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FISCAL AUTONOMY AND PUBLIC TRANSPARENCY: EMPIRICAL EVIDENCE FROM BRAZILIAN MUNICIPALITIES

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ABSTRACT

In Brazil, access to public information has been guaranteed by law since 2011 with the enactment of Law No. 12,527/2011. However, the literature indicates that the existence of a legal framework is not sufficient to ensure high levels of transparency, as this depends on institutional and fiscal conditions. In light of Fiscal Federalism Theory, this study aimed to investigate the relationship between fiscal autonomy and the level of public transparency in Brazilian municipalities. Using panel data, hypotheses were tested through multiple linear regression using the Ordinary Least Squares, Tobit, and Quantile Logit methods. The results indicate that fiscal autonomy is directly associated with the level of municipal transparency. This study contributes theoretically by employing a governmental index that encompasses both active and passive transparency, thereby expanding the analysis of public transparency in Brazil. In addition, the sample enables examination of Brazilian municipalities at the national level. From a practical standpoint, the findings may provide guidance for public policymakers, suggesting that policies aimed at increasing fiscal autonomy can have positive effects on the transparency of municipal administrations.

Keywords: Fiscal Federalism. Public Sector Accounting. Accountability. Transparent Brazil Scale. Public Management.

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1 INTRODUCTION

The process of administrative decentralization in Brazil was consolidated with the Federal Constitution of 1988, granting greater autonomy to municipalities and promoting the strengthening of local governance, under the expectation that this institutional arrangement would lead to improvements in the quality of public goods and services offered to the population (Firjan, 2019). Fiscal Federalism Theory argues that decentralization makes local governments better able to generate their own revenues and respond more efficiently to social demands. However, in the Brazilian reality, this premise is partially undermined due to the high dependence on intergovernmental transfers and the limited capacity for local revenue collection, factors that restrict the financial autonomy of municipalities and compromise the effectiveness of decentralized fiscal management. This scenario is evidenced by the performance of the Firjan Fiscal Management Index – Autonomy, which measures the relationship between revenues derived from the municipality's economic activity and the costs of financing its administrative structure, and which, in 2022, recorded the lowest average among the indicators of Brazilian municipalities (Firjan, 2023).

According to Tejedo-Romero and Araújo (2018), the efficient use of scarce resources requires a more effective use of transparency mechanisms in the municipal decision-making process. In Brazil, the Access to Information Law (Brazil, 2011) regulated access to public information, strengthening social control and citizen participation in monitoring public policies and financial outcomes (Santos & Machado, 2021).

Despite the extensive normative framework regulating public transparency in Brazil, the literature presents a consensus that legislation alone does not ensure high levels of transparency in governmental information. Several studies indicate that the effectiveness of transparency depends on structural, political, and, above all, fiscal factors, which condition the capacity of public entities to comply with legal requirements (Alt et al., 2006; Zuccolotto & Teixeira, 2014; Sun & Andrews, 2020; Baldissera et al., 2020; Fenner et al., 2022). In this context, fiscal conditions such as dependence on transfers, indebtedness, and financial autonomy emerge as relevant determinants of public transparency (Costa et al., 2020; Lopes et al., 2021; Santos et al., 2020).

Among Brazilian studies, Santos and Machado (2021) stand out for examining the relationship between fiscal management and active transparency in municipalities in the state of Paraíba, identifying results regarding fiscal autonomy that diverge from the international findings of Tavares and Cruz (2020) and Yuniarta and Purnamawati (2020), who found a positive relationship between autonomy and transparency in Portugal and Indonesia, respectively. This divergence highlights a theoretical and empirical gap. Although Fiscal Federalism Theory postulates that greater autonomy fosters accountability and efficiency in public management, the Brazilian context still lacks consistent evidence confirming this relationship. Therefore, understanding how fiscal factors, especially municipal fiscal autonomy, influence public transparency becomes essential to explain the limits between theoretical expectations and observed practice in local governments.

In light of these divergent findings, the following research problem arises: what is the relationship between fiscal autonomy and the level of public transparency in Brazilian municipalities? The relevance of this study lies in the need to understand whether fiscal autonomy, as a central element of Fiscal Federalism, effectively contributes to strengthening transparency in the Brazilian municipal context. This research aims to investigate the relationship between fiscal autonomy and the level of public transparency in Brazilian municipalities. To this end, an applied study was conducted, with a quantitative approach and descriptive procedures. Using panel data from 2018 and 2020 and regression methods (OLS, Tobit, and Quantile Logit), the relationship between transparency (measured by the Escala

Brasil Transparente 360º) and municipal fiscal autonomy (measured by the IFGF Autonomy Index) was tested. The results suggest that fiscal autonomy is positively related to the level of municipal transparency and that greater fiscal autonomy reduces the risk of low transparency.

This study contributes to the literature in two main ways. First, it uses as a proxy for transparency a governmental index that measures both active and passive transparency in Brazilian municipalities, in accordance with the Access to Information Law (LAI). This approach broadens the scope of the analysis by considering different dimensions of public transparency. Second, the study employs a nationally representative sample, allowing the examination of results in a broader context. From a practical perspective, the findings may provide guidance for public policymakers, indicating that policies aimed at increasing fiscal autonomy can have positive effects on the transparency of municipal administrations.

2 THEORETICAL FRAMEWORK

2.1 Determinants of transparency

A widely accepted definition among public transparency scholars is that of Kopits and Craig (1998), who, in their seminal work, define public transparency as the openness of information regarding government structure and functions, fiscal policy and activities, public sector accounts, and projections to the general public. Public transparency can be understood as the degree of availability and accessibility of governmental information relevant to citizens, constituting an essential instrument for accountability and social control. From the perspective of Fiscal Federalism, transparency stems from institutional incentives that encourage local governments to render accounts and justify their decisions (Oates, 1999). Transparency can further be divided into two categories: active transparency, carried out proactively by public organizations, and passive transparency, in which these organizations respond reactively to external demands (Araújo & Tejedo-Romero, 2016).

