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Influence of socio-economic, financial-budgetary and political-electoral aspects on the transparency of local governments

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This study aims to analyze the influence of socioeconomic, financial-budgetary and political-electoral aspects on the active and passive transparency of Brazilian local governments. From 3,550 Brazilian municipalities, a resampling of 100,000 samples was performed using the multiple linear regression method with cross-sectional data, obtaining better data robustness and reliability. The results indicate that in larger municipalities there is a greater propensity to actively disseminate information to reduce agency costs. A population with higher per capita income and better educated tend to demand more information, seeking to know where is the taxpayers' money invested. Capital investments are important to society, so it is expected that the level of transparency will be higher where there is more spending of this kind. Electoral competition require public managers to be more transparent toward their opponents and population to confirm their pre-election promises.
Keywords: transparency; disclosure; public choice theory; public administration; local governments.

Influência dos aspectos socioeconômicos, financeiro-orçamentários e político-eleitorais na transparência dos governos locais

Este estudo tem por objetivo analisar a influência dos aspectos socioeconômicos, financeiro-orçamentários e político-eleitorais na transparência ativa e passiva dos governos locais brasileiros. A partir de 3.550 municípios brasileiros, realizou-se a reamostragem de 100.000 amostras e, utilizando o método de regressão linear múltipla com dados de seção transversal, obteve-se melhor robustez e confiabilidade dos dados. Os resultados indicam que em municípios maiores existe maior propensão a divulgar informações de modo ativo para diminuir os custos de agência. Uma população com renda *per capita* elevada exige mais informações, pois busca saber onde seus impostos são aplicados, o que exige uma sociedade mais bem-educada. Os investimentos de capital são de interesse da sociedade, por isso se espera que o nível de transparência seja maior onde houver mais gastos desse tipo. A competição eleitoral exige do gestor público uma postura mais transparente diante de seus adversários e da população para confirmar suas promessas pré-eleitorais.
Palavras-chave: transparência; divulgação; teoria da escolha pública; gestão pública; municípios.

Influencia de los aspectos socioeconómicos, financiero-presupuestarios y políticos-electorales en la transparencia de los gobiernos locales

Este estudio tiene como objetivo analizar la influencia de los aspectos socioeconómicos, financiero-presupuestarios y políticos electorales en la transparencia activa y pasiva de los gobiernos locales brasileños. A partir de 3.550 municipios brasileños, se realizó el remuestreo de 100.000 muestras y, utilizando el método de regresión lineal múltiple con datos de sección transversal, fue posible obtener una mejor robustez y confiabilidad de los datos. Los resultados indican que en municipios mayores existe una mayor propensión a divulgar información de forma activa para disminuir los costos de agencia. Una población de renta per cápita elevada exige más información, pues busca saber dónde se aplican sus impuestos, lo que exige una sociedad mejor educada. Las inversiones de capital son de interés de la sociedad, por lo que se espera que el nivel de transparencia sea mayor donde haya más gastos de este tipo. La competencia electoral exige del gestor público una postura más transparente frente a sus adversarios y población para confirmar sus promesas preelectorales.
Palabras clave: transparencia; divulgación; teoría de la elección pública; gestión pública; municipios.

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1. INTRODUCTION

The discussion on public transparency is necessary to understand the advantages and disadvantages of its use and the dynamics and complexity of this phenomenon. (Bannister & Connolly, 2011; Etzioni, 2010; Grimmelikhuijsen & Welch, 2012; Meijer, 2009). Transparency is a challenge for current and future public administration reform, as well as for more modern and efficient governance (Piotrowski & Van Ryzin, 2007).

Public transparency involves making information continually available to interested external individuals and is used to improve understanding of what the government has been doing (Meijer, 2013; Porumbescu, 2015). Such definition covers two types of disclosure: a) active transparency, which is proactively developed by the agency; b) passive transparency, when the entity responds reactively to external demands through requests for information (Grimmelikhuijsen & Welch, 2012).

Transparency makes it possible to monitor and evaluate the performance of representatives and public servants, characterizing itself as an essential component of good governance and institutional quality (Sol, 2013); it is built through complex interactions between various political and social actors, within the set of formal and informal rules, with the availability of a variety of new and continually changing technologies (Meijer, 2013).

Transparency is desirable from an economic perspective as it increases efficiency in resource allocation, reducing problems between principal and agent (Hölmstrom, 1979), discouraging income-seeking activities (Calderón & Chong, 2006). However, the asymmetry in information distorts this relation (Lane, 2006), justified by the limited rationality of the individuals (Oliveira & Fontes, 2017).

People, while the utility maximizers, (Buchanan & Tullock, 1962), selfish and rational (Mueller, 1976), may explain the behavior of politicians in charge of public management (Buchanan & Tullock, 1962; Mueller, 1976). These theoretical perspectives can be used to understand the dynamics of transparency in Brazilian local governments.

