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Effect of tax incentives in IPI, ICMS export, PIS, and Cofins on the municipalities' current budget results

Marconi Silva Miranda
http://orcid.org/0000-0001-8870-347X

Luiz Antônio Abrantes
https://orcid.org/0000-0002-4460-125Xr

Antônio Carlos Brunozi Júnior
https://orcid.org/0000-0001-9372-6246

Marco Aurelio Marques Ferreira
https://orcid.org/0000-0002-9538-1699

Abstract

Objective: To assess the effects of tax incentive policies applied to municipalities in IPI, ICMS export, PIS, and Cofins on the budgetary balance of Brazilian municipalities.
Method: The sample comprised 5,570 Brazilian municipalities, and secondary data were used. The timeframe was determined according to data availability, i.e., between 1999 and 2017. Econometric models were estimated in stages for panel data. Time series stationary was first tested to instrumentalize the models' estimation. Then, the consistency test of the series' Wu-Hausman estimators was applied to verify the existence of endogeneity between the dependent and explanatory variables.
Results: In general, tax incentive policies did not favor the fiscal balance of municipal finances.
Contributions: This study advances and innovates by analyzing the fiscal balance of Brazilian municipalities' public finances in a context where multiple tax exemption policies are adopted simultaneously. The implications for policymakers are that they are unaware of how susceptible municipalities are to political and fiscal maneuvers at higher levels of government.
Keywords: Tax incentives; Budget balance; Municipal finances.

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1. Introduction

The federative pact, determined by the Brazilian Federal Constitution of 1988, weakened municipalities in matters related to the composition of their revenues, considering that municipal fiscal autonomy was not expanded.

In this context, most municipalities have depended almost exclusively on transfers between governments, including through participation funds and linked and voluntary transfers. These resources are instruments and measures that enable subnational entities to comply with the duties imposed by the Constitution (Domingues, 2007; Sediyama *et al.*, 2019).

Given municipalities' dependence on the tax system, decisions concerning changes or propositions of new tax policies influence these municipalities' budgets and, as a result, their public policies (Lima et al., 2018; Rodrigues & Silva, 2020; Wakim et al., 2018). When there is a drop in revenue and, consequently, in the level of transfers, such policies may negatively interfere with local socioeconomic development, contradicting the precepts of federalism cooperation in decreasing federative imbalance and social inequalities through transfer systems (Botelho & Abrantes, 2018; Mendes *et al.*, 2018)..

In developing countries such as Brazil, using expansionary policies through tax incentives to promote macroeconomic stability, maintain employment and income levels, and ensure economic growth may go against the premises supporting a decentralized system. Chygryn *et al.* (2018), Melnyk *et al.* (2018), and Pimonenko (2017) note that this may occur because fiscal decentralization generally involves the transfer of a significant amount of budgetary resources to the subnational government level with the simultaneous expansion of its financial capabilities.

In this context, the Economic Theory of Fiscal Decentralization emerges as a theoretical framework to support understanding the phenomenon involving the national federative system concerning the autonomy of all levels of government, fiscal policies, resource transfers, tax powers, and the not-always-cooperative relationship between entities. In this theoretical context, the participation of the State in various sectors of the economy may interfere with the relationship of the vertical structure of the public sector since the central government is responsible for macroeconomic stabilization and income distribution (Baskaran *et al.*, 2016; Boadway & Cuff, 2017; Catarino & Abraham, 2018; Ewetan *et al.*, 2020; Vande, 2021)

In Brazil, tax incentives as an instrument of economic policy, resulting from exemptions, tax benefits, and special purposes, among other advantages, were applied to various taxes that make up the funds for transferring resources to Brazilian municipalities. However, the application of these incentives to taxes that affect consumption, such as incentive policies applied to the Tax on Industrialized Products (IPI), Value-added tax on Sales and certain Services (ICMS export), the Social Integration Program (PIS), and the Contribution for Social Security Financing (Cofins), may cause a drop in revenue if the there is no growth in economic activity and compensation for the increase in the collection of income taxes.

In this context, this study assumes that tax incentive policies increase negative externalities in public finances and affect the distribution of intergovernmental transfers to municipalities. Therefore, based on this premise and considering that tax policies are simultaneously implemented on IPI, ICMS exports, and PIS/Cofins, the following question is proposed: **What are the effects of tax incentive policies, considering their joint incidence on the multiplicity of taxes, on the public finances of Brazilian municipalities?**

Here, we consider that economic and structural contrasts may severely enhance such effects on municipalities. Brazilian municipalities' conditions and economic power are directly linked to the predominant economic sector and the regions to which they belong. Additionally, small municipalities in more economically vulnerable regions are supported almost solely by revenues from the government (Leroy *et al.*, 2017; Revorêdo *et al.*, 2021; Ribeiro, 2016). Thus, this study's general objective was to assess the effects of tax incentive policies concomitantly applied to IPI, ICMS export, PIS, and Cofins on the budgetary balance of Brazilian municipalities.

