Influence of the municipal participation fund and fiscal responsibility on the level of socioeconomic development of Brazilian municipalities

Influência do fundo de participação dos municípios e da responsabilidade fiscal no nível de desenvolvimento socioeconômico dos municípios brasileiros

Influencia del fondo de participación municipal y la responsabilidad fiscal en el nivel de desarrollo socioeconómico de los municipios brasileños

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Abstract
The aim of this study was to analyze the influence of the Municipal Participation Fund (FPM) and fiscal responsibility on the level of socioeconomic development of Brazilian municipalities. 5,541 municipalities were analyzed during the period from 2006 to 2016. The data were processed using exploratory analysis and the regression model for panel data with random effects. The results of the study indicated a significant and positive relationship between FPM and socioeconomic development. However, the effects of responsible fiscal management on development have not been observed. These results partially corroborate the hypothesis defended by this study, demonstrating that the socioeconomic development of Brazilian municipalities was positively affected by the FPM. Thus, there is empirical evidence that this intergovernmental transfer (FPM) fulfilled its role, that is, it was an important instrument to mitigate the socioeconomic inequalities that exist in Brazilian municipalities.
Keywords: Municipality Participation Fund; Fiscal Responsibility; Socioeconomic Development; Brazilian Municipalities

Resumo
O objetivo do estudo foi identificar quais os efeitos do Fundo de Participação dos Municípios (FPM) e da responsabilidade fiscal no nível de desenvolvimento socioeconômico dos municípios brasileiros. Foram analisados 5.541 municípios durante o período de 2006 a 2016. O tratamento dos dados ocorreu por meio da análise exploratória e do modelo de regressão para dados em painel com efeitos aleatórios. Os resultados do estudo indicaram relação significativa e positiva entre o FPM e o desenvolvimento socioeconômico. Todavia, não foram observados efeitos da gestão fiscal responsável sobre o desenvolvimento. Esses resultados corroboram, parcialmente, a hipótese defendida por este estudo, demonstrando que o desenvolvimento socioeconômico dos municípios brasileiros foi afetado positivamente pelo FPM. Assim, há evidências empíricas de que essa transferência intergovernamental (FPM) cumpriu o seu papel, e foi um importante instrumento para atenuar as desigualdades socioeconômicas existentes nos municípios brasileiros.
Palavras-chave: Fundo de Participação de Municípios; Responsabilidade Fiscal; Desenvolvimento Socioeconômico; Municípios Brasileiros

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Resumen

El objetivo de este estudio fue analizar la influencia del Fondo de Participación Municipal (FPM) y la responsabilidad fiscal en el nivel de desarrollo socioeconómico de los municipios brasileños. Se analizaron 5.541 municipios durante el período de 2006 a 2016. Los datos se procesaron mediante análisis exploratorio y el modelo de regresión para datos de panel con efectos aleatorios. Los resultados del estudio indicaron una relación significativa y positiva entre la FPM y el desarrollo socioeconómico. Sin embargo, no se han observado los efectos de una gestión fiscal responsable en el desarrollo. Estos resultados corroboran parcialmente la hipótesis defendida por este estudio, demostrando que el desarrollo socioeconómico de los municipios brasileños fue afectado positivamente por el FPM. Así, existe evidencia empírica de que esta transferencia intergubernamental (MPF) cumplió su rol, es decir, fue un importante instrumento para mitigar las desigualdades socioeconómicas que existen en los municipios brasileños.

Palabras clave: Fondo de Participación Municipal; Responsabilidad fiscal; Desarrollo socioeconómico; Municipios brasileños

1 Introduction

In Brazil, due to its wide territorial extension, a scenario of socioeconomic inequalities prevails, which manifests itself mainly at the municipal level. In this scenario, the federative pact, which provides for cooperation between federated entities, has become an important instrument to alleviate socioeconomic inequalities and the worsening of federative imbalances, through the distribution of fiscal resources from higher levels of government to subnational units.

In this construction, the distribution of fiscal resources took place through tax distribution funds, with the Municipal Participation Fund (FPM) being the main constitutional transfer of a redistributive nature from the Union to municipal governments (Ribeiro, 2016). The FPM is defined as an intergovernmental transfer, with a decentralizing nature, being distributed in a differentiated manner between federal states and municipalities based on the criterion of population composition (Ravelo & Bender, 2019).

However, the distribution of financial resources at the local level was not accompanied in an equitable manner by the decentralization of public services, which largely led to the intensification of federative imbalances, due to the growth of municipal responsibilities. Thus, the main challenge of fiscal federalism has been to face the expansion of regional disparities, which originated from the concentration of tax bases in specific points of the territory (Rezende, 2006; Galvarro, Braga & Fontes, 2008). This occurs because between municipal and higher-level governments there is an accounting mismatch between the collection of public resources and the need to provide public goods and services, thus creating a "vertical gap" (Prado, 2007).

The funds created to reduce regional inequalities and facilitate cooperation between federated entities, such as the Municipal Participation Fund (FPM), present difficulties in meeting their objective, which encourages discussion on the essence of fiscal federalism and its efficiency. This discussion becomes urgent in the current context, as the demands for public services, both in their quantitative and qualitative aspects are growing. Furthermore, the absence of the state's capacity to satisfactorily meet such demands, in addition to public policies of social interest, allow questions regarding the role of the State as an inducer of economic and social development.

However, the analysis of the federative pact and its instruments for allocating resources and the effects on socioeconomic development must be studied in combination with public management mechanisms for a better understanding. According to Marinho, Soares, and Benegas (2004), the institutional mechanisms outlined by public management aim to optimize the use of resources and promote allocation in priority areas. The authors also emphasize that the ability to provide well-being to a society must consider efficiency, which would be determined by technical and institutional factors.

