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Do good things come in small packages? The effects of size on municipal performance

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This research shows the direct and indirect effects of size on the performance of the Brazilian municipalities in the state of Santa Catarina, considering the academic debate around the issue. The research examined all municipalities of the state from 2005 to 2016, a period that comprised three municipal elections. The study sample consisted of 3,504 observations, with 293 municipalities, during these 12 years. The panel data analysis was estimated by Feasible Generalized Least Squares (FGLS). The results suggest that size affects municipal performance positively and directly. Also, size influences indirectly when considering the mayor's schooling, i.e., the larger the municipality and the higher the mayor's schooling, the better the municipal performance. The analysis of performance based on municipal tax (IPTU) collected per capita showed that, the larger the population, the higher the IPTU per capita, which means that larger municipalities tend to show better performance. Finally, the analysis of performance based on the percentage of IPTU levied from total tax revenue showed that size and size associated with the mayor's capability did not affect performance.
Keywords: size; performance; public sector; municipalities.

Os pequenos perfumes fazem grandes frascos? Os efeitos do tamanho no desempenho municipal

Esta pesquisa tem por objetivo evidenciar os efeitos direto e indireto do tamanho no desempenho dos municípios de Santa Catarina, em razão da discussão acadêmica quanto ao tamanho do município afetar o desempenho deste. Analisaram-se todos os municípios do estado de Santa Catarina, no período de 2005 a 2016, compreendendo três períodos eleitorais. A amostra é de 3.504 observações, com 293 municípios, no período de 12 anos. A análise de dados em painel foi estimada por mínimos quadrados generalizados factíveis (MQGF). Observa-se nos resultados indícios de que o tamanho afeta de forma direta e positiva o desempenho municipal e de forma indireta quando associado com a escolaridade do prefeito. Assim, nos municípios catarinenses, quanto maior for a população, maior será o IPTU arrecado *per capita*. E quanto maior for o tamanho da população associado a prefeitos com maior grau de escolaridade, maior será o desempenho municipal. Quando o desempenho é medido pelo percentual do IPTU arrecadado da receita fiscal total, não há efeito do tamanho e do tamanho associado à capacidade do prefeito no desempenho.
Palavras-chave: tamanho; desempenho; setor público; municípios.

¿Los pequeños perfumes hacen grandes frascos? Los efectos del tamaño en el desempeño municipal

Ante la discusión académica en cuanto a si el tamaño del municipio afecta el desempeño, esta investigación tiene por objetivo evidenciar el efecto directo e indirecto del tamaño en el desempeño de los municipios de Santa Catarina. Se analizaron todos los municipios del estado de Santa Catarina, en el período de 2005 a 2016, comprendiendo tres períodos electorales. La muestra es de 3.504 observaciones, con 293 municipios, en el período de 12 años. El análisis de datos en panel fue estimado por los mínimos cuadrados generalizados factibles (MCGF). En los resultados se observan indicios de que el tamaño afecta de forma directa y positiva el desempeño municipal y de forma indirecta cuando es asociado a la escolaridad del alcalde. Así, en los municipios catarinenses cuanto mayor sea la población mayor será el IPTU (impuesto sobre la propiedad y territorial urbano) recaudado per cápita y cuanto mayor el tamaño de la población asociado a alcaldes con mayor grado de escolaridad mayor será el desempeño municipal. Cuando el rendimiento se mide por el porcentaje del IPTU recaudado del ingreso fiscal total no hay efecto del tamaño y del tamaño asociado a la capacidad del alcalde en el desempeño.
Palabras clave: tamaño; rendimiento; sector público; municipios.

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1. INTRODUCTION

New Public Management (NPM) reforms public management from bureaucratic perspectives to managerialism, stimulated by globalization and privatization. The philosophy is a State that facilitates the provision of public services, rather than a direct provider. There is also the defense of the gradual absorption of concepts from private accounting to the public approach, such as: efficiency, effectiveness, decision making and innovations in the accounting system (Hammes, Flach & Mattos, 2020; Lapsley, 1999; Parker & Gould, 1999; Van der Hoek, 2005).

Public sector reform is based on an international demand which, in addition to observing the characteristics of efficiency and focus on decision making (Van der Hoek, 2005), aims a comparison between countries, aiming to improve management and performance, strengthen the control of public accounts and facilitate managers' accountability for mismanagement of public resources (Campbell, 1993; Peters & Savoie, 1996). Additionally, Romzek (2000) states that despite being in favor of efficiency in the public sector, the main focus in the reform is the challenges and impacts on the accountability of public managers.

