use of HDIm as a time-consistent proxy for socioeconomic progress in subnational policy evaluation.

For this study, HDIm is merged with the fiscal compliance and political fragmentation panels using the six-digit IBGE municipal code. In our main empirical models, it is used as the headline socioeconomic control. For robustness, we alternatively disaggregate HDIm into its constituent pillars to disentangle economic versus social channels. We also explore interaction effects between HDIm and political fragmentation to assess whether socioeconomic development moderates the political determinants of fiscal rule compliance.

2.5.4 Summary Statistics

To enrich the analysis, the panel includes two fiscal controls: annual average net current revenue (NCR) over the mandate, and population in the election year. These are used to compute per capita revenue (NCR pc) and log-transformed population as additional covariates. These variables help account for structural differences in municipal size and fiscal capacity that may affect both rule compliance and policy incentives.

Tabela 2.15 – Summary Statistics

Statistic	N	Median	Mean	St. Dev.	Min	Max
General FR non-compliance dummy	7,915	0	0.34	0.47	0	1
Cash rule non-compliance dummy	3,777	0	0.17	0.38	0	1
Expenditure rule non-compliance dummy	7,518	0	0.08	0.27	0	1
HDIm index	11,055	0.52	0.51	0.14	0.11	0.87
HHIpar index	16,697	0.17	0.20	0.11	0.04	1.00
NCR per capita (R\$ thousands)	8,018	3.59	4.25	2.50	0.10	42.19
Population (in log)	16,704	9.34	9.46	1.17	6.65	16.33

The overall non-compliance dummy is equal to one in 34% of observations, while the rates are lower for the cash rule (17%) and the personnel expenditure rule (8%). These figures suggest substantial variation across municipalities and rules, justifying an empirical investigation into their determinants. The HDIm index displays a near-normal distribution centered around 0.51, consistent with moderate development levels across most localities. The political fragmentation index (HHIpar) shows a right-skewed distribution with a mean of 0.20, reflecting generally low vote concentration among parties. Fiscal

capacity, as proxied by per capita net current revenue, ranges widely from 0.1 to over 40 thousand reais, with a median of 3.6 and mean of 4.25, highlighting significant heterogeneity. Finally, the population variable spans over two orders of magnitude in log terms, from 6.65 to 16.33, underscoring the diversity in municipal scale.

2.6 Estimation

To examine the political and social determinants of fiscal non-compliance at the municipal level, it is estimated a linear probability model (LPM) using panel data for two electoral mandates. The dependent variable is a binary indicator equal to one if the municipality breached any of the fiscal rules defined under the Fiscal Responsibility Law (LRF) in at least one year within the term, and zero otherwise. The main explanatory variables are political fragmentation (measured by the Herfindahl-Hirschman Index for party fragmentation votes, $HHIpar$), human development (proxied by the Municipal Human Development Index, $HDIm$), and their interaction. While the analysis controls for a range of fixed effects and observable characteristics, the estimates should be interpreted as statistical correlations rather than causal effects.

The LPM is estimated with fixed effects for municipalities, states, and electoral years. This structure absorbs unobserved heterogeneity across units, such as historical institutional quality, fiscal culture, or local enforcement practices. The inclusion of state fixed effects is particularly justified in the Brazilian context, where state-level audit courts (Tribunais de Contas Estaduais, TCEs) are responsible for monitoring municipal compliance with the LRF. These courts differ in their legal interpretation, autonomy, and bureaucratic rigor, introducing cross-state variation in the effective enforcement of fiscal rules.

Given the short panel dimension of the dataset (two time periods), the LPM is preferred over non-linear alternatives such as fixed-effects logit models. The latter suffer from the incidental parameters problem, which generates biased estimates when time is limited (Angrist and Pischke (2009)), and drop all units with no variation in the dependent variable across periods. This is particularly problematic in this context, where a substantial number of municipalities are either consistently compliant or consistently non-compliant. The LPM, in contrast, retains the full sample and allows for direct estimation of marginal effects and straightforward inclusion of high-dimensional fixed effects. Although the LPM has known limitations (most notably, the possibility of predicted probabilities falling outside the $[0,1]$ interval), it remains a widely accepted approach in political economy and public finance research, especially when the focus lies on coefficient interpretation and heterogeneity analysis. In all specifications, standard errors are clustered at the municipality level to account for potential serial correlation and heteroskedasticity.

Formally, the estimated model is:

$$\begin{aligned} \text{Prob(NonCompliance)}_{it} = & \beta_1 \cdot HDIm_{it} + \beta_2 \cdot HHIpar_{it} + \beta_3 \cdot (HDIm_{it} \times HHIpar_{it}) \\ & + \mathbf{X}_{it}\boldsymbol{\beta} + \alpha_i + \lambda_t + \delta_s + \varepsilon_{it} \end{aligned} \quad (2.2)$$

where t is the electoral year, $\text{Prob}(\text{NonCompliance})_{it}$ is a dummy equal to 1 if municipality i violated any fiscal rule during the 4-years mandate that will start in $t + 1$; HDI_{it} is the Municipal Human Development Index; HHIpar_{it} is the Herfindahl Index of party concentration in the local legislature for the term starting at $t+1$, calculated using voting shares from the election in the year t ; and \mathbf{X}_{it} is a vector of controls including net current revenue per capita (NCRpc) in the 4-year term and the logarithm of municipal population in the election year t . The terms α_i , λ_t , and δ_s denote municipality, year, and state fixed effects, respectively. The error term is represented by ε_{it} , and standard errors are clustered at the municipality level.

This modeling strategy allows the analysis to account for multiple sources of latent heterogeneity that could confound the relationship between political and social factors and fiscal behavior. Municipality fixed effects absorb time-invariant characteristics such as historical governance quality, fiscal management traditions, and local political culture. Year fixed effects control for national trends, macroeconomic conditions, and federal transfers that affect all municipalities simultaneously. State fixed effects capture differences in institutional enforcement, given the decentralization of oversight to state-level audit courts. Together, these controls enhance the robustness of the estimates by reducing omitted variable bias and isolating the cross-temporal variation that remains within each municipality.

2.7 Results

2.7.1 Compliance with Fiscal Rules

The results presented in Table 2.16 indicate that a municipality's fiscal capacity, measured by per capita current net revenue (NCRpc), is the most robust predictor of non-compliance with fiscal rules: across all specifications, municipalities with greater fiscal resources are significantly less likely to breach fiscal constraints. The coefficient is statistically significant at the 1% level and substantively relevant: an increase of R\$1,000 in per capita revenue is associated with a reduction of approximately 2.6 percentage points in the probability of non-compliance in the models using municipality fixed effects (columns 1 and 4), which is meaningful given that the average non-compliance rate is around 34%. Models with state fixed effects (columns 2 and 4) display weaker explanatory power: the coefficient for fiscal capacity (NCRpc) falls to 1.4 percentage points and the R^2 is considerably lower. The specification including both municipality and state fixed effects yields results identical to the municipality fixed-effects model, and is therefore omitted from the table for conciseness.

The coefficient for municipal human development (HDI_m) is negative in three of the four specifications, indicating that municipalities with higher levels of social development tend to have lower probabilities of non-compliance with fiscal rules. The effect is statistically significant at the 1% level only in the models with state fixed effects (columns 2 and 4), with estimated magnitudes of -0.4493 and -0.5138, respectively. Given that HDI_m is an index ranging from 0 to 1 with a sample mean of 0.52, these magnitudes imply that a 0.1 increase in the index (roughly one-fifth of the sample mean) is associated with a reduction

in the probability of non-compliance of about 4.5 to 5.1 percentage points. This effect is meaningful when compared to the average non-compliance rate of 34%.

The coefficient for political concentration (HHIpar) is statistically insignificant across all specifications, and its sign changes depending on the model. In the baseline specifications without the interaction term (columns 1 and 2), the coefficients are small and negative, suggesting a weak association between greater political concentration and lower probabilities of non-compliance. However, these estimates are far from conventional significance thresholds and are substantively negligible. When the interaction with HDIm is included (columns 3 and 4), the main effect of HHIpar changes sign in column (3), and remains statistically insignificant across all specifications. This instability in both sign and magnitude indicates that any direct effect of political concentration on fiscal compliance is highly sensitive to model specification and is not robustly supported by the data.

The interaction between HHIpar and HDIm is also statistically insignificant in both specifications where it is included. In column (3), the coefficient is negative (-0.3805), while in column (4) it is positive (0.3041), again highlighting sensitivity to the fixed-effects structure. The wide confidence intervals around these estimates suggest substantial uncertainty, and the lack of statistical significance implies that the moderating role of human development on the relationship between political concentration and fiscal compliance cannot be confirmed in this setting.

From a political economy perspective, the lack of significance and the instability of the HHIpar coefficients suggest that local political concentration, by itself, is not a consistent determinant of fiscal rule compliance once fiscal capacity and development are accounted for. This result contrasts with theoretical expectations that a cohesive legislature would strengthen fiscal discipline or that concentrated political power would facilitate rent extraction. The fact that HDIm is statistically significant mainly in the state fixed-effects models is consistent with the institutional design of Brazil's fiscal auditing system, in which oversight is conducted by state audit courts. Since these courts operate at the state level, they may exert more uniform pressure within their jurisdictions, while differences between states in enforcement capacity, resources, and oversight priorities generate cross-sectional variation in compliance.