In Brazil, the landmark for public transparency was established by the Federal Constitution of 1988, which guaranteed the right of access to information, except in cases of secrecy (Brazil, 1988). The administrative reform of 1995, with the implementation of e-government, and the Fiscal Responsibility Law of 2000, which required the disclosure of budgetary information, strengthened social control (Zuccolotto & Teixeira, 2014). In 2009, Complementary Law No. 131, known as the Transparency Law, required states and municipalities to publish their revenues and expenditures on electronic portals (Brazil, 2009). Subsequently, Law No. 12,527/2011 (Access to Information Law) consolidated the regulatory framework by detailing procedures for providing information to society and enabling the monitoring of public policies and financial results (Brazil, 2011; Santos & Machado, 2021). These legal instruments imposed new requirements for budgetary and financial disclosure, redefining governance and social control practices in the public sector.

In order to identify whether Brazilian municipalities comply with legal requirements regarding public transparency, the Office of the Comptroller General of the Union (CGU) created the Escala Brasil Transparente (EBT). In 2018 and 2020, this tool measured the levels of active and passive transparency of Brazilian municipalities in accordance with the Access to Information Law (CGU, 2020). The high degree of heterogeneity in transparency levels corroborates the literature's assertion that legislation alone is insufficient to ensure fiscal transparency (Zuccolotto & Teixeira, 2014). Thus, as Baldissera et al. (2020) argues, beyond identifying the degree of public transparency, it is important to understand the reasons for discrepancies among municipalities and to observe the main factors explaining such variations.

Research conducted in different contexts reveals that levels of public transparency display substantial heterogeneity and are influenced by socioeconomic, political, institutional, demographic, and fiscal factors (Alt et al., 2006; Sun & Andrews, 2020; Zuccolotto & Teixeira,

2014; Ríos et al., 2016; Bernardo et al., 2017; Brocco et al., 2018; Baldissera et al., 2020; Silva, 2019; Barbosa, 2019). Demographic aspects such as education and income influence the demand for transparency, as shown by Piotrowski and Van Ryzin (2007), who analyzed more than 1,800 citizens in the United States. In Brazil, Baldissera et al. (2020) and other studies identified that population size, income, and education positively affect transparency (Barros & Fonseca, 2015; Barbosa, 2019; Silva, 2019; Cruz et al., 2009; Marques, 2014). Conversely, Bernardo et al. (2017) found a negative relationship between urbanization and transparency in municipalities in Minas Gerais, although other studies suggest that urbanization may increase the demand for fiscal information (Andreula & Chong, 2016; Robinson, 2007; Sun & Andrews, 2020).

Internet access and the use of technology are also relevant factors. Alcaraz-Quiles et al. (2014) highlighted that education, internet access, and e-government factors, such as broadband and online services, foster transparency regarding sustainability in Spanish regions. Studies by Perez et al. (2008) and Guillamón et al. (2016) reinforce this relationship, indicating that greater internet access and the use of social networks, such as Facebook, by local governments promote citizen oversight and increase transparency. In addition, Sun and Andrews (2020) found positive associations between internet use and fiscal transparency in China.

Social factors also influence transparency levels. Tejedo-Romero and Araújo (2018) concluded that high unemployment rates in Spanish local governments are associated with reduced transparency. In Brazil, Zuccolotto and Teixeira (2014) pointed out that unemployment reduces citizens' interest in monitoring public spending. On the other hand, Silva (2019) found that factors such as employment, health, and education are positively related to public transparency in Brazilian municipalities. These findings suggest that the determinants of transparency are complex and vary according to the context in which they are embedded.

Several studies also highlight fiscal factors that may be related to transparency levels in public entities. Among the main variables examined in this group are financial dependence (Sun & Andrews, 2020; Tejedo-Romero & Araújo, 2018; Baldissera et al., 2020; Diniz et al., 2020; Baldissera et al., 2023), indebtedness (Baldissera et al., 2020; Fenner et al., 2022; Baldissera et al., 2023; Martinho et al., 2023), received transfers (Bastida et al., 2020; Thuy & Lim, 2023; Baldissera et al., 2023), investment (Baldissera et al., 2020; Santos & Machado, 2021; Fenner et al., 2022; Baldissera et al., 2023), revenues (Costa et al., 2020; Lopes et al., 2020; Santos et al., 2021; Pagliari et al., 2020), expenditures (Araújo et al., 2020; Sun & Andrews, 2020; Hong, 2020; Thuy & Lim, 2023; Martinho et al., 2023), and autonomy (Tavares & Cruz, 2020; Yuniarta & Purnamawati, 2020; Santos & Machado, 2021).

Therefore, understanding how these determinants interact is fundamental to assessing whether fiscal autonomy, a central element of Fiscal Federalism, constitutes a relevant explanatory factor for the different levels of transparency observed among Brazilian municipalities.

2.2 Fiscal Autonomy

Fiscal autonomy is defined as the ability of revenues generated from a municipality's economic activity to cover the costs of maintaining the City Council and the administrative structure of the municipal government. The 2023 edition of the Firjan Fiscal Management Index (IFGF) introduced the IFGF Autonomy indicator as the most critical dimension for efficient fiscal management in municipalities, with 55.5 percent of Brazilian municipalities showing a low capacity to sustain themselves financially (Firjan, 2023). The IFGF Autonomy assesses whether Brazilian municipal governments generate sufficient resources to bear their operating costs. Otherwise, the primary objective of municipal emancipation established by the 1988 Constitution would be at risk.

