Revista Catarinense da CIÊNCIA CONTÁBIL

ISSN 2237-7662, Florianópolis, SC, v. 18, 1-14, e2828, 2019

DOI: 10.16930/2237-766220192828
Available at http://revista.crcsc.org.br

CRCSC
CONSELHO REGIONAL DE CONTABILIDADE DE SANTA CATARINA

THEORY OF COGNITIVE RESOURCES AND HUMAN CAPITAL: THE INFLUENCE OF THE DEGREE OF FORMAL EDUCATION IN THE MANAGEMENT OF MUNICIPALITIES IN THE SOUTHERN REGION OF BRAