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Inequality and the Equalization Fund in Brazil: Redefining Strategies

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Abstract

This article examines Brazilian states' per capita income convergence from 1990 to 2020. A reduction in state inequalities was observed, attributed to the redistribution of resources through the State Participation Fund (FPE) and Constitutional Funds and the Municipal Participation Fund and transfers for health and education, benefiting federative entities with lower per capita incomes. However, a significant volume of resources aimed at income redistribution was characterized by overlapping actions, whose results were not evaluated in isolation. Moreover, while historically, less economically advantaged states strive to reach the national average, more economically advantaged states tend to maintain or enhance their relative positions. Barro's analysis (2001) suggests that equalization funds, by benefiting entities with lower GDP per capita, discourage governors from promoting the state's economic development, as this would imply a loss of FPE resources. This situation would be a government failure commonly pointed out by authors of the Public Choice School. In light of this, this study proposes a revision of the FPE distribution criteria, reducing the emphasis on the inverse of per capita income and including variables such as population, collection effort, and state size, aiming to promote a more effective and equitable convergence of per capita income in the Brazilian federation.

Keywords: convergence, public spending, revenue sharing, fiscal policy, and Taxation.

1. Introduction

The State Participation Fund (FPE) is a pivotal mechanism in Brazilian fiscal federalism, acting as an indispensable tool for redistributing resources and lessening regional disparities. In light of the enduring challenges faced across various Brazilian regions, a meticulous assessment of the FPE's efficacy is warranted. This study endeavours to scrutinise the present impact of the FPE on income convergence amongst the states and suggests fresh criteria for its allocation. The aim is to augment the effectiveness and equity of this essential fund, ensuring it more aptly addresses the needs for regional development and the diminution of economic inequalities within the nation.

There is no unanimous view in academic discourse on the necessity of transfers to facilitate the diminution of inequalities, as with other forms of state intervention. The neoclassical model suggests that, owing to decreasing marginal yields, per capita income across different regions tends towards equilibrium, provided unimpeded capital mobility and economies exhibit comparable levels of preferences and technology. This situation arises as capital accumulation boosts employment, raising wages in more developed states above those in less developed ones. Businesspersons aiming to manufacture at reduced costs would shift enterprises from more affluent to less developed areas. Adopting this framework, one might anticipate equal per capita income, even without income transfers, to counterbalance initial disparity.

Nevertheless, in several federal nations, the aspiration to diminish regional disparities manifests in budgetary decentralisation through implementing revenue transfer schemes among federative entities. Likewise, in Brazil, the rationale seemingly underpinning the State Participation Fund (FPE) is that market mechanisms alone are inadequate for lessening regional inequalities, or at the very least, they are somewhat ineffective in fostering per capita income convergence amongst the states. In this vein, the FPE has been employed to facilitate transfers from the Union to the states, in line with Article 159, I, a, of the Federal Constitution, which dedicates 21.5% of

the Union's Income Tax and Industrialized Products Tax revenue, after deducting tax incentives and reimbursements. The Complementary Law No. 143/2013 regulates the computation, handing over, and oversight of the disbursement of FPE funds.

The main goal of this transfer is to lessen regional disparities, as outlined in Clause VII of Article 170 of the Federal Constitution, coupled with Clause II of Article 161, via a vertical financing system. In this context, the amount of transfers from the Union to the states is substantial, chiefly owing to the marked inequalities among the Federation's units.

However, this is not the sole, and perhaps not the foremost, reason for the inception of this kind of transfer. Beyond serving as a governmental intervention for income redistribution, transfers between entities are advocated for their role in democratising resources bolstered by significant political influence. Notably, in Brazil, socio-economic disparities are politically offset: less developed regions and states enjoy greater proportional representation in the Chamber of Deputies compared to the South and Southeast regions.

It is noteworthy that, notwithstanding the presence of the FPE, the diminished productivity of capital in the North and Northeast regions, relative to the Southeast and South, does not align with theoretical expectations. A viable hypothesis for the lack of convergence in states' per capita income is that the FPE's implementation might be flawed, inadequate for fostering such a process, or even contradicting the natural progression.

Buchanan (1985) shows that state actions cater to the interests of various, often conflicting groups rather than the nation's goals. The state is not a unitary entity pursuing a singular governmental aim. If this is the case, one would expect economic policies to align with set objectives consistently without contradictory measures. Nevertheless, many policies enacted serve particular group interests, sometimes adversely influencing the Federation's fiscal health, such as the proliferation of municipalities increasing per capita municipal spending. Other policies neglect national concerns, focusing solely on regional matters that undermine fiscal discipline. For instance, despite lacking constitutional authority to set ICMS tax rates, Brazilian subnational entities do so, leading to a competitive scramble for tax revenues, exacerbated by the lack of a comprehensive national and regional development strategy.

Budgetary decentralisation without expanding subnational entities' roles tends to undermine fiscal discipline and impede the equalisation of states' per capita income. Decentralisation incurs costs: enhanced transfers to subnational bodies weaken the federal government and more developed states' capacity to incentivise industry. For the FPE's efficacy, investments should focus on economic expansion rather than leaders' re-election. Furthermore, subnational governments' state actions should aim to bolster the economy through infrastructure development and the establishment of science and technology parks.