This study's relevance lies in the fact that international and Brazilian studies analyze the effects of tax incentive policies on the public finances of subnational entities, considering specific taxes and economic sectors in isolation (Abad *et al.*, 2020; Bergman *et al.*, 2016; Gross, 2021; Larch *et al.*, 2021; Peña, 2020; Pfeiffer *et al.*, 2021; Piergallini & Postigliola, 2020; Botelho & Abrantes, 2020; Fazoli *et al.*, 2018; Marostica & Petri, 2017).

Regarding the effects of tax incentive policies on the public finances of Brazilian subnational entities, Barbosa *et al.* (2020), Vieira, Oliveira, and Ávila (2021), Griebeler, Silva, and Allebrandt (2020) note that tax incentives positively influenced the finances of subnational entities, specifically municipalities, especially regarding their revenues, as they influenced the generation of new formal jobs and increased consumption of goods and services. However, Alves (2018), Meneghetti Neto (2017), and Correia and Neduziak (2019) found adverse effects that compromised the budgetary autonomy of states and municipalities, limiting investment capacity and expanding debts.

One of the reasons for these conflicting results may lie in the tax base used, considering that most studies analyzed isolated policies affecting (or resulting from) a single tax. These specific analyses may, to a certain extent, mask and bias the results of the effects of state interventions through the application of tax incentive policies on the public finances of subnational governments. Note that the effects of tax incentive policies on specific sectors, such as the IPI, which is levied on industrialized products, do not assess the impacts of this policy on economic sectors based on income or consumption behavior.

This study advances knowledge by verifying the concomitant incidence and implications of the effects of fiscal policy on the multiplicity of taxes on municipal public finances. Analyzing the effect of tax incentive policies that are simultaneously applied to IPI, ICMS exports, and PIS/Cofins on the fiscal balance of the public finances of Brazilian municipalities according to economic sectors and regions is a novel pursuit and an innovation in studies on fiscal policies. An investigation covering the industrial, services, and agricultural sectors enables the identification of these policies' macroeconomic effects on municipal finances according to the sector. Additionally, progress is achieved by analyzing the behavior of transfers from the Union and States to municipalities for different regions in a scenario where multiple tax exemption policies are adopted simultaneously.

This study's theoretical-empirical contributions include results showing that in general tax incentive policies did not favor the fiscal balance of the finances of municipalities in the South and Mid-West. Furthermore, the effects were negative for the balance of municipal public finances through the industrial and agricultural sectors and positive through the services sector.

2. Fiscal Policy

Fiscal policies are considered one of the elements guiding discussions about public finances and the complex task of maintaining a balance between revenues and expenditures. In conceptual terms, the Classical Economic Theory provides, in the seminal study by Keynes (1936), the first assumptions for the use of fiscal policy as a way to boost the economy. Using fiscal policies in periods of instability to leverage investment and maintain economic activity increases the expectations of entrepreneurs, which may contribute to increasing investment and maintaining employment and income, an aspect particularly relevant to public finances (Keynes, 1996).

In his seminal study, Haavelmo (1945) opposes expansionary fiscal policies since employment can be maintained with a balanced budget financed by previously collected taxes. Barro (1974) argues that fiscal policies would be inefficient since people would expect tax increases to offset fiscal expenditures. Thus, these policies would have contractionary rather than expansionary effects.

In the fiscal policy context, the central government uses tax incentive policies to ensure the growth and maintenance of employment and income. These policies are important for assessing a country's investment environment and are favorable for attracting investors to specific economic sectors (Babajide *et al.*, 2014; Moolman & Zwan, 2016). However, Kraal (2019) argues that, in practice, tax incentives are not satisfactory, ineffective, and might negatively affect the tax base, besides being subject to abuse and corruption.

Specifically regarding public finances, the literature discusses the effects of tax incentive policies on the finances of subnational entities. Griebeler, Silva, and Allebrandt (2020) and Barbosa *et al.* (2020) state that tax incentives do not compromise a municipality's fiscal balance, as they promote revenue growth (Araújo, 2016). On the other hand, Makreshanska-Mladenovska and Petrevski (2020) consider that there is an association between tax incentive policies and budget deficit, in addition to "harming" federative autonomy. However, the dependence of local governments on intergovernmental transfers does not interfere with these governments' fiscal discipline.

In summary, the analyses in the literature regarding the effects of tax incentives on the balance of public finances diverge, as studies have shown that these effects may be related to factors such as federated entities' fiscal autonomy, revenue, budget deficit, and intergovernmental transfers. One of the reasons for such divergence may be related to the tax base analyzed since most of these studies analyzed tax incentives from the perspective of a single tax and through specific economic sectors, which may lead to inconclusive results about the effects of these policies on public finances (Bresser-Pereira & Nakano, 2020).

3. Public Finances under the aegis of the economic theory of Fiscal Decentralization

Within the complexity of the federal system that involves autonomy, tax powers, fiscal policies, and intergovernmental transfers, the Economic Theory of Fiscal Decentralization emerges as a theoretical framework to assist and support discussions concerning public finances, especially those of municipalities. The theoretical framework for fiscal decentralization is strengthened by the seminal studies of Hayek (1945), Samuelson (1954), Tiebout (1956), Musgrave (1959), and Oates (1972). They presented the concepts, fiscal functions, and fiscal control devices shared among the levels of government, all under the coordination of the central government.