The absence of a robust interaction effect between HHIpar and HDIm suggests that the moderating role of political structure on the development-compliance relationship is not homogeneous across municipalities. The sign reversal between columns (3) and (4) may reflect context-specific mechanisms (for instance, in more developed municipalities, citizen monitoring may offset coordination challenges in fragmented councils, whereas in less-developed settings, concentrated councils could provide political stability). However, the imprecision of the estimates prevents definitive conclusions.

Overall, the results indicate that fiscal rule compliance at the municipal level is more strongly associated with structural economic and developmental capacity than with the configuration of the local legislature. This does not mean that political institutions are irrelevant; rather, their effects are likely mediated by other factors (such as administrative capacity, intergovernmental oversight, and the alignment of incentives between executive and legislative actors) that are not fully captured by a single measure

Tabela 2.16 – Compliance With Fiscal Rules: Any Rule

	Probability of Non-Compliance			
	(1)	(2)	(3)	(4)
<i>Variables</i>				
HHIpar	-0.0226 (0.1196)	-0.0289 (0.0750)	0.1583 (0.3975)	-0.1796 (0.2500)
HDIm	-0.0593 (0.2771)	-0.4493 (0.0919)	0.0089 (0.3027)	-0.5138 (0.1376)
HHIpar x HDIm			-0.3805 (0.7552)	0.3041 (0.4721)
NCRpc	-0.0263 (0.0091)	-0.0143 (0.0031)	-0.0254 (0.0092)	-0.0145 (0.0031)
log(pop)	0.1902 (0.2341)	0.0135 (0.0113)	0.1849 (0.2341)	0.0142 (0.0113)
<i>Fixed-effects</i>				
Municipality	Yes		Yes	
State		Yes		Yes
Time	Yes	Yes	Yes	Yes
<i>Fit statistics</i>				
Observations	5,230	5,230	5,230	5,230
R ²	0.67248	0.11986	0.67252	0.11993
Within R ²	0.00522	0.01365	0.00535	0.01373
<i>Clustered (municipality-level) standard-errors in parentheses</i>				
<i>Signif. Codes: : 0.01, : 0.05, : 0.1</i>				

of political concentration. In low-capacity municipalities, concentrated councils may facilitate negotiation and budget cohesion, while in high-capacity municipalities, fragmentation may not significantly impede compliance due to stronger bureaucratic and auditing mechanisms. From a policy perspective, strengthening fiscal capacity, improving development outcomes, and enhancing the effectiveness and independence of state audit courts are likely to produce more consistent improvements in compliance than institutional reforms aimed solely at altering the degree of political concentration at the local level.

2.7.2 Compliance with Cash Rule

Table 2.17 presents regression estimates for the probability that a municipality violates the Cash Rule (Article 42 of Brazil's Fiscal Responsibility Law), which prohibits the contracting of expenditure obligations without sufficient cash availability in the final year of the mayoral term. The specification including both municipality and state fixed effects yields results identical to the municipality fixed-effects model, and is therefore omitted from the table for conciseness.

The regression estimates in Table 2.17 indicate that the determinants of non-compliance with

Tabela 2.17 – Compliance With Fiscal Rules: Cash Rule

	Probability of Non-Compliance			
	(1)	(2)	(3)	(4)
<i>Variables</i>				
HHIpar	-0.1995 (0.1323)	-0.0777 (0.0721)	-0.2707 (0.4146)	-0.1410 (0.2467)
HDIm	-0.3677 (0.3188)	-0.3148 (0.0901)	-0.3964 (0.3446)	-0.3437 (0.1393)
HHIpar x HDIm			0.1528 (0.7897)	0.1291 (0.4484)
NCRpc	0.0049 (0.0056)	-0.0046 (0.0024)	0.0046 (0.0056)	-0.0046 (0.0024)
log(pop)	0.2770 (0.2050)	0.0041 (0.0106)	0.2804 (0.2049)	0.0044 (0.0107)
<i>Fixed-effects</i>				
Municipality	Yes		Yes	
State		Yes		Yes
Time	Yes	Yes	Yes	Yes
<i>Fit statistics</i>				
Observations	3,194	3,194	3,194	3,194
R ²	0.72309	0.07913	0.72310	0.07915
Within R ²	0.00449	0.00672	0.00452	0.00674

Clustered (municipality-level) standard-errors in parentheses
Signif. Codes: : 0.01, : 0.05, : 0.1

the Cash Rule differ markedly from those found for overall fiscal rule non-compliance. Fiscal capacity (NCRpc) is generally not statistically significant, with the exception of the state fixed-effects specifications (columns 2 and 4), where the coefficient is small, negative, and significant only at the 10% level. This suggests that higher per capita revenues have only a modest association with lower non-compliance when cross-state variation is exploited, and that average revenue levels over the mayoral term play a limited role in explaining compliance with this end-of-term rule.