Among studies examining the relationship between transparency and fiscal variables in Brazilian local governments, only Santos and Machado (2021) investigated the autonomy factor. They analyzed the relationship between active transparency and fiscal management in 157 municipalities in the state of Paraíba, finding a positive relationship between these variables. However, when specifically analyzing the components of fiscal management, they did not identify the same relationship between active transparency and fiscal autonomy.

These findings diverge from international studies such as Tavares and Cruz (2020), who found that Portuguese municipalities with lower financial autonomy exhibit lower levels of transparency. According to these authors, a greater proportion of the local budget derived from own-source revenues strengthens local government and its capacity to make policy choices regarding transparency, and likely also stimulates accountability to local taxpayers. The findings also differ from those of Yuniarta and Purnamawati (2020), who investigated the same relationship in Indonesia and identified a positive association between autonomy and transparency.

From the perspective of Fiscal Federalism Theory, fiscal autonomy is a central element in the federative arrangement, as it conditions the degree of responsibility of local governments regarding revenue collection and public spending. Jiménez and Cetrángolo (2004) highlight that excessive dependence on intergovernmental transfers can create incentive problems, reducing accountability and weakening social control mechanisms. When local governments do not face political costs associated with taxation, they tend to be less responsive and less transparent to citizens.

In this context, greater fiscal autonomy tends to strengthen vertical accountability, since citizens have clearer knowledge of who collects taxes and how resources are allocated (Faguet, 2004; Arvate & Pereira, 2010). This direct link between revenue collection and accountability may encourage transparency practices, especially when institutional and social oversight mechanisms are present.

In the Brazilian case, the federative pact is characterized by high expenditure decentralization combined with significant revenue concentration at the federal and state levels, resulting in strong municipal dependence on transfers (Giambiagi et al., 2017). This configuration creates challenges for strengthening fiscal autonomy and consolidating a culture of transparency and fiscal responsibility at the local level. Therefore, in light of Fiscal Federalism Theory, it is expected that municipalities with greater fiscal autonomy are more likely to adopt good governance practices, including the expansion of public transparency.

Accordingly, considering international findings and with the objective of extending the study by Santos and Machado (2021), the following hypothesis was formulated: municipalities with greater fiscal autonomy exhibit higher levels of fiscal transparency.

3 RESEARCH METHODOLOGY

This study is characterized as applied research, with a quantitative approach and descriptive procedures. This section presents the research design, the procedures adopted for data collection, and the procedures and techniques used for data treatment and analysis.

3.1 Sample Selection

The sample consisted of secondary data for the years 2018 and 2020. These periods were selected because they correspond to the most recent available editions of the evaluation of active and passive transparency in Brazilian municipalities, conducted by a governmental body. Comparisons with scores from earlier assessments were not feasible, since the Escala Brasil Transparente – 360° Evaluation adopted different samples, methodologies, and metrics from the 2015, 2016, and 2017 editions (CGU, 2020).

The sample was delimited to municipalities with more than 50,000 inhabitants, justified by the concentration of most of the Brazilian population within this group (CGU, 2020). Analysis at the municipal level is particularly relevant, given that the degree of fiscal autonomy of Brazilian municipalities remains one of the main challenges to the effective decentralization promoted by the Federal Constitution of 1988. In addition, problems of information asymmetry tend to be greater at this level of government, as municipal managers often make decisions in a more discretionary manner (Guillamón et al., 2011). It is also worth noting that, in the Brazilian context, legislation requiring public entities to disclose information through transparency portals has been in force for just over a decade. This highlights the still recent nature of transparency practices and underscores the importance of understanding their evolution and determinants.

3.2 Econometric model and description of variables

In order to test the hypothesis that fiscal autonomy positively influences the level of public transparency, multiple regression models were estimated using the Ordinary Least Squares (OLS), Tobit, and Quantile Logit methods. The application of different techniques aimed to ensure the robustness of the results, considering both continuous and categorical dependent variables. Accordingly, two econometric models are adopted, as specified below:

$$\begin{aligned} EBT_i = {} & \beta_0 + \beta_1 autonomy_i + \beta_2 GDPpercapita_i + \beta_3 urbanization_i + \beta_4 internetaccess_i \\ & + \beta_5 personnelexpenditure_i + \beta_6 liquidity_i + \beta_7 investiment_i + \beta_8 employmentandincome_i \\ & + \beta_9 education_i \\ & + \beta_{10} health_i + \beta_{11} centralwest_i + \beta_{12} northeast_i + \beta_{13} north_i + \beta_{14} southeast_i + \varepsilon_i \end{aligned} \quad (1)$$

$$\begin{aligned} D\_transp_i = {} & \beta_0 + \beta_1 autonomy_i + \beta_2 GDPpercapita_i + \beta_3 urbanization_i \\ & + \beta_4 internetaccess_i \\ & + \beta_5 personnelexpenditure_i + \beta_6 liquidity_i + \beta_7 investiment_i + \beta_8 employmentandincome_i \\ & + \beta_9 education_i \\ & + \beta_{10} health_i + \beta_{11} centralwest_i + \beta_{12} northeast_i + \beta_{13} north_i + \beta_{14} southeast_i + \varepsilon_i \end{aligned} \quad (2)$$

The dependent variable in the first model is the level of fiscal transparency measured by the Escala Brasil Transparente 360º (EBT), developed by the CGU, which evaluates both active and passive transparency. The methodology assigns scores ranging from zero to ten to municipalities with more than 50,000 inhabitants, according to their compliance with the requirements of the Access to Information Law. This metric is widely used in the literature on public transparency because it comprehensively reflects compliance with legal obligations and the degree of openness of municipal administrations.