In this context, the empirical literature discusses the effects of fiscal decentralization on public finances across a wide range of topics. International studies have analyzed these effects through the public budget, intergovernmental transfers, capital expenditures, revenues, and public spending (Bisaro *et al.*, 2020; Chiades *et al.*, 2019; Joanis, 2016; Kim, 2018; Smith & Revell, 2016)

Also noteworthy is the study by Jia, Ding, and Liu (2020), which describes that fiscal decentralization negatively interfered with the public finances of local governments in China by reducing these governments' tax execution. Makreshanska-Mladenovska and Petrevski (2020) found evidence of the association between decentralization and public finances through the budget deficit of 11 European countries.

Other empirical studies expanded the findings on the effects of fiscal decentralization on the public finances of subnational entities. Sovilla, López, and Sánchez (2018) argue that decentralization does not generate fiscal autonomy and is detrimental to public finances, as it causes local governments to become indebted. In turn, Masaki (2018) argues that fiscal decentralization increases the tax capacity of local governments, with higher revenue collection volumes.

Brazilian studies have addressed the implications of decentralization on public finances through fiscal stress, economic stability, primary healthcare, state capacity, intergovernmental transfers, fiscal responsibility law, and economic development, among others (Almeida, 2016; Botelho & Abrantes, 2020; Corcelli, 2021; Dantas Junior *et al.*, 2019; Luna *et al.*, 2017; Nishijima *et al.*, 2017; Suzart *et al.*, 2018)usando como medida de corrupção as irregularidades descritas nos relatórios das auditoriasdo programa de fiscalização dos municípios da Controladoria Geral da União. O artigo procura verificar se os resultados encontrados para a região Sudeste no período de 2004 a 2006 (Peixoto et al, 2012.

However, empirical studies that converge on the theme addressed here are very similar or tend to analyze the same taxes or objects. Araújo (2016) analyzed ICMS and verified that such policies had no short-term effect on the State of Goiás public finances. Cavalcante and Zanocch (2020) state that tax waivers increased considerably in 2020 and interfered with the public budget. Finally, Braatz and Rocha (2021) found that revenue losses due to tax incentive policies compromised the budget and public finances of the municipalities of Rio Grande do Sul.

Regarding tax incentives on IPI, some studies have shown that these policies were favorable for public finances, especially in municipal revenues (Barbosa *et al.*, 2020; Vieira, Oliveira & Ávila, 2021), which, in addition to not causing a significant drop in revenue, did not cause budgetary imbalances that could compromise the implementation of public policies (Oliveira, Pinto & Rita, 2017).

The literature does not agree on the effects of fiscal decentralization on the finances of subnational entities. In this context, this study aimed to analyze the effects of tax incentive policies on IPI, ICMS exports, and PIS/Cofins on the public finances of Brazilian municipalities when implemented simultaneously. Potential losses in consumption due to exemptions in the industry sector, for example, are believed to be offset by increased revenue due to the maintenance of income and employment, especially in larger municipalities.

Furthermore, as Silva (2019) points out, under the pretext of promoting industry or economic activity, these policies may only spread clientelism and nepotism through subjective privileges in some regions of the country. Goularti (2019) argues that, depending on the Brazilian region, tax incentive policies may increase the concentration of wealth and worsen inequalities. Catão (2004) also explains that tax incentive policies have not helped the finances and development of municipalities, as is the case in the North and Northeast, which have not contributed to creating an economic activity or a prominent economic sector. Thus, we sought to analyze these effects for each of the five regions of Brazil separately. Hence, the first hypothesis is proposed:

H_1: The joint effects of tax incentive policies tend to affect a municipality's balance of public finances depending on its geographic region.

Baião, Cunha, and Souza (2017) and Costa *et al*. (2012) consider that an analysis according to the region is relevant, as Brazil's continental dimensions and the territorial division under which it is organized, accentuate existing disparities, not only between municipalities, due to their size, but also due to the region in which they are located, including in public finances. Szajnbok (2019) and Vieira *et al*. (2019) also emphasize that the existence of regional disparities causes the public entity to adopt strategies to equalize the economic situation.

Furthermore, as Botelho and Abrantes (2020) note, the adoption of tax incentive policies has been encouraged, given the possibility of tax equity, administrative efficiency, and benefits for sectors not served by the State, to reduce regional disparities. It is also important to note that the characteristics of municipalities are closely related to the region in which they are located, which might affect their public finances. As Almeida (2016) points out, the North and Northeast, for example, have a lower concentration of municipalities, lower population density, and low economic development.

However, since exemptions occurred in different economic sectors, the effects of tax incentive policies on Brazilian municipalities' public finances were conducted separately through each of the three sectors – industry, services, and agriculture. Therefore, the second hypothesis is presented:

H_2: The joint effects of tax incentive policies affect the Brazilian municipalities' public finances fiscal balance, depending on the predominant economic sector benefited

Zolt (2015) considers the analysis by economic sector pertinent because governments grant tax incentives to selected groups of taxpayers or to specific sectors of the economy, claiming that this will mitigate market failures and deficient internal investment. As described by Sosvilla-Rivero and Rubio-Guerrero (2022), knowledge of the effects of fiscal policies according to each economic sector is important to establishing public policies such as tax exemptions.