Authors emphasize that the size of the organization can influence its performance and that small government units tend to be more efficient, since the proximity to the population facilitates the understanding of their needs (Flynn, 1993; Grosskopf & Yaisawarng, 1990; Holzer et al., 2009). Thus, Schumacher (1973) created the term "small is beautiful", characterizing the fragmentation of municipalities in developing countries.

In scientific literature, some studies have already shown a causality relationship on the effect of size in performance in the public sector. Other studies that have shown a positive causality relationship, there are: Avellaneda and Gomes (2015, 2017); Christenson and Sachs (1980); Smith and Meier (1994); Whetten (1978). However, this is still not a consensus, since the following authors found a negative causality relationship: Fowler and Walberg (1991); Heck and Mayor (1993); Sharkansky (1967). In addition, Dean and Peroff (1977) found a neutral relationship. Therefore, there is a gap in the scientific literature.

Thus, the following research question emerges: what is the direct and indirect effect of size in municipal performance? In consequence, this research aims to show the direct and indirect effect of size in the performance of the municipalities of Santa Catarina, in the years of 2005 to 2016.

This study will expand the research of Avellaneda and Gomes (2015), by applying the method adopted in the municipalities of the state of Santa Catarina, in the years to 2005 to 2016, comprising three electoral periods. The relevance of the state of Santa Catarina is because it remains stable considering other Brazilian states during contemporary period of political and economic instability.

An important hypothesis in this research is to verify the relationship between schooling of mayors and higher collection of the Property Tax and Urban Territorial (IPTU). The idea is to make an argument about the logical relationship between the variables, to understand if there is causality or if schooling can be the effect of other variables, such as urbanization, party ideology or professionalization of the municipal administration.

Marenco, Strohschoen and Joner (2017) found a strong relationship and statistically significant between the proportion of statutory employees with higher education in direct administration and the collection of IPTU, even in small and micro municipalities. In addition, Lowi (2009) explains that the property tax, such as IPTU, consists of a redistributive policy, which implies a zero-sum game, with dead loss and conflict.

As a theoretical justification, the contribution to the literature with longitudinal analysis is emphasized, since longitudinal studies manage to overcome specific effects of organizations, mitigating results that are biased by the effect of time (Adhikari, Derashid & Zhang, 2006). In addition of being considered fundamental for the deduction of causal inferences (Hedeker & Gibbons, 2006), longitudinal studies mitigate problems of statistical analysis, as they offer greater variability of data and result in greater smoothness in the data to be analyzed, in comparison with the analyzes individual (Fávero & Belfiore, 2017).

In contribution to the literature, from the point of view of practical justification, the study contributes to society, as it highlights the effect of size and control variables (human material, municipal revenue, managerial characteristics of managers and political characteristics) in the performance, which seems relevant for analysis, given the contemporary Brazilian scenario of economic and political uncertainty.

2. THEORETICAL REVIEW: THE EFFECT OF SIZE ON MUNICIPAL PERFORMANCE

The concept of performance in the public sector was developed in the scientific literature based on sociodemographic, political, economic factors. Among the political influences on performance, the studies refer to party support (Doig & Hargrove, 1990), control mechanisms (Clingermayer & Wood, 1995), social control and citizen participation (Blair, 2000), governmental ideology (Swank , 2002), politicians' motivation (Anderson, 2003; Gibson & Lehoucq, 2003) and electoral competitiveness (Holbrook & Van Dunk, 1993). Among the economic determinants for performance in the public sector, studies have identified the influence of budgets, gross domestic product (GDP) and level of development. As a sociodemographic explanation for performance in the public sector, scientific research points to the nature of the target population and the size of the organization (Avellaneda, 2009; Durant & Legge, 1993; Walker, Damanpour & Avellaneda, 2009). Although this set of political, economic and sociodemographic influences is focused on external factors to the organization (macro level), there are also authors who point to the micro level. In this case, performance is also influenced by internal factors, inherent to the potentials of the individual, and also of the group, which exercises influence and control by an elected public manager. In fact, no group of political actors becomes more important in the operation and performance in public bodies than elected officials (Pandey & Moynihan, 2006).

Gooding and Wagner (1985) already demonstrated the interest of researchers in analyzing the effect of size of the organization on the performance obtained. The authors have shown that organizational researchers are concerned with the structure of the organization, with size being one of the most widespread characteristics in organizational relationships. Economics studies usually relate the size of organizations to economies of scale, with significant - positive and negative - relationship and variations in size specificity (larger and smaller organizations). Studies in the field of social psychology list the size of the group to the performance of the group. The findings of those studies still demonstrate diverse results in relation to the proposed relationship, as they generally find insignificant or negative relationships, or even high costs of group coordination.

