Municipal public transparency: analysis of the determining political and socioeconomic variables

Transparência pública municipal: análise das variáveis políticas e socioeconômicas determinantes

Transparencia pública municipal: análisis de las variables políticas y socioeconómicas determinantes

Vanessa Unfried Fenner*
Mestre em Desenvolvimento e Políticas Públicas (UFFS),
Roque Gonzales/RS, Brasil
va.fenner@hotmail.com
https://orcid.org/0000-0003-4877-940 ⓘ

Monize Sâmara Visentini
Doutora em Administração (UFRGS)
Professora da Universidade Federal da Fronteira Sul (UFFS),
Cerro Largo/RS, Brasil
monize.visentini@uffs.edu.br
https://orcid.org/0000-0001-6233-6106 ⓘ

Felipe Micail da Silva Smolski
Doutorando em Economia (UNISINOS)
Mestre em Desenvolvimento e Políticas Públicas (UFFS),
Cerro Largo/RS, Brasil
felipesmolski@hotmail.com
https://orcid.org/0000-0002-1982-3109 ⓘ

Address of primary contact for correspondence*
Avenida Pirapó, n◦ 62, Centro CEP: 97970-000 – Roque Gonzales/RS Brasil

Abstract
This article aims to identify the political and socioeconomic variables that determine the public transparency index of Brazilian municipalities. This research contains a quantitative focus and correlational scope, using the statistical Poisson regression model with data from 1,134 Brazilian municipalities probabilistically selected. The results show that municipalities with higher rates of electoral participation, and governed by men are more transparent, a peculiarity of the Brazilian context. The level of unemployment is the only socioeconomic variable tested that influences transparency, with higher unemployment rates leading to lower rates of municipal transparency. The study contributes to demonstrating that the manager's level of electoral participation, unemployment level, and gender impact on municipal transparency indexes.
Keywords: public management; counties; political variables; socioeconomic variables

Resumo
Este artigo busca identificar as variáveis políticas e socioeconômicas determinantes do índice de transparência pública dos municípios brasileiros. É uma pesquisa de enfoque quantitativo e de alcance correlacional, utilizando o modelo estatístico de regressão de Poisson com dados de 1.134 municípios brasileiros selecionados probabilisticamente. Os resultados indicam que municípios com maiores taxas de participação eleitoral e governados por homens são mais transparentes, uma peculiaridade do contexto brasileiro. O nível de desemprego é a única variável socioeconômica testada que influencia a transparência, sendo que maiores taxas de desemprego levam a menores índices de transparência municipal. O estudo contribui para demonstrar que o nível de participação eleitoral, nível de desemprego e gênero do gestor impactam sobre os índices de transparência municipal.
Palavras-chave: gestão pública; municípios; variáveis políticas; variáveis socioeconômicas

Resumen
Este artículo busca identificar las variables políticas y socioeconómicas que determinan el índice de transparencia pública en los municipios brasileños. Es una investigación con un enfoque cuantitativo y un alcance correlacional, utilizando el modelo estadístico de regresión de Poisson con datos de 1.134 municipios brasileños seleccionados probabilísticamente. Los resultados muestran que los municipios con mayores tasas de participación electoral son más transparentes, así como los municipios gobernados por hombres, una peculiaridad del contexto brasileño. El nivel de desempleo es la única variable

socioeconómica probada que influye en la transparencia, con tasas de desempleo más altas que conducen a tasas más bajas de transparencia municipal. El estudio contribuye a demostrar que el nivel de participación electoral, el nivel de desempleo y el género del gerente impactan en los índices de transparencia municipal.

Palabras clave: gestión pública; condados; variables políticas; variables socioeconómicas

1 Introduction

The New Public Management (NPM) is based on values such as responsiveness, resource optimization, innovation, promotion of better results for society, and transparency (Bernardo et al., 2017), coupled with social, economic, and political transformations worldwide and the consolidation of democracy in Brazil, have raised the demand of citizens with the management of public organizations and transparency of administrative acts (Beuren et al., 2013). Public transparency is understood as the availability, complete, timely, and through means accessible to the population, of all information regarding public administration activities and public bodies that compose it, except for information legally protected by secrecy. According to Armstrong (2005), it refers to full public access to reliable and timely information about the actions and performance of public sector institutions.

New legal instruments have been inserted into Brazilian legislation to support the population's increasing concern with the performance of public administration. In this regard, the most notorious device created was Law No. 12,527 (2011), known as the Access to Information Law (LAI). After the advent of the LAI, public agencies and entities are now required to disclose a minimum amount of information about their activities via the Internet, surpassing rules already established by the Fiscal Responsibility Law (LRF), Complementary Law No. 101 (2000), and the Transparency Law Complementary Law No. 131 (2009), other critical steps toward transparency. The LAI also enabled the government to measure the transparency of public agencies through indices such as the National Transparency Ranking (RNT), developed by the Federal Public Prosecutor's Office (MPF), and the Transparent Brazil Scale (EBT), prepared by the Office of the Comptroller General (CGU).