The coefficient for municipal human development (HDIm) is negative across all specifications, consistent with the idea that higher levels of social development are associated with improved compliance. Statistical significance emerges only in the state fixed-effects models (columns 2 and 4), with magnitudes of -0.3148 and -0.3437, respectively. Given the HDIm range from 0 to 1 and a sample mean of 0.52, a 0.1 increase in the index is associated with a reduction in the probability of non-compliance of roughly 3.1 to 3.4 percentage points in these models. This result highlights the relevance of structural socio-economic differences across states in shaping compliance with the Cash Rule.

Political concentration (HHIpar) remains statistically insignificant in all specifications, suggesting

that, like broader fiscal rules, the structure of the local legislature has little direct impact on adherence to the Cash Rule once fiscal capacity and development are taken into account.

The interaction term between political fragmentation and HDIm is positive in models (3) and (4) of 2.17, differing from results obtained in 2.16. In other words, even in more developed municipalities (higher levels of HDIm), excessive legislative political concentration (higher levels of HHIPar) may reduce the effectiveness of compliance mechanisms with Cash Rule, especially during the politically sensitive final year of a mayoral term. Unlike other fiscal rules, the Cash Rule is often considered a “*skeleton in the closet*” of public finances, as violations are typically concealed through the strategic use of unpaid obligations difficult to monitor (“restos a pagar”). These liabilities, although formally registered, are frequently postponed beyond the term in which they were contracted, making detection and enforcement of this rule significantly more difficult. This opacity may help explain why the Cash Rule is not significantly associated with broader political or social indicators, as traditional mechanisms of oversight are weakened or bypassed in practice.

Unlike the general model in Table 2.16, Table 2.17 shows that fiscal capacity (NCRpc) does not appear to be a significant determinant of compliance with the Cash Rule. This may reflect the short-term nature of the rule’s enforcement, which focuses on end-of-term behavior rather than average revenue levels over the entire mandate. Similarly, population size (log(pop)) remains insignificant, reinforcing previous evidence that administrative scale does not directly influence compliance once institutional and fiscal controls are accounted for.

These findings highlight that different fiscal rules are shaped by different political and institutional dynamics. While general fiscal compliance is clearly associated with structural factors like revenue capacity, compliance with the Cash Rule appears to be more context-dependent and politically contingent.

2.7.3 Compliance with Personnel Expenditure Rule

Table 2.18 presents the estimates for the probability that a municipality exceeds the legal threshold on personnel expenditures, as established by Article 20 of Brazil’s Fiscal Responsibility Law, which limits such expenses to 60% of net current revenue (NCR). Unlike the Cash Rule, and more similarly to the general non-compliance model in Table 2.16, this rule appears significantly associated with political and fiscal variables, suggesting a more structured and observable pattern for the non-compliance behavior. The specification including both municipality and state fixed effects yields results identical to the municipality fixed-effects model, and is therefore omitted from the table for conciseness.

Tabela 2.18 – Compliance With Fiscal Rules: Expenditure Rule

	Probability of Non-Compliance			
	(1)	(2)	(3)	(4)
<i>Variables</i>				
HHIpar	-0.1191 (0.0702)	-0.1635 (0.0383)	-0.6112 (0.2304)	-0.5056 (0.1438)
HDIm	-0.0239 (0.1459)	-0.1027 (0.0435)	-0.2109 (0.1672)	-0.2497 (0.0707)
HHIpar x HDIm			1.033 (0.4237)	0.6888 (0.2497)
NCRpc	-0.0300 (0.0066)	-0.0072 (0.0018)	-0.0324 (0.0069)	-0.0075 (0.0018)
log(pop)	-0.2521 (0.1177)	-0.0231 (0.0063)	-0.2384 (0.1169)	-0.0215 (0.0064)
<i>Fixed-effects</i>				
Municipality	Yes		Yes	
State		Yes		Yes
Time	Yes	Yes	Yes	Yes
<i>Fit statistics</i>				
Observations	5,178	5,178	5,178	5,178
R ²	0.69839	0.09946	0.69952	0.10078
Within R ²	0.02261	0.00874	0.02628	0.01018

Clustered (municipality-level) standard-errors in parentheses
Signif. Codes: : 0.01, : 0.05, : 0.1