Furthermore, according to Christelis *et al.* (2019) and Jordà and Taylor (2016), underestimating the short- and long-term effects of incentive policies may lead governments to establish unattainable fiscal targets for each economic sector, leading to slow growth, budget deficits, and consequent losses for the public finances of all the Federation's entities.

4. Method

The sample comprised 5,570 Brazilian municipalities. The timeframe was determined according to data availability, considering 1999 to 2017.

A proxy was used as the dependent variable to measure the fiscal balance of the Brazilian municipalities' public finances. This proxy was determined by the Fiscal Balance Quotient (FBQ), defined by Kohama (2015), as the division of the sum of total current revenue by total current expenses. For Akin, Bulut-Cevik, and Neyapti (2016), Kyriacou, Muinelo-Gallo, Roca-Sagalés (2017), Neyapti (2013) and Marconato, Parré and Coelho (2021), the revenue-to-expenditure ratio is one of the best ways to measure the fiscal balance of municipalities, since an investigation of the effects of fiscal policies on subnational public finances must address aspects involving these elements.

A dummy variable, tax exemption (*taxexem*), was used as the explanatory variable. It measures the simultaneous occurrence of tax incentive policies. Hence, a dummy was first assigned to represent the tax incentives corresponding to the IPI; 1 was assigned to the years in which tax incentives occurred in the IPI and zero otherwise. Likewise, two other dummies were created: one representing the tax incentives on the ICMS export and the other for the incentives on PIS/Cofins. In both cases, 1 was assigned to the years in which taxes were exempted and zero otherwise.

Next, the dummy representing the simultaneous occurrence of tax incentives was created based on the product of the dummy variables that individually captured the years in which the incentives for each tax occurred separately. One (1) was assigned for the years the policies were applied simultaneously, and zero otherwise. Jorge and Martins (2013) and Rumina, Balandina, and Bannova (2015) agree that the analysis of the effects of these policies is relevant as they may be inefficient and also affect aggregate demand through various channels, taxes, current expenditures, and transfers, public investments, expenses, and revenues, in addition to the multiplier effect on private consumption and investment.

Gross Value Added (GVA) was also used as an explanatory variable to measure economic activity in the three economic sectors: industry, services, and agriculture. Suri *et al.* (2011) and Todaro and Smith (2012) note that considering that GVA composes the GDP, it reflects the increase in a country's actual production, which is an important driver of economic growth due to the relationship between employment and the population's income. Due to this study's objectives, the GDP variation according to the economic sector (industry, agriculture, and services) was used to analyze the effects of tax exemptions.

Control variables were used to capture the effect of economic development, political issues, and fiscal management on the balance of public finances in Brazilian municipalities. For economic development, a proxy called employment (Emp), the ratio between the number of employment contracts and the number of terminated contracts in each of the three economic sectors separately, was used.

According to Aglietta (1979) and Todaro and Smith (2012), employment contract behavior is a good macroeconomic indicator because, in addition to reflecting economic growth, an increase in contract terminations significantly interferes with socioeconomic development. Albertini *et al.* (2021) and Challe (2020) note that the risk of contract termination, specifically in the industrial sector, influences fiscal policies, considering that workers increase savings and decrease consumption in adverse conditions, which may negatively affect public finances.

The influence of fiscal decentralization on municipal finances was measured using a dummy (Party), which sought to capture how political relations, i.e., the alternation of power between the municipal and federal levels of government, interfere in the balance of municipal finances. This dummy is represented by 1 when the party of the municipal mayor is the same as that of the President of the Republic and zero otherwise. Sakurai and Menezes-Filho (2011), Veloso and Bornhold (2016), Balaguer-Coll *et al.* (2015), Chortareas, Logothetis, and Papandreou (2016) state that such an analysis might reveal additional results on how political factors affect public finances and whether these factors interfere in budgetary matters.

The *Índice Firjan de Gestão Fiscal (IFGF)*[Firjan Fiscal Management Index] was a control variable focused on economic regulation. Silva *et al.* (2020) and Cruz and Afonso (2018) explain that the objective of the IFGF is to encourage a culture of administrative responsibility, promoting the improvement of municipal fiscal management, considering that the absence of regulation discourages accurate budgets. Excellence management is essential for quality budgetary results. Hence, the importance of the index in the modeling is given that it provides content beyond the dependent variable, involving autonomy, personnel expenses, investments, and liquidity. Additionally, the endogeneity test for this and the dependent variable was negative.

Temporal dummies (Ti; i = 1 to 5) were used each year, during which tax incentives co-occurred to capture whether factors other than tax incentives affected municipal finances. Dorn, Gäbler, and Rösel (2021) report that these dummies capture macroeconomic effects not observed in the model, such as the behavior of stock markets, exchange rates, and inflation, among others, which may eventually affect the public finances of subnational entities. Table 1 presents a description of the variables used.