A concern highlighted by scholars such as Buchanan (1950) is the efficiency loss brought about by fiscal equalisation. Barbosa (1998) posits that to offset this trend, the transfer system should not only pursue fiscal equalisation but also concentrate on centralising tax collection at the level of government most adept at its administration. These aims, however, might clash with maintaining fiscal stability. This situation is due to transfer methods being susceptible to the competing interests of regional blocs, with less developed regions advocating for increased FPE resources and the more affluent South and Southeast regions aspiring to broaden their tax bases.

The subject, albeit important, has not been extensively debated in scholarly circles. Nunes and Nunes (2005) used Barro and Sala-i-Martin's (1991 e 1992) estimation approach to investigate the existence of both absolute and conditional convergence of per capita income across Brazilian states between 1937 and 1999. They found convergence only from 1969 to 1999, partly attributable to the rise in transfer incomes.

The principal distinction between Complementary Law No. 62/89 and Complementary Law No. 143/2013 lies in the FPE distribution criteria. While Law No. 62/89 allocated 85% of FPE resources to the North, Northeast, and Central-West regions and 15% to the South and Southeast regions, with fixed criteria for the states and the DF, Law No. 143/2013 revised this approach. It introduced criteria based on state populations and inverse per capita income, updating the allocated amounts in line with the IPCA and the actual GDP change.

Both laws establish limits for changes in population and per capita income criteria, aiming to balance resource distribution among states and limiting the amounts received based on these factors. This distribution includes adjustments for states with per capita household income above a set reference value and ensuring the total sum of coefficients equals 1.

This article investigates whether there has been a convergence in per capita income among the Brazilian states from 1990 to 2020. Based on the literature, the study assumes that the criteria for the transfer of the State

Participation Fund do not encourage the increase in own revenue collection, which could provide the states with resources to promote growth and, consequently, reduce regional disparities. In light of this diagnosis, the work presents new criteria for transferring the FPE to enhance the convergence of per capita income within the Federation.

The isolated assessment of the FPE's contribution is complicated due to the significant resources allocated for income redistribution through various government measures. These actions, characterised by their overlap, have not been evaluated in isolation. Meanwhile, historically, less affluent states struggle to reach the national average, while the more affluent tend to maintain or improve their relative positions. Barro's (2001) analysis indicates that equalisation funds, by benefiting entities with a lower GDP per capita, may discourage rulers from promoting economic development, as this would result in the loss of FPE resources. This scenario is often cited as a government failure by the Public Choice School. In this context, this study suggests a review of the FPE distribution criteria, reducing the emphasis on reversing per capita income and including variables such as population, collection effort, and demographic dispersion to promote a more effective and equitable convergence of per capita income in the Brazilian federation.

This study is structured into five main sections, following this introductory part. The second section delves into the theoretical framework, discussing economic theories related to state intervention, market regulation, and public choice theory. The third section examines the reduction of state-level inequalities through a specific model and presents an analysis of international experiences with equalisation funds, highlighting cases from Spain and Switzerland. The fourth section evaluates the model's outcomes and explores new criteria for the apportionment and distribution of FPE funds based on an extensive review of literature and data analysis. Finally, the study concludes with reflections on the implications of these findings for public policy and suggestions for future research. This structure thoroughly explores per capita income convergence dynamics across Brazilian states, from theoretical underpinnings to practical policy recommendations.

2. Methodology

This study employs a methodology to investigate the dynamics of per capita income convergence across Brazilian states. The analysis begins with applying the index used by Ferreira (2000) e Ferreira e Diniz (1995), an analytical tool that provides an initial approach to assessing equity in income distribution among the states. This index, expressed by the formula $j_i=Y_i/P_i$, where P_i represents the proportion of the population of the state i relative to the total population of Brazil, and Y_i reflects the contribution of that state's income to the national GDP, serves as a preliminary indicator of income distribution. In an ideal scenario of equitable income distribution, we expect all states to present j values uniformly equal to 1. Values below 1 suggest a relatively more favourable economic condition, whilst indices above 1 indicate a less favourable position in the income distribution spectrum.

Proceeding with the analysis, we utilise the Bourguignon index (Esposito & Lambert, 2009), for a more detailed assessment of interstate economic disparities. Using a robust data set provided by the IBGE and the Ministry of Finance, this indicator quantifies the degree of economic inequality, incorporating statistical analyses to capture significant nuances in income disparities.

The methodology recognises that income convergence is achieved when states with lower per capita income exhibit higher economic growth rates than wealthier states, reducing existing disparities. This dynamic is crucial to understanding the underlying forces in income distribution and guiding effective policy interventions.

An extensive review of the literature on fiscal and economic equalisation funds within the Brazilian context and in international experiences significantly enriches the analysis. This literary examination contextualises the FPE within a global panorama of redistribution mechanisms. It sheds light on successful practices and lessons learned in other contexts, providing a theoretical and practical foundation for the analysis.

Based on this literature review and data analysis, the study advances in proposing innovative criteria for reformulating the FPE distribution. These criteria, anchored in indicators of fiscal effort, public service needs, and revenue-generating capacities, aim for a more equitable and efficient resource allocation, realigning the FPE with principles of fiscal justice and administrative efficacy.