It is observed that, in the scope of research that uses the municipalities as a data base, there is a tendency towards results that demonstrate that the larger the size of the municipalities, the greater the responsibilities with the social services to be offered (Stein, 1990). This way, Stein (1990) explains that, with the expansion of coverage in the municipalities, there would be an increase in the costs

of services provided, it should present an increase on the costs in the workforce required to make services available to the population.

Therefore, Meier and O´Toole (2002) show that the larger the size of the district, the greater the demand for services. Moreover, with that, the greater the workforce needed to perform public services. This would require a greater amount of resources. An alternative to improve the performance and organization of municipalities to face this new demand for services, caused by their expansion, consists on merging municipalities (Steiner, 2003).

The merger, in addition to increasing the territorial size of the municipality, increases the potential for obtaining resources and the dissemination of new forms of government, considering that in larger municipalities the concepts and principles of New Public Management (NPM) are more generalized (Steiner, 2003). It is important to highlight that the generalization of NPM disseminates efficiency in the use of public resources and makes managers responsible for poor management of public funds (Lapsley, 1999; Parker & Gould, 1999; Romzek, 2000, Van der Hoek, 2005).

Observing the scenario of growth of size in the municipalities, Damanpour, Walker and Avellaneda (2009) highlight, that size affects the relationship of organizational characteristics and the demand for resources in performance. The findings of Damanpouret al. (2009) indicate that the greater the organizational size and urbanization of the municipality, greater will be the performance. Although, greater the need and diversity of services to be provided, lower it will be the performance.

A counterpoint for larger municipal organizations to perform better is the argument put forward by Holzer et al. (2009). The authors propose that in the relationship between size and performance, the smaller the municipalities, the greater the proximity of managers with the needs of the population, tending to achieve greater performance. However, it is worth mentioning that, when analyzing the per capita performance in relation to the size of the population, the trend is: the larger and smaller the size of the municipality, the lower the performance. For that matter, the peaks of municipal size (larger and smaller) are negatively related to the increase in performance. Medium-sized municipalities tend to perform better (Drew, Kortt & Dollery, 2014; Holzer et al., 2009).

In this sense, Holzer et al. (2009) concluded that municipalities with a population between 25 thousand and 250 thousand inhabitants are more efficient than municipalities with more than 250 thousand inhabitants. Although this research demonstrates a tendency to municipalities with lesser inhabitants to be more efficient than municipalities with more inhabitants, Avellaneda and Gomes (2015) emphasize there is no consensus in the literature and believe that further studies in the area are necessary.

In the study of Avellaneda and Gomes (2015), it was used the collection of property taxes as performance indicator. Based on the inconsistency of the literature between the influence of the size of the municipalities on performance, and the tendency of smaller municipalities to be more efficient (Holzer et al., 2009), we have the first hypothesis of the study:

H_1 - The size of the municipalities is positively related to performance (collection of own taxes).

Besides analyzing the direct relationship between the size of the municipality and performance, it can be check an indirect relationship, since medium-sized municipalities may have economic density, a greater amount of human material and values applied in the collection of own resources (Avellaneda & Gomes, 2015; Drew et al., 2014).

That said, the inverse relationship between size and performance will be observed, based on the inverted U, considering the characteristics of the medium municipalities on not having the same bureaucracy as the ones large municipalities face, nor the proximity of small municipalities (Avellaneda & Gomes), 2015). Thereby:

H_2 - Population size has a curvilinear association with municipal performance.

In the context of municipal performance, it is observed that characteristics in the leader of an organization affect material and human resources, through his decisions and strategy definitions (Avellaneda, 2012). Lynn (1996) points out that the leader obtains all his knowledge through his experience and formal education.

Evidence in the management literature describes that there is a positive effect on human capital in return of sales. This effect is greater in large companies than in small companies (Roca-Puig, Beltrán-Martín & Segarra Cipres, 2011). Drawing a parallel between companies and municipalities, it is clear that govern a larger municipality requires greater coordination, strategic behavior, organizational differentiation and prioritization in the budget (Avellaneda & Gomes, 2015; Meier & O´Toole, 2002; Steiner, 2003).

Thus, the third hypothesis of this research stands out:

H_3 - The impact of human capital on municipal performance by its manager is positively moderated by the size of the population.

Considering this topic, the development of this research is reinforced, contributing to the discussion of the effect of size on performance. These results can be used as a basis for decision making in planning expansions and municipal developments.