Table 1
Variables used in the models

Variables	Description	Source	Literature
FBQ	Fiscal Balance Quotient	–	Kohama (2015); Marconato, Parré e Coelho (2021); Neyapti (2013); Akin, Bulut-Cevik e Neyapti (2016), Kyriacou, Muinelo-Gallo, Roca-Sagalés (2017)
GVAind	Gross Value Added - Industry	IBGE	Suri *et al*. (2011); Todaro e Smith (2012)
GVAserv	Gross Value Added - Services		
GVAagro	Gross Value Added - Agriculture		
Party	*The Dummy for party alignment assumes 1 if the mayor's party is the same as the president of the Republic's and 0 otherwise*	TSE	Sakurai e Menezes-Filho (2011); Veloso e Bornhold (2016); Balaguer-Coll *et al*. (2015); Chortareas, Logothetis e Papandreou (2016)
IFGF	Firjan Fiscal Management Index	FIRJAN	Silva *et al.* (2020); Cruz e Afonso (2018)
Empind	Ratio between employment contracts and contract terminations in the industry sector	CAGED	Aglietta (1979); Todaro e Smith (2012); Albertini et al. (2021); Challe (2020)
Empserv	Ratio between employment contracts and contract terminations in the services sector		
Empagro	Ratio between employment contracts and contract terminations in the agriculture sector		
taxexem	*Dummy to indicate the simultaneous exemptions of IPI, ICMS export, and PIS/Cofins*	Portal de Legislação do Planalto	Jorge e Martins (2013); Rumina, Balandina e Bannova (2015)
T_1 *a* T_5	*Temporal Dummies to capture factors other than tax incentive policies*	–	Mattos, Rocha e Toporcov (2013) Dorn, Gäbler e Röse;l (2021),

* Monetary values were adjusted by the General Price Index (IGP-DI), from Getúlio Vargas Foundation – FGV, on 31/12/2017, in thousands of Reais and weighted by population (per capita).

Source: developed by the author.

Thus, according to region, econometric models were estimated for panel data for each of the three economic sectors. The models were estimated in four stages, differentiated by the inclusion of variables, to ensure the consistency and robustness of the results. First, the effects of only the explanatory variables were estimated, and then the control variables were included in stages. Equation 1 presents the general form of the estimated model.

$$FIN_{it} = \alpha_{it} + \beta_1 lnGVAs_{it} + \beta_2 (taxrel\ x\ s)_{it} + \xi X_{kit} + e_{it} \quad (1)$$

As shown in Table 1, FIN_{it} represents the Fiscal Balance Quotient (FBQ); *taxexem* and $GVAs_{it}$ are the explanatory variables; X_{kit} is a vector of k control variables; α_{it} is the intercept to be estimated; e_{it} is the model's random error. i refers to each of the Brazilian municipalities and t represents each year considered in the model.

Note that the estimate of the effects of tax exemptions on the public finances of Brazilian municipalities is given by the sum of the coefficients of the variables GVA_s and $taxexemxGVA_s$ since the $taxexemxGVA_s$ variable resulted from the product of GVA by the dummy corresponding to the tax exemption policies implemented simultaneously. Gujarati and Porter (2011) and Wooldridge (2011) describe that the estimate occurs by summing the coefficients; when two variables are multiplied, all observations are combined, thus the regression structure changes, modifying the intercept, the angular coefficient, or both. As the dummy variable represents different periods in time, we have a differential intercept and a differential angular coefficient in this type of regression.

Time series stationarity from 1999 to 2017 was tested using the unit root test for panel data to instrumentalize the models' estimation. The Fisher-type unit root test was chosen because it can be applied to balanced and unbalanced panels. Next, the Durbin-Wu-Hausman estimator consistency test was applied to verify the existence of endogeneity between the dependent and explanatory variables (Janot, Vandanjon & Gautier, 2016).

Finally, in addition to the logarithmization of the dependent and monetary variables, the data relating to the other variables in the model were Winsorized to obtain an even more robust data set.

5. Results and discussions

5.1 Tax Incentive Policies and Public Finances of Brazilian Municipalities According to Economic Sector

Given the dependent and explanatory variables' stationarity and non-endogeneity, Table 2 presents the results of the effects of tax incentives applied simultaneously on IPI, ICMS export, and PIS/Cofins on the balance of municipal finances. Note that models 1, 2, and 3 are estimated to ensure the consistency and robustness of the estimates. Model 4 presents the results related to the variable of interest.

Thus, the first results concerning the explanatory variable indicate that the tax exemptions, when applied simultaneously to IPI, ICMS export, and PIS/Cofins, negatively affected the balance of municipal public finances through the industrial and agricultural sectors between 2009 and 2013. Regarding the service sector, the results showed that the effects of tax exemptions on the balance of municipal finances tend to be positive. Note that this estimate is obtained by summing the coefficients of the variables GVA and taxexemxGVA, as the taxexemxGVA variable resulted from the product of the dummy concerning tax exemptions by the GVA.

In general, the inferential result regarding the variable of interest violates the premises of the Economic Theory of Fiscal Decentralization, which, according to Musgrave (1959), gives the central government the condition to interfere in the economy to promote macroeconomic stability. The reason is that tax incentives implemented simultaneously on IPI, ICMS export, and PIS/Cofins may interfere with this entity's allocative condition and provide goods and services to its population by causing adverse effects on the balance of municipal finances. According to Bevilacqua, Buissa, and Morais (2017), these results reinforce the need to cautiously analyze and plan the use of tax incentives, which, despite being legal instruments, may compromise the fiscal balance of federated entities.