The methodology's international dimension provides a valuable comparative perspective, highlighting how similar reforms have been implemented in other nations and what outcomes were observed. These international comparisons enrich our understanding of possible reform trajectories for the FPE and place discussions on income inequality and fiscal redistribution in a broader global context.

In conclusion, this study examines the variation in per capita income across Brazilian states. It begins by utilising

an analytical tool to assess equity in income distribution among the states. It then uses a more detailed indicator to quantify economic inequality and assess state disparities. The study examines how lower-income states can achieve higher economic growth rates than wealthier states to reduce disparities. It reviews how other countries have addressed similar issues and proposes new criteria for reformulating the distribution of funds to achieve a more equitable and efficient resource allocation. This study provides a comprehensive analysis to unravel the complexities of income distribution among Brazilian states. It offers valuable insights for formulating public policies to improve economic equity and promote balanced regional development in Brazil.

3. Theoretical Framework

3.1 Discuss Economic Theories and State Intervention, Market Regulation, and Public Choice Theory

Academic literature discusses the role of government transfers in reducing inequalities, focusing on control and individualistic theories. Studying economic theories provides fundamental explanations to understand how economies function, adapt, and evolve over time. Each economic theory offers a unique perspective, allowing us to examine the nuances of market behaviour, consumer decisions, and governmental policies. The importance of this study lies in the fact that these theories underpin the adoption of political measures. As John Maynard Keynes pointed out in 1936, *'the ideas of economists and political philosophers, both when they are right and when they are wrong, are more powerful than is commonly understood. Practical men, who believe themselves to be quite exempt from any intellectual influences, are usually the slaves of some defunct economist'* (KEYNES, 2007, p. 383).

In particular, the role of state intervention in the economy has been a topic of intense debate and analysis. The government's influence ranges from subtle market regulation to direct participation in strategic sectors. This state intervention not only shapes the economic landscape but also affects a nation's social welfare and political structure.

Analysis shows that economic control theory emphasises the active role of the state in economic management. Meanwhile, the individualistic approach highlights the influence of private interests on public policies and proposes measures to limit the actions of interest groups. Economic control theory sees the state as a unified entity directing the economy to achieve macroeconomic objectives. For Keynes and many post-Keynesians, the absence of automatic market mechanisms for full employment justifies state intervention to prevent crises and promote economic growth. In this context, Keynesians consider governmental intervention essential to prevent or mitigate economic crises. Tobin (1986, p. 245) confirms Keynes' view that a centralised investment organisation might be necessary to stabilise capitalist economies. Therefore, state intervention is necessary in the control approach to stimulate growth. Otherwise, the economy may face a crisis. This category includes Keynesian-inspired currents, such as developmentalism. Also, it encompasses classical theory, particularly in Adam Smith (2023), who sees the economy as self-regulating but recognises the need for state intervention to solve social problems.

Conversely, the individualistic approach, represented by Public Choice Theory, argues that private interests rather than a collective goal often sway government decisions. These theories offer different perspectives for assessing the effectiveness of public policies, such as the Fund for States' Participation and the state's role in the economy.

Classical and neoclassical theories advocate an economic perspective that values market self-regulation and minimal state intervention, aligning with the principles of laissez-faire. While classical theory acknowledges situations where government intervention is necessary, as Adam Smith (2023) and John Stuart Mill (1983) highlighted, the neoclassical theory emphasises market efficiency and the natural tendency for per capita income equalisation through market mechanisms. Both approaches provide critical insights into the limits and possibilities of state intervention in the economy.

In the context of individualist theory, as marginalist economists propose, state intervention is justifiable in market failure cases. However, for (Friedman, 1980, p. 79), private action is considered more appropriate, even under such circumstances. Friedman's scepticism towards state action led him to state: *if you put the federal government in charge of the Sahara Desert, in 5 years there'd be a shortage of sand*.

Similarly, Ronald Coase argues that in certain economic situations, state action can be efficiently replaced by private negotiation, a central idea of the Coase Theorem, which emphasises the resolution of externalities through well-defined property rights and low transaction costs.

The Public Choice Theory revisits the classical principles already present in Adam Smith's work (2023), suggesting that the market is a system that allocates resources and functions independently of any particular

individual's will. The actions of rulers could not provide balance to the market but only hinder its operation.

In line with the ideas of Coase and Friedman, Public Choice Theory presents the concept of government failure to question the efficacy of state intervention. According to this theory, government failure occurs when governmental intervention leads to less efficient resource allocation than free markets, resulting in a loss of economic well-being. This contrasts with market failure, where the market is inefficient in resource allocation. Public Choice Theory highlights the challenges arising from government action, including inefficiencies and misaligned incentives.

The theory of public choice applied within the context of the FPE, reveals how political decisions and the influence of lobbying groups can impact the efficient management of public resources. This perspective highlights that increased expenditure on personnel and other budgetary decisions often prioritises the interests of politicians and influential groups over collective needs. This dynamic can result in fiscal imbalances, challenging the proposed principles of equity and efficiency in the FPE. It underscores the necessity for stricter criteria in resource distribution. Notably, bureaucrats, political parties, and lobbying groups act as pivotal median voters to pursue their interests within this theoretical framework in democracies.