According to Maciel, Piza and Penoff (2010), efficiency is placed, together with other aspects, as fundamental for the development of certain regions. The authors also argue that the analysis of efficiency in generating socioeconomic development takes into account that Brazilian federative entities, through the use of their revenues and tax transfers, seek to provide public goods to generate greater social well-being and socioeconomic development.

At the municipal level, Veloso (2008) argues that studies on government transfers have shown that they can affect the fiscal behavior of governments, revealing the flypaper effect, in which subnational government spending responds more to increases in transfers than in their own collections. Therefore, literature has analyzed the fiscal effort of subnational entities, seeking to explain the levels of dependence on resources at the expense of the fiscal effort of their own collection (Massardi & Abranches, 2015; Ravelo & Bender, 2019).

The collection capacity translated into the volume of financial resources is one of the factors that can influence the municipal socioeconomic development. As explained by Vieira, Abrantes, Almeida and Anjos (2017), transfers to small municipalities generate a greater capacity to convert these resources into public services that make it possible to increase the region's socioeconomic development. Additionally, evaluating

the management of these financial resources in meeting the population's priority demands can be a determining factor for socioeconomic development.

In this context, an important institutional management mechanism is the fiscal rules. In Brazil, they are materialized by Complementary Law nº 101/2000 (Fiscal Responsibility Law [LRF]). The referred legislation instituted rules that seek to discipline the pillars of public management, aiming to guide the planning of government actions, balance of public accounts, transparency, and control of public resources, establishing parameters and limits for responsible fiscal management.

According to Sousa, Lima, Nascimento and Peter (2013), at the municipal level, the LRF perspective is even more relevant, due to the scarcity of investment resources and the growing demand for social services. Still, these authors argue that the LRF, by intensifying the control and accountability of municipal managers, through public accounts, fosters development. This occurs because with limitation of the use of public resources, they must be strategically directed towards the society's quality of life.

From this perspective of efficiency in the application of public spending, based on the Fiscal Responsibility Law, the topic was studied in works of Souza et al. (2013), Leite Filho and Fialho (2015), Louzano, Abrantes, Ferreira and Zuccolotto (2019), and Silva and Crisóstomo (2019). In turn, studies by Vieira et al. (2017), Mendes, Ferreira, Abrantes and Faria (2018), and Vieira, Abrantes, Almeida and Anjos (2019) investigated intergovernmental transfers.

It can be seen that most of the studies mentioned in the previous paragraph address the analysis of effects of intergovernmental transfers, not individualizing the Municipal Participation Fund, an important source of municipal revenue. Furthermore, part of these studies sought to investigate the effects of the Fiscal Responsibility Law on socioeconomic development.

Despite the existence of these works, research that encompass a joint analysis of the Municipal Participation Fund and responsible fiscal management are still incipient. This is because resources made available through resource sharing to municipalities are an important mechanism for reducing social inequalities, while, together with responsible management of public accounts, they enhance the results desired by the public sector. Thus, the following research question was elaborated: **What is the influence of the Municipal Participation Fund and fiscal responsibility on the level of socioeconomic development of Brazilian municipalities?**

In order to answer this research question, this study aims to identify effects of the Municipal Participation Fund and fiscal responsibility on the socioeconomic development of Brazilian municipalities. For this, an exploratory analysis technique and regression model for panel data with random effects was used.

This study is justified, primarily, from the perspective of the state of the art, as it intends to fill the gap in knowledge mentioned at the beginning of the previous paragraph, that is, to investigate effects of the combined action of two institutional mechanisms that reflect the effects of redistribution role of Brazilian fiscal federalism and efficiency in the application of public resources on the socioeconomic development of municipalities. It is expected, in this way, to contribute to the analysis of a country that presents a scenario of great economic and social disparities among its local entities. Furthermore, it is expected to foster academic and conceptual discussions on issues related to accounting applied to the public sector, especially regarding providing possible explanations about factors that affect the socioeconomic development of municipalities. This branch of accounting, together with aspects related to public finances, are important mechanisms to provide information for managers, control bodies, government institutions and citizens in general, which can lead to the development of more critical and conscientious individuals, and more assertive decision-making.

This study is also justified by the fact that understanding this topic is relevant to the formulation and implementation of public policies aimed at reducing local inequalities, both in the indication of improvements in the form of income distribution among federal entities, as to signal results of the Fiscal Responsibility Law in the management of resources made available to the municipality. Among possible actors interested in the findings of this work, we can mention the public administration itself, because by bringing evidence of variables that affect economic development, it can guide, as already mentioned, the formulation and implementation of public policies; in addition to citizens in general, who need information about public management to exercise social control. It is the information that allows society to inspect, monitor, and control the actions of public administration, enabling the strengthening of citizenship. By investigating whether the Municipal Participation Fund fulfills its role of mitigating socioeconomic inequalities existing in Brazil and whether, almost 20 years after the implementation of the LRF, Brazilian municipalities really comply with the guidelines contained in that legislation, it is possible to provide valuable information so that society fulfills its role of exercising social control.

Regarding the results, it was expected that the Municipal Participation Fund and fiscal responsibility (LRF) would positively influence the socioeconomic development of Brazilian municipalities. The study findings actually indicated a significant and positive relationship between the Municipal Participation Fund (FPM) and socioeconomic development. However, the effects of responsible fiscal management on development were not observed, perhaps due to the low level of fiscal responsibility achieved by the entities analyzed between 2006 and 2016. That is, in an attempt to jointly analyze effects of the Municipal Participation Fund and responsible fiscal management in the socioeconomic development of municipalities, it

was observed, in the analyzed sample, that only the Municipal Participation Fund was positively associated with development.

2 Literature Review

2.1 Municipal Participation Fund (FPM)

The Municipal Participation Fund (FPM) is considered one of the main constitutional transfers to local entities. According to Mendes, Miranda and Cosio (2008), the FPM is a redistributive transfer, paid by the Union to all municipalities in the country, being used unconditionally, mandatorily, and without consideration. According to the aforementioned authors, the FPM is a mechanism rooted in the country's federative tradition and its origin dates back to the 1946 Constitution, although the name Municipal Participation Fund was established by the 1967 Constitution.

Gasparini and Miranda (2006) detail that the FPM was effectively created in 1965 through Constitutional Amendment nº 18, of 12/01/1965. In this provision, it was determined that 20% of proceeds from the collection of Income Tax and Income of Any Nature (IR) and the Tax on Industrialized Products (IPI) were directed to the Participation Fund of States and Federal District (FPE) (10%) and the Municipal Participation Fund (FPM) (10%). Also as explained by Gasparini and Miranda (2006), Law nº 5,172/1966 regulated these funds and defined that the FPM distribution criterion would be given so that each unit would receive an individual participation coefficient, according to population groups, which would be readjusted through demographic census. Such provisions were absorbed by the 1967 Federal Constitution (Gasparini & Miranda, 2006). The percentage initially foreseen for the Municipal Participation Fund (FPM) underwent changes after the enactment of numerous provisions, culminating in the final amount determined by the 1988 Constitution (22.5%), which is still in force today.

The FPM composition, therefore, is 22.5% of the Income Tax (IR) and Tax on Industrialized Products (IPI) collection, and its distribution to the municipalities is conducted according to the number of inhabitants, being that population ranges are fixed, and an individual coefficient is established for each range, as determined in Law nº 5,172/96 (Veloso, 2008). Based on this information, it is noted that the Municipal Participation Fund has as its primary objective to promote socioeconomic balance among the country's municipalities. In other words, it is a way of redistributing resources to entities that do not have a collection base capable of offering an adequate level of public goods and services.

As already mentioned, the FPM is classified in the literature as unconditional redistributive transfers. Baião, Cunha and Souza (2017) emphasize that unconditional transfers are distributed according to formulas that include demographic and socioeconomic indicators, with the objective of minimizing horizontal and vertical gaps between federal entities. Its main characteristic is that, as they are unconditional, they do not have any restrictions on the decision for the local government to apply them.

For Veloso (2008), the transfer system is one of the ways to make the public sector better designed, harmonizing public actions with the resources needed to meet them, promoting the coordination of national policies and fiscal balance.

On the other hand, Moraes (2006) considers that the extensive use of intergovernmental transfers created an institutional framework that excessively privileges small municipalities. According to the aforementioned author, these entities do not make an effort to collect the taxes that are within their competence, evidencing the existing trade-off between the financial dependence of municipalities in relation to the superior entity and the effect of financial accommodation, which propitiates a low performance and fiscal effort.

In addition to this aspect, there is also the flypaper effect concept which, according to Varela, Martins and Fávero (2010), indicates that the receipt of unconditional and unrequited tax transfers, as in the case of the Municipal Participation Fund (FPM), results in an increase in local public expenditure proportionately greater than an equivalent increase in personal income. That is, although theoretically there is equivalence between transfers to governments and residents, so that the impact of transfers or personal income on public expenditure should be the same, empirically, this result has not been observed (Varela, Martins & Fávero, 2010).

One of the explanations for the flypaper effect, also according to Varela, Martins and Fávero (2010), is observed in the models of fiscal illusion, in which there is a tendency for the public manager to increase budget spending when it has a broad informational advantage, that is, the voter does not realize the volume of transfers received by the local government, allowing the governor to spend part of the resources in his own interest. This makes research related to the topic under analysis, including works that raise discussions on constitutional transfers, even more relevant, as they would increase the degree of information available to voters. Bardhan and Mookherjee (2005) also emphasize that the degree of information of voters is a direct function of their socioeconomic situation, a topic addressed in this work in the context of socioeconomic development in Brazilian municipalities.

In view of the scenario depicted, fiscal rules were established for federated entities. Enactment of the Fiscal Responsibility Law, in 2000, for example, aimed to guide public management regarding aspects

related to revenue collection, expenditure application, public debt limits, and parameters for fiscal management transparency of all entities, with a view to improving public management and achieving the desired social objectives as a consequence.

2.2 Fiscal Management in Brazil

Fiscal management, according to Cruz, Silva, and Santos (2009), is configured as the existing relationship between public revenue and expenditure. Responsible fiscal management, in turn, is associated with the concepts of planning, control, transparency, and responsibility (Cruz & Afonso, 2018). Regarding the first aspect, "the budget is the planning instrument that allows monitoring, controlling, and evaluating the management of public resources" (Cruz, 2015, p. 43); control is a means of making government accountable and politically responsible, according to the concept of accountability (Arantes et al., 2010), and transparency is one of the principles of public governance, so that initiatives that aim to improve transparency mechanisms in public management are treated as good governance practices (Cruz & Afonso, 2018). Similarly, in the understanding of Martins and Nascimento (2014), the fundamental principles of fiscal management can be outlined as follows: prevention of public deficits, fiscal prudence, security, planning and publicity or transparency.

Along the same lines, Von Hagen and Wolff (2006) explain that fiscal rules aim to impose limitations on excessive deficits and, consequently, restrict the behavior of governments, which makes it possible to generate greater stability and economic growth. As stated by Lima (2003), fiscal rules were structured along the following lines: primary results; debt limits; limit to personnel expenses; and restrictions on the creation of ongoing expenses of a continuing nature or the waiver of income.