In the second model, the level of fiscal transparency is measured by a dummy variable, separating municipalities into two groups: the 10 percent of municipalities with the highest and the lowest scores on the transparency index. This variable assumes the value 1 if the municipality belongs to one of these groups and 0 otherwise. This additional approach makes it possible to identify whether fiscal autonomy exerts a differentiated influence among municipalities with relatively high and low levels of transparency, thereby broadening the understanding of the phenomenon under analysis.

The independent variable, Fiscal Autonomy, was measured by the IFGF Autonomy indicator, which expresses the municipality's capacity to generate sufficient own-source revenues to cover its administrative expenses. The indicator assesses the relationship between (i) revenues derived from the municipality's economic activity and (ii) the costs of maintaining the City Council and the administrative structure of the municipal government (Firjan, 2023). This variable operationalizes the concept of fiscal autonomy proposed by Fiscal Federalism

Theory, according to which more autonomous local governments tend to exhibit greater accountability and transparency toward their citizens.

In addition to the main variable, control variables were included and grouped into three dimensions: (i) fiscal variables, which reflect municipalities' financial capacity and budgetary balance; (ii) socioeconomic variables, which capture human development and social well-being conditions; and (iii) demographic and technological variables, associated with urbanization levels and access to information. The inclusion of these controls aims to isolate the specific effect of fiscal autonomy on transparency, minimizing biases arising from omitted variables.

The variables GDP per capita and Urbanization were obtained from the Brazilian Institute of Geography and Statistics (IBGE). Municipal GDP per capita is widely used as a proxy for local economic development and, consequently, for the administrative and institutional capacity of municipal governments. It represents the gross domestic product, that is, the sum of all goods and services produced by the municipality, divided by the municipal population. Thus, municipalities with higher GDP are expected to present higher levels of transparency, as suggested by Cruz et al. (2012). The urbanization rate is measured as the percentage of the population living in urban households in relation to the total population. Urban areas are defined by the IBGE as those located within the officially delimited urban perimeter of the municipality. The inclusion of the urbanization rate is justified by the fact that more urbanized municipalities tend to concentrate higher population density, greater access to information, and stronger social demand for accountability, factors that may encourage the disclosure of public data.

To measure internet use in municipalities, broadband access density data were collected from the website of the National Telecommunications Agency (Anatel). Internet access represents a relevant technological factor for transparency, since greater availability of digital infrastructure facilitates information disclosure on electronic portals and enables social oversight by citizens. The variables employment and income, educational performance, health, and total population were obtained from the Firjan Municipal Development Index (IDM). Finally, data on fiscal variables (liquidity, personnel expenditure, and investment) were extracted from the Firjan Fiscal Management Index (IFGF). These variables reflect the level of local human development and are included in the model because they influence citizens' capacity to demand and monitor public information. Municipalities with better social indicators tend to exhibit higher civic engagement and, consequently, higher levels of transparency.

3.3 Data Treatment

The collected data were organized in a panel structure, including observations for the years 2018 and 2020. Initially, a descriptive analysis of the variables was conducted to characterize the sample and identify possible behavioral patterns among municipalities. This step allowed the examination of data distribution, the presence of asymmetries, and potential extreme values. To mitigate the effect of outliers, continuous variables were winsorized at 1 percent.

Next, a Pearson correlation analysis was performed to assess the existence of multicollinearity and to understand preliminary bivariate relationships among fiscal, socioeconomic, and transparency indicators.

The main stage of the analysis consisted of estimating multiple regression models to test the hypothesis that fiscal autonomy exerts a positive influence on the level of public transparency in Brazilian municipalities. Three econometric methods were employed: Ordinary Least Squares (OLS), Tobit, and Quantile Logit. The OLS model made it possible to evaluate the relationship between the continuous dependent variable (level of transparency) and the explanatory variables. The Tobit model was applied to address the censored nature of the

dependent variable, since Escala Brasil Transparente scores range from 0 to 10. Finally, the Quantile Logit model was used with a binary transparency variable classifying municipalities as belonging to the top or bottom 10 percent of transparency scores, enabling the identification of potential behavioral differences between groups with distinct performance levels.

Based on these procedures, the results presented in the following section provide descriptive statistics and correlations among the variables, as well as the estimated effects of fiscal autonomy and other factors on the level of municipal transparency.

4 DATA ANALYSIS

This section examines the relationship between fiscal autonomy and public transparency, testing the hypothesis through OLS, Tobit, and Quantile Logit regressions. First, descriptive statistics are presented, followed by the regression analyses. Finally, the significance of the results is discussed.

4.1. Descriptive Statistics

Table 1 presents the results for the study variables for the full sample and for each year.

Table 1

Descriptive Statistics

Part A – General Descriptive Statistics

Variables	Number of Observations	Mean	CV	Min	p25	p50	p75	Max
EBT	1320	6.685318	.2781472	2.47	5.4	6.53	8.285	9.95
IFGF AUTONOMY	1289	.6875066	.5441106	0	.3614563	.9224937	1	1
URBANIZATION	1320	86.17798	.1882585	34.83	80.39	92.85	97.52	100
INTERNETACCESS	1320	14.16553	.6306864	.3774625	6.810817	13.81622	20.65459	35.80918
IFGFPERSONNELEXPENDITURE	1289	.5628087	.6027726	0	.3099386	.5841199	.8854595	1
IFGFLIQUIDITY	1289	.5810631	.5444142	0	.4588812	.5990928	.8241095	1
IFGFINVESTMENT	1289	.4439851	.58131	.0497935	.2442488	.3895517	.5989113	1
IFDMEMPLOYMENTANDINCOME	1318	.5705756	.2187188	.29035	.472307	.581948	.671203	.795112
IFDMEDUCAÇÃO	1320	.7949384	.1427418	.531516	.7091295	.803294	.8847105	.992081
IFDMSAÚDE	1320	.8074425	.1390886	.422698	.7586715	.8354005	.8879105	.95603
PIBPERCAPITA	1320	31286.93	.6908631	7044.61	16009.35	26565.72	40524.67	135298.8