Analysis suggests that focusing solely on per capita income equalisation is ineffective for optimising the efficiency of distributing funds from the States Participation Fund. It is proposed that the Union conditions transfer on states' fiscal efforts, encouraging responsible and effective management. The public choice theory also explains how political pressures and interest groups can increase public spending, particularly on personnel, affecting fiscal balance. Therefore, it would be prudent to link the States Participation Fund to performance and fiscal responsibility to promote a strategic allocation of allocated funds.

Barro (2001) discusses the current criterion used by the FPE, based on the inverse of per capita income, highlighting the need for corrective measures for the current system. He points out that this redistributive criterion harms existing intergovernmental relations and perpetuates delay, poverty, and disparities, as it encourages states to remain in conditions of poverty to ensure more resources from the funds allocated to the poorer states.

According to the author, the incentive contract is formulated to transfer more resources to areas of greater poverty. However, if a state is rewarded based on its poverty level, it will not overcome its developmental delays. This issue is particularly acute given the significance of the FPE for Brazil's poorest states. Barros (2001) also highlights a 'conflicting logic' in political agents; on the one hand, they might prefer to remain impoverished to maintain or increase the funds received, and on the other hand, they might want to improve living conditions, understanding that it is better to have a reduction in funds received from the Union in exchange for improved quality of life.

In sum, analysing fund distribution strategies, particularly in the context of the FPE, uncovers the complexity and challenges in pursuing an equitable system. Barros's (2001) insights on the current distribution criteria, based on inverse per capita income and population, highlight the flaws in the existing system and the need for more effective approaches that meet the real demands of the population. Considering a population-based criterion underscores the importance of resource allocation that truly reflects needs and encourages equitable development among states. Thus, Barros's recommendations are vital for guiding future reforms in fiscal management and fund distribution in Brazil.

3.2 Integrated Fiscal Management: Connecting Income Equalization Funds with Global Strategies for Debt Control and Fiscal Adjustment

Despite the academic controversy, when considering the efficient allocation of public resources and expenditure control, examining the global strategies adopted for debt management and fiscal adjustment is crucial, which offers additional perspectives and varied approaches to economic management.

A central element in income equalisation is the control of subnational government indebtedness. Only entities without financial vulnerability can grow. There is a relationship between lower growth rates and indebtedness. Thus, measures to contain indebtedness are necessary to foster growth.

Analysis of international experiences in debt management reveals a wide variety of adopted strategies. Generally, we can distinguish four main approaches. The first is reliance on market discipline, where market forces determine the state's debt limit. The second is a cooperative approach to debt control, involving setting debt limits for subnational governments through negotiations between the federal government and subnational entities. The third is rule-based subnational debt control, establishing specific constitutional or legislation norms. The fourth involves direct central government controls over subnational indebtedness, where the central government

has direct authority to regulate the indebtedness of subnational governments.

Ter-Minassian (1977a and 1997b) suggests several measures to promote fiscal adjustment and prevent increasing indebtedness in states and municipalities. These include advocating for deficit reduction or the creation of surpluses and implementing fiscal adjustment programs tailored to the specific needs of each state, supported by realistic debt limits. Additionally, it is recommended to set debt limits strictly and impartially and to avoid replacing domestic debt with external debt.

According to Kotov (2021), Germany's regional policy has successfully mitigated regional differences. The authors note that regional development policy fosters investment through subsidies from budgetary resources. It also aims to provide research and development of new products, services, production processes, and employee training to meet company needs, among others. These services are targeted at small and medium-sized enterprises. The success in reducing German regional disparities is attributed to ensuring the participation of federal territorial entities in economic and social policy-making. Projects that conflict with the interests of the central and subnational governments are not implemented.

The German government establishes three goals to minimise the trade-off between growth and fiscal discipline: compensation, growth, and stabilisation objectives. The compensatory policy aims to create equal living conditions across all regions. The growth objective seeks to foster greater growth in poorer regions. The stabilisation objective aims to prevent regional growth from compromising national economic stability.

This section bridges the gap between domestic fiscal strategies and global debt management approaches, emphasising the interconnectedness of income equalisation funds and broader economic policies. It delves into the nuances of managing subnational debt, exploring various international strategies and their implications for sustainable fiscal growth. The section highlights the importance of adopting tailored fiscal adjustment measures, considering the unique financial needs of each region, and discusses the role of government intervention in balancing economic stability and growth, drawing insights from global examples.

3.3 Criteria for the Equalization Funds of Spain and Switzerland

The Spanish Federation is marked by disputes between federal and subnational governments, as well as among the subnational federal entities themselves. Despite many communities claiming that the financing system is unfair, the Spanish Federation is considered cooperative, governed by addressing all federated entities' common and particular interests. The Constitution establishes a mixed financing system for subnational governments so that revenues have a dual origin: their own revenues and those from the Federal Government.

Constitutional and infra-constitutional norms establish the basic principles for transferring taxes from the Federal State to subnational governments, aiming to achieve uniform development. There is also a convergence process of indirect taxes to a uniform rate and legislation, especially for the Value Added Tax (VAT). Moreover, states have full normative capacity over all relevant taxes, including those shared with autonomous communities and municipalities.