Hence, legal advances in transparency regulation could stimulate social participation, enhance state accountability before the population, and reduce the distance between public administration and society (Figueiredo & Santos, 2013). In this sense, transparency may constitute one of the instruments with a fundamental role in the search for a fairer society in which collective interests take precedence over individual and specific ones. Knowledge and understanding of factors that condition transparency in the public sector facilitates the achievement of this model of society, given that it can help determine the directions that government actions should take in order to promote greater participation and social control, especially at the municipal management level, where citizens' proximity to the government is greater.

Some national and international studies have sought to provide information regarding the factors that determine transparency by analyzing the municipal level of public management (Cruz et al., 2012; Souza et al., 2013; Araujo & Tejedo-Romero, 2016a; Araujo & Tejedo-Romero, 2017; Birskyte, 2018; Piña & Avellaneda, 2018; Silva & Bruni, 2019), with only the last one analyzing the totality of Brazilian municipalities. The other national investigations have established cutoffs based on regional or population criteria.

Socioeconomic and political variables stand out among the factors that influence public transparency; socioeconomic variables are evaluated by both national and international studies that analyze municipal transparency (Cruz et al., 2012; Souza et al., 2013; Silva & Bruni, 2019; Araujo & Tejedo-Romero, 2016a, 2017; Birskyte, 2018; Piña & Avellaneda, 2018); nevertheless, political variables are only addressed in international research (Araujo & Tejedo-Romero, 2016a, 2017; Birskyte, 2018; Piña & Avellaneda, 2018).

The absence of Brazilian studies investigating the influence of political factors on municipal public transparency and the absence of research whose results can be inferred to all Brazilian municipalities and that encompasses passive and active transparency instigated this study, which sought to fill this theoretical gap. Hence, this study aimed to identify the political and socioeconomic variables that determine the public transparency index of Brazilian municipalities.

The choice of Brazil as a study site is due to the absence of this type of study in the country, as research that evaluates many variables in such an expressive probabilistic sample is unprecedented. The sampling technique, which follows the EBT method, is a consolidated technique used by government agencies such as the CGU, ensuring that robust and reliable results are obtained. In order to fill in the gaps found in the existing literature, we used the study by Araujo and Tejedo-Romero (2016a), who analyzed the influence of political and socioeconomic factors on the transparency of Spanish municipalities. The model investigated by these authors and the variables that comprise it were adapted to suit the Brazilian context. Thus, political and socioeconomic variables are assumed to influence Brazilian municipalities' transparency levels.

In addition to the academic contributions, the study of the variables that affect municipal public transparency may support governmental actions aimed at increasing the disclosure of and access to

information by municipal administrations. Once the factors contributing to positive and negative changes in the transparency index are known, actions focused on such aspects can be taken to raise the index.

The simple disclosure of the transparency index and the RNT can also raise municipal transparency. Upon learning of their score and position in the ranking, municipalities tend to create a rivalry with the others, especially those inserted in the same regional context. This dispute instigates actions to improve transparency that, by making it easier for citizens to exercise social control and evaluate public policies, generates benefits to the performance of municipal management, reducing levels of corruption and misappropriation of resources and instigating the creation of programs and the provision of services aimed at improving the quality of life of the population. In this sense, this study can also foster municipalities' development by promoting municipal public transparency, social control, and improvements to public management.

2 Variables Determining Transparency

During the last few years, national and international studies have turned their interests to public transparency, particularly in identifying transparency-associated factors. Many of these have studies focused on local or municipal governments (Cruz et al., 2012; Souza, Barros, Araújo, & Silva, 2013; Araujo & Tejedo-Romero, 2016a, 2017; Birskyte, 2018; Piña & Avellaneda, 2018). Political and socioeconomic variables have been reported as among the ones investigated in the literature as influencing transparency. For this study, electoral participation, political competitiveness, legislative composition, reelection, mayor's gender, unemployment level, population, investment, and municipal debt were adopted as independent variables, many present in previous studies, particularly in the work of Araujo and Tejedo-Romero (2016a).

The first among the political variables, electoral participation, refers to exercising the right to vote. It represents the number of voters who showed up at the polls in their municipalities during elections. In Spain, where the study of Araujo and Tejedo-Romero (2016a) was conducted, the basis for the model of this study, voting is not compulsory, unlike in Brazil; the same occurs in numerous other countries. Therefore, the compulsory nature of voting in Brazil is a study limitation. In order to circumvent this, only valid votes were considered for the electoral participation variable, that is, the votes cast by voters for regularly registered candidates and party affiliations, discounting blank and null votes.

As for electoral participation, some studies have shown that a higher number of voters indicates that citizens have greater access to information and expressive interest in government activities (Hollyer et al., 2011; Esteller-Moré & Polo-Otero, 2012; Caamaño-Alegre et al., 2013). Electoral participation would then indicate citizens' concern for political issues and the demand for transparency (Guillamón et al., 2011; Sol, 2013). The significant interest of the population in public management activities puts pressure on governments to disclose information, thereby increasing the transparency of municipalities. Hence, higher levels of participation would lead to higher levels of transparency.