Studies have addressed the impact of social, economic, political, organizational, and institutional factors on the disclosure of financial information in the public sector. However, aspects related to the political cycle still seem unexplored by these studies for Brazilian local governments. Therefore, this study advances and includes political and electoral aspects as variables of interest. Thus, the objective of this research is to analyze the influence of socioeconomic, financial-budgetary, and political-electoral aspects on the active and passive transparency of Brazilian local governments.

2. THEORETICAL FOUNDATION

Transparency involves the disclosure of information by an organization that enables external agents to monitor and evaluate its internal functioning and performance. Transparency can be proactively developed, called *active transparency*, or it can be a response to society's information demands, called *passive transparency*. (Grimmelikhuijsen & Welch, 2012).

Transparency becomes fundamental in a democratic environment in which government actions must be transparent and knowledgeable of the people, to allow them to be held accountable, accountable and punished for acts that do not improve the conditions of society (Cross, 1953). Many

countries have adopted freedom of information as a law (Cucciniello & Nasi, 2014; Meijer, 2013), including Brazil, through Law no. 12.527 (Lei de Acesso à Informação, 2011).

The participation of citizens show various advantages for governments and the citizens themselves (Irvin & Stansbury, 2004); society involvement can improve strategic decision-making processes and produce efficiency benefits for society as a whole (Randolph & Bauer, 1999). This kind of participation improves the conduct and choices of public policies but only becomes possible if there is transparency of government actions towards society (Cucciniello & Nasi, 2014).

Related theories seek to explain why politicians are encouraged to adopt more transparent practices (Alesina & Perotti, 1996). More transparency minimizes de moral hazard problem[1], facilitating public control, which makes corruption decrease. This finding is in line with the assumption that the probability of an individual committing a crime depends on the risk taken, the possible gain, and the probable punishment (Becker, 1968). That is, transparency increases the risk of the perpetrator being caught (Sol, 2013).

Regarding the determinants of public transparency, there are different incentives for the disclosure of information (Alcaide Muñoz, Rodríguez Bolívar, & López Hernández, 2016). In this study, three main categories were grouped: a) socioeconomic conditions; b) financial and budgetary conditions; and c) political and electoral conditions.

Among the socioeconomic aspects, one of the characteristics that have been observed is the size of the municipality, measured through the population. Agency costs and the conflict of interest with citizens are more evident in municipalities with more significant numbers of inhabitants, which is justified by the presence of information asymmetry between politicians and citizens. Therefore, information disclosure reduces these agency costs and information asymmetry, allowing managers to evaluate their performance (Serrano-Cinca, Rueda-Tomás, & Portillo-Tarragona, 2009; Zimmerman, 1977).

However, in a study with local governments in Spain that discussed fiscal transparency, the same result was not obtained, and a negative relationship was observed (Esteller-Moré & Otero, 2012). Thus, Hypothesis 1 is created:

H1: The number of inhabitants influences the public transparency of Brazilian municipalities positively.

Municipal income is also another determinant. In situations with high *per capita* municipal income, people expect better service and more information to confirm that their taxes are being spent effectively (Alcaide Muñoz et al., 2016; Cheng, 1992; Giroux, 1989; Ingram, 1984). Public managers are interested in disclosing financial statements and other public information in order to confirm to citizens the management of public finances and to influence citizens' opinions on the impacts of public policies (Alcaide Muñoz et al., 2016).

[1] M*oral hazard*: possibility of an economic agent modifying its behavior according to the different contexts in which economic transactions occur.

Municipal income should be positively associated with public transparency because it provides a signal of quality management, which benefits local politicians, increases their chances of reelection, and lowers agency costs (Gandía & Archidona, 2008). Nevertheless, a study conducted in municipalities in Italy and Spain found a negative association (Guillamón, Ríos, Gesuele, & Metallo, 2016). Thus, Hypothesis 2 is created:

H2: Municipal income influences the public transparency of Brazilian municipalities positively.

A highly educated population puts pressure on public administrations to disclose information, which will increase the level of transparency (Guillamón et al., 2016), suggesting a positive influence. Nonetheless, this same relationship was not significant in other studies conducted in Spain, in countries joining the Organisation for Economic Co-operation and Development (OECD) and in Italy (Caba Perez, Rodríguez Bolívar, & López Hernández, 2014; Guillamón et al., 2016; Serrano-Cinca et al., 2009). Differences in the organizational culture, the accounting regime, e the government level (Alcaide Muñoz et al., 2016) may explain these results. Thus, Hypothesis 3 is created:

H3: The level of educational development influences the public transparency of Brazilian municipalities positively.

The region where the municipality is located can also be a determinant of transparency, especially in the Brazilian case, where a sizeable territorial extension is perceived, with very distinct socioeconomic situations between the regions. Therefore, it is expected that this relationship will be distinct among the different Brazilian geographic regions. In the literature, it was also observed that with municipalities of different countries a control variable was used to distinguish the different regions considering the economic aspects of each one (Gallego-Álvarez, Rodríguez-Domínguez, & García-Sánchez, 2010). Thus, Hypothesis 4 is created:

H4: The region influences the public transparency of Brazilian municipalities positively.