Table 2

Effects of tax incentives on IPI, ICMS export, and PIS/Cofins on the balance of public finances of Brazilian municipalities by economic sector

Variables	Model 1	Model 2	Model 3	Model 4
		Industrial Sector		
lnGVAind	- 0,0257*	- 0,0252*	- 0,0091*	- 0,0053*
taxexemxGVAind	0,00000132*	0,00000133*	0,00000107*	0,00000044*
Party		0,0623*	0,0223*	0,0283*
Emp ind			0,0032*	0,0015**
IFGF			0,2712*	0,1296*
T1				0,0211*
T2				0,0532*
T3				0,0917*
T4				0,0789*
T5				-0,1872*
No. of observations	95.211	95.211	57.318	57.318
F test	0,0000*	0,0148*	0,0000*	0,0000*
		Agricultural Sector		
lnGVAagro	- 0,0475*	- 0,0464*	- 0,0155*	- 0,0073*
taxexemxGVAagro	0,00000161*	0,00000165*	0,00000143*	-0,00000073*
Party		0,0615*	0,0226*	0,0282*
Emp agro			0,0022*	0,0016**
IFGF			0,2720*	0,1294*
T1				0,0253*
T2				0,0584*
T3				0,0973*
T4				0,0836*
T5				-0,1842*
No. of observations	95.155	95.155	57.293	57.293
F test	0,0000*	0,0000*	0,0000*	0,0000*
		Service Sector		
lnGVAserv	- 0,0092*	- 0,0081*	0,0196*	0,0557*
taxexemxGVAserv	0,00000146*	0,00000148*	0,00000193*	-0,00000057*
Party		0,0628*	0,0230*	0,0300*
Emp serv			0,0016**	0,0008***
IFGF			0,2631*	0,1097*
T1				0,0142*
T2				0,0627*
T3				0,1166*
T4				0,0988*
T5				-0,1739*
No. of observations	95.227	95.227	57.333	57.333
F test	0,0000*	0,0000*	0,0000*	0,0000*

* Significant at 5%; ** Significant at 10%; *** Non-significant. Tests: Durbin-Wu-Hausman was not significant. Standard errors were obtained considering fixed effects.

Source: Study's results.

Regarding the results obtained for the variable of interest, Matias Pereira (2017) considers that this happens because the application of mistaken fiscal policies adopted by the government after 2010, including tax incentives, contributed to the destructuring of public finances. Ribeiro (2019) and Bastos, Rodrigues, and Lara (2015) consider that one of the reasons for the adverse effects of tax incentives on public finances, especially after 2006, is that tax exemptions negatively impact the public budget. Lima and Machado (2018) also argue that tax exemptions do not enhance the value added by companies, which negatively impacts revenues and public finances.

These results reinforce this study's hypothesis that tax incentive policies depend on each other when applied simultaneously to several taxes. Additionally, they might negatively impact municipal public finances depending on the economic sector. This is consistent with the empirical findings of Ferreira Bruno, Moraes, and Oliveira (2021), Rocha, Tatsch, and Cário (2019), and Silva, Menezes Filho, and Komatsu (2016), which indicate the relevant growth of the services sector for the Brazilian economy perceived mainly in the number of total jobs generated in its various segments, in comparison with the industrial sector.

Note that the empirical studies by Vieira, Oliveira, and Ávila (2021), Barbosa *et al.* (2020), Oliveira, Pinto, and Rita (2017), and Lukic (2015) indicate that IPI exemptions were favorable for the balance of municipal public finances. This probably did not occur when multiple tax incentive policies were implemented simultaneously. By analyzing a single policy separately, these studies may have neglected that their effects on the balance of public finances depend on each other.

Furthermore, not considering that, during a period, IPI exemptions occurred simultaneously with exemptions on ICMS exports may bias the results. As Braatz and Rocha (2021), Silva and Gonçalves (2019), Cavalcante and Zanocchi (2020), and Davis and Biondini (2018) highlight, among all the tax exemptions, those on ICMS exports via the Kandir Law, were those with most significant adverse effect on the balance of municipal finances.

Therefore, a more comprehensive analysis of tax incentives implemented simultaneously on IPI, ICMS exports, and PIS/Cofins on the balance of municipal public finances, presented by the variable of interest, enables more consistent and robust results. The theory of fiscal decentralization corroborates this study's second hypothesis that the effects of multiple and dependent tax incentive policies on the fiscal balance of public finances of Brazilian municipalities vary depending on the recipient economic sector.

Additionally, a model was estimated using the Primary Budget Result (PBR) as a proxy to measure fiscal balance – the difference between primary revenues and expenditures – fiscal indicators traditionally published by public entities to further strengthen the analysis of the effects of tax incentives on municipal public finances. The estimated coefficients presented in Table 3 show that, in general, the results were similar to those found for the dependent variable FBQ, i.e., the variable of interest used to infer the effects of tax incentive policies, when applied simultaneously, harms municipal finances through the industrial and agricultural sectors. Again, the estimates are obtained by summing the estimated coefficients for lnGVA and taxexemxGVA.