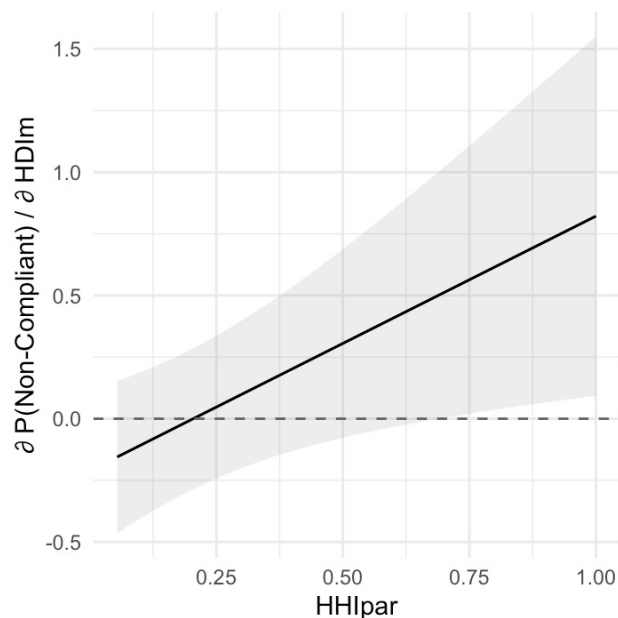
The results in Table 2.18 indicate that political concentration, fiscal capacity, and municipality size are all systematically associated with non-compliance with the personnel expenditure rule. The coefficients for political concentration (HHIpar) are negative and statistically significant across all specifications, indicating that greater political concentration is associated with a lower probability of exceeding the 60% legal threshold on personnel spending. In the interaction models (columns 3 and 4), the main effect of political concentration becomes more negative and the interaction with social development (HDIm) is positive and significant, suggesting that the constraining effect of political concentration is weaker in municipalities with higher levels of human development: for a given level of social development, increasing political concentration is linked to an increase in the probability of non-complying with the personnel expenditure rule.

This relationship is presented in Figure 2.3: the upward slope indicates that as political concentration increases, the effect of HDIm on the probability of non-compliance becomes more positive. In municipalities with low political concentration (e.g., around the sample mean of HHIpar = 0.17), a higher HDIm is associated with a slight reduction or an almost negligible effect on non-compliance. In contrast, in

municipalities with high political concentration, an increase in HDIm substantially raises the probability of non-compliance. The positive and statistically significant coefficient of the $\text{HHIpar} \times \text{HDIm}$ interaction (1.033 in model 3 and 0.689 in model 4) confirms this pattern: the effect of municipal human development on the likelihood of non-compliance is conditioned by political concentration, becoming less favorable to compliance when legislative power is more concentrated. In practical terms, for municipalities with HDIm close to the sample mean (0.52), political concentration tends to reverse the typically negative relationship between human development and non-compliance, suggesting that the combination of high socioeconomic capacity and low political competition may facilitate practices that breach the legal personnel expenditure ceiling.

This last finding reinforces the argument that institutions do not operate in a vacuum: their effectiveness in promoting fiscal responsibility depends critically on the political structures within which they are embedded, even when the municipality has advanced level of social development. Technical capacity and development alone are insufficient conditions for accountability and compliance; they must be complemented by balanced political power and effective oversight mechanisms that ensure local institutions can translate resources and capacity into genuine fiscal discipline

Figura 2.3 – Marginal effect of HDIm for different levels of political concentration



Source: Own elaboration.

The coefficient for social development (HDIm) is negative in all specifications, but it is statistically significant only in the state fixed-effects models (columns 2 and 4), with magnitudes of -0.1027 and -0.2497, respectively. Given that HDIm ranges from 0 to 1 and has a sample mean of 0.52, these values imply that a 0.1 increase in the index is associated with a 1 to 2.5 percentage point reduction in the probability of non-compliance in these models. The difference in statistical significance between municipality and state fixed-effects specifications suggests that cross-state variation in social development plays a more

important role in explaining compliance than within-municipality changes over time.

Fiscal capacity, measured by NCRpc, is consistently negative and highly significant across all models. In the municipality fixed-effects specifications (columns 1 and 3), an increase of R\$1,000 in per capita net current revenue is associated with a reduction in the probability of non-compliance of roughly 3.0 to 3.2 percentage points; in the state fixed-effects specifications (columns 2 and 4), the reduction is about 0.7 to 0.75 percentage points. These magnitudes underscore the role of fiscal resources in enabling municipalities to remain within the personnel expenditure ceiling.

Population size is also negatively associated with non-compliance and statistically significant in all specifications, although the effect is small in the state fixed-effects models. This pattern is consistent with the idea that larger municipalities, which often have more professionalized administrations and stronger bureaucratic structures, may face greater public scrutiny and therefore be more likely to comply with personnel spending limits.

The R^2 values are much higher in the municipality fixed-effects models (around 0.70) than in the state fixed-effects models (around 0.10), indicating that much of the explanatory power comes from time-invariant municipal characteristics. Among the three fiscal rules analyzed, the Personnel Expenditure Rule displays the strongest and most consistent association with structural, fiscal, and political variables. Its predictable enforcement, high political visibility, and the nature of payroll expenses, which cannot be easily deferred, likely contribute to the robustness of these results. This contrasts sharply with the Cash Rule, where opacity and the strategic use of unpaid obligations limit the explanatory power of conventional structural and political predictors.