Part B – Descriptive Statistics (2018)

Variables	Number of Observations	Mean	CV	Min	p25	p50	p75	Max
EBT	660	6.512939	.2860407	2.47	5.24	6.44	8.05	9.95
IFGFAUTONOMY	655	.6864089	.5478219	0	.3517043	.9411656	1	1
URBANIZATION	660	86.17798	.1883299	34.83	80.39	92.85	97.52	100
INTERNETACCESS	660	13.04125	.6494385	.3774625	5.880493	12.63384	19.04756	35.80918
IFGFPERSONNELEXPENDITURE	655	.5002658	.6639702	0	.2402497	.5012381	.7713086	1
IFGFLIQUIDITY	655	.536	.6124802	0	.4257174	.552422	.7585362	1
IFGFINVESTMENT	655	.3596491	.6031134	.0497935	.2018403	.3189131	.4637598	1
IFDMEMPLOYMENTANDINCOME	659	.5705756	.2188019	.29035	.472307	.581948	.671203	.795112
IFDMEDUCATION	660	.7949384	.142796	.531516	.7091295	.803294	.8847105	.992081
IFDMHEALTH	660	.8074425	.1391413	.422698	.7586715	.8354005	.8879105	.95603
GDPPERCAPITA	6600	28868.75	.6795193	7044.61	15064.36	24638.89	37880	135298.8

Part C – Descriptive Statistics (2020)

Variables	Number of Observations	Mean	CV	Min	p25	p50	p75	Max
EBT	660	6.857697	.2685091	2.47	5.56	6.6	8.6	9.5
IFGFAUTONOMY	634	.6886406	.5406993	0	.3692816	.8975513	1	1
URBANIZATION	660	86.17798	.1883299	34.83	80.39	92.85	97.52	100
INTERNETACCESS	660	15.28982	.6047216	.3774625	7.447227	14.97742	22.5673	35.80918
IFGFGASTOCOMPESSOAL	634	.6274233	.5332856	0	.3668803	.6858496	.961480	1
IFGFLIQUIDITY	634	.6276188	.4726487	0	.4882132	.6495038	.859527	1
IFGFINVESTMENT	634	.5311146	.5050953	.0497935	.3185117	.4854974	.724116	1
IFDMEMPLOYMENTANDINCOME	659	.5705756	.2188019	.29035	.472307	.581948	.671203	.795112
IFDMEDUCATION	660	.7949384	.142796	.531516	.7091295	.803294	.884710	.992081
IFDMHEALTH	660	.8074425	.1391413	.422698	.7586715	.8354005	.887910	.95603
GDPPERCAPITA	660	33705.1	.6885464	7044.61	17645.03	28489.93	43976.26	135298.8

Note: The table presents the main descriptive statistics (total observations, mean, coefficient of variation, minimum, 1st quartile, median, 3rd quartile, and maximum, respectively) for the study variables: EBT = Escala Brasil Transparente; GDP per capita = Gross Domestic Product per capita; Urbanization = Urbanization rate; Internet access = Broadband internet access per 100 households; Autonomy = Firjan Fiscal Management Index – Autonomy; Personnel expenditure = Firjan Fiscal Management Index – Personnel Expenditure; Liquidity = Firjan Fiscal Management Index – Liquidity; Investment = Firjan Fiscal Management Index – Investment; Employment and income = Firjan Municipal Development Index – Employment and Income; Education = Firjan Municipal Development Index – Education; and Health = Firjan Municipal Development Index – Health.
Source: Authors' own elaboration.

The average value of the overall transparency index (EBT) of 6.69 suggests a reasonable level of performance. On the other hand, the distance between the minimum (2.47) and maximum (9.95) values indicates that, even with a nationwide legal framework in place, some municipalities are able to implement good transparency practices, while others still face substantial difficulties. This finding corroborates the literature indicating that legislation alone does not explain transparency levels.

Fiscal autonomy, with a mean of 0.69 and a coefficient of variation of 0.54, reveals a marked disparity in municipalities' capacity to generate own-source revenues to cover administrative costs. The presence of extreme values, with a minimum of 0 and a maximum of 1, suggests that some municipalities rely entirely on intergovernmental transfers, whereas others are able to finance their expenditures with own revenues.

The urbanization rate, with an average of 86.18 percent, indicates a strong concentration of the population in urban areas. This result is expected, given that the sample comprises Brazilian municipalities with populations above 50,000 inhabitants. Internet access displays a highly unequal distribution, with a coefficient of variation of 0.63 and an average of 14.16 broadband accesses per 100 inhabitants, ranging from 0.38 to 35.81. This suggests that digital infrastructure may be a limiting factor for transparency in certain municipalities.

Among fiscal factors, personnel expenditure stands out, with an average of 0.56 and a coefficient of variation of 0.60, indicating substantial variation across municipalities. A significant share of municipal revenues committed to payroll expenses may limit investments in transparency initiatives or reduce incentives to disclose information.

With regard to socioeconomic indicators such as employment and income, education, and health, there is a tendency toward relative homogeneity, although variations remain that may reflect significant regional inequalities. Concerning GDP per capita, an increase of approximately 16.7 percent was observed between 2018 and 2020, rising from R$ 31,286.93 to R$ 33,705.10. This growth suggests economic expansion in the analyzed municipalities, although data dispersion remains high, with a coefficient of variation close to 0.69 in both years. The wide gap between minimum (R$ 7,044.61) and maximum (R$ 135,298.80) values indicates the persistence of regional economic inequalities.