H1: The higher the electoral participation of municipalities, the higher the municipal public transparency index.

Information disclosure (i.e., transparency) is also influenced by political competitiveness or competition (Wehner & Renzio, 2013). According to Berliner and Erlich (2015), political competitiveness matters in adopting institutional reform and improving access to information and transparency. In a scenario of high political competitiveness, staying in power becomes increasingly difficult. Political actors become more transparent to circumvent this difficulty and increase the chances of staying in power. According to Caba-Pérez, et al. (2014), high levels of political rivalry encourage the disclosure of information about the activities of the political party in power, thus increasing the level of transparency. Esteller-Moré and Polo-Otero (2012) also highlighted the importance of political competition when the incumbent's reelection is uncertain. According to these authors, disclosing information becomes a strategic tool that ensures political agents greater chances of being reelected in the face of strong competition.

H2: The higher the degree of political competitiveness of municipalities, the higher their public transparency indices.

In addition to the variables tested by Araujo and Tejedo-Romero (2016a), the political variable legislative composition was included in this study, given its apparent influence on the good performance of public management, especially in municipalities. Cavalcante (2013) pointed out that mayors who start the mandate with more allied councilors face fewer obstacles to governability and present better results. A chamber composed mostly of councilors opposed to the municipal mayor could also collaborate to raise the municipal transparency index. According to Alt et al. (2006), legislative competition is negatively related to increased municipal transparency. This situation tends to occur due to the opposition councilors' greater commitment to overseeing acts of the executive branch. For this more effective inspection to occur, one can assume that it is necessary to expand the disclosure of information about municipal management. Piña and Avellaneda (2018) also investigated this variable by addressing the possibility that mayors who act in governments with strong opposition are encouraged to promote municipal transparency.

H3: The higher the percentage of councilors (legislative composition) belonging to the mayor's party or party coalition, the lower the municipal public transparency index.

It is worth noting that the reelection variable in this study replaced the political ideology variable in Araujo and Tejedo-Romero (2016a). We chose to replace the political ideology variable with the reelection variable due to the difficulty of distinguishing between right- and left-wing parties in the Brazilian political landscape. According to Tarouco and Madeira (2013), political ideology is in decay despite being frequently used in research as an independent variable in theoretical models. According to the authors, "the distances between parties' positions in the left-right dimension have been reducing, and many analyses have reported a non-significant effect of this variable" (p. 94).

According to Alt et al. (2006), government turnover is negatively related to transparency, especially fiscal and budgetary transparency. Therefore, the change of elected members of government impairs public transparency. A possible cause in Brazil is administrative discontinuity, which is part of the daily routine of public management. The Brazilian regime foresees the possibility of the governors being reelected, continuing their administration for two consecutive terms. When reelected, mayors can continue government plans and projects that have not yet been concluded. However, in case of a change of managers, many projects are interrupted frequently. In this way, reelected mayors can finish more projects and fulfill a more significant number of proposals than those who govern for only one term. In order to demonstrate their achievements and win the trust and approval of the local population, reelected mayors tend to increase transparency in their governments. Thus, the discontinuity of actions is not usually publicized beyond legal obligations.

H4: Municipalities with reelected mayors are more transparent.

The gender of the municipal manager is another variable frequently highlighted in the literature. According to Piotrowski and Van Ryzin (2007), men are more politically active and engaged than women, although women in political leadership positions show more admirable results. It is also likely that their qualities and traits make them more predisposed to disclose information and contribute to raising the level of transparency (Weyer, 2007). Moreover, female mayors encourage citizens to participate more in public administration and communicate with their administrators (Rodríguez-Garcia, 2015). Brollo and Troiano (2016), in a Brazilian study, concluded that women achieve better results in municipal administration and are less involved in corruption cases. According to Gains and Annesley (2010), the length of time women govern and the power they gain through it can affect transparency, as they could change political will and broaden support for accountability and internal transparency demands and initiatives. Similarly, a government with the support of the political majority would give female governors more power, providing opportunities for greater transparency (Araujo & Tejedo-Romero, 2017).

H5: Municipalities governed by women are more transparent.

As for the socioeconomic variables, in periods of economic depression, an increase in the level of unemployment is expected. Consequently, the municipal economic situation will enter a crisis, decreasing transparency. This occurs because lower economic development and higher unemployment are detrimental to civic engagement (i.e., the demand for opportunities to participate in decision-making in public administration diminishes). According to these fundamentals, studies have tended to indicate that higher unemployment rates are detrimental to transparency, particularly fiscal transparency (Caamaño-Alegre et al., 2013; Sol, 2013; Araújo & Tejedo-Romero, 2016a; Tavares & Cruz, 2017).

H6: The higher the level of municipal unemployment, the lower the municipal public transparency index.

Research has shown that debt levels are also related to transparent budget procedures and institutions and fiscal transparency (Alt & Lassen, 2006; Gavazza & Lizzeri, 2009; Alt et al., 2006; Sol, 2013), with lower debt levels leading to higher municipal transparency indices (Cuadrado-Ballesteros, 2014). According to Alt et al. (2006), increasing debt reduces transparency. When debt is high, politicians can obscure available information so voters cannot inform themselves about loan expenditures of the municipality and failure to keep their promises (Benito et al., 2016; Ríos et al., 2016). According to Reis et al. (2018), municipalities with higher public spending have higher levels of perceived corruption, which is facilitated by insufficient municipal public transparency.

H7: The higher the per capita annual municipal debt, the lower the municipal public transparency index.

Regarding municipal government investments, there is evidence that publicizing them is a way for politicians to improve their popularity and gather citizens' support. García and García-García (2010) reported that citizens have a more positive attitude toward public projects that require important investment efforts as long as they understand that their living conditions will improve. Disclosing information about municipal investments is a way for politicians to improve their popularity and gather citizens' support. Municipal budgets during election years have shown increased politicians' interest in initiating ambitious projects to gain voters' interest. Hence, according to legitimacy theory, it is plausible to expect that politicians who engage in projects that require significant investment efforts are interested in publicizing this information (García & García-García, 2010). As a result, higher government spending is expected to be associated with increased fiscal transparency (Arapis & Reitano, 2017).

H8: The higher the per capita value of the municipality's annual investment, the higher the municipal public transparency index.

The municipality's population size also has a positive and statistically significant effect on the transparency index (Styles & Tennyson, 2007; Guillamón et al., 2011). Therefore, larger populations imply more public service users and greater public funds (Alcaraz-Quiles et al., 2014). Thus, it is expected that municipalities would be interested in disclosing information allowing citizens and other entities to monitor the actions of elected officials (Laswad et al., 2005; Benito et al., 2010).

Larger municipalities have more resources and capabilities to adopt technical and managerial innovations, better-trained staff, a larger budget, and an established Information Technology department that helps them adopt the best practices in e-government (Norris & Moon, 2005). As a result, they are more likely to have efficient and improved transparency processes and instruments and better administrative capabilities and, hence, provide more and better information to citizens (Guillamón et al., 2011; Sol, 2013; Serrano-Cinca et al., 2009; Lowatcharin & Menifield, 2015; Serrano-Cinca et al., 2009). Araújo et al. (2020) analyzed the fiscal transparency of Brazilian municipalities and found that municipalities with a population between 5,000 and 10,000 inhabitants show less compliance with the LRF than those with larger populations.

H9: The larger the population of the municipality, the higher the municipal public transparency index.

3 Methodology

In order to identify influence relations between variables through statistical tests and collect numerical data, this study adopted a quantitative and correlational approach. The sample was extracted from the 5570 Brazilian municipalities using a stratified random probability sampling technique to estimate the proportion. This is the same technique used by the EBT survey (CGU, 2016), which formulates a transparency index for some of Brazil's municipalities. Using the sampling technique adopted by government agencies and already consolidated in Brazil gives the survey a probabilistic character and makes it capable of providing robust and safe results.

In this sampling process, the sample universe is divided into strata (the 26 federal states of Brazil except for the Federal District). Each stratum is further subdivided into population strata, and then the sample is distributed proportionally in each of these smaller strata. Following the instructions of the CGU (2016), a 10% error and a 90% confidence level must be adopted with a random selection of the municipalities. Thus, through the sample calculation, 1,134 municipalities were obtained and distributed according to Table 1. The selection of the municipalities occurred randomly by drawings made for each stratum and their respective sub-stratum using the LibreOffice Calc software, and seven state capitals were randomly selected.

Table 1
Sample distribution per population stratum

Strata	Population	Universe of municipalities	Sample of municipalities
1	<= 5,000	1,237	211
2	5,000–10,000	1,209	234
3	10,000–20,000	1,364	298
4	20,000–50,000	1,101	252
5	50,000–100,000	350	75
6	100,000–500,000	268	57
7	> 500,000	41	7
Total		5,569*	1,134

Source: Adapted from CGU, 2016.
*Total Brazilian municipalities, not counting Brasília.

The data collected are of secondary origin and made available from government sources via the Internet, as listed in Table 2. The RNT used in this study consists of an index produced by the MPF that evaluates the effective compliance with the transparency laws in all municipalities, the Federal District, and 26 states of Brazil, assigning them a score. This evaluation aims, among other objectives, to take judicial and extrajudicial measures against municipalities and states in debt with the laws. The MPF uses a questionnaire for the assessments, prepared jointly with representatives from control and inspection agencies and institutions. The questionnaire is based on the legal requirements and two items that refer to good transparency practices, addressing aspects of active and passive transparency. It involves general questions about revenues, expenses, bids and contracts, reports, SIC and e-SIC, disclosure of the entity's structure, forms of contact, and good transparency practices (MPF, 2020b).