Among the three fiscal rules analyzed, the Personnel Expenditure Rule presents the strongest and most consistent association with structural, fiscal, and institutional variables. Its predictable enforcement and political salience, combined with the fact that payroll spending is visible and difficult to defer, likely contribute to the robustness of these results. By contrast, the Cash Rule showed no significant association with fiscal or political variables. The opacity of this rule, which often relies on the strategic use of unpaid obligations ("restos a pagar"), makes violations harder to detect and monitor, both for oversight institutions and the broader public. As a result, traditional predictors of fiscal behavior, such as development and political structure, appear less effective in explaining compliance with this specific rule.

The general non-compliance model reflects an intermediate case: fiscal capacity remains a dominant explanatory variable, while the interaction between political fragmentation and human development highlights important contextual dynamics. These findings collectively suggest that fiscal rule compliance in Brazil is not uniform across rule types, but rather rule-contingent—shaped by the nature of enforcement, the transparency of each rule, and the institutional and political context in which fiscal decisions are made.

Taken together, these results reinforce the argument that effective fiscal governance requires more than the formal existence of rules, but demands attention to the specific characteristics of each rule, to the political incentives surrounding its enforcement and monitoring, and to the underlying institutional and social conditions of the municipalities to which they apply.

2.8 Robustness

The previous analysis revealed that the effect of institutional and social conditions on fiscal compliance is conditional on the political structure of the local legislature. In particular, the marginal effect of the Human Development Index (HDI_m) on compliance with the personnel expenditure rule depends on the level of political fragmentation of the municipality. This result reinforces the notion that institutional quality does not operate in a vacuum and even in municipalities with high levels of social development, the concentration of political power may undermine the disciplining effect of greater institutional and social environment.

Because of this, we assess whether these effects are related uniformly by the HDI_m as a whole or by specific dimensions of development. To do so, we disentangle the HDI_m into its three components (education, health, and income) and re-estimate the models of fiscal non-compliance using each sub-index separately. This approach allows us to examine whether certain aspects of development are more effective than others in constraining opportunistic fiscal behavior, and whether the interaction between political fragmentation and development holds consistently across different dimensions of institutional capacity.

Table 2.19 investigates whether the results observed in the baseline model using the aggregate Human Development Index (HDI_m) hold when its components (education, health, and income) are analyzed separately. This disaggregated approach aims to identify which dimensions of development are most relevant in shaping fiscal compliance under different political conditions.

Tabela 2.19 – Compliance With Fiscal Rules: Expenditure Rule

Model:	Probability of Non-Compliance			
	(1)	(2)	(3)	(4)
<i>Variables</i>				
HHIpar	-0.6112 (0.2309)	-0.3678 (0.1892)	-0.2406 (0.2333)	-0.5045 (0.1435)
HDIm	-0.2109 (0.1676)			
HHIpar x HDIm	1.033 (0.4247)			
HDIm_educ		-0.1466 (0.1248)		
HHIpar x HDIm_educ		0.5038 (0.3332)		
HDIm_health			-0.0693 (0.1063)	
HHIpar x HDIm_health			0.2225 (0.4000)	
HDIm_income				-0.1680 (0.1402)
HHIpar x HDIm_income				0.9467 (0.2704)
NCR pc	-0.0324 (0.0069)	-0.0306 (0.0068)	-0.0284 (0.0064)	-0.0310 (0.0064)
log(pop)	-0.2384 (0.1172)	-0.2291 (0.1170)	-0.2656 (0.1150)	-0.2922 (0.1172)
<i>Fixed-effects</i>				
Municipality	Yes	Yes	Yes	Yes
State				
Time	Yes	Yes	Yes	Yes
<i>Fit statistics</i>				
Observations	5,178	5,178	5,246	5,246
R ²	0.69952	0.69879	0.69536	0.69732
Within R ²	0.02628	0.02391	0.02105	0.02736