3. METHOD

In order to achieve evidences and showing the direct and indirect effect of size on municipal performance, this research is positioned in the functionalist paradigm (Burrell & Morgan, 1979), observing the typology of descriptive research, using a quantitative approach to the data (Sampieri, Collado & Lucio, 2013).

Data were collected from the websites of the National Treasury Office (STN), the Brazilian Institute of Geography and Statistics (IBGE), the Superior Electoral Court (TSE), the Santa Catarina State Court of Auditors (TCE-SC) and the transparency portals of the municipalities analyzed. The research population includes all municipalities in the state of Santa Catarina, covering 295 municipalities, from 2005 to 2016.

It should be noted that due to the lack of data covering the analyzed period, the municipalities of Balneário Rincão and Pescaria Brava (without data from 2004 to 2011) were excluded from the sample. Therefore, the final sample included 293 municipalities, corresponding to 3,504 observations. In addition, it should be considered that the excluded municipalities were created in 2003, being effectively installed in 2013.

To facilitate comprehension, Table 1 shows the dependent, independent and control variables, as observed by Avellaneda and Gomes (2015).

TABLE 1 RESEARCHED VARIABLES

Variable	Measure	Author
Dependent Variables		
1 – IPTU *per capita*	$IPTUpc = \frac{IPTU\ Collected}{Population}$	Avellaneda and Gomes (2015)
2 – IPTU share in total tax revenue	$IPTUrt = \frac{IPTU\ pc}{Total\ Tax\ Revenue}$	
Independent Variables		
3 – Municipality Size	$LP = Log\ Population$	Avellaneda and Gomes (2015)
4 – Mayor´s capacity referring to age (IP)	$IP = Log\ Mayor's\ age$	
5 – Capacidade do prefeito referente à escolaridade (EP)	Mayor's education level, obtained by the scale: 1 - Can barely read your own name; 2 - Incomplete elementary school; 3 - Elementary Education; 4 - Incomplete high school; 5 - Complete high school; 6 – College/university incomplete; 7 – College/university degree; 8 – Post Graduate.	
Control Variables		
6 – Political party alignment between the government and the mayor (AP)	Governor and mayor belong to the same political party? 1 - Yes / 2 - No	Avellaneda and Gomes (2015)
7 – Former Mayor (ExP)	Does the mayor have a previous election? 1 - Yes / 2 - No	
8 – Political party leadership (DP)	What is the mayor's party leadership? 1 - Left / 2 - Right / 3 - Center	
9 – PIB *per capita* ()	$PIBpc = \frac{PIB}{Population}$	
10 – Population density (DP)	$DP = \frac{População}{Municipal\ area\ (km^2)}$	
11 – Proximity to the capital	Distance in kilometers from the municipality in to the capital.	
12 – Measurement of billing performance	$IPTU\ Collected_{t-1}$	

Source: Research data.

Table 1 highlights the control variable Political Party Direction that uses the methodology of Carreirão (2006) to position Brazilian political parties. Thus, they are classified as right-wing parties: DEM, PR, PP, PFL, PRN, PDC, PL, PTB, PSC, PSP, PRP, PSL, PSD and PRONA, as well as the PMDB and PSDB (even though they have central characteristics, due to their conservative orientation it was considered like right-wing party); left-wing parties: PT, PDT, PPS, PC do B, PSB, PV, PSTU, PCO and PMN; and as a center party: PHS, PPS, PRB, PRTB, PSD, PSDC, PT DO B, PTC and PTN.

As for the statistical Model to be used for analysis, given the transversal nature of the data set, the dependent variable IPTUpc (Model 1), the following Models were estimated by ordinary least squares (OLS). The IPTUrt dependent variable Model (Model 2) includes the same explanatory variables, as follows:

$$IPTUpc_i = \alpha + \beta_1(LP) + \beta_2(LP)^2 + \beta_3(IP) + \beta_4(EP) + \beta_5(LP * IP) + \beta_6(LP * EP) + \beta_7(X_i) + \beta_8 e$$

$$IPTUrt_i = \alpha + \beta_1(LP) + \beta_2(LP)^2 + \beta_3(IP) + \beta_4(EP) + \beta_5(LP * IP) + \beta_6(LP * EP) + \beta_7(X_i) + \beta_8 e$$

Where, $IPTUrt_i$ corresponds to IPTU *per capita,* "X_i" refers to the known and expected socio-economic determinants of municipal revenues (control variables), "EP" is the mayor's education level; "IP" is the logarithm of the mayor's capacity referring to age; "LP" is the population size logarithm; "*e*" is the error term.

On Model 1, when elaborating the tests to verify the presence of heteroscedasticity, using the test of Poi and Wiggins (2001) and the test of Wald, since the best estimate is Fixed Effects (by the tests of Chow and Hausman); and the autocorrelation with the Wooldrige test (Fávero & Belfiore, 2017), it was obtained in the test results the presence of heteroscedasticity and autocorrelation in the data.

Thus, Model 1 was re-estimated using the FGLS estimators with autocorrelation being controlled by the Durbin-Watson method. Model 2, on the other hand, based on the Chow F and the Lagrange tests by Breusch-Pagan, should be use the Pools method or stacked data (Fávero & Belfiore, 2017). Facing the same problems of heteroscedasticity and autocorrelation, the Pools method was estimated based on the Feasible Generalized Least Squares (FGLS).

The Models were executed in the Stata® software, the results will be presented in the next topic.

4. DATA ANALYSIS AND DISCUSSION OF RESULTS

Based on variables presented in Table 1, some variables stand out on the descriptive analysis, there are: IPTUpc with an average of BRL 209.04, a minimum of BRL 0.09 (Brusque) and a maximum of BRL 560,059.03 (Biguaçu), there is a high variation in the municipalities of Santa Catarina, corroborating with the municipalities of Minas Gerais, based on the research by Avellaneda and Gomes (2015). The IP variable, with an average of 49.40 years, minimum of 24 (Mafra) and maximum of 80 years (Barra Velha), which is also similar to the municipalities of Minas Gerais in view of the fact they have an average of 48, minimum 25 and maximum 85 years (Avellaneda & Gomes, 2015).

The EP variable, with an average of 5.44, shows that, on average, mayors have finished high school and, based on the minimum and maximum values, five municipalities have mayors who can barely read their own name (Bombinhas, Luiz Alvez, Rio das Antas, Romelândia and Timbó Grande) and one municipality has a postgraduate mayor.

In order provide this information, and due the fact it is the only municipality with a mayor with a postgraduate degree, it was necessary to confirm the data through the advisory office of the mayor of Biguaçu and it was found that he has a lato sensu specialization in Public Security Management. It is important to highlight that no mayor has stricto sensu specialization.

Education data advances in the research by Avellaneda and Gomes (2015), considering that the researchers proposed a metric maximum of seven points, considering the maximum the complete graduation/college degree. Comparing the education average of the mayors of the municipalities of Santa Catarina and Minas Gerais, it is noticeable a similarity in the samples since on average mayors of both states have high school degree.

The descriptive statistics of the political party alignment variable between the mayor and the state governor has an average value of 1.77, so there is a tendency of mayors not being in the same political party as the governor. It is also noted that the ideological-party tendency of the mayors of Santa Catarina is to be on the right-wing party (average of 1.97).

The results of following variables, political party alignment and political party ideology endorses the study of Avellaneda and Gomes (2015), because in Minas Gerais the same trend was found as in Santa Catarina. Regarding this point, there is a limitation of the researches (the present research and the of Avellaneda and Gomes) since party coalitions were not analyzed, which means, even if the mayor is not in the same political party as the governor, there may be a party alignment by the coalitions.

It should be noted that there is no consensus in coalitions for municipal and state elections, meaning, parties linked to municipal elections may not be a coalition for state elections. After the descriptive analysis of the variables, it can be observed that in the state of Santa Catarina there is a tendency for mayors to be re-elected (average 1.70), diverging from the state of Minas Gerais where there is no such trend (average 0.37).

It is important to consider that the data presented by Avellaneda and Gomes (2015) refer to the years 2005 to 2007, covering 787 observations in the state of Minas Gerais, while the current research refers to the interval between 2005 and 2016, covering 3,504 observations in the state of Santa Catarina, therefore socioeconomic peculiarities and uncontrolled time lapses should be avoided for comparison purposes.

Continuing with the statistical analysis of the data, Table 2 shows the correlations between the variables presented. Note that, except for the relations AP and D.Part (−0.4240); LP and Dens. Pop (0.5462) and Unp.IPTU and AP (0.6426), significant at 1%, have a moderate correlation, the correlations are from very weak to weak (Fávero & Belfiore, 2017).

Low correlation is important, as variables with high correlation may omit / enhance the results or bias the analysis (Fávero & Belfiore, 2017).