All data used in this study refer to the year 2016. The absence of political data in the following years due to the last municipal elections held in 2016 made it necessary to delimit this year as a reference for all

other types of data. This way, there is a greater standardization of the data and validity of the research results.

Table 2
Detail of the research data

Data type	Description	Reference year	Source	Variable type
Transparency	Score given by the National Transparency Ranking (RNT) of the Federal Public Prosecutor's Office.	2016	Federal Public Prosecutor's Office (MPF)	Dependent
Voter participation	Percentage of voters who went to the polls in the last municipal election.	2016	Superior Electoral Court (TSE)	Independent
Political competitiveness	Difference between the percentage of votes of the first- and second-place candidates for mayor in the last municipal election.	2016	Superior Electoral Court (TSE)	
Legislative composition	Percentage of councilors from the same political party as the mayor-elect or from one of the political parties that made up the coalition by which they were elected.	2016	Superior Electoral Court (TSE)	
Reelection	Residency condition of the mayor from the previous term.	2016	Superior Electoral Court (TSE)	
Mayor's gender	Gender of the leader of the municipal executive.	2016	Superior Electoral Court (TSE)	
Unemployment level	Percentage of the economically active population that is not in a formal job.	2016	Brazilian Institute of Geography and Statistics (IBGE)	
Annual municipal debt per capita	Value of the total consolidated debt of the municipality at the end of the year divided by the size of the population.	2016	National Treasury (SICONFI)	
Annual municipal investment per capita	The total amount of paid capital expenditures of the municipality in the year divided by the population's size.	2016	National Treasury (SICONFI)	
Population size	Estimated population of the municipality.	2016	Brazilian Institute of Geography and Statistics (IBGE)	

Source: Prepared by the authors, 2020.

Regarding the electoral participation variable, the obligatory nature of voting in Brazil constitutes a study limitation. Thus, only valid votes will be considered to circumvent this limitation, that is, the votes cast by voters for regularly registered candidates and party legends, discounting blank and null votes (Law no. 9.504, 1997).

The data were submitted to descriptive analysis and Poisson regression to allow the proposed objective to be reached. Three models were tested: the first (i1) aims to verify the influence of political variables on the municipal public transparency index; the second (i2) seeks to investigate the influence of socioeconomic indices on the municipal public transparency index; the third (i3) is composed of the union of the first two, testing the influence of nine variables (political and socioeconomic) on the municipal public transparency index.

Poisson regression was used in this research because of its application in previous studies investigating the determinants of transparency (Bernardo et al., 2017), with the argument that the dependent variables were composed of integer values and with little variability. In addition, when choosing this technique, we considered the non-normality of the data distribution of the dependent variable (transparency). This characteristic prevents the application of the most common model analysis techniques, such as linear regression (Alvarenga, 2015).

Poisson regression is one of the techniques of generalized linear models, whose distribution of the response variable does not have to be normal, contrary to the linear models most commonly used to test influence relationships between variables (Alvarenga, 2015). In order to correctly apply the Poisson model, it is necessary for (1) the data to be absolute values and not negative and (2) the data to have a Poisson distribution (i.e., the data must have equal dispersion), with its mean equal to the variance (Fávero, 2014; Fávero & Belfiore, 2017).

The first assumption was met by rounding the data of the dependent variable, the transparency score. Thus, scores from 0 to 0.5, for instance, were considered 0, scores from 0.6 to 1.0 were classified as 1.0, scores from 9.0 to 9.5 were considered 9.0, and scores from 9.6 to 10.0 were considered 10.0. The second, however, was verified using the dispersion test, whose values obtained as results were close to 1 (Table 3), demonstrating that the mean is equal or very similar to the variance (Fávero & Belfiore, 2017).

In addition to the assumptions, other statistics must be observed when estimating a Poisson regression model; these statistics are listed in Table 4. The R^2 represents the percentage of variation in the response that the model explains. In the adjusted R^2, this percentage is adjusted for the number of predictors in the model relative to the number of observations. The Akaike information criterion (AIC), like the likelihood function, also indicates which model is the best fit, finding the lowest AIC. Finally, the Shapiro-Wilk test is used to verify the normality of the model's residuals. Models with p-values above 0.05 ($p > 0.05$) have normal residuals.

Given the above, we decided to apply Poisson regression with grouped values. Thus, the mean values for each group of numerical variables were obtained, considering the rounded transparency value. The treatment of missing data, which could not be obtained during data collection, consisted of excluding the sample element, in this case, the municipality.

4 Analysis of Results

Transparency, the dependent variable of this study, is represented by the score of the second evaluation of the RNT that occurred in 2016. The descriptive statistics show that the average transparency of the municipalities was 5.09 (± 2.86) (Table 3). This score is relatively low since it makes up the seventh among the eleven classification categories of the RNT.