Clustered (cod_ibge) standard-errors in parentheses

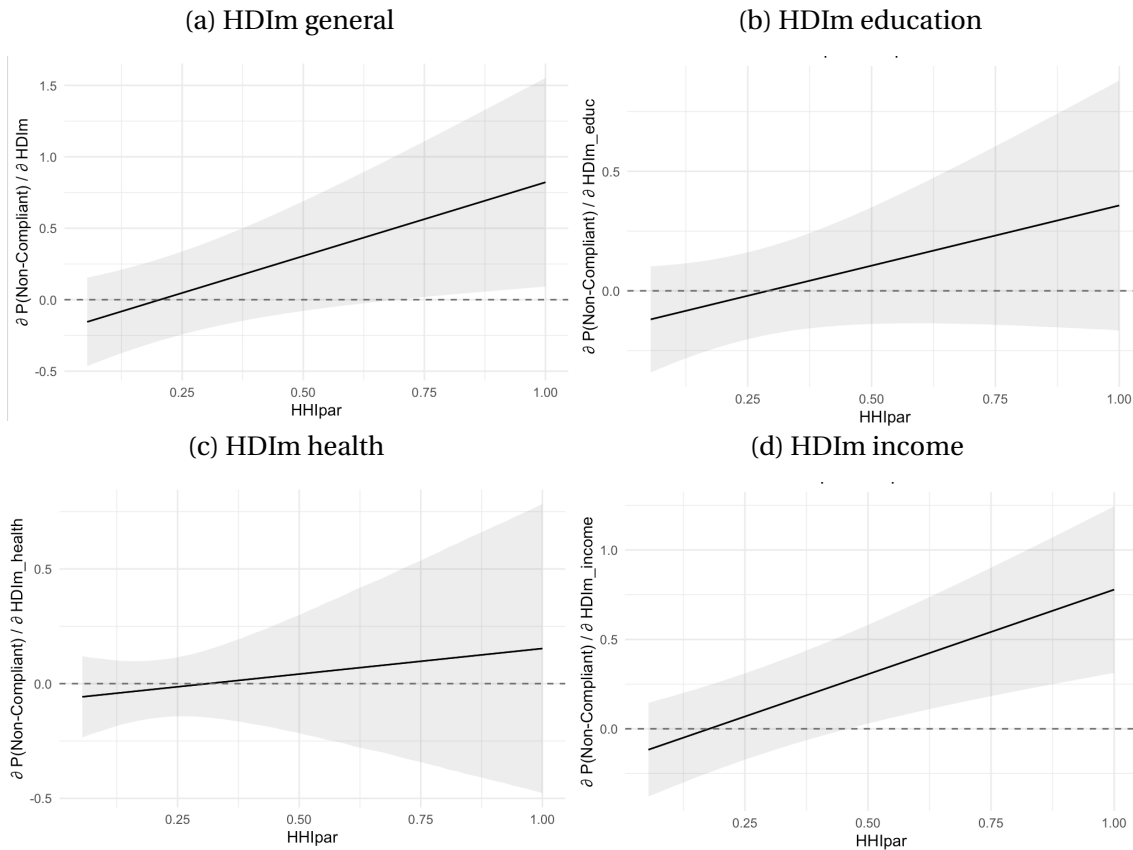
Signif. Codes: : 0.01, : 0.05, : 0.1

Across all specifications, the solo coefficient of political fragmentation (HHIpar) retains a negative and statistically significant coefficient across all specifications excluding specification (3). The solo coefficient for human development (HDIm) remains negative and non-significant across all specifications. Fiscal capacity (NCR pc) and population size (log(pop)) also remain significant and negatively associated

with non-compliance, suggesting that larger and more fiscally capable municipalities are better positioned to meet the personnel spending limit.

Now, taking a deeper look into the interaction coefficient in order to understand which component (education, health, or income) of the general IDHM index is more important for the results observed in baseline model (1). We find that the education component (HDIm_educ) is not statistically significant, nor is its interaction with political fragmentation; the same pattern holds for the health component (Model 3), suggesting that these two dimensions of development do not significantly explain variation in compliance behavior. In contrast, Model (4), which includes the income and employment dimension (HDIm_income), shows a statistically significant and positive interaction with HHlpar. Although the main effect of HDIm_income is not significant, the interaction term is significant at the 1% level and has a magnitude close to that observed in the baseline model (1) using the aggregate HDIm.

Figura 2.4 – Marginal effect of HDIm for different levels of political concentration



This suggests that the conditional effect of social development on fiscal compliance is primarily related to the municipality income dimension. This is interesting in two dimensions: first, it confirms the baseline finding that more concentrated legislative branch is associated with greater probability of non-complying with the personnel expenditure rule; second, that economic “strength”, captured by per-capita revenue and income development, has a relevant role in complying to fiscal limits, probably by providing the necessary resources and stability to absorb shocks and complying with the fiscal limits.

These findings show that not all forms of development contribute equally to fiscal discipline. While health and education may support long-term institutional capacity, it is primarily the economic dimension of development that interacts meaningfully with political structure in shaping municipalities fiscal behavior. The robustness checks therefore reinforce the central argument of the paper: the effect of development on fiscal rule compliance is conditional on political context, and institutional effectiveness and fiscal rule compliance depends not only on available resources but on how power is distributed locally.