Financial and budgetary conditions are related to the need for governments to implement structures and practices to demonstrate that they are fulfilling their duty of transparency and accountability in the use of public resources (Alcaide Muñoz et al., 2016). Thus, we seek to verify the effect of the financial condition, debt, intergovernmental transfers, and capital investments of municipalities on public transparency.

The government's local financial condition is positively related to managers' motivation to provide public information (Alcaide Muñoz et al., 2016; Ingram, 1984). This variable represents the financial credibility (Ingram, 1984), as well as reflects the government's ability to meet its debt repayment commitments (Giroux & Deis, 1993).

Public managers are encouraged to disclose public financial information as a mechanism to allow their actions to be monitored (Cárcaba García & García García, 2010).

There are studies that found a negative relationship with the financial situation in Brazil (Fiirst, Costa, Baldissera, & Dall'Asta, 2017), or even failed to prove the variation of this public financial situation with public transparency in the local governments of the United States of America (USA) (Giroux, 1989), in the local governments of Italy and Spain (Guillamón et al., 2016) and also in the

Spanish local governments (Serrano-Cinca et al., 2009). However, it is expected that the better-off Brazilian municipalities will be more transparent. Thus, Hypothesis 5 is created:

H5: The municipal financial influences positively on the public transparency of Brazilian municipalities.

Debt is another variable of interest in this study. Higher debt levels diminish the government's ability to meet demands for services (Rodríguez Bolívar, Alcaide Muñoz, & López Hernández, 2013). Public managers reduce the debt because it lowers property taxes, which are reflected in more votes for politicians (Caba Perez et al., 2014), and, furthermore, to reduce borrowing costs, which tends to increase the welfare of this politician (Caba Perez et al., 2014; Zimmerman, 1977).

Managers are motivated to reduce debt and provide information to facilitate the monitoring of their actions. (Laswad, Fisher, & Oyelere, 2005), which would suggest a positive (Ríos, Benito, & Bastida, 2013). However, this relationship is not consistent in all studies; some have already obtained evidence of a negative relationship (Alt & Lassen, 2006; Caba Perez et al., 2014; Cheng, 1992; Smith, 2004). The negative relationship is justified by the fact that it would be a means of assessing the accountability and effectiveness of government agencies, especially when the debt level is low (Caba Perez et al., 2014). Thus, Hypothesis 6 is created:

H6: Municipal debt influences negatively on the public transparency of Brazilian municipalities.

Dependence on intergovernmental transfer resources requires the recipient to disclose more information to justify the use of incoming transfers, demonstrating that the choices of public managers are in line with their responsibilities (Alcaide Muñoz et al., 2016; Rodríguez Bolívar et al., 2013). However, this relationship may be contrary. Increased intergovernmental resource receipts stimulate a disproportionate increase in spending on the recipient (flypaper effect) (Mota, Diniz, & Santos, 2017). Thus, Hypothesis 7 is created:

H7: Intergovernmental transfers influence positively on the public transparency of Brazilian municipalities.

Common sense leads one to believe that politicians, when performing public works, tend to make this clear to the whole of society. This idea is in line with theoretical aspects and empirical evidence related to capital investments, except for a study in Brazil that did not find a significant association (Fiirst et al., 2017). Significant investment efforts in public projects positively impact citizens. Therefore, public managers are involved in projects with significant investments and use transparency to disclose this type of information (Cárcaba García & García García, 2010). Thus, Hypothesis 8 is created:

H8: Capital investment influences positively on the public transparency of Brazilian municipalities.

Dissemination of information can be a technique used to mitigate problems between opposition political parties, as well as the ability to influence retention or reelection. For this reason, the use of

variables such as political competition, political orientation, and party coalition has been consecrated in the studies. The electoral mandate has not yet been a variable addressed in other studies as a determinant of transparency.

Political competition is a variable of interest in this study. Politicians ignore their pre-election promises after taking office, giving priority to their interests and disregarding the public good, as they are aware of the difficulty of citizens exercising effective control of public management (Alcaide Muñoz et al., 2016; Cárcaba García & García García, 2010).

Strong opposition requires responsible management; otherwise, it will send signals citizens of any divergences in their electoral program (Alcaide Muñoz et al., 2016; Giroux, 1989; Serrano-Cinca et al., 2009). Therefore, the higher the political competition, the more incentive the manager has to fulfill his or her pre-election promises (Alcaide Muñoz et al., 2016; Baber, 1983; Caba Pérez, Rodríguez Bolívar, & López Hernández, 2008; Gandía & Archidona, 2008).

Although there are studies that have not proven the significant relationship (Caba Pérez et al., 2008; García-Sánchez, Frías-Aceituno, & Rodríguez-Domínguez, 2013; Laswad et al., 2005; Serrano-Cinca et al., 2009; Smith, 2004), or even contrary to transparency (Cheng, 1992; Esteller-Moré & Otero, 2012; Ríos et al., 2013), most of the literature is directed to positive association (Alcaide Muñoz et al., 2016; Caba Perez et al., 2014; Cárcaba García & García García, 2010; Gallego-Álvarez et al., 2010; Gandía & Archidona, 2008; Ingram, 1984; Rodríguez Bolívar et al., 2013). This diversity of outcome is justified by the institutional and economic differences of each government (Puron-Cid & Bolívar, 2018). Thus, Hypothesis 9 is created:

H9: Political competition influences positively on the public transparency of Brazilian municipalities.