Silva and Crisóstomo (2019) highlight that a higher standard of fiscal management tends to be related to better instruments of social control over public management and, thus, fiscal management is seen as a promoter of more efficient public management, which provides better socioeconomic development. Efficiency in the public sector, in turn, is related to the optimization of the application of resources, which enables expansion of the quality of services provided to the population (Šťastná & Gregor, 2011).

In Brazil, for a significant period, the relationship between public revenue and expenditure was unbalanced for a multitude of Public Administration bodies and entities (Cruz, Silva & Santos, 2009). The reforms that took place in the country, mainly from the 1990s onwards, after the political opening, brought within their scope debates around the balance of public accounts, culminating in the approval of Complementary Law nº 101/2000, also known as the Fiscal Responsibility Law – LRF (Cruz, Silva & Santos, 2009). Fiscal responsibility assessment initiatives in public entities, such as the LRF itself, have emphasized parameters related to compliance with legal targets and limits (Cruz & Afonso, 2018).

The Fiscal Responsibility Law constituted an important regulatory framework for the fiscal sanitation of public accounts. The law's objective was to discipline the management of public resources, attributing more responsibility to managers (Kraemer, 2003), disciplining the public finances of all federal entities.

The LRF established limits for the ratio of total personnel expenses to net current revenue. Additionally, it established rules to avoid the growing indebtedness of federated entities, stipulating limits for the net consolidated debt. The LRF also foresees that, from the extrapolation of legal limits, the federative unit starts to suffer sanctions, such as suspension in the handovers of voluntary transfers, impossibility of contracting credit operations, among others (Brasil, 2000).

The LRF determined the preparation of bimonthly reports (Summary Report of Budget Execution) and four-monthly (Fiscal Management Report) that would enable the monitoring of the main fiscal management indicators of federated entities (Brasil, 2000).

As stated by Leite (2011), it can be said that, in general, the LRF defined goals and limits for several indicators, including personnel expenses and indebtedness; determined corrective measures for cases of temporary non-compliance; and established sanctions for definitive non-compliance with these targets (Leite, 2011).

For Nunes (2002), the pillars of responsible fiscal management harmonize and consolidate the process objectives of this change in the fiscal regime undertaken in recent decades. However, Vargas (2006) considers that despite the institution of fiscal rules, they did not involve concerns with reformulations within the scope of Brazilian Fiscal Federalism, with redefinition of competences and duties, as well as remodeling of the transfer system. Thus, it is understood that the tax legislation, as it was conceived and especially considering the Fiscal Responsibility Law, cannot be considered an element that directly affects the Municipal Participation Fund (FPM), in view of the non-reformulation of this transfer after the aforementioned legislation. However, the rules established by the Liability Law constitute an important instrument to guide public management in the application of public resources, and the municipal resources received through the Municipal Participation Fund are an expressive source of municipal revenue that must be applied with efficiency, following the pillars of responsible fiscal management for the promotion of economic and social development.

It is noteworthy that what is intended in this work is the joint analysis of resource distribution instruments – in the specific case the FPM – and fiscal responsibility, and their effects on socioeconomic

development. That is, although both are considered to influence socioeconomic development, it is not intended to investigate tax legislation as an element that directly affects the Municipal Participation Fund, although it is an important instrument to guide public management in the application of public resources in general.

2.3 Socioeconomic Development and Tax Management Indicators

Several indices were developed to capture the results of public management and its effects on economic and social development (examples: Fiscal, Social and Management Responsibility Index created by the National Confederation of Municipalities; Human Development Index, advanced by the United Nations Program for Development; Firjan Index of Municipal Development and Firjan Index of Fiscal Management, created by the Federation of Industries of the State of Rio de Janeiro). In this way, the use of indicators in regular historical time series allows municipal and inter- or intraregional analyses and comparisons.

An important indicator of socioeconomic development is the Firjan Municipal Development Index (IFDM), prepared by the Federation of Industries of the State of Rio de Janeiro (Massardi & Abrantes, 2015). The IFDM includes areas related to Employment/Income, Education and Health, weighted in an equitable manner, using data from the Ministry of Labor and Employment (IFDM 2018, Base Year 2016, p. 9).

For the measurement of Employment and Income, data related to: generation of formal employment, rate of formalization of the labor market, income generation, real wages in the formal labor market and gini index of income inequality at formal work are used (IFDM 2018, Base Year 2016, p. 9). For the measurement of Education, the data used refer to: attendance to early childhood education, dropout in elementary school, age-grade distortion in elementary school, teachers with higher education in elementary school, average daily class hours in elementary school and result of the Basic Education Development Index (IDEB) in elementary education (IFDM 2018, Base Year 2016, p. 9). To measure health, the data used assess: proportion of adequate prenatal care, deaths from ill-defined causes, infant deaths from preventable causes, and primary care-sensitive hospitalization (ISAB) (IFDM 2018, Base Year 2016, p. 9).

The IFDM ranges between 0 (minimum) and 1 (maximum), classifying the location into four levels of development: low (from 0 to 0.4), regular (0.4 to 0.6), moderate (from 0.6 to 0.8) and high (0.8 to 1). The closer to 1, the greater the location development (FIRJAN, 2018).

In order to assess the results of fiscal management, the Firjan Index of Fiscal Management (IFGF) is used, also prepared by the Federation of Industries of the State of Rio de Janeiro, which aims to classify municipalities using the indicators of the Fiscal Responsibility Law. The IFGF is composed by the weighting of five indicators, such as: Own Income, Personnel Expenses, Liquidity, Investments and Cost of Debt, and seeks to evaluate management.

It should be noted that the indicators are weighted for composition of the global Firjan index, in the following proportions: Own Revenue (22.5%), Personnel Expenses (22.5%), Liquidity (22.5%), Investments (22.5%) and Cost of Debt (10%).