2.9 Conclusion

This paper shows that municipal compliance with Brazil's Fiscal Responsibility Law is shaped primarily by fiscal capacity and, for specific rules, by socioeconomic development and political structure. First, per capita net current revenue emerges as the most consistent predictor of compliance across rules, with higher revenues associated with substantially lower probabilities of non-compliance. This highlights the role of resource availability as a necessary precondition for fiscal discipline. Second, higher levels of socioeconomic development are linked to lower probabilities of non-compliance of fiscal rules. Third, political concentration has no robust marginal effect on overall fiscal compliance, but plays a significant role in the personnel expenditure rule, where greater legislative concentration is linked to higher non-compliance. Fourth, the economic dimension of development, reflected both in per capita revenue and in the income component of the social development, appears to be the most relevant for sustaining compliance, likely by providing the resources and stability required to absorb fiscal shocks and maintain expenditure within legal limits.

A key innovation of our study is the construction of a municipal-level database of *de facto* non-compliance, which combines administrative accounts, audit flags and reclassification codes to detect accounting maneuvers that mask formal compliance. This database covers over 2,000 municipalities and five distinct fiscal rules, providing an original portrait of how local governments respond to legal constraints in a large developing country. Its creation entailed harmonizing multiple fiscal datasets, resolving inconsistent reporting, and validating circumvention episodes through cross-checks of budgetary and audit records.

Our findings carry several policy implications. Efforts to strengthen rule-based governance should go beyond the numerical design of limits and devote equal attention to building local revenue capacity, encouraging political pluralism in municipal councils due to its auditing and monitoring role in fiscal compliance, and enhancing transparency around less-visible obligations.

Finally, this work opens several avenues for further research. First, future research could take a deeper look into the relationship between the legislative council and the executive administration, to investigate if the negative effect of party concentration on rule compliance depends on the degree of alignment or conflict between the mayor and the council. Second, future analyses might link our non-compliance indicators to measures of service delivery or electoral outcomes, exploring the broader welfare and political consequences of rule-circumvention in the municipality. Third, the annual panel of fiscal-rule

compliance that we have constructed can serve as a source for a wide range of studies on how compliance to fiscal rules affects social welfare outcomes, such as public service provision, poverty reduction, and infrastructure investment at the municipal level.

In sum, our results demonstrate that durable municipal fiscal discipline requires not only sound rule design, but the right combination of economic capacity, balanced political structures and robust institutional development to translate formal limits into real-world compliance.

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3 CONCLUSION

The first chapter, "Fiscal Rules, Inequality and Polarization: Empirical Evidence", investigates the impact of fiscal rules on income inequality, political risk, and polarization. Using the local projections method with an instrumental variable (IV) approach, we address endogeneity by leveraging neighboring countries' adoption of fiscal rules. Our findings show that fiscal rules reduce both pre-tax and post-tax income inequality, with pre-tax inequality improving more than post-tax inequality. This suggests that fiscal rules first contribute to macroeconomic stability and economic activity growth, which later strengthens the government's redistributive power. Fiscal rules are associated with significant increases in political risk and polarization. These results provide new evidence on the heterogeneous effects of fiscal rules, emphasizing the importance of considering their stabilizing, distributional, and political consequences when assessing their overall efficacy, particularly in economies with high inequality or when fiscal rules face voter backlash.

The second chapter, "Fiscal Rules, Political Structure and Municipal Compliance: Evidence from Brazil", examines municipal compliance with Brazil's Fiscal Responsibility Law using a novel panel of "de facto non-compliance" indicators that captures outright violations and accounting maneuvers ("restos a pagar", expenditure reclassification) for over 2,000 municipalities from 2015 to 2024. We study three cases: general fiscal compliance, the end-of-term Cash Rule compliance, and the 60% personnel-expenditure cap compliance, focusing on fiscal capacity, political concentration, and social development. Per-capita revenue emerges as the strongest predictor: a R\$ 1,000 increase reduces non-compliance by about 2.6 percentage points. While overall political concentration has no consistent effect on compliance, for the personnel-expenditure rule it is associated with higher non-compliance in municipalities with higher levels of socioeconomic development. The income component of human development, unlike education or health, conditions these relationships, indicating that economic capacity both underpins direct compliance and interacts with local power structures to shape rule enforcement.

Overall, this thesis provides new insights into the impacts of fiscal rules, bridging the gap between the literature on fiscal performance and the emerging literature on fiscal rules and social indicators. The findings from the first chapter highlight the heterogeneous effects of fiscal rules on income inequality and political stability, while the second chapter provides a granular analysis of how institutional and socioeconomic factors at the local level influence compliance with fiscal rules in Brazil. By combining a cross-country analysis with a detailed municipal-level study, the work emphasizes the importance of considering stabilizing, distributional, and political consequences when evaluating the efficacy of fiscal rules. This suggests that the design and enforcement of fiscal rules must be context-specific, taking into account the unique economic and political landscapes in which they operate.