When comparing data from 2018 and 2020, a slight improvement in transparency levels can be observed. The average EBT in 2020 increased to 6.85 compared to 2018, indicating a trend toward enhanced disclosure of public information. This evolution may be attributed to ongoing efforts to comply with transparency regulations, as well as the growing use of digital tools and internet access, suggesting gradual progress toward improved transparency and digital inclusion. Fiscal autonomy, although showing stability with an average of 0.69 in both years, registered a slight reduction in dispersion to 0.54.

4.2 Multiple Linear Regression

Table 2 presents the results of Model 1, with regressions estimated by Ordinary Least Squares. The regressions estimated in Models M1 to M5 analyze the relationship between fiscal autonomy and transparency, using different levels of control and analytical robustness. In Model M1, a pooled regression is employed to observe the raw effect of fiscal autonomy on transparency. In Model M2, fiscal, socioeconomic, and demographic control variables are added to isolate the specific effects of fiscal autonomy, eliminating potential biases arising from omitted variables. Model M3 introduces year fixed effects, capturing temporal influences that may affect all municipalities simultaneously, such as legislative changes or economic conditions. Model M4 includes state fixed effects, controlling for structural and contextual differences across Brazilian states, such as institutional or economic variations. Finally, Model M5 combines both year and state fixed effects, providing a more robust specification by controlling for both temporal and regional variations. This methodological progression ensures a more comprehensive and reliable analysis.

Table 2
OLS Regression Analysis

Variables	M1	M2	M3	M4	M5
Constant	5.890***	7.542***	7.934***	7.313***	7.800***
IFGF Autonomy	1.176***	0.667***	0.744***	0.796***	0.883***
IFGF Personnel Expenditure		0.560***	0.532***	0.661***	0.624***
IFGF Liquidity		-0.003	-0.029	-0.0843	-0.118
IFGF Investment		0.247	0.111	0.086	-0.077
IFDM Employment and Income		1.512***	1.579***	0.602	0.658
IFDM Education		-1.709**	-1.673**	0.055	0.063
IFDM Health		0.537	0.603	-0.030	0.091
Urbanization		-0.006	-0.005	-0.001	-0.001
Internet Access		0.0355***	0.0324***	0.045***	0.040***
GDP		-0.162	-0.206	-0.234	-0.287**
Observations	1289	1287	1287	1287	1287
Control Variables		X	X	X	X
Panel Data			X	X	X
Year Fixed Effects			X		X
State Fixed Effects				X	X
r^2	0.0556	0.0889	0.0919	0.1450	0.1489

Note. The values presented represent the results of the OLS regressions. The variables are: EBT = Escala Brasil Transparente; GDP per capita = Gross Domestic Product per capita; Urbanization = Urbanization rate; Internet access = Broadband internet access per 100 households; Autonomy = Firjan Fiscal Management Index – Autonomy; Personnel expenditure = Firjan Fiscal Management Index – Personnel Expenditure; Liquidity = Firjan Fiscal Management Index – Liquidity; Investment = Firjan Fiscal Management Index – Investment; Employment and income = Firjan Municipal Development Index – Employment and Income; Education = Firjan Municipal Development Index – Education; and Health = Firjan Municipal Development Index – Health. Coefficients marked with one asterisk () are statistically significant at the 10 percent level, coefficients marked with two asterisks () are statistically significant at the 5 percent level, and coefficients marked with three asterisks () are statistically significant at the 1 percent level.
Source: Authors' own elaboration.

The results presented in Table 2 indicate that fiscal autonomy exerts a positive and statistically significant impact on the levels of fiscal transparency of Brazilian municipalities. The fiscal autonomy variable displayed positive and statistically significant coefficients in all OLS model specifications, with significance at the 1 percent level. In Model M5, which includes both state and year fixed effects, the coefficient was 0.883, indicating that, on average, a 0.1 increase in municipal fiscal autonomy is associated with an increase of 0.0883 in the level of transparency. These findings differ from those of Santos and Machado (2021) for municipalities in Paraíba but corroborate studies such as Tavares and Cruz (2020) and Yuniarta

and Purnamawati (2020), which found similar evidence in Portugal and Indonesia, respectively. Both studies argue that greater own-source revenue reduces dependence on transfers and encourages transparency practices, a mechanism that appears to operate similarly in the Brazilian context.

Regarding fiscal variables, only personnel expenditure showed a positive and statistically significant relationship with transparency levels, with coefficients significant at 1 percent in Models M2, M3, and M5, and at 5 percent in Model M4. In Model M5, the coefficient of 0.624 suggests that a 0.1 increase in the personnel expenditure index is associated with an increase of 0.0624 in the transparency index. These results corroborate the findings of Zuccolotto and Teixeira (2014), suggesting that municipalities with greater capacity to allocate human resources may implement public information disclosure practices more effectively. Moreover, considering that 49.4 percent of Brazilian municipalities spent more than half of their total revenues on personnel payroll in 2018 (Firjan, 2019), and in light of current debates regarding the size of the Brazilian state, it is reasonable that society demands greater publicity of public expenditures. On the other hand, the liquidity and investment variables did not show statistical significance in any specification, which contrasts with the findings of Silva (2019), who reported that higher levels of public investment imply greater municipal fiscal transparency. Although financial stability is fundamental to fiscal governance, its direct relationship with transparency may be less evident.