In Spain, the criteria for equalisation transfers include various indicators estimating a broad demand for public services: population, area, dispersion, isolation, and population segments requiring greater governmental assistance. The term 'equalisation transfers' refers to those aiming to establish a minimum value, usually per capita, to be used by each local government for a specific program or action. A formula for expenditure needs is provided for each Province to fund a uniform level of public services throughout the national territory.

In Switzerland, competitive federalism encourages competition among member states in providing services and public policies, but with a higher degree of tolerance than that prevalent in Spain. In Swiss federalism, fiscal competition is seen as a way to prevent excessive tax burdens and limit the expansion of public spending. In fiscal competition, there is a greater incentive for the mobility of capital and labour than in a competitive federation.

Swiss federalism is characterised by less intervention from the federal government, resulting in high participation of subnational governments in shared revenues and autonomy for subnational entities to collect taxes in significant volumes. The federal government is responsible for 30% of revenues and expenditures, while 70% falls under the responsibility of subnational governments. The goals of the distribution system are achieved and accompanied by a reduction in tax rates.

The Swiss experience shows that even a country with competitive federalism and a high degree of budgetary decentralisation can maintain fiscal discipline. It also supports the view that proximity and competitiveness among subnational governments can contribute to fiscal discipline. Containment of central government spending was accompanied by fiscal adjustment efforts in subnational governments, leading to better-consolidated

outcomes than those of the central government. This situation allows us to assert that the country's institutional maturity is as significant as, or even more important than, the norms.

This analysis of Spain and Switzerland's approaches to their Equalization Funds reveals two distinct but effective fiscal management systems. While Spain focuses on a cooperative model balancing federative interests, Switzerland adopts competitive federalism with less central government intervention. Both models demonstrate how diverse approaches can contribute to fiscal stability and uniform development, highlighting the importance of institutional maturity and adaptation to local needs.

4. The Reduction of Regional Inequality in Brazil

In this section, the study investigates whether inequality has been reduced among Brazilian states. Thus, the study employs the indicator utilised by Ferreira & Diniz (1995) to assess income inequality among Brazil's states. This indicator assumes that an equitable distribution of income across the states would be realised when the per capita income of each state equals the national average, resulting in js indices of 1 for all states.

The computation of the indicator is performed using the formula j = Yi / Pi, where Pi indicates the proportion of each state's population relative to Brazil's total population, and Yi signifies the share of state i's income in the nation's total income. Based on this indicator, a state boasting a higher per capita income will see its j value approach zero, signifying its superior financial status. In contrast, a state finds itself at a disadvantage when its index value exceeds 1, reflecting a per capita income that falls below the national average.

The analysis of the evolution of the JS index in Brazil between 1990 and 2020 reveals a consistent trend of decreasing income inequality among the Brazilian states. Each five years, the average annual reduction in the JS index indicates continuous progress in a more equitable income distribution among the states. These percentage reductions ranged from 3.05% to 4.30% over the intervals considered, reflecting a gradual improvement in income equality.

In 1990, the states with the highest JS index values, indicating lower per capita income relative to the national average, included Maranhão, Tocantins, Piauí, Ceará, and Paraíba. In contrast, by 2020, despite overall improvements, Maranhão, Piauí, Paraíba, Ceará, and Acre were still among the states with the lowest per capita income compared to the national average. On the other hand, the Federal District maintained or improved its position as the state with the highest per capita income, followed by Mato Grosso do Sul, São Paulo, Mato Grosso, and Santa Catarina, indicating relatively high per capita incomes.

This analysis suggests significant disparities persist despite a general trend of reducing state income inequality. Historically, less affluent states still face challenges reaching the national average, while more affluent states tend to maintain or improve their relative positions. The convergence in per capita incomes is a positive sign, but the persistence of inequalities points to the need for ongoing policies focused on reducing these regional disparities.

Table 1. Trend of income disparity indices among Brazilian States: 1990/2020

	1990	1995	2000	2005	2010	2015	2020	
AC	2.04	1.67	1.79	1.84	1.84	1.73	1.95	M
AL	2.42	2.61	2.50	2.30	2.36	2.11	1.91	M
AM	0.78	1.04	1.12	1.12	1.17	1.33	1.30	P
AP	1.20	0.98	1.38	1.63	1.62	1.62	1.68	P
BA	1.80	2.17	2.00	1.84	1.82	1.82	1.76	M
CE	2.68	2.21	2.26	2.32	2.13	2.00	1.98	M
DF	0.67	0.25	0.31	0.36	0.36	0.40	0.41	M
ES	1.06	0.90	0.91	0.85	0.82	0.96	1.06	M
GO	1.56	1.35	1.34	1.23	1.15	1.12	1.14	M
MA	4.21	3.71	3.27	2.87	2.90	2.58	2.39	M
MG	1.16	1.23	1.23	1.20	1.14	1.18	1.12	M
MS	0.25	0.24	0.28	0.30	0.28	0.37	0.44	P
MT	1.61	1.43	1.16	0.96	1.10	0.89	0.71	M
PA	1.62	2.24	2.24	2.03	1.88	1.83	1.44	M
PB	2.59	2.92	2.58	2.41	2.29	2.08	2.07	M
PE	1.83	2.08	2.01	1.97	1.85	1.75	1.79	M
PI	3.93	3.44	3.22	3.31	2.87	2.39	2.09	M