TABLE 2 **RESEARCH VARIABLES**

	1	2	3	4	5	6	7	8	9	10	11	12
1. IPTUpc	1.0000											
2. IPTUrt	0.0044 (0.7968)	1.0000										
3. LP	0.0309 (0.0679)	0.0170 (0.3134)	1.0000									
4. IP	–0.0104 (0.5393)	0.0039 (0.8177)	0.0598 (0.0004)*	1.0000								
5. EP	0.0262 (0.1204)	0.0246 (0.1453)	0.2589 (0.0000)*	–0.1734 (0.0000)*	1.0000							
6. AP	–0.0296 (0.0796)	–0.0286 (0.0905)	0.0412 (0.0148)**	0.0117 (0.4900)	0.0367 (0.0297)**	1.0000						
7. Ex.P	–0.0255 (0.1307)	0.0156 (0.3551)	0.0139 (0.4116)	–0.0497 (0.0033)*	0.0454 (0.0072)*	0.0168 (0.3203)	1.0000					
8. D.Part	0.0019 (0.9114)	–0.0036 (0.8331)	0.0043 (0.7995)	0.1071 (0.0000)*	–0.0194 (0.2504)	–0.4240 (0.0000)*	–0.0433 (0.0103)***	1.0000				
9. PIBpc	–0.0131 (0.4390)	0.0161 (0.3413)	0.2084 (0.0000)*	0.0994 (0.0000)*	0.01410 (0.0000)*	0.1405 (0.0000)*	–0.0236 (0.1622)	0.0454 (0.0072)*	1.0000			
10. Dens. Pop	0.0111 (0.5120)	0.0087 (0.6075)	0.5462 (0.0000)*	–0.0275 (0.1038)***	0.1457 (0.0000)*	0.0309 (0.0678)	0.0130 (0.4409)	0.0396 (0.0191)**	0.01464 (0.0000)*	1.0000		
11. Prox.Cap	–0.0004 (0.9833)	–0.0010 (0.9518)	–0.0114 (0.5000)	0.0026 (0.8793)	–0.0042 (0.8026)	0.0093 (0.5808)	0.0109 (0.5179)	0.0031 (0.8536)	0.0031 (0.8543)	–0.0056 (0.7421)	1.0000	
12. Desemp. IPTU	–0.0204 (0.2273)	–0.0268 (0.1133)	–0.0102 (0.5457)	–0.0213 (0.2078)	–0.0103 (0.5414)	0.6426 (0.0000)*	–0.0142 (0.3996)	–0.2414 (0.0000)*	0.1326 (0.0000)*	–0.0515 (0.0023)*	0.0311 (0.0655)***	1.0000

Note: ****p < 0.10; **p < 0.05; * p < 0.01.*
Source: Research data.

The correlation between LP and Dens.Pop was expected, since larger the population, greater the population density. The negative result between AP and D.Part draws attention by suggesting when there is party alignment between the mayor and governor, reverse political party direction occurs. This relationship, apparently with no logic, can be explained by party coalitions in municipal elections, where you can find on the same political campaign banners from the left, right and center parties.

IPTU performance (Desemp.IPTU), measured by the natural logarithm of the IPTU collection in the previous year, is positively associated with the party alignment between the mayor and the governor. In this specific relationship, there is no feasible explanation in the literature and it is emphasized that it is a relationship between two control variables that only makes sense in relation to dependent variables.

The next analysis is related to Tables 3 and 4, in which the results of Models 1 and 2 are presented. It should be noted that, for a better adjustment of the proposed analysis Models, the following variables were excluded: population density (Dens.Pop), proximity to the state capital (Prox.Cap) and the performance of the IPTU collected in the previous year (Desp.IPTU). Thus, the "X_i" element in the equation for both Models will be composed with the following control variables: party alignment (AP), former Mayor (Ex.P) and PIB (GDP) per capita (PIBpc).

Worth to mention that Models 1 and 2 were estimated by the feasible generalized least squares (FGLS); and they were calculated in three different ways: the first includes dependent, independent and control variables strictly without interactions and quadratic terms; the second way, the variable with quadratic interaction was added; and in the third, the variables interactions with each other were added.

TABLE 3 MODEL 1

IPTUpc	*FGLS*	Model with quadratic terms	Model with term interaction
H_1 – Municipality Size			
LP	257.8015 (0.081)***	–270.7618 (0.876)	1423.5480 (0.670)
H_2 – Curvature effect size			
LP^2	----------	27.4870 (0.760)	–40.4380 (0.673)
Mayor's capacity			
IP	–413.4802 (0.659)	–393.1385 (0.676)	3260.3430 (0.645)
EP	117.4420 (0.225)	119.2618 (0.219)	–1669.947 (0.050)**
H_3 – Moderating effects			
LP*IP	----------	----------	-403.0164 (0.595)
LP*EP	----------	----------	201.1074 (0.034)**
Control variables			
AP	–637.3110 (0.094)***	–363.6453 (0.094)***	–628.2533 (0.098)***

Continue

IPTUpc	*FGLS*	Model with quadratic terms	Model with term interaction
Ex.P	–566.4186 (0.106)***	–567.9439 (0.106)***	–559.6563 (0.111)
	–15.2289 (0.293)	–15.6340 (0.282)	–14.6749 (0.313)
Regression with Feasible Generalized Least Squares			
Number of observations	3.504	3.504	3.504
Time period	12	12	12
F	11.94	12.03	17.40
Prob. > *F*	0.0634	0.0995	0.0428
Panels	*Homoskedastics*		
Correlation	*No autocorrelation*		

Note: ****p < 0.10; **p < 0.05; * p < 0.01.*
Source: Research data.