Table 3

Effects of tax incentives on IPI, ICMS export, and PIS/Cofins on the primary budget result of Brazilian municipalities according to economic sector

Variables	Estimated coefficients
Industrial Sector	
lnGVAind	- 25,1672*
taxexemxGVAind	0,0145*
No. of observations	57.318
F test	0,0000*
Agricultural Sector	
lnGVAind	- 73,9890*
taxexemxGVAind	0,0045*
No. of observations	57.318
F test	0,0000*
Services Sector	
lnGVAind	- 15,7912**
taxexemxGVAind	0,0113*
No. of observations	57.318
F test	0,0000*

* Significant at 5%; ** Non-significant; Tests: Durbin-Wu-Hausman was not significant. OLS Estimators. Standard errors were obtained considering fixed effects.

Source: Study's results.

Regarding the control variables, the Party variable positively affected the municipalities' balance of public finances. The findings corroborate the results by Ansolabehere, and Snyder Jr. (2006) for the United States, Khemani (2007) for India, Solé-Ollé and Sorribas-Navarro (2008) for Spain, Gonschorek, Schulze, and Sjahrir (2018) for Indonesia, and Sakurai and Theodoro (2020) for Brazil indicate that one of the reasons for the positive effect of party alignment between the mayor and the President of the Republic on municipal public finances is the excessive volume of extra resources through voluntary transfers, which also indicates that the non-alternation of power in the period contributed to the municipalities' fiscal balance.

Estimates regarding the number of new employment contracts for the industrial and agricultural sectors positively affected the balance of municipal public finances. These results indicate that economic development, represented by the variable Employment, positively affected municipal finances. Füchter, Aparecida, and Vargas (2017) highlight that the number of employment contracts in the industry increases during periods of tax incentives, which indicates economic development, with positive effects on municipal finances.

The results concerning the IFGF indicated a positive effect on the balance of municipal finances. Căpraru, Georgescu, and Sprincean (2022) and Cruz and Afonso (2018) explain that adequate fiscal management is expected to have a positive effect on public finances, as it is related to planning, transparency, and control, elements that benefit the budget balance.

Regarding temporal variables, estimates indicate that, between 2009 and 2012, other factors not included in the model positively influenced municipal finances. Behera and Dash (2018), Casquete-Baidal and León-Cedeño and Delgado-Solís (2020), and Misra (2018) highlight that these factors include the behavior of stock markets, exchange rates, inflation, the price of a barrel of oil, money supply, trade balance, and price fluctuations, among others.

5.2 Effects of Tax Incentive Policies on Public Finances of Brazilian Municipalities According to Region

Table 4 presents the results of the estimates of the effects of tax incentive policies implemented simultaneously on IPI, ICMS export, and PIS/Cofins on the balance of public finances of Brazilian municipalities according to the estimated coefficients of the variable of interest according to region.

Adverse effects were found in the South's economic sectors and the Mid-West industrial and agricultural sectors. The results were generally positive for the Northeast, North, and Southeast.

The South's figures suggest that the federal government's tax incentive policies, which were implemented simultaneously and depended on each other, did not contribute to the balance of the municipalities' public finances. These estimates indicate that the federal government's use of tax incentive policies to promote economic stability did not favor the municipal finances in any economic activities in this region, whether concerning consumption or the maintenance of employment and income. Silva and Gonçalves (2019) and Bozzetto (2017) argue that this occurred due to the Union's failure to compensate for tax waivers, mainly in Paraná and Rio Grande do Sul.

Table 4

Effects of the tax incentives on IPI, ICMS export, and PIS/Cofins on the balance of public finances of Brazilian municipalities according to region

Variables	Mid-west	Northeast	North	Southeast	South
			Industry Sector		
lnGVAind	-0,0286*	-0,0018***	0.0139*	-0.0027***	-0.0356*
taxexemxGVAind	0,00000091**	0,00000165*	0.00000148*	0.00000010*	0.00000132**
Party	0,0688*	-0,0214*	0.0494*	0.0140*	0.0496*
Emp ind	0,0158*	0,0018*	-0.0011***	0.0064*	0.0017***
IFGF	0,2542*	0,1819*	0.2326*	0.3346*	0.3250*
			Services Sector		
lnGVAserv	-0,0073***	0,0265*	0.0431*	0.0299*	-0.0355*
taxexemxGVAserv	0,00000357*	0,00000268*	0.00000184*	0.00000160*	0.00000152*
Party	0,0673*	-0,0192*	-0.0510*	-0.0144*	0.0487*
Emp serv	-0,0005***	-0,0004***	-0.0005***	-0.0038**	0.0096*
IFGF	0,2517*	0,1729*	0.2247*	0.3266*	0.3172*
			Agriculture Sector		
lnGVAagro	-0,0695*	0,0257*	-0.0371*	-0.0043***	-0.1071*
taxexemxGVAagro	0,00000172*	0,00000222*	0.00000206**	0.00000249*	0.00000115*
Party	0,0648*	-0,0220*	-0.0516*	0.0138*	0.0501*
Emp agro	-0,0114***	0,0021**	-0.0036**	0.0036***	0.0011***
IFGF	0,2521*	0,1823*	0.2299*	0.3375*	0.3275*
nº de obs	4.877	16.805	3.901	18.123	13.587
Teste F	0,0000*	0,0000*	0.0000*	0.0000*	0.0000*

* Significant at 5%; ** Significant at 10%. *** Non-significant. Tests: *Durbin-Wu-Hausman* was not significant. OLS Estimators. Standard errors were obtained considering fixed effects.