Among socioeconomic variables, employment and income stood out as the only factor with a positive and significant impact in Models M2 and M3; however, after the inclusion of both state and year fixed effects, this variable lost statistical significance. This result diverges from the literature (Alcaide Muñoz et al., 2016; Gandía & Archidona, 2008), which suggests that populations with higher income and employment have greater capacity to monitor public officials and demand accountability. The remaining socioeconomic variables (GDP per capita, education, and urbanization) were not statistically significant, contradicting the findings of Cruz et al. (2012) and Baldissera et al. (2020). Conversely, the internet access variable was significant at the 1 percent level in all specifications. In Model M5, the coefficient was 0.040, suggesting that improvements in digital infrastructure can contribute to strengthening fiscal transparency.

To test the robustness of the findings, additional models were estimated using the Tobit estimator and logistic regressions with transparency measured as a categorical variable (above or below the median). In all specifications, fiscal autonomy maintained its positive and significant impact on transparency, reinforcing the consistency of the results. Table 3 presents the results obtained using the Tobit regression.

Table 3
Tobit Regression Analysis

Variables	T1	T2	T3	T4	T5
Constant	5.890***	7.542***	7.094***	6.749***	7.606***
IFGF Autonomy	1.176***	0.667***	0.592**	0.518*	0.679**
IFGF Personnel Expenditure		0.560***	0.330*	0.455**	0.389**
IFGF Liquidity		-0.003	0.118	0.122	0.064
IFGF Investment		0.247	0.031	0.156	-0.088
IFDM Employment and Income		1.512***	1.706**	0.752	0.876
IFDM Education		-1.709**	-1.386*	-0.007	0.012
IFDM Health		0.537	0.575	-0.094	0.118
Urbanization		-0.006	-0.004	-0.000	-0.000
Internet Access		0.035***	0.030***	0.0433***	0.035***
GDP		-0.162	-0.151	-0.116	-0.225
Observations	1289	1287	1287	1287	1287
Control Variables		X	X	X	X
Panel Data			X	X	X
Year Fixed Effects			X		X
State Fixed Effects				X	X
Pseudo r^2	0.0140	0.0228	0.0410	0.0501	0.0519

Note. The values presented represent the results of the regressions estimated using the Tobit model. The variables are: EBT = Escala Brasil Transparente; GDP per capita = Gross Domestic Product per capita; Urbanization = Urbanization rate; Internet access = Broadband internet access per 100 households; Autonomy = Firjan Fiscal Management Index – Autonomy; Personnel expenditure = Firjan Fiscal Management Index – Personnel Expenditure; Liquidity = Firjan Fiscal Management Index – Liquidity; Investment = Firjan Fiscal Management Index – Investment; Employment and income = Firjan Municipal Development Index – Employment and Income; Education = Firjan Municipal Development Index – Education; and Health = Firjan Municipal Development Index – Health. Coefficients marked with one asterisk () are statistically significant at the 10 percent level, coefficients marked with two asterisks () are statistically significant at the 5 percent level, and coefficients marked with three asterisks () are statistically significant at the 1 percent level.
Source: Authors' own elaboration.

Following the same trend observed in the model presented in Table 2, fiscal autonomy exhibited a positive and significant effect in all specifications. In Models T1 to T3, the coefficients are statistically significant at the 1 percent level, while in Model T4 the effect remains positive, though of smaller magnitude and significant at the 5 percent level. This result suggests that greater fiscal autonomy is associated with increases in municipal transparency levels. Internet access once again appears as consistently positive and significant at the 1 percent level in all models, with coefficients indicating that increased internet access is strongly associated with higher values of the dependent variable.

After confirming the positive relationship between fiscal transparency and fiscal autonomy, this study further applied a robustness technique to verify the impact of fiscal autonomy on municipalities occupying the highest and lowest positions in the Escala Brasil Transparente 360º ranking by the CGU. Table 4 presents the results of these estimations, using dummy variables to determine whether a municipality exhibits high transparency (quantile > 90 percent) or low transparency (quantile < 10 percent).

Tabela 4
Análise de Regressão Logit Quantílica

Variables	Alta	Baixa	Alta	Baixa
Constant	0.766	1.462	3.728	1.500
IFGF Autonomy	0.557*	-0.358	1.008*	-0.692
IFGF Personnel Expenditure	0.932***	-0.251	1.209***	-0.300
IFGF Liquidity	0.094	-0.067	-0.111	-0.113
IFGF Investment	0.280	-0.431	-0.238	-0.157
IFDM Employment and Income	0.560	-1.427**	0.169	-0.798
IFDM Education	-1.998**	1.659*	-0.588	-0.322
IFDM Health	-0.090	-0.288	-0.274	0.513
Urbanization	0.001	0.006	0.012	0.004
Internet Access	0.037***	-0.030**	0.063***	-0.043**
GDP	-0.227	-0.237	-0.604**	-0.194
Observations	1287	1287	1287	1287
Control Variables	X	X	X	X
Panel Data			X	X
Year Fixed Effects			X	X
State Fixed Effects			X	X
Pseudo r^2	0.0510	0.0510	0.0853	0.0853

Note: The values presented represent the results of the study's regression models. The variables are: ed_transp = transparency dummy; GDP per capita = Gross Domestic Product per capita; Urbanization = Urbanization rate; Internet access = Broadband internet access per 100 households; Autonomy = Firjan Fiscal Management Index – Autonomy; Personnel expenditure = Firjan Fiscal Management Index – Personnel Expenditure; Liquidity = Firjan Fiscal Management Index – Liquidity; Investment = Firjan Fiscal Management Index – Investment; Employment and income = Firjan Municipal Development Index – Employment and Income (referring to 2018); Education = Firjan Municipal Development Index – Education; and Health = Firjan Municipal Development Index – Health. Coefficients marked with one asterisk () are statistically significant at the 10 percent level, coefficients marked with two asterisks () are statistically significant at the 5 percent level, and coefficients marked with three asterisks () are statistically significant at the 1 percent level.
Source: Authors' own elaboration.