For interpretation of the IFGF, its variation between 0 and 1 is also evaluated, and the closer the score to 1, the better the fiscal situation of the municipality. Results above 0.8 points are classified in the category of Concept A (Excellence Management); results between 0.6 and 0.8 points are classified in Concept B (Good Management); results between 0.4 and 0.6 points are classified in Concept C (Management in Difficulty) and results below 0.4 points show Concept D (Critical Management) (IFGF, 2017).

2.4 Relationship between socioeconomic development, responsible fiscal management, and intergovernmental transfers in Brazil

In this topic, the results of recent empirical studies that analyzed the relationship between socioeconomic development, responsible fiscal management, and intergovernmental transfers in Brazil are presented. Regarding works that focused on fiscal management, the studies by Souza et al. (2013), Leite Filho and Fialho (2015), Louzano et al. (2019) and Silva and Crisóstomo (2019). In turn, the focus of the studies by Vieira et al. (2017), Mendes et al. (2018) and Vieira et al. (2019) were intergovernmental transfers.

Souza et al. (2012) analyzed the effect of fiscal responsibility on the socioeconomic development of Brazilian municipalities. The study was developed with data referring to 373 municipalities during the period of 2005 to 2009; the adopted methodology was the linear regression for panel data. Fiscal management was measured using the Fiscal Responsibility Index (IRF), developed by the National Confederation of Municipalities, while the IFDM was used as a proxy for development. Regarding the results, the authors observed a positive and meaningful relationship between municipal development and compliance with the Fiscal Responsibility Law.

Results similar to those of Souza et al. (2012) were found in the studies by Leite Filho and Fialho (2015) and by Silva and Crisóstomo (2019). Leite Filho and Fialho (2015) analyzed 5,555 Brazilian municipalities between 2006 and 2011. In turn, the sample analyzed by the work of Silva and Crisóstomo

(2019) was 184 municipalities from Ceará during 2007 to 2013. In both studies, the model of regression for panel data was used. Fiscal responsibility and socioeconomic development were measured using the IFGF and IFDM indicators, respectively, and a positive and meaningful relationship was found between these two indicators.

Nevertheless, Louzano et al. (2019) investigated the relationship between socioeconomic development and fiscal management in 4,317 Brazilian municipalities, during the period of 2006 to 2013. The authors found results that corroborate the studies mentioned above. However, the causal relationship between fiscal management and development was not confirmed by the Granger Causality test, indicating that efficient fiscal management does not always contribute to promoting local development.

Regarding the works that investigated the influence of intergovernmental transfers on development, there is the study by Vieira et al. (2017). The authors measured socioeconomic development using the IFDM and data processing was performed by estimating quantile regressions with panel data. Vieira et al. (2017) found evidence that the FPM positively influenced the development of municipalities from 2008 to 2012.

In their study, Mendes et al. (2018), separately considered the effect of state transfers and federal transfers on the human development of municipal federated entities, during the period of 2007 to 2013. The IFDM was used as a proxy for the development of municipalities and the logistic regression model for panel data was used for data processing. Overall, the authors found evidence that both transfers positively impacted municipal human development.

Finally, Vieira et al. (2019) analyzed the effect of the State Participation Fund (FPE) on the socioeconomic development of Brazilian states, from 2005 to 2012. To measure socioeconomic disparities, the authors used two variables: i) Gini index, proxy for intrastate inequalities; ii) Interstate Inequality Indicator (IDES), which was constructed by the authors to capture inter-regional disparities. The study results, estimated through a dynamic panel (Regression by the Generalized Moments Method - GMM), indicated that, over the years, the FPE has only contributed to reducing inequalities between states, not affecting the existing disparities within each state.

Based on findings of the empirical studies presented above, the following hypothesis was formulated: **Hypothesis:** The socioeconomic development of Brazilian municipalities is positively affected by the Municipal Participation Fund and by responsible fiscal management.

Furthermore, it is noteworthy that, in order to control other factors that can affect the socioeconomic development of federated entities, Leite Filho and Fialho (2015), Vieira et al. (2017), Mendes et al. (2018), Silva and Crisóstomo (2019) and Vieira et al. (2019) added control variables to the regression models and found significant results for the following variables: Gross Domestic Product (GDP) and political administrative region of the entity (North, Northeast, Midwest, Southeast, and South).

3 Methodological Procedures

3.1 Description of Sample and Data Sources

The universe of analysis in this study encompassed the 5,541 municipalities located in the five political administrative regions of Brazil (North, Northeast, Midwest, Southeast, and South). This universe of analysis corresponds to approximately 99% of the population (5,570 municipalities), The period covered is from 2006 to 2016. The universe and the period of analysis were chosen based on the availability of data for the variables used in this work, in particular, the variables FIRJAN Index of Municipal Development and FIRJAN Index of Fiscal Management.

Data sources used in this research were websites of the Federation of Industries of the State of Rio de Janeiro (FIRJAN), the National Treasury Secretariat (STN), and the Brazilian Institute of Geography and Statistics (IBGE). Through these websites, it was possible to conduct the collection of secondary data, which were later used in the construction of the variables described in the following topic. After collecting all data from these sources, the initial sample consisted of 59,144 observations. However, as 12,058 observations did not present data for all variables, the final sample analyzed by this study is an unbalanced panel composed of 47,086 observations. The sample distribution by federation units is presented in Table 1 below.

Table 1
Sample Distribution

Region	Federation Units	Number of Municipalites
North	Acre	22
	Amapá	16
	Amazonas	62
	Pará	141
	Rondônia	52
	Raraima	15
	Tocantins	139

Region	Federation Units	Number of Municipalites
Northeast	Alagoas	101
	Bahia	414
	Ceará	183
	Maranhão	216
	Paraíba	222
	Pernambuco	183
	Piauí	224
	Rio Grande do Norte	166
	Sergipe	75
Midwest	Goiás	246
	Mato Grosso	140
	Mato Grosso do Sul	78
Southeast	Espírito Santo	78
	Minas Gerais	852
	Rio de Janeiro	91
	São Paulo	643
South	Paraná	399
	Rio Grande do Sul	491
	Santa Catarina	292
Total Municipalities in the Sample		**5,541**

Source: Prepared by authors.