It is observed that in the first analysis of Model 1, the variable LP has a positive influence on the dependent variable with 10% confidence. This result shows that the greater the population of the municipality, the greater its performance, or the greater the volume of IPTU collection per capita in the municipality.

With this result, the hypothesis that the size of the municipality is positively related to the performance in the collection of own taxes, is confirmed, meaning, the IPTU. This result corroborates with the studies by Avellaneda and Gomes (2015), Christensen and Sachs, (1980), Smith and Meier (1994) and Whetten (1978) and diverges from the research by Holzer et al. (2009), as they defend the perspective that smaller municipalities are more efficient in collecting taxes since they do not need an extensive control structure and because the administration is closer to the population, knowing their demands and desires.

Important to highlight that with the quadratic interactions and the interaction between terms, there is no statistical significance in the relationship between population size and performance. Also, it is observed that in none of the forms of analysis of Model 1 and 2, hypothesis H_2 has statistical support to be confirmed. Thus, the hypothesis that population size is curvilinearly related with municipal performance is rejected.

Even if there is a theoretical basis that supports the hypothesis that medium-sized municipalities perform better, as they do not require an extensive bureaucratic structure as in large municipalities and there is no proximity to the population as in small municipalities, knowing their needs (Drew et al., 2014), the rejection of H_2 corroborates the research by Avellaneda and Gomes (2015) because it also has no statistical significance in the proposed relationship. Thus, in the states of Santa Catarina and Minas Gerais it is reinforced that larger the municipality, greater the performance.

When testing whether the impact of a manager's human capital on municipal performance is positively moderated by the size of the population, the results demonstrate that the higher the mayor's education (EP), associated with a larger population size (LP), the greater the municipal performance of tax collection of IPTU per capita.

This finding corroborates with Avellaneda and Gomes (2015), Meier and O´Toole (2002), Steiner (2003), for the reason that the greater the manager's human capacity related to education, greater his capacity to undertake in the municipality to attract organizations, and consequently new entrepreneurs, new opportunities, which contributes to municipal development. This way, Lynn (1996) highlights that one of the ways for the leader to obtain knowledge for management is through formal education.

Avellaneda (2012) states that the characteristics of an organizational manager affect material and human resources through their decisions. Therefore, the larger the municipality, greater will be the mayor's need for coordination and strategic behavior to increase collection performance (Avellaneda & Gomes, 2015; Meier & O´Toole, 2002; Steiner, 2003).

Following is presented Table 4 to demonstrate the result of the three forms of analysis of Model 2.

TABLE 4 MODELO 2

IPTUrt	*POOLS*	Model with quadratic terms	Model with term interaction
H_1 – Municipality size			
LP	0.1971 (0.241)	0.5474 (0.138)	0.5573 (0.207)
H_2 – Curvature effect on size			
LP^2	----------	–0.0274 (0.163)	–0.0275 (0.210)
Mayor's capacity			
IP	0.0979 (0.537)	0.0776 (0.594)	0.1012 (0.828)
EP	0.0314 (0.183)	0.0296 (0.186)	0.0278 (0.661)
H_3 – Moderating effects			
LP*IP	----------	----------	–0.0025 (0.950)
LP*EP	----------	----------	0.0002 (0.981)
Control variables			
AP	–0.1926 (0.324)	–0.1933 (0.323)	–0.1933 (0.323)
Ex.P	0.0874 (0.176)	0.0889 (0.174)	0.0890 (0.175)
	0.0033 (0.404)	0.0037 (0.381)	0.0037 (0.383)
Linear regression			
Number of observations	3.504	3.504	3.504
F	6.04	5.48	5.74
Prob. > *F*	0.0000	0.0000	0.0000
R^2	0.0021	0.0025	0.0025

Note: ***p < 0.10; **p < 0.05; * p < 0.01.
Source: Research data.

It is observed that, although the Model is adjusted to what is proposed (Prob.> F = 0.0000), the explanatory power is very low R^2 0.002, which means, the Model explains 0.2% of the dependent variable. Thus, based on the dependent variable percentage of IPTU on the total tax revenue of the municipality, the proposed hypotheses (H1, H2 and H3) for this research should be rejected.

Comparing with the article used as base for this research, Avellaneda and Gomes (2015), corroborates with the result of rejecting H2, reinforcing that the population size is not curvinearly associated with the municipal performance. As for H1 and H3, the results diverge from what was found by Avellaneda and Gomes (2015), since the size of the population is not associated to the increase in performance; and the increase in population size associated with the increase in the mayor's human capacity is not related to the increase of IPTU performance.

The non-significant relationship between the size of the municipality and the increase in performance gets close to the results shown on the research by Dean and Peroff (1977), by showing that the effect of size on municipal performance is neutral.

Finally, it is emphasized that in Models 1 and 2 the human capacity of the mayor measured by his age is not significantly related to the increase in performance; on Model 1, in the three forms of analysis, party alignment is significantly opposite (10%) to increased performance; in two forms of analysis, the mayor's re-election is negative and significantly (10%) related to the increase in performance; and the control variable PIBpc is not related to increase of performance.

These results differ from those presented by Avellaneda and Gomes (2015), since there was no statistical significance on the data. Observing the inverse relationship between the AP and IPTUpc, it is emphasized that the party alignment may facilitate the negotiation between the municipality and the government on the exchange of resources, but not in the collection of its own revenue. Based on the literature, it is known that the closer to the population, the greater the performance of the municipality (Holzer et al., 2009), in this sense, when knowing the state government is not close the population, the party alignment between the mayor and governor does not reflect in the revenue collection of municipalities.

5. FINAL CONSIDERATIONS

The research aimed to analyze the effect of size on the municipal performance of Santa Catarina municipalities. The sample analyzed constituted of 293 municipalities covering three electoral periods (12 years). Additionally, it was verified whether the mayor's capacity affects municipal performance when associated with size of the municipality. Municipal performance was measured by two variables, the IPTU collected per capita and the percentage of the IPTU collected on the total tax revenue.

Based on the results, it is noted that when performance is measured by IPTU collected per capital, the size of the municipality influences directly on performance. Meaning, the population of the municipality, greater the performance in municipal revenue.

These results corroborate with Avellaneda and Gomes (2015) and contribute to the literary discussion on the effect of size on the performance of municipalities, since several studies address the theme (Avellaneda & Gomes, 2015, 2017; Christenson & Sachs, 1980; Dean & Peroff, 1977; Fowler & Walberg, 1991; Heck & Mayor, 1993; Sharkansky, 1967; Smith & Meier, 1994; Whetten, 1978). When performance was measured by the percentage of IPTU collected from total tax revenue, it is observed that there is no direct and indirect influence of size on performance.

It is emphasized that there is no consensus regarding the effect of size on municipal performance, suggesting more research in this topic. Consequently, it is recommended for future researches: the use of another sample, comparing other Brazilian states; sample separation in smaller, medium and larger municipalities for comparison between data; inclusion of control variables that measure socioeconomic performance, since they can help to explain the increase in performance (same research line by Damanpour et al. (2009); and the segregation of state samples by regions, aiming to analyze whether the regional location contributes to the effect of size on performance.

This research is not exempt of limitations, the low explanatory strength shown on Model 2 is one of them. In addition to recommendations for future research, it is important to be aware of statistical issues regarding autocorrelation between variables and heteroscedasticity. Robust and highly reliable Models assist in this literary segment, pointing out ways to be followed and confirming (or rejecting) the effect on the proposed relationships (Gujarati & Porter, 2011; Fávero & Belfiore, 2017).

Ultimately, the question of the research title is resumed in: "Do small perfumes make large bottles?" This research offers indications that no, small perfumes do not create large bottles! In fact, it was found in this research that when performance is measured by IPTU collected per capital, there is a direct influence of the size of the municipality on performance, which means, larger municipalities have an advantage over small ones. After all, it was shown in this research that larger municipalities (with a larger population) tend to have greater performance in municipal revenue. In addition, it is concluded that the size of the municipality also influences indirectly in municipal performance, when associated with the mayor's education, in other words, municipalities of larger sizes and with mayor´s with higher education degree, tend - on average - to have greater municipal performance. Therefore, it is based on the direct and indirect effect of size on performance found in Model 1. However, given the limitations of research and the adoption of a cautious stance, it is corroborated by Avellaneda and Gomes (2015) in the statement that in the Brazilian scenario "it remains uncertain" that size and human capital are the recipe for growth in the municipal performance.

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