PR	0.91	0.98	0.98	0.95	0.95	0.87	0.85	M
RJ	0.81	0.76	0.71	0.67	0.72	0.74	0.83	P
RN	2.29	2.37	2.09	1.77	1.79	1.76	1.77	M
RO	1.52	1.93	1.57	1.45	1.34	1.42	1.25	M
RR	1.27	1.18	1.09	1.44	1.38	1.45	1.42	P
RS	0.77	0.87	0.87	0.94	0.91	0.86	0.87	P
SC	0.83	0.90	0.85	0.85	0.83	0.80	0.74	M
SE	1.76	1.90	1.89	1.61	1.60	1.71	1.84	P
SP	0.58	0.58	0.61	0.64	0.65	0.67	0.70	P
TN	3.96	2.48	2.25	2.00	1.72	1.54	1.31	M

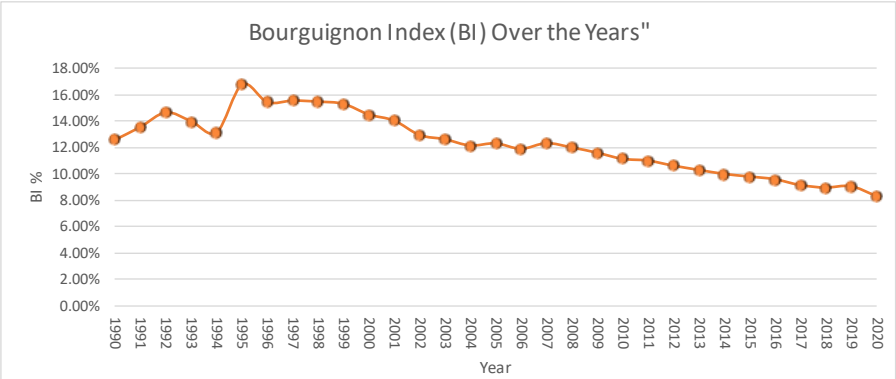
Source: IBGE, elaborate by authors.

Here is the trend of the JS Index for Brazil from 1990 to 2020. The plot shows a peak in 1995 followed by a general downward trend, indicating a reduction in income inequality across the country over the 30-year period.

The convergence identified in this study was also observed in Nunes and Nunes (2005). The authors discovered a convergence of per capita income from 1969 to 1999. Ferreira and Diniz (1995) found it from 1970 to 1985.

Graph

Historical Decline of the Bourguignon Index Indicating Income Convergence in Brazil: 1995-2020



The chart illustrates the evolution of the Bourguignon Index (BI) over the years, highlighting a downward trend that indicates a reduction in income disparities among Brazilian states. This decline in the BI can be seen as a sign of progress towards regional economic convergence.

After discussing the fiscal management approaches of Spain and Switzerland, attention turns to Brazil, where the FPE apportionment system is criticised for not promoting the enrichment of lower per capita income states. In this context, Lozano et al. (2023) reinforce this criticism by stating that the current system negatively affects the state's economic development, thus highlighting the direct consequences of the failures in the resource distribution policy.

The Brazilian experience with the FPE apportionment criteria falls within a historical context of criticism. Relying on a single criterion is seen as an incomplete system that could lead to numerous injustices and involuntary fluctuations, especially in a country with vast disparities.

4.1 Effort in Tax Collection by the States

To improve the distribution system of the Fund for State Participation (FPE) and promote a more equitable resource allocation, a change in the apportionment criteria is proposed: the fiscal effort of the states should represent 10% of the total FPE value, and an additional 10% should reflect each state's territorial percentage in the country. This measure aims to encourage fiscal discipline, which is essential for sustainable economic growth, and balance the resource distribution, considering both the collection effort and the territorial extent of the states and the Federal District.

Furthermore, it is crucial to enhance the effectiveness of the FPE as a compensatory mechanism, often reduced by the minimal fiscal effort of certain states. These states, primarily depending on the FPE as a source of revenue, avoid increasing their state tax burden. Given that some states grant tax concessions that can reach up to 40% of their tax revenues, it becomes necessary to discourage such practices. Encouraging a more vigorous fiscal effort by the states can ensure a more fair and effective distribution of resources.

This measure would encourage the fiscal effort of the states and mitigate the fiscal war. If all states made an equivalent fiscal effort, the funds allocated to that region would be divided equally. However, it is more likely that some states will always be more efficient in tax collection, as has been observed so far.

Such a change would promote the fiscal effort of the states. Once all states are exploiting their full fiscal capacity, the total amount of the FPE transferred to the states respecting their group would be apportioned relatively equally. Thus, the state with greater efficiency in collecting its taxes would not receive a percentage below its potential.

This section proposes new criteria for distributing FPE funds to correct observed distortions. The variables from international experience will be the state GDP per capita, population, collection effort, and demographic dispersion. Ideally, criteria that can be constantly updated according to the socioeconomic evolution of the entities should be adopted. In Germany, every five years, an adjustment of revenue transfers is made according to the assessment of the entities' competencies.