Discussions on the left or right wings of the political spectrum are also present on the theme of transparency. Left-wing parties favor increased public spending, while right-wing parties aim for budget cuts. However, the direction of influence depends on the nature of the information of the local government at stake and the ruling party at that time (Piotrowski & Van Ryzin, 2007).

Previous evidence indicates that leftmost parties have a higher level of transparency (Caamaño-Alegre, Lago-Peñas, Reyes-Santias, & Santiago-Boubeta, 2013; Sol, 2013), and, on the other hand, rightmost parties demonstrate a lower level of transparency (García-Sánchez et al., 2013; Guillamón, Bastida, & Benito, 2011; Ríos et al., 2013). Thus, Hypothesis 10 is created:

H10a: Rightmost political orientation influences the public transparency of Brazilian municipalities negatively.

H10b: Leftmost political orientation influences the public transparency of Brazilian municipalities positively.

Party coalition between governments is associated with political stability. This stability may lead to the advancement of government-related activities, which only makes it possible to occur if the government proves transparent; otherwise, it would not be able to advance its public policies (Gallego-

Álvarez et al., 2010). This coincidence of political orientation between different levels of government may portray a political dimension that encourages (Puron-Cid & Bolívar, 2018).

However, although the empirical evidence is inconclusive (Gallego-Álvarez et al., 2010; Puron-Cid & Bolívar, 2018; Serrano-Cinca et al., 2009), another study showed a significant but negative association (Caamaño-Alegre et al., 2013). Thus, Hypothesis 11 is created:

H11: The party coalition has a negative and significant influence on the public transparency of Brazilian municipalities.

The last variable represents the electoral mandate. Given the assumption that managers behave opportunistically, those in their first term are expected to have more incentive to behave in this manner compared to those in their second term (Rogoff, 1990).

Managers who provide higher returns in the first term are more likely to be reelected (Besley & Case, 1995). Previous evidence confirms that when governors are candidates for reelection, economic activity is higher, and taxes are lower (Alt, Mesquita, & Rose, 2011). Given this behavior, politicians are expected to be encouraged to disclose information on their sound management practices in the first term for reelection for the next term. Thus, Hypothesis 12 is created:

H12: The electoral term of office has a positive and significant influence on the public transparency of Brazilian municipalities.

3. METHODOLOGY

3.1 Research Sample

This study investigated Brazilian local governments, since they are closer to society and, therefore, the behavior of the manager may be related to the control performed by society (Sol, 2013); the total number of Brazilian municipalities is 5,570.

For the sample selection of this research, some municipalities were excluded because they did not present data in one or more of the variables used in this study, and, in other cases, the data generated by the municipality presented inconsistencies. In the end, there were 3,550 municipalities.

3.2 Definition of variables

Transparency-related variables were obtained from the *Ranking Nacional de Transparência* (National Transparency Ranking) conducted by the Federal Prosecution Office (MPF, N/A). This transparency index is based on compliance by municipalities with Active Transparency requirements (20 items evaluated; Cronbach's alpha = 0.93), Passive Transparency (10 items evaluated; Cronbach's alpha = 0.89), and Good Transparency Practices (2 items evaluated; Cronbach's alpha = 0.57). Cronbach's alpha shows that, except for Good Transparency Practices, as it has only two items evaluated, all the others showed high internal reliability in the referred items, so that the index evaluated reflects the transparency of each item.

Each item has a different relevance for the total composition of the municipality's transparency index, so it considers the impact of that item concerning transparency as a whole.

This index was prepared by the controlling institutions and is based essentially on the legal requirements (Constitution of the Federative Republic of Brazil [CF], 1988; Complementary Law no. 101 [Lei de Responsabilidade Fiscal - LRF (Tax Liability Law)], 2000; Decree no. 7,185, 2010; Lei de Acesso à Informação – LAI (Access to Information Law), 2011; Supreme Federal Court [STF], 2015), except for items related to "Good Transparency Practices," which include non-mandatory items but considered voluntary disclosure.

This index is a comprehensive one that includes the different legal requirements to which municipalities are subjected, so its final assessment represents the mandatory (active and passive) and voluntary (good practices) transparency of the municipality.

Independent variables refer to socioeconomic, financial-budgetary, and political-electoral conditions. The group of socioeconomic variables, represented by the number of inhabitants, per capita income, and region, were collected on the website of the Brazilian Institute of Geography and Statistics (IBGE, 2010). For assessing the level of educational development, data from the Industry Federation of the State of Rio de Janeiro (FIRJAN, N/A) were used. The financial-budgetary variables were obtained from the National Treasury Secretariat's website (STN, N/A). Finally, the political-electoral variables were obtained from the portal of the Superior Electoral Court (TSE, N/A). The definition, measurement, and description of each of the variables are shown in Box 1.