3.2 Description of Variables and Regression Model

In order to achieve the objective proposed in this study, secondary data were used to construct the variables, with the FIRJAN Municipal Development Index (IFDM) being the dependent variable of the regression model, while the Municipal Participation Fund and the Index FIRJAN of Fiscal Management correspond to the independent variables of interest. Furthermore, in order to obtain robust results, the variables that designate the Gross Domestic Product and the political administrative regions were included in the model as control variables. These variables were chosen based on the literature mentioned above, which showed meaningful results of the influence of these variables on socioeconomic development. Table 2 presents the description of such variables.

Table 2
Description of the variables used in this study

Variable	Description	Expected Relationship	Previous Studies
IFDM	***Dependent variable.*** FIRJAN Municipal Development Index. Designates the degree of socioeconomic development of the municipalities. Ranges from 0 (worst) to 1 (best). Source: FIRJAN *website*.	Not applicable	Souza et al. (2012); Leite Filho and Fialho (2015); Vieira (2017); Mendes *et al.* (2018); Louzano *et al.* (2019); Silva and Crisóstomo (2019).
IFGF	***Independent variable of interest.*** FIRJAN Fiscal Management Index. Designates the degree of fiscal management of municipalities. Ranges from 0 (worst) to 1 (best). Source: FIRJAN *website*.	Positive	Leite Filho and Fialho (2015); Louzano *et al.* (2019); Silva and Crisóstomo (2019).
FPM	***Independent variable of interest.*** Municipalities Participation Fund *per capita*. Designates the *per capita* amount transferred by the Union to municipalities through the FPM divided by the size of the municipality's population. Source: STN *website*.	Positive	Vieira et al. (2017).
GDP	***Independent control variable***. Municipal Gross Domestic Product *per capita*. Designates the gross added values of the agricultural, industrial, and services sectors divided by the size of the municipality's population. Source: IBGE *website*.	Positive	Leite Filho and Fialho (2015); Vieira et al. (2017); Mendes et al. (2018); Silva and Crisóstomo (2019).
REG_NO	***Independent control variable***. *Dummy* variable that designates the political administrative region to which the municipality belongs. 1: North region; 0: other regions. Source: IBGE *website*.	Negative	Vieira et al. (2019).

Variable	Description	Expected Relationship	Previous Studies
REG_ND	*Independent control variable*. *Dummy* variable that designates the political administrative region to which the municipality belongs. 1: Northeast region; 0: other regions. Source: IBGE *website*.	Negative	Vieira et al. (2019).
REG_CO	*Independent control variable*. *Dummy* variable that designates the political administrative region to which the municipality belongs. 1: Midwest region; 0: other regions. Source: IBGE *website*.	Negative	Vieira et al. (2019).

Source: Prepared by authors. Note: The FPM and the municipal GDP were deflated based on the Broad National Consumer Price Index (IPCA) of December 2016.

For data treatment, the statistical regression model for panel data was estimated. According to Gujarati and Porter (2011), the use of this methodology is necessary due to the characteristics of the sample analyzed in this study, the cross-sectional unit of which (municipality) is monitored over time (period of 2006 to 2016). In this sense, Fávero and Belfiore (2017) argue that the main advantage of regression models for panel data is the possibility of analyzing the variations of a given phenomenon among the individuals that make up the sample, as well as the temporal progress of each individual.

The equation that represents the regression model for panel data used in this study is presented below.

$$IFDM_{it} = \beta_0 + \beta_1 IFGF_{it} + \beta_2 FPM_{it} + \beta_3 PIB_{it} + \beta_4 REG\_NO_{it} + \beta_5 REG\_ND_{it} + \beta_6 REG\_CO_{it} + \varepsilon_{it}$$

Wherein:

$IFDM_{it}$: FIRJAN Municipal Development Index of municipality i during the t period;
$IFGF_{it}$: FIRJAN Fiscal Management Index of municipality i during the t period;
FPM: Municipality Participation Fund *per capita* for municipality i during the t period
PIB_{it}: Gross Domestic Product *per capita* for municipality i during the t period;
REG_NO_{it}: variable that I assumed 1: North region; 0: other regions;
REG_ND_{it}: variable that I assumed 1: Northeast region; 0: other regions;
REG_CO_{it}: variable that I assumed 1: Midwest region; 0: other regions;
ε_i: regression model residual error.

Gujarati and Porter (2011) clarify that the regression for panel data can be estimated through the following possibilities: MQO Model for stacked data (pooled); fixed effects model and random effects model. To choose the appropriate regression model for the data in this research, the literature (Gujarati & Porter, 2011; Fávero & Belfiore, 2017) indicates the use of the following statistical tests: Chow Test (Pooled vs. Fixed Effects), the Breusch-Pagan Test (Pooled vs. Random Effects), and the Hausman Test (Random Effects vs. Fixed Effects). Based on results of the referred tests, the chosen approach for panel data was the random effects model, results of tests that support the choice of this model are presented in the topic Analysis and Discussion of Results. Finally, for validation of the panel data model estimated by fixed effects, tests were performed to verify the existence of heteroscedasticity (Breusch-Pagan Test), autocorrelation (*Wooldridge* Test), and multicollinearity (*Variance Inflation Factor* - VIF), as recommended by Gujarati and Porter (2011) and Fávero and Belfiore (2017). The referred statistical procedures were performed using the Stata® software.