Table 3
Statistics for the transparency variable

Statistics	Values
Number of valid votes	1134
Average	5.0344
Median	5.3000
Mode	0.00
Standard model	2.8464
Variance	8.10
Minimum	0.00
Maximum	10.00

Source: Prepared by the author, 2020.

A total of 72 Brazilian municipalities in the sample presented a score of 0, according to the RNT (MPF, 2016), and only 26 reached the maximum score of 10. Therefore, the score of 0 is the mode of transparency in the sample. The list of these municipalities can be found in Appendix F. The median indicates that 50% of the municipalities in the sample have a transparency score higher/lower than 5.30.

When performing a descriptive analysis that categorizes the municipalities of the sample by the characteristic of being or not a state capital, one can see, through Table 4 a more satisfactory level of transparency in the capital cities. The capitals have an average score of 8.07; the most frequently observed score among these municipalities is 10.

Table 4
Descriptive analysis of the transparency variable for capitals and non-capitals

Feature	Number of municipalities in the sample	% of the 0 scores	Mode of the scores	Average scores	Absolute sample population	% of the absolute population
Capital	7	0	10.00	8.07	5,580,178	14.30
Non-capital	1127	6.39	0.00	5.30	33,438,355	85.70

Source: Prepared by the authors, 2020.

No capital city scored zero on the index. This result, analyzed with the high demographic concentration in Brazilian capitals, indicates that many of the inhabitants have access to information in the cities where they live. Only seven capitals concentrate 14.30% of the population residing in the evaluated cities. The situation is the opposite in the other municipalities that make up the sample. In them, the transparency index is only 5.30, and 72 municipalities (6.39%) were evaluated with a score of zero, indicating that the information for transparency is still deficient in many cities of Brazil that are not characterized as capitals.

Therefore, we observed that the overall average transparency of the municipalities analyzed is consistent with the average for all Brazilian municipalities (5.21) (MPF, 2016), despite being low (5.03), especially when compared to the average transparency of the capital cities (8.07). This fact highlights a

probable difficulty encountered by citizens who reside in Brazilian cities that are not capitals in the search for information about public management.

The discussion of the other variables in the study also helps understand the situation in which the Brazilian municipalities find themselves. The municipalities in the sample have an average of 34,408 inhabitants and high unemployment rates (86.84%), reaching 99.6% in Alto Alegre do Pindaré and São Roberto, two municipalities in Maranhão State. The high rates, nonetheless, disregard informal jobs, growing in periods of economic recession, and rural workers in large numbers in small municipalities in the countryside. However, Barueri (São Paulo State) has an unemployment rate of 0% (IBGE, 2016), the lowest rate among the municipalities in the sample.

The average per capita investment of the municipalities (R$ 158.78) is lower than the average per capita debt (R$ 595.08), indicating the difficulty in achieving the balance of public accounts. The fact that some municipalities did not make any investments in the period (Itaubal, Amapá State; Mazagão, Amapá State; Hidrolina, Goiás State; Cajari, Maranhão State; Sampaio, Tocantins State) and the absence of debt in 155 municipalities, deserves to be highlighted.

Regarding the political variables, the average electoral participation is high (79.01%). This data, however, does not indicate society's interest in political and public issues since it refers to voting, which is compulsory in Brazil. Political competitiveness, on average, is high (14.77%). Among the municipalities in the sample, 22 presented zero competitiveness due to the achievement of consensus, with only one candidate for the municipality's mayor post. Regarding the legislative composition, on average, 52.18% of the councilors elected in the municipalities belong to the same political party as the mayor or to one of the parties that made up the coalition through which the mayor was elected.

Still, 264 municipalities in the sample (22.5%) reelected their mayors in 2016, and only 135 (11.9%) are governed by women. This finding matches the political reality of Brazil, in which only 11.57% of women were elected mayors in the 2016 elections (Superior Electoral Court, 2016). According to IBGE (2018), in 2017, when the new mayors took office, women represented 11.8% of Brazilian mayors.

In order to achieve the general objective of this study and identify the variables that influence the municipal public transparency index, Poisson regression analyses were performed for each of the three proposed models, and the results are presented in Table 5.

Model i1, referring to political variables, presents low R^2, explaining only 14% of the variability of the transparency index for Brazilian municipalities. In terms of fit, this model has high fragility, as noted by the dispersion test, whose result (1.75) is the worst among the three models, by the value of the adjusted R^2 (0.02) and the Shapiro-Wilk Test ($p > 0.05$), which verifies the normality of the residuals. Similar to this model, Birskyte (2018) also found that electoral participation negatively affects budget transparency when testing political and socioeconomic variables. In a model composed solely of political variables, although the author found that electoral participation positively influences the budget transparency index. Other studies have reported no significant influence of electoral participation on the municipal public transparency index (Tavares & Cruz, 2017; Sol, 2013), the municipal financial transparency index (Guillamón et al., 2011), and the budget transparency index (Caamaño-Alegre et al., 2013).