However, the impact of income transfer mechanisms, such as the State Participation Fund (FPE), continues to provoke discussion.

According to Barro (2001), the current model of the FPE, which is based on the principle of reversing per capita income, may discourage efforts towards economic development of the states, potentially exacerbating existing inequalities. There is a risk that this system encourages economic complacency in states that, by settling for a lower level of development, ensure a larger flow of resources. The persistence of poverty in many regions after thirty years highlights the urgency of revisiting these political strategies.

Legally, the Federal Constitution of 1988, in its article 3, subsection III, commits the country to reducing inter-regional inequalities, employing various legal mechanisms for this purpose. Articles 198 to 200 of the Federal Constitution direct federal funds towards education and health to mitigate regional differences.

However, the multitude of unsynchronised regulations leads to duplicated efforts and a lack of budgetary efficiency, especially when the outcomes of public investments are not adequately measured.

5. Suggestion for New Criteria in the Distribution of FPE

In light of this, a new methodology for distributing resources is proposed to address the shortcomings identified by Barro (2001) while simultaneously encouraging fiscal responsibility among the states. The suggested criterion promotes a more significant allocation of federal funds to states that demonstrate greater efficacy in collecting their own revenues about their Gross Domestic Product (GDP). This performance-based method is designed to motivate the states to foster local economic growth and efficiency in fiscal management.

The FPE criterion suggested in the following equation is designed to work on the basis of two vectors. The first vector is directly proportional to three factors: the population, the territorial size of the state, and the effort in revenue collection. The second vector is inversely proportional to the state's per capita GDP. This approach aims to increase the allocation of resources to less developed regions. Consequently, it promotes a convergence in the revenues across all federative entities.

The formula for calculating the resources for the States:

$$E_i = \left(\frac{R_i}{\sum_{j=1}^{n} R_j}\right) * 0.70FPE + \left(\frac{EF_i}{\sum_{j=1}^{n} EF_j}\right) * 0.10FPE + \left(\frac{T_i}{\sum_{j=1}^{n} T_j}\right) T * 0.10FPE + \left(\frac{P_i}{\sum_{j=1}^{n} P_j}\right) P * 0.10FPE$$

where,

E_i= it is the FPE quota allocated to the i-th state;

FPE= It is the amount of resources allocated to the FPE;

EF_i= fiscal effort measure at t. To calculate the fiscal effort (EFi) at time t, measured by the growth from ICMSt-1 to ICMSt-2, the growth rate is computed using the formula:

$$EF_i = \left(\frac{ICMS_{t-1} - ICMS_{t-2}}{ICMS_{t-2}}\right)$$

R_i=it is the inverse of the per capita income of the i-th state;

T= is the dimension of the i-th state.

Pi= the population of the i-th state.

The larger a state's population, the greater the need for resources to provide public goods and services to citizens, and the larger the territory, the higher the relative cost of providing these goods. Therefore, it is suggested that

the FPE distribution should be directly related to the population and the territory's size.

Furthermore, the collection effort would prevent transfers from making states lenient regarding tax collection and would be an incentive for those more committed to fiscal discipline. Thus, the criticism that a low fiscal effort neutralises the compensatory effects of the FPE would be avoided, as the state that relies mainly on FPE revenue would not seek to increase its own tax burden. Therefore, it is suggested that 10% of the FPE be distributed proportionally to the fiscal effort of the states.

The allocation of greater resources to larger states is justified by the complexity and high cost associated with the logistical management of these areas. Such states face unique challenges due to their vast geography, including the need for diverse public policies, extensive infrastructure maintenance, and the provision of services in remote areas. This strategy aims to ensure equity in the provision of public services, promote balanced development, and reduce regional disparities, considering each region's specific characteristics and needs.

The table below presents the results of applying the proposed criteria for distributing the State Participation Fund (FPE) resources among the various Brazilian states, considering factors such as efficiency, income, population, and territory. These factors are used to calculate the proposed allocation of the FPE and are compared with the currently distributed values. The differences highlight disparities in allocation, which may be due to the different logistical and demographic challenges and the effort of tax collection faced by each state. The proposed FPE column reflects a suggested distribution aimed at addressing these challenges, seeking a more equitable resource distribution aligned with the needs and characteristics of each state. The data illustrate the practical application of the principle that larger states, with their complex logistics and high management costs, require more substantial resources to ensure balanced development and service provision throughout their territory.

Table 2. Analysis of state participation fund allocation factors by Brazilian State