4 Analysis and Discussion of Results

In order to know the behavior of the variables considered in this study, Table 3 presents the exploratory analysis of the data, through measures of central tendency (median and mean) and dispersion (standard deviation, minimum, maximum, and coefficient of variation).

Table 3
Exploratory Analysis of Data referring to Brazilian municipalities during the period of 2006 and 2016

Variables	Median	Average	DP	Minimum	Maximum	CV
IFDM	0.6472	0.6357	0.1208	0.1866	0.9358	19%
IFGF	0.4993	0.4974	0.1412	0.0428	0.9931	28%
FPM	R$815.95	R$1,068.17	841.24	R$1.04	R$69,821.52	79%
PIB	R$14.14	R$19.14	21.49	R$2.46	R$1,030.18	112%

Source: Prepared by authors.
Note: DP: standard deviation; CV: coefficient of variation.

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Analysis of the level of development represented by the IFDM: high (greater than 0.8 points); moderate (between 0.6 and 0.8 points); regular (between 0.4 and 0.6 points); low (less than 0.4 point). Analysis of the type of fiscal management through the IFGF: excellent (greater than 0.8 points); good (between 0.6 and 0.8 points); in difficulty (between 0.4 and 0.6 points); critical (less than 0.4 point).

It can be seen from Table 3 that, between 2006 and 2016, Brazilian municipalities presented, on average, a moderate level of socioeconomic development, with low variability among the observations that make up the sample. It is worth noting that, despite the IFDM presenting discrepant minimum and maximum values, the variability of the data was less than 20%.

A similar result can be seen in the analysis of the fiscal responsibility indicator of Brazilian municipalities, in which the variation in data was less than 30%. However, the average value of the IFGF reveals that, from 2006 to 2016, the Brazilian municipalities in the sample were unable to adequately meet the assumptions established by the Fiscal Responsibility Law.

Nevertheless, the exploratory analysis of the FPM and GDP per capita showed high variability in the level of federal resources transferred to municipalities with the aim of reducing regional inequalities, as well as in the wealth produced by each municipal federated entity. The minimum and maximum values indicated that, in the analyzed period, there is an entity that received R$1.04 per capita from the Municipal Participation Fund, while another received R$69,821.52 per capita. The same situation is observed for the GDP; there is a municipality that produced only R$2.46 per person, as opposed to another in which the added wealth per capita was R$1,030.18.

Through exploratory data analysis, it was possible to analyze the behavior of the variables considered in this study, during the period of 2006 to 2016. This exploratory analysis revealed the existence of socioeconomic disparities between the sample municipalities, as well as the low level of fiscal responsibility of these municipalities.

However, to verify the influence of FPM and fiscal responsibility on the development, the regression model for panel data was estimated, the results of which are shown in Table 4.

Table 4
Results of the regression model for panel data with fixed effects and random effects estimated with data referring to Brazilian municipalities during the period between 2006 thru 2016

*ln*IFDM	E.F	E.A
*ln*FPM	0.1345***	0.0593***
*ln*IFGF	-0.0215***	-0.0143***
*ln*PIB	0.1572***	0.1772***
REG_NO	-	-0.1706***
REG_ND	-	-0.1113***
REG_CO	-	-0.0700***
Constant	-1.8169	-1.3077
Nº	5,541	5,541
Observations	47,086	47,086
Total R^2 adjusted	34.64	57.83
F Test/ Wald Test	1,083.25	10,180.31
Prob	0.0000	0.0000
Chow Test	Prob>F: 0.0000	
Breusch-Pagan	Prob>chibar2: 0.0000	
Hausman Test	Prob>chi2: 0.0000	
VIF Average	1.34	
Heteroscedasticity Test	Prob>chi2: 0.0000	
Autocorrelation Test	Prob>F: 0.0000	

Source: Prepared by authors.
Note:***significant at the 1% level; **significant at the 5% level.
In order to adjust the measurement units, the variables used in the model were transformed into natural logarithms, with the exception of the dummies that designate the political administrative region of the municipality.

To choose the appropriate regression model for the data in this research, the Chow Test (Pooled vs. Fixed Effects), Breusch-Pagan Test (Pooled vs. Random Effects), and Hausman Test (Random Effects vs. Fixed Effects) were performed. The results of these tests are shown at the end of Table 4. It can be verified in the referred Table that the Chow (Pooled vs. EF), Breusch-Pagan (Pooled vs. EA) and Hausman (EA vs EF) tests indicated suitability of the fixed effects model to the data of this research. However, due to the omission of results related to the dummies that designate the political administrative region of each municipality, it was decided to consider the random effects model.

The recommendation to use the panel data model with random effects, when the panel data model with fixed effects is not able to identify the coefficients of the dummy variables, is made by Gujarati and Porter (2011). Furthermore, it can be seen in Table 4 that the sign of estimated coefficients and significance of the explanatory variables are identical in the effects model and in the random-effects model.

Also, to validate the panel data model estimated by fixed effects, tests were performed to verify the existence of heteroscedasticity (Breusch-Pagan Test), autocorrelation (Wooldridge Test), and multicollinearity (Variance Inflation Factor – VIF) problems VIF). Results of the referred tests are shown at the end of Table 4, which demonstrate the presence of heteroscedasticity and serial autocorrelation. In order to correct this problem, it was decided to process the panel data regressions through clustered robust standard errors (Fávero & Belfiore, 2017). Furthermore, the global significance of the regression model is observed through the Wald Test, indicating its suitability to analyze the MPF influence and fiscal responsibility on socioeconomic development.