The results for model i1 demonstrated the existence of a very particular reality in the transparency of Brazilian municipalities compared to other countries. While in studies conducted in European countries, various political variables influence the municipal public transparency index (García & García-García, 2010; Esteller-Moré & Polo-Otero, 2012; Araujo & Tejedo-Romero, 2016a, 2017; Arapis & Reitano, 2017; Tavares & Cruz, 2017; Birskyte, 2018; Chen & Han, 2018; Piña & Avellaneda, 2018), in Brazil they are not responsible for the variations in the index. This may indicate that Brazilian municipal transparency is more strongly determined by social factors, as presented in the socioeconomic model (i2).

The socioeconomic model (i2) can explain 54% of the transparency index of Brazilian municipalities. The adjustments are adequate, with a dispersion of 1.19, adjusted $R^2 = 0.49$, and normal residuals ($p > 0.05$). Furthermore, the AIC indicated model i2 as the best fit among the three models. Nevertheless, the model, as with model i1, presents only one significant variable, the level of unemployment, at the 1% level.

The influence of unemployment on transparency is negative, confirming H6. Thus, the municipal public transparency index decreases as the unemployment level increases. For each 1% change in the unemployment rate, the transparency index decreases by 0.402. Similar results were obtained by Cuadrado-Balesteros (2014) and Tavares and Cruz (2017) when investigating the determinants of public transparency in Spanish and Portuguese municipalities, respectively, and Caamaño-Alegre et al. (2013) in an analysis of municipal budget transparency in Galicia, Spain. Additionally, Araujo and Tejedo-Romero (2016a) found a negative relationship between unemployment and transparency, thus reinforcing the relevance of this indicator for the topic and justifying that policies to reduce unemployment can contribute to a more efficient public management, feeding back the development of regions and bringing benefits with spillover effects in the territory.

Lastly, the i3 model, through the R^2, presents a capacity to explain 61% of the variability of the transparency index for Brazilian municipalities. The quality of this model and data fit are also satisfactory, as seen by the results of the dispersion test (1.01), the adjusted R^2 (0.49), and the Shapiro-Wilk test ($p > 0.05$).

Table 5
Results of the regression models

		Transparency index					
		Model i1	Marginal effects¹	Model i2	Marginal effects	Model i3	Marginal effects
Voter participation	Coefficient	0.050***	0.2524***			-0.02	-0.102
	standard error	(0.017)	(0.088)			(0.026)	(0.129)
Political competitiveness	Coefficient	0.014	0.069			-0.001	-0.003
	Standard error	(0.009)	(0.044)			(0.01)	(0.051)
Legislative composition	Coefficient	-0.013	-0.067			0.018	0.088
	Standard error	(0.01)	(0.050)			(0.014)	(0.072)
Reelection	Coefficient	-0.135	-0.687			0.197	0.995
	Standard error	(0.192)	(0.984)			(0.239)	(1.212)
Mayor's gender	Coefficient	0.088	0.443			-0.482***	-2.566***
	Standard error	(0.148)	(0.746)			(0.184)	(1.049)
Unemployment level	Coefficient			-0.080***	-0.402***	-0.110***	-0.555***
	Standard error			(0.021)	(0.111)	(0.025)	(0.131)
Annual municipal debt (per capita)	Coefficient			0.000	-0.001	0.000	-0.001
	Standard error			(0.0004)	(0.002)	(0.0004)	(0.002)
Annual municipal investment (per capita)	Coefficient			0.001	0.003	0.001	0.002
	Standard error			(0.0005)	(0.002)	(0.001)	(0.004)
Population size	Coefficient			0.000	0.000	0.000	0.000
	Standard error			(0.000)	(0.000)	(0.000)	(0.000)
Constant	Coefficient	-1.798		8.419***		11.810***	
	Standard error	(1.508)		(1.986)		(3.174)	
Dispersion		1.750		1.190		1.010	
R^2		0.140		0.540		0.610	
R^2 adjusted		0.020		0.490		0.490	
Shapiro-Wilk test (*p*-value)		0,120		0.440		0.390	
Observations		41		41		41	
AIC		226.6		194.8		196	

Source: Prepared by the author, 2020.
Note: The values in parentheses are the robust standard errors estimated by the White method and *, **, and *** correspond to the significance at the 10, 5, and 1% levels, respectively.
¹ Marginal effects are not presented for the mayor's reelection and gender variables due to their qualitative nature.

Only two variables in model i3 are responsible for influencing transparency: the gender of the mayor and the level of unemployment. The unemployment level, once again, presents a significance level of 1% and negatively influences the municipal public transparency index. In this model, the marginal effects indicate that for each 1% increase in the unemployment level, transparency is reduced by 0.555. The mayor's gender variable, significant at the 1% level, indicates that municipalities whose mayors are men are more transparent than those governed by women, thereby refuting H5.