State	efficiency factor	income factor	population factor	territory factor	proposed FPE	distributed FPE	difference
AC	0.00	2,250,923,899.58	31,037,126.27	143,525,870.95	2,425,486,896.80	2,568,147,662.67	-142,660,765.87
AL	124,140,511.08	2,865,672,023.42	118,641,362.42	24,348,607.30	3,132,802,504.21	3,138,397,074.30	-5,594,570.09
AM	154,321,530.94	2,586,712,799.90	145,698,307.02	1,363,487,029.07	4,250,219,666.93	2,193,474,786.27	2,056,744,880.66
AP	245,423,678.28	2,387,502,712.62	29,617,101.82	124,590,397.26	2,787,133,889.98	2,571,905,304.14	215,228,585.84
BA	120,450,579.70	2,432,924,880.76	528,884,821.27	493,880,668.75	3,576,140,950.48	6,947,715,408.38	-3,371,574,457.90
CE	814,549,251.89	2,393,087,514.29	324,046,250.52	130,207,288.57	3,661,890,305.28	5,410,800,094.06	-1,748,909,788.78
DF	0.00	831,743,831.19	106,211,837.14	5,037,974.60	942,993,642.93	512,089,544.70	430,904,098.23
ES	279,879,168.09	1,579,992,142.64	141,834,202.38	40,291,553.81	2,041,997,066.93	1,169,092,012.31	872,905,054.62
GO	550,363,269.69	1,546,553,155.49	247,120,208.30	297,506,348.10	2,641,542,981.58	2,126,676,061.27	514,866,920.31
MA	618,285,521.13	3,381,966,652.43	251,186,796.11	288,270,790.09	4,539,709,759.76	5,357,130,793.74	-817,421,033.98
MG	322,270,301.33	1,547,723,014.16	751,257,307.29	512,910,588.07	3,134,161,210.85	3,343,929,427.41	-209,768,216.56
MS	210,428,785.45	1,421,883,130.45	97,814,765.69	312,322,943.06	2,042,449,624.65	1,003,753,090.53	1,038,696,534.12
MT	200,293,384.45	1,476,255,284.79	122,896,615.57	789,851,400.92	2,589,296,685.73	1,694,269,253.46	895,027,432.27
PA	271,852,521.67	2,370,903,620.76	303,403,963.12	1,089,509,885.01	4,035,669,990.57	4,555,522,468.17	-519,852,477.60
PB	120,290,981.45	2,278,496,464.05	142,694,979.06	49,380,196.41	2,590,862,620.98	3,542,208,157.28	-951,345,536.30
PE	294,279,710.39	2,349,127,238.48	339,065,389.66	85,760,127.17	3,068,232,465.70	5,116,674,271.20	-2,048,441,805.50
PI	1,547,049,010.45	2,504,393,910.31	116,255,374.30	220,160,626.68	4,387,858,921.73	3,221,656,667.37	1,166,202,254.36
PR	106,663,645.34	1,273,235,734.11	405,214,049.40	174,286,286.92	1,959,399,715.78	2,107,295,358.76	-147,895,642.98
RJ	20,866,888.69	1,211,420,855.37	612,696,755.58	38,259,223.84	1,883,243,723.49	1,167,157,906.45	716,085,817.04
RN	23,730,149.43	2,140,261,322.93	124,218,129.86	46,182,162.54	2,334,391,764.75	3,101,202,906.76	-766,811,142.01
RO	247,524,047.92	1,838,355,637.66	62,754,754.55	207,924,671.02	2,356,559,111.16	2,098,556,466.04	258,002,645.12
RR	550,692,724.28	1,699,410,153.42	20,586,373.33	195,576,779.81	2,466,266,030.85	1,843,274,951.15	622,991,079.70
RS	67,971,854.28	1,200,052,683.12	404,417,827.41	246,351,798.20	1,918,794,163.01	1,709,200,723.25	209,593,439.76
SC	211,128,593.20	1,232,584,231.76	251,824,023.65	83,716,428.75	1,779,253,277.36	957,058,319.94	822,194,957.42
SE	30,276,647.84	2,258,377,289.98	81,347,038.09	19,173,336.75	2,389,174,312.66	3,073,159,669.93	-683,985,357.27
SP	172,295,853.85	1,078,024,143.69	1,625,968,728.36	217,066,657.90	3,093,355,383.80	724,924,420.70	2,368,430,963.10
TO	137,194,963.58	1,957,980,693.51	55,529,486.23	242,643,932.85	2,393,349,076.17	3,166,962,943.88	-773,613,867.71

6. Conclusion

The study investigated the convergence in per capita income across Brazilian states from 1990 to 2020. Ideally, this would have bolstered the per capita GDP in economically lagging states relative to their more prosperous counterparts in the Federation.

Recognising the mechanism's shortcomings, the research proposes a reformed approach to the State Participation Fund (FPE). By factoring in state GDP per capita, population size, tax collection efficiency, and demographic dispersion, the aim is to boost the success and equity of income convergence across the Federation.

The proposed FPE distribution criteria and the simulations performed are an initial step toward a fairer allocation

system for Brazilian states. The paper recommends additional research to assess other criteria and the effects of altering the weights of per capita income and population in the FPE formula. It acknowledges, however, that focusing exclusively on FPE disbursements is a limitation, as a truly holistic assessment of distributive justice should encompass all types of state transfers.

Implementing these proposed reforms presents political challenges, notably the necessity of persuading more prosperous states to consent to a reduced share of resources to support economically weaker states. A gradual transition period is advised to mitigate political resistance, incorporating safeguards to prevent abrupt shifts under the new guidelines.

Furthermore, it is crucial to challenge the misconception that the FPE's equalisation process simply transfers wealth from wealthier states to the affluent in poorer states, a misconception that can lead to the 'flypaper effect'—a scenario where local governments might become passive and ignore fiscal discipline. To build on this study, an enhancement of the tax effort metric is suggested to gauge fiscal responsibility more accurately.

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