Analyzing results of the regression model for panel data with random effects, it appears that the variable representing the Municipal Participation Fund presented a positive and significant coefficient. This result indicates that, during the period of 2006 to 2016, federal transfers related to the MPF contributed to the reduction of socioeconomic disparities existing among Brazilian municipalities. A similar result was found by Vieira et al. (2017). Nevertheless, the referred authors, when using the quantile regression model and data from 2008 to 2012, observed that FPM resources positively affected the level of socioeconomic development of the municipalities only up to a certain level of development. Given that, for municipalities with higher socioeconomic development indices, the maintenance of social well-being and quality of life was not positively associated with the sharing of FPM resources. In this sense, the authors argue that "the sharing of FPM resources, by itself, can only be an accessory in the dynamics of promoting integrated regional socioeconomic development, but not the main instrument" (Vieira et al, 2017, p.01).

In turn, it can be seen from Table 4 that fiscal management had a negative relationship with the socioeconomic development of Brazilian municipalities, that is, the greater the fiscal management of the municipalities, the lower their development tended to be. This finding is in line with the studies by Souza et al. (2012), Leite Filho and Fialho (2015), Louzano et al. (2019), and Silva and Crisóstomo (2019), who observed a positive and significant relationship between social responsibility and socioeconomic development. It is considered that a possible explanation for this result is the low level of fiscal responsibility assessed by these federal entities between 2006 and 2016. As revealed by the exploratory analysis of the data, the municipalities in the sample had difficulty in meeting the guidelines of the Fiscal Responsibility Law, which may have compromised its effect on development. It should be noted that this inference is just an assumption, which needs further analysis in future research.

The hypothesis defended by this study was partially accepted. It was assumed, based on the literature consulted, that the socioeconomic development of Brazilian municipalities would be positively affected by the Municipal Participation Fund and by responsible fiscal management. Given that socioeconomic development had a negative relationship with fiscal responsibility, this hypothesis was only accepted in the analysis of the relationship between socioeconomic development and the MPF.

Finally, in order to capture the effects of other factors that may affect the development of Brazilian municipalities, the following control variables were included: PIB; REG_NO; REG_ND; and REG_CO. The first of them, the per capita wealth generated by the municipality, showed a positive and meaningful relationship with development, as expected in the literature (Leite Filho & Fialho, 2015; Vieira et al., 2017; Mendes et al., 2018; Silva & Crisóstomo, 2019).

The variables that designate the political administrative regions of Brazilian municipalities presented a negative and significant coefficient. This finding indicates that, in comparison with the cities of the South and Southeast regions, the federated entities of the North, Northeast, and Midwest regions had a lower level of socioeconomic development. Possibly, this result was due to the characteristics of those municipalities, which have high levels of socioeconomic inequalities (Vieira, 2017).

5 Final Considerations

This work aimed to identify effects of the Municipal Participation Fund and fiscal responsibility on the socioeconomic development of Brazilian municipalities. For such, 5,541 Brazilian municipalities were analyzed during the period of 2006 to 2016. Data treatment occurred through exploratory data analysis and the regression model for panel data with random effects and robust clustered standard errors.

The study results indicated a significant and positive relationship between the FPM and socioeconomic development. However, effects of responsible fiscal management on development were not observed. These results partially corroborate the hypothesis defended by this study, demonstrating that the socioeconomic development of Brazilian municipalities is positively affected by the Municipal Participation Fund.

It should be noted that, in addition to contributing to the literature, the results of this study contribute to public administration. By bringing evidence that socioeconomic development is positively affected by the FPM, it is evident that this intergovernmental transfer has fulfilled its role. Thus, the FPM has proved to be an important instrument to alleviate the socioeconomic inequalities existing in Brazil, a country that presents a scenario of great economic and social disparities among its local entities.

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Furthermore, the results of this study highlight that the fiscal management of Brazilian municipalities lacks attention of the public administration, as almost 20 years after the implementation of the LRF, Brazilian municipalities had difficulty in meeting the guidelines contained in the aforementioned legislation, which may have compromised its effect on the socioeconomic development of these local entities.

Given these results, the study fills the gap on the subject, encompassing a survey that addresses the FPM and responsible fiscal management jointly in the municipal economic context. Research already conducted has addressed the relationship between economic development and fiscal responsibility, or governmental transfers and economic and social aspects. This study advances the scientific knowledge addressing both aspects, FPM, and fiscal responsibility, on the socioeconomic development of Brazilian municipalities. Thus, it was found that the socioeconomic development of Brazilian municipalities was positively affected by the MPF and that such intergovernmental transfer proved to be a relevant mechanism to alleviate the existing socioeconomic inequalities in Brazilian municipalities.

Thus, the findings shown here can help public managers in the execution of policies aimed at better management of resources arising from government transfers, as well as creating efficient mechanisms for responsible fiscal management. Society, in general, can also make use of research, analyzing the results and, therefore, exercising social control.

As a limitation of this study, it is highlighted that the results apply only to the sample and to the period analyzed, and its generalization is not possible. Therefore, future research may investigate whether these results are observed in other samples or not.

Furthermore, another limitation of this study was the regression technique used to estimate the results. This technique did not allow the control of the recursive character of socioeconomic development. However, it is noteworthy that the regression model estimated through the GMM was not validated for the data in this research. Thus, future studies can adopt this methodological procedure in order to verify the convergence or divergence between the results.

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NOTES

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Data collection: Rodrigues, D. S. Andrade, F. O.
Data analysis: Rodrigues, D. S. Andrade, F. O.
Discussion of results: Rodrigues, D. S. Andrade, F.
Review and approval: Avelino, B.C. Barbosa Neto, J. E.

DATASET
The entire data set that supports the results of this study was published in the article itself.

CONSENT TO USE IMAGE
Does not apply.

APPROVAL OF THE RESEARCH ETHICS COMMITTEE
Does not apply.

CONFLICT OF INTERESTS
Does not apply.

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