This result contrasts Araujo and Tejedo-Romero (2017) and Tavares and Cruz (2017), who found that Spanish and Portuguese municipalities, respectively, that have women at the head of government, are more transparent. Araujo and Tejedo-Romero (2016b) also obtained the same result in a panel study conducted with Spanish municipalities. Hence, the evidence obtained in this study must be considered in the Brazilian context, as it has a history of low female access to leadership positions at municipal levels, which is linked both to the mechanisms of incentives for political party participation and the restrictions and challenges to develop the role of women in society as a whole, in various aspects, being culturally dependent on the territorial and social fabric. Furthermore, analyses that consider more extended periods of observation on the evolution, advances, and impacts of women's leadership on indicators at the municipal level are warranted.

5 Final Considerations

In recent years, transparency has become a critical tool to increase legitimacy and trust in government, improve citizen participation, and combat corruption (Cruz et al., 2016). Without transparency, integrity and good performance of public management are not demonstrated, and accountability mechanisms are not enforceable. This study collaborated to advance knowledge on municipal public transparency and sought to verify the influence of political and socioeconomic variables on the public

transparency index of Brazilian municipalities. Our findings revealed that the average public transparency of the evaluated municipalities in the RNT is 5.03, which is close to the average of all 5,570 Brazilian municipalities (5.21) (MPF, 2016). State capitals and municipalities of greater population size have much higher scores than smaller municipalities, indicating a probable difficulty for citizens who reside in the Brazilian countryside and small towns in the search for information on the management of their municipalities.

Among the three regression models tested, models i2 and i3 showed the best results, the first composed only of socioeconomic variables and the second based on the base model of Araujo and Tejedo-Romero (2016a). Model i3 was better adjusted utilizing the R^2, while the AIC indicated model i2 as the best fit. The variables that influence the transparency index were electoral participation, the mayor's gender, and, especially, the unemployment level, which was significant in two of the tested models.

These findings suggest that higher voter participation rates in municipal elections lead to a higher transparency index. Conversely, municipalities with high unemployment levels have lower transparency rates. Regarding the gender variable, Brazilian municipalities run by men are more transparent than those run by women. This last result was not found in any other study previously conducted, evidencing a particular characteristic of municipal transparency in Brazil, possibly affected by the inexpressive number of women in Brazilian politics and, especially, in the leadership of the executive power of the municipalities. According to Jevoux (2018), there are numerous obstacles capable of interfering with the candidacy of women for municipal leadership positions, including sexist barriers in the parties, meetings with low female presence, judgments linked exclusively to the gender of the public representative and not to their performance, in addition to the violence of Brazilian society, which is patriarchal, sexist, and cowers the desire of women to enter politics.

It is understood that the results enable a better understanding of municipal public transparency and, consequently, the possibility of public managers manipulating the variables that affect it to raise it. In this sense, initiatives to increase electoral participation in the next municipal elections can raise transparency scores. Similarly, opening new jobs, possibly achieved through incentives to companies that make up the municipality's private sector, can make it more transparent. Furthermore, this study's data can support public managers to justify to the citizens the score obtained by their municipalities in the transparency index when it is impossible to control the variables that determine it.

In addition to the practical contributions, this study also contributes to the theoretical-scientific development of transparency, filling gaps in research on the subject. One of these gaps is the absence of a Brazilian study that analyzes municipal public transparency, considering its active and passive dimensions — included in the RNT transparency index —that takes all municipalities in Brazil as the study population. Another existing gap is the absence of research addressing political variables' influence on the public transparency index. Additionally, this study innovates by investigating variables not previously analyzed, such as reelection and legislative composition. Furthermore, applying Poisson regression to estimate the proposed model can be considered a differential, as few studies on transparency and the factors influencing it have utilized this technique.

Despite filling gaps in the scientific production on transparency and presenting results that allow for some practical applications, this study has some limitations. The non-compliance with the LRF determinations, through the publication of the Fiscal Management Reports and Balance Sheet in the Accounting and Tax Information System, made it impossible to collect data referring to the annual per capita debt and annual per capita investment of some municipalities. This limitation highlights the fragility of public transparency in Brazil and the need to disseminate its importance. The period to which the data refer can also be cited as a limitation. Due to the last municipal elections having taken place in 2016 and the need for electoral data, all the data collected, including those of a socioeconomic nature, are relative to this period and may not be considered current.

It is recommended that future research include new variables, both political and economic, analysis by region, and the application of studies based on data from the 2020 municipal elections. Another critical step that national research on transparency must take is to conduct experimental studies. Research in national journals can shed more light on the inexistence of scientific production with the use of experiments (Visentini et al., 2019), while in the international literature on the subject, this type of study is quite widespread (Cucciniello et al., 2016).

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NOTES

AUTHORSHIP CONTRIBUTION
Conception and preparation of the manuscript: V. U. Fenner, M. S. Visentini, F. S. Smolski
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Data analysis: V. U. Fenner, M. S. Visentini, F. S. Smolski
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