Table 4 presents the results of the Quantile Logit regressions estimated to identify the factors explaining the probability of a municipality being among the 10 percent with the highest (High) or lowest (Low) levels of public transparency. The estimations in the last two columns were performed using panel data, controlling for year and state fixed effects in order to mitigate unobserved heterogeneity.

Overall, the results indicate that fiscal autonomy (IFGF Autonomy) exerts a positive and statistically significant influence on the probability of a municipality being among the most transparent. This effect is observed in Model 1 (coef. 0.557; $p < 0.10$) and in Model 3 (coef. 1.008; $p < 0.10$). These findings confirm the central hypothesis of the study and reinforce the theoretical argument that a greater capacity to generate own-source revenues increases accountability and, consequently, strengthens local governments' commitment to disclosing public information. Conversely, fiscal autonomy was not significant in the models for the lowest-transparency group, suggesting that limited fiscal capacity alone does not fully explain low levels of disclosure. In such cases, political or institutional factors may play a more prominent role.

In general, the results reinforce the hypothesis that fiscal autonomy and factors related to institutional and technological capacity are important determinants of public transparency. Municipalities with greater autonomy, stronger fiscal control, and more developed digital infrastructure are more likely to belong to the group representing the top 10 percent in transparency. These findings are consistent with Fiscal Federalism Theory, which associates greater decentralization and financial self-sufficiency with enhanced accountability and higher-quality local public management.

4.3 Discussion and implications of the results

The results obtained confirm the central hypothesis of this research, indicating that fiscal autonomy exerts a positive and statistically significant effect on the level of public transparency in Brazilian municipalities. This finding is consistent with the assumptions of Fiscal Federalism Theory, according to which the decentralization of responsibilities and revenues tends to increase local governments' accountability to their citizens, strengthening oversight and encouraging more transparent management practices (Oates, 1999; Rodden, 2004).

The positive relationship between fiscal autonomy and transparency can be explained by the fact that local governments with greater capacity to generate own-source revenues are subject to higher levels of social scrutiny. When public financing relies more heavily on local revenue collection, municipal managers become directly accountable to local taxpayers, creating incentives to disclose information, justify decisions, and promote greater visibility of governmental actions (Alt et al., 2006).

Furthermore, greater financial autonomy is associated with improved administrative capacity and the availability of technological resources necessary to maintain transparency portals and internal control systems. This relationship reinforces the argument that transparency depends not only on the existence of a legal framework but also on fiscal and institutional conditions that enable its effective implementation (Zuccolotto & Teixeira, 2014; Baldissera et al., 2020).

The results also align with the findings of Tavares and Cruz (2020) in Portugal and Yuniarta and Purnamawati (2020) in Indonesia, who observed a similar relationship between autonomy and transparency in contexts of fiscal decentralization. However, unlike the study by Santos and Machado (2021), which did not find statistical significance for this relationship in municipalities in Paraíba, the results of this research suggest that, in a national sample, the effect of fiscal autonomy is more evident. This indicates that fiscal and institutional diversity among Brazilian municipalities may explain the divergences observed across studies. Overall, the

empirical evidence reinforces the understanding that fiscal autonomy can strengthen governmental transparency, provided it is accompanied by effective mechanisms of oversight and social participation.

5 FINAL CONSIDERATIONS

This study aimed to investigate the relationship between fiscal autonomy and the level of public transparency in Brazilian municipalities. The results confirmed the hypothesis that fiscal autonomy exerts a positive influence on the level of public transparency in Brazilian municipalities. Based on panel data analysis for the years 2018 and 2020, it was verified that municipalities with greater capacity to generate own-source revenues present higher levels of information disclosure, indicating that financial independence (fiscal autonomy) constitutes a determining factor for the effectiveness of transparency practices. This finding reinforces the importance of fiscal autonomy as a condition for improving public management and strengthening accountability at the local level.

This study offers two main contributions to the literature. First, it adopts as a proxy for transparency a governmental index that evaluates both active and passive transparency in Brazilian municipalities, in accordance with the requirements of the Access to Information Law (LAI). This approach broadens the scope of analysis by incorporating different dimensions of public transparency, providing a more comprehensive view of the phenomenon. Second, the research uses a nationally representative sample, allowing the results to be generalized to the context of Brazilian municipalities as a whole. From a practical perspective, the findings can guide public policymakers, suggesting that initiatives aimed at strengthening fiscal autonomy have the potential to significantly improve transparency levels in municipal administrations.

As a limitation of the research, it was not possible to compare the scores achieved by municipalities in earlier assessments, since the Escala Brasil Transparente – 360° Evaluation adopts a methodology and metrics different from those used in the 2015, 2016, and 2017 evaluations, in which only aspects of passive transparency were considered (CGU, 2020). In addition, the restriction of data availability to municipalities with more than 50,000 inhabitants prevents extrapolation of the results to smaller municipalities, although similar outcomes are expected in light of the discussion presented.

For future research, it is suggested that the methodology developed by the Escala Brasil Transparente be applied to new periods and to the full set of Brazilian municipalities, enabling the analysis and understanding of transparency behavior over time.

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CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest regarding this submitted work.

DATA AVAILABILITY

The dataset supporting the findings of this study is not publicly available.

AUTHOR CONTRIBUTIONS

Roles	1st author	2nd author	3rd author
Conceptualization	♦		
Data Curation	♦		♦
Formal Analysis	♦		♦
Funding Acquisition			
Investigation	♦		
Methodology	♦	♦	♦
Project Administration	♦	♦	
Resources			
Software	♦	♦	♦
Supervision		♦	
Validation		♦	♦
Visualization	♦	♦	♦
Writing – Original Draft	♦		
Writing – Review and Editing	♦		♦