Source: Study's results.

The negative results for the South and Mid-West suggest that regional elements are sensitive to this type of fiscal policy, suggesting that there are more complex issues, such as vulnerabilities, that the central government must assess when adopting tax incentives to promote economic stability. Perez *et al.* (2020) and Wanzinack and Signorelli (2014)criado com vistas à identificação de vulnerabilidades e minimização de problemas de seu entorno, contribuindo com o Desenvolvimento Regional. Com a recente política nacional de expansão do Ensino Superior Federal, foi viabilizada a criação do campus Litoral da Universidade Federal do Paraná (UFPR Litoral argue that these vulnerabilities may result from population growth mismatching economic growth, an unfavorable social context, poor health and education indicators, environmental fragilities, or territorial occupation without preserving the ecosystem.

Still, regarding the variable of interest, the positive results found for the Southeast in the services sector suggest that losses in industrial revenue might have been offset by other economic activities, considering the region's solid economic capacity. According to Teles (2016), this is due to the region's solid economic profile, with the largest GDP in the country.

However, when the variable of interest includes exemptions on several taxes – IPI, ICMS export, PIS/COFINS –applied simultaneously, the positive results for some regions and negative results for others may also indicate that, depending on the predominant economic sector, there may have been a compensatory movement in some regions; for example, through consumption, thus causing a positive effect on municipal public finances. Thus, according to the Economic Theory of Fiscal Decentralization, the results confirm this study's first hypothesis that the effects of multiple and dependent tax incentive policies on the fiscal balance of public finances of Brazilian municipalities vary, depending on the geographic region.

Regarding the control variables, the estimates for the Party variable were positive for municipal finances in all regions. These figures possibly reflect the importance of political relations between the mayor and the President of the Republic for municipal finances in all regions. Regarding employment contracts, the results indicate that the positive effect on the balance of municipal public finances is most prominent in the industrial sector, with emphasis on the Mid-West, Northeast, and Southeast.

Finally, the IFGF was positive for all economic sectors, regardless of the region. However, the empirical results of Miranda *et al.* (2018) state that, although the North and Southeast have the highest IFGF, the positive effects of sound fiscal management are more significant in the South and Southeast.

6. Final Considerations

The results suggest that tax exemption policies have not contributed to the balance of finances of Brazilian municipalities, encouraging a discussion about the recurrent use of tax incentive policies to promote economic stability. This is because different Brazilian governments seem to adopt populist measures to obtain approval and remain in power. Evidence that tax incentives have not contributed to the municipalities' fiscal balance suggests that these measures are often merely used for political purposes. In such a context, the central government should interrupt this vicious cycle of expansionist economic policies and adopt more responsible fiscal policies to promote economic stability and prevent harming the balance of public finances.

As for the implications of such results, tax incentives violate the theoretical premises of fiscal decentralization – greater efficiency in the provision of goods and services, optimization of the population's well-being, the possibility of a greater supply of public goods and services suited to regional preferences – which favors a decentralized system rather than a centralized one. There are two reasons: First, incentives might interfere with transfers and make it even more difficult for municipalities, which mainly depend on these resources to provide goods and services, thus affecting their allocative capacity. Second, there is no requirement for municipalities to provide any type of counterpart for these transfers.

The implications for public policymakers, who usually propose these fiscal policies from a top-down perspective, considering their economic effects from a macro-level perspective only, are that these results suggest that policymakers are unaware of municipalities' susceptibility to political and fiscal maneuvers at the government's higher levels.

Therefore, policymakers should establish mechanisms – besides those already provided by law, such as population proportionality – to link these resource transfers to municipalities' counterparts. In this context, some measures could be implemented: First, the creation, at the municipal level, of a standardized and detailed information system that enables the central government to monitor the provision of goods and services by municipalities to their populations. Second, an indexer should be created to refer to the allocation of goods and services provided by these municipalities to their populations and conditions for the receipt of transfers of resources from the central government to a quantitative measure established by this indexer. For example, these measures could help partially reduce the influence of political issues, such as party collusion and electoral corrals, for municipalities to obtain resources. Additionally, this indexer could function as a quantitative control of municipal allocative efficiency.

Another aspect concerns the application of tax exemption policies related to Brazil's regional disparities. These exemptions might further aggravate the existing social differences between Brazilian regions by favoring sectors that are in more developed regions, which makes it difficult for municipalities to provide services to their population, considering that this study's results indicate that exemptions did not contribute to the balance of municipal finances in two Brazilian regions.

The fact that the geographic analysis is restricted to regions, i.e., the states of the Federation were not analyzed separately, constitutes a limitation. Such an analysis would allow for identifying more specific regional characteristics of municipal finances. Given the results and limitations presented, future studies are suggested to analyze municipal spending on basic education and primary health care and identify clusters according to the hierarchical allocation capacity of these municipalities.

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