BOX 1 DEFINITION OF STUDY VARIABLES

Variable	Code	Measurement	Description	Year
		DEPENDENT VARIABLES		
		TRANSPARENCY		
General Transparency	GT	Checklist, which involves regulation by LAI, LRF e LT.	An indicator that aims to assess the degree of compliance with legal provisions regarding transparency.	2016
Active Transparency	AT	General information; revenue; expense; bids and contracts; reports.	It involves aspects related to the disclosure of information regardless of the citizens' request.	2016
Passive Transparency	PT	Citizen Information Service (SIC); Electronic System for the Citizen Information Service (e-SIC); Disclosure of structure and form of contact.	It involves aspects related to information disclosure to meet citizens' requirements.	2016
Good Transparency Practices	GTP	Individual remuneration by public agent; individual and complete daily rates and ticket fees.	It involves non-mandatory aspects, but which comply with good transparency practices.	2016

Continue

Variable	Code	Measurement	Description	Year
INDEPENDENT VARIABLES				
SOCIOECONOMIC FACTORS				
Population	POP	Natural logarithm of the number of inhabitants of the municipality.	The number of inhabitants of a given municipality.	2016
Per capita income	INCOME1	*Per capita* income: the sum of income per household divided by the number of residents.	It represents the sum of monthly household income, in reais (BRL), divided by the number of residents.	2010
	INCOME2	Gini index: the income gap between the richest and the poorest.	It represents the degree of income concentration.	2010
FIRJAN index of Municipal Development - Education	EDUC	Enrollment in early childhood education; Dropout in elementary school; age-grade distortion in elementary school; Teachers with Higher Education in Elementary School; Average daily class hours in elementary school; Result of the Basic Education Development Index (IDEB) in Elementary School.	The index that calculates the socioeconomic development of Brazilian municipalities, based on education.	2013
Region (REG)	N	Categorical dummy: (1) If the municipality is located in the northern region; (0) If the municipality is not located in the North region.	Brazilian geographic regions: North (N), Northeast (NE), Central-West (CW), Southeast (SE), South (S). Southeast is the reference region.	2016
	NE	Categorical dummy: (1) If the municipality is located in the Northeast region; (0) If the municipality is not located in the Northeast region.		
	CW	Categorical dummy: (1) If the municipality is located in the Central-West region; (0) If the municipality is not located in the Central-West region.		
	S	Categorical dummy: (1) If the municipality is located in the South region; (0) If the municipality is not located in the South region.		
FINANCIAL AND BUDGETARY FACTORS				
Current Budget Execution Index	CBEI	$CEBEI = \frac{CRE}{CEE}$ Where: *CBEI* = Current Budget Execution Index; *CRE* = Current revenue executed; *CEE* = Current expense executed.	It shows the capacity of the public agency to maintain its current expenses through its current revenues for the same period.	2016
Indebtedness	IND	$IND = \frac{PP + (FP - FA)}{NCR}$ Where: *PP*: Permanent Passive; *FP* = Financial Passive; *FA* = Financial Active; *NCR* = Net Current Revenue.	It evaluates the degree of commitment of debts of a particular entity with third parties.	2016

Continue

Variable	Code	Measurement	Description	Year
Dependency Degree Index	DDI	$DDI = \frac{IT}{TR}$ Where: TI = Intergovernmental Transfer Revenue; RT = Total Revenue	It indicates the degree of dependence of the municipal administration on transfers received.	2016
	fDDI	$DDI = \frac{FT}{TR}$ Where: FT = Federal Transfer Revenue; TR= Total Revenue	It indicates the degree of dependence of the municipal administration on transfers received from the Union.	2016
	sDDI	$DDI = \frac{ST}{TR}$ Where: ST = State Transfer Revenue; TR = Total Revenue	It indicates the degree of dependence of the municipal administration on transfers received from states.	2016
	mDDI	$DDI = \frac{MT}{TR}$ Where: MT = Multigovernmental Transfer Revenue; TR = Total Revenue	It indicates the degree of dependence of the municipal administration on multigovernmental transfers received.	2016
Investment Expense Index	IEI	$IEI = \frac{IE}{NCR}$ Where: IE = Investment Expense; NCR = Net Current Revenue	It indicates the relationship between Investment Expenses and Net Current Revenue.	2016
		POLITICAL-ELECTORAL FACTORS		
Political Competition	PC	$PC = \frac{1}{\sum_{i=1}^{n} p_i^2}$ Where: p = proportion of votes cast for each mayor in the elections	It defines the degree of fragmentation of the party system by weighing the relative strength of its component subtitles.	2016
Political Orientation (PO)	LEF	Dummy: (1) If the governor's political party is leftmost. (0) The opposite.	Political orientation of the political parties of the respective municipal mayors. Leftmost: PT, PSB, PPS, PDT, PMN, PV, and PC do B. Centermost: PMDB, PSDB, and PTB. Rightmost: PFL, PL, PSD, PSC, Prona, PSL, PST, PP, and DEM (Klein & Sakurai, 2015).	2016
	RIG	Dummy: (1) If the governor's political party is rightmost. (0) The opposite.		
Party Coalition (PCo)	PPCo	Dummy: (1) If the mayor's party belongs to the president's party coalition. (0) The opposite.	It checks whether the mayor's party belongs to the president's party coalition.	2016
	GPCo	Dummy: (1) If the mayor's party belongs to the governor's party coalition. (0) The opposite.	It checks whether the mayor's party belongs to the governor's party coalition.	
Electoral Mandate	EM	Dummy: (1) If the mayor of the municipality exercises the first electoral mandate. (0) The opposite.	It checks if the mayor of the municipality exercises the first electoral mandate.	2016

Source: Elaborated by the authors.

3.3 Econometric model

The multivariate analysis technique was used, which allows exploring the joint performance of the variables and determining the influence or importance of each one, while the others are present. The multiple linear regression method was used as a statistical technique for this research through the ordinary least squares (OLS) method. As the variables tested refer to different municipalities in the same period, the cross-section data technique was used. Therefore, we have Equation 1, which is subdivided according to the dependent variable:

$$Y_i = \beta_{1i} + \beta_2 POP_i + \beta_3 INCOME1_i + \beta_4 INCOME2_i + \beta_5 EDUC_i + \beta_6 N_i + \beta_7 NE_i + \beta_8 CW1_i + \beta_9 S_i + \beta_{10} CBEI_i + \beta_{11} IND_i + \beta_{12} DDI_i + \beta_{13} fDDI_i + \beta_{14} sDDI_i + \beta_{15} mDDI_i + \beta_{16} IEI_i + \beta_{17} PC_i + \beta_{18} LEF_i + \beta_{19} RIG_i + \beta_{20} PPCo_i + \beta_{21} GPCo_i + \beta_{22} EM_i + \varepsilon_i \quad (1)$$

Through these tests, it was possible to observe and analyze the determination of the transparency variable as a function of the independent variables. For data analysis, they were organized in a spreadsheet of the MS Excel software to then submit to specific quantitative analysis software, such as the R software. Statistical treatment of the data, in addition to resampling, uses bivariate and multivariate analysis techniques.

Given the need to improve the reliability and robustness of the results, the resampling method was chosen, since it aims to recognize a phenomenon whose mathematical modeling is complex from cross-sectional data.

The resampling repeated 100,000 times the sample and allowed to obtain an estimation and validation sample, from which it was possible to obtain coefficients that represented the estimated relationship. This way, a better solution could be found by doing 100,000 simulations to make the sample more robust. From this sample, it was divided into two groups, 70% estimation to run the model and 30% test, used to test the predictability of the model.

4. DESCRIPTION AND ANALYSIS OF RESULTS

4.1 Description of Results

The dependent variables were divided into 4 perspectives: a) General Transparency; b) Active Transparency; c) Passive Transparency; and d) Good Transparency Practices. For the resampling and the regression test, the municipalities that contained outlier data for each equation were excluded, since their use could impair the reliability and predictability of the results.

Resampling provided more robust results and the best predictive model for the selected data, which are summarized in Table 1.

TABLE 1 **RESULTS OF MULTIPLE LINEAR REGRESSION TESTS (100,000 ESTIMATION AND VALIDATION SAMPLES)**

General Transparency				Active Transparency				Passive Transparency				Good Transparency Practices			
	2.50%	**Mean**	**97.50%**		**2.50%**	**Mean**	**97.50%**		**2.50%**	**Mean**	**97.50%**		**2.50%**	**Mean**	**97.50%**
R^2	0.8345	0,8398	0.8451	R^2	0.8117	0.8177	0.8238	R^2	0.0816	0.0927	0.1042	R^2	0.4388	0.4590	0.4649
U_2 *Theil*	0.3864	0,4021	0.4192	U_2 *Theil*	0.4120	0.4284	0.4461	U_2 *Theil*	0.4737	0.4921	0.5121	U_2 *Theil*	0.7225	0.7421	0.7644
***p* value**				***p* value**				***p* value**				***p* value**			
	2.50%	Mean	97.50%		2.50%	Mean	97.50%		2.50%	Mean	97.50%		2.50%	Mean	97.50%
POP	0.0004	0.0629	0.1612	POP	0.0024	0.0922	0.2218	POP	0.0005	0.0373	0.0976	POP	0.0000	0.0000	0.0000
Income1	0.0000	0.0000	0.0000	Income1	0.0000	0.0000	0.0000	Income1	0.0000	0.0000	0.0000	Income1	0.0006	0.0389	0.2040
Educ	0.0000	0.0000	0.0000	Income2	0.1602	0.6416	0.9842	N	0.0000	0.0000	0.0000	N	0.0000	0.0000	0.0002
N	0.0000	0.0007	0.0057	Educ	0.0000	0.0000	0.0000	NE	0.0000	0.0000	0.0000	NE	0.0069	0.1408	0.5276
NE	0.0000	0.0000	0.0000	NE	0.0000	0.0000	0.0000	CW	0.0000	0.0040	0.0027	S	0.0000	0.0000	0.0000
CW	0.0000	0.0013	0.0102	CW	0.0003	0.0317	0.1765	S	0.0000	0.0000	0.0000	DDI	0.2333	0.7215	0.9879
S	0.0000	0.0000	0.0000	S	0.0000	0.0000	0.0000	IEI	0.0030	0.0185	0.1002	fDDI	0.2224	0.7396	0.9896
IEI	0.0000	0.0043	0.0278	IEI	0.0019	0.0900	0.3811	Const.	0.0000	0.0000	0.0000	sDDI	0.2263	0.7343	0.9891
PC2	0.0000	0.0084	0.0565	GPCo	0.0006	0.0377	0.1897					mDDI	0.2149	0.7483	0.9912
RIG	0.0153	0.2149	0.7086									IEI	0.0000	0.0087	0.0590
GPCo	0.0015	0.0630	0.2902												

General Transparency					Active Transparency				Passive Transparency				Good Transparency Practices			
	Coefficient				Coefficient				Coefficient				Coefficient			
	2.50%	Mean	97.50%		2.50%	Mean	97.50%		2.50%	Mean	97.50%		2.50%	Mean	97.50%	
POP	0.0000	0.0000	0.0000	POP	0.0000	0.0000	0.0000	POP	0.0000	0.0000	0.0000	POP	0.2489	0.3093	0.3696	
Income1	0.0027	0.0031	0.0035	Income1	0.0029	0.0033	0.0037	Income1	0.0028	0.0033	0.0037	Income1	0.0007	0.0012	0.0018	
Educ	2.1897	2.5635	2.9633	Income2	-0.8660	-0.1730	0.5094	N	1.4510	1.7747	2.1055	N	1.3306	1.7476	2.1582	
N	0.6378	0.8942	1.1517	Educ	3.5388	4.0493	4.5721	NE	1.1404	1.3785	1.6123	NE	0.1744	0.4603	0.7477	
NE	1.1433	1.2944	1.4447	NE	1.0822	1.2811	1.4799	CW	0.5877	0.8642	1.1466	S	2.3299	2.5618	2.7953	
CW	0.4935	0.7083	0.9241	CW	0.3044	0.5575	0.8126	S	1.4290	1.6208	1.8130	DDI	-24.7943	1.7411	68.7501	
S	1.8907	2.0364	2.1843	S	1.8769	2.0406	2.2070	IEI	2.0604	3.3308	4.7112	fDDI	-70.6185	-3.6136	22.9375	
IEI	1.9977	3.9573	4.0718	IEI	0.9121	2.0863	3.4690	Const.	2.6527	2.9303	3.2131	sDDI	-69.9680	-3.0095	23.5608	
PC	0.1667	0.2658	0.3641	GPCo	0.1923	0.3451	0.4996					mDDI	-72.1224	-4.9302	21.7049	
RIG	0.0533	0.2008	0.3489									IEI	2.6122	4.1195	5.6038	
GPCo	0.1353	0.2696	0.4048													

Source: Elaborated by the authors.

Table 1 presents the results for the model's explanatory capacity concerning the known data (R^2), the prediction capacity in the simulation of 100,000 samples (*Theil's* U_2), showing the expectation of the error. Finally, it also presents the results obtained for the significance of each variable (*p-value*) in the equation that is tested within the probability distribution (2.50%, mean, and 97.50%), with the respective coefficients.

For the dependent variables, General Transparency, Active Transparency, Passive Transparency, and Good Transparency Practices, after excluding municipalities with outlier data, 3,313, 3,273, 3,457 and 3,457 observations, respectively, were used in each model. The average R^2, which represents the proportion of sample variation of the dependent variable explained by the independent variables, the highest was 83.98% for the known data in the model whose dependent was General Transparency, while the lowest was when the model with Passive Transparency (9.27%). The Theil's U_2, which represents the unknown data, was 40.21%, 42.84%, 49.21%, and 74.71%, respectively. These results indicate high predictive power for known data and low expectation of error for unknown data. This model showed no serial autocorrelation problems, confirmed by the Durbin-Watson test, and no heteroscedasticity problems, confirmed by the Box-Ljung test.

Each of the models used indicated different results. The highest predictive power was obtained when comparing the variables to General Transparency and Active Transparency. This result may be justified since passive transparency represents different incentives for the public manager since it is only observed by those who request information from the public authorities.

Among the variables, the socioeconomic aspects determine the behavior of the different types of transparency. Among the financial-budgetary variables, only the investment expenses were determinant for General Transparency and Good Transparency Practices, whereas among political factors, only the political competition was significant compared to General Transparency.

4.2 Discussion and implications of results

The results support Hypotheses 1, 2, 3, and 4, although, in some situations, there was no relationship with all dependent variables. They make it possible to confirm that, in the case of Brazilian municipal governments, socioeconomic aspects have a positive impact on transparency. Regarding the financial and budgetary aspects, only capital investments seem to have a positive impact on the transparency of Brazilian municipalities, which support Hypothesis 8. Finally, the political competition also indicated that it had a positive impact on General Transparency, supporting Hypothesis 9.

The number of inhabitants indicates a positive impact on the level of Passive Transparency and Good Transparency Practices. The results presented indicate that for the 1 point increase in the number of inhabitants' index, the impact on Passive Transparency is close to 0. However, if the same increase is observed, the level of Good Transparency Practices is increased by 0.3093 points. This result is in line with the literature, as large populations require more services; public administration must deal with a wide variety of stakeholders, who require the implementation of social responsibility practices and more information (García-Sánchez et al., 2013).

The population has a positive effect, since conflicts of interest are more likely to occur in larger municipalities, and information asymmetry is even more significant in these municipalities. Transparency, therefore, proves to be a tool for reducing agency costs and information asymmetry.

This means that municipal management becomes more accessible with transparency, as several demands of the population will be met immediately from active transparency and others will be met via request (passive transparency).

Municipal income has a positive effect on the level of General Transparency, Active Transparency, and Passive Transparency. This means that the 1 point increase in the *per capita* income of the municipality raises, on average, 0.0031 points the level of General Transparency, 0.0033 points the level of Active Transparency and Passive Transparency. With the increase in municipal income, the population requires better public service and more information to confirm the proper use of public resources. This attitude influences citizens' opinions about the impacts of public policies, thus demonstrating a sign of quality management, benefiting local politicians by increasing their chances of reelection, as well as reducing agency costs (Alcaide Muñoz et al., 2016; Gandía & Archidona, 2008).

The level of educational development has a positive impact on the level of General Transparency and Active Transparency. The perceived effect on transparency is high since when there is an increase of 1 point in the FIRJAN Index of Municipal Development in Education, there is an average increase of 2.5635 points in General Transparency and 4.0493 points on Active Transparency.

A well-educated population demands more information from public managers (Tolbert, Mossberger, & McNeal, 2008). Citizens should be educated enough to acquire the knowledge and skills needed to make use of public transparency mechanisms and thus be able to examine available information (Ríos et al., 2013).

The region has a positive effect on the different levels of transparency. Brazilian geographic regions aggregate different socioeconomic characteristics, so they are a determinant of the level of transparency.

Capital investments have shown a positive effect on the level of General Transparency and Good Transparency Practices. This result means that each increase of 1 point in the Investment Expense Index represents an average increase of 3.9573 points at the General Transparency level and 4.1195 points at the Good Transparency Practices level. Brazilian citizens are interested in developing public projects that require a significant investment, as they understand that this will improve their living conditions. Thus, this association is justified by the fact that public managers are involved in significant investment projects and use transparency so that citizens can view this type of information not only in situations where information is required to be disclosed (Cárcaba García & García García, 2010).

Finally, there is also a positive effect of local political competition on the level of General Transparency. This result indicates the condition that each 1 point increase in the rate of political competition results in an average increase of 0.2658 points in the level of General Transparency of Brazilian municipalities. This fact is that politicians often ignore their pre-election promises after taking office, as they recognize the difficulty of citizens exercising their control (Alcaide Muñoz et al., 2016; Cárcaba García & García García, 2010). However, when political fragmentation is high, and there is strong political opposition, it increases the costs of politicians in failing to fulfill their promises, which forces them to justify and provide transparency to their actions (Alcaide Muñoz et al., 2016; Baber, 1983). Therefore, it is observed that transparency strengthens the mechanism of control by society and the opposition itself, which improves the quality of public management.

5. CONCLUSION

The results indicate that socio-economic aspects are essential determinants of public transparency of Brazilian municipalities. Capital investment and local political competition also have a positive effect. Therefore, there is simply no positive effect on these variables, but the relationship of these variables to the different perspectives of transparency also has a different effect.

Active transparency captures most of society's interests, so there is often an association of socioeconomic, financial-budgetary, and political aspects of this variable. Passive transparency does not seem to be easily explained in the model used in this study. One explanation for this is the fact that these are situations in which the municipal entity seeks to respond to society's wishes through requests for information, which represents a longer and more difficult process for the government.

The number of inhabitants represents the very complicated relationship between public administration and society, which makes municipalities more proactive about transparency. Local governments whose population has higher *per capita* income or higher levels of education also have a higher level of transparency, as they seek to recognize where their government-paid taxes are applied, which is most easily visible in a better-educated population and, therefore, participatory. Brazilian geographic regions aggregate different socioeconomic characteristics, and these different realities influence the levels of transparency.

The population follows capital investment projects that are more readily visible in municipal management, so the situations in which a municipal government invests more in this type of project justify the positive association with transparency since public managers need to anticipate and disseminate this type of information to society. Political competition increases the care of the manager. Municipalities whose political fragmentation is high in electoral competitions demand from the public manager a more explicit stance towards their opponents and the population, precisely to confirm their pre-electoral promises.

The contribution of this study is the identification of the main determinants of the level of public transparency of Brazilian local governments, thus differentiating itself from the others by observing the effects of financial, budgetary, and political factors on the different dimensions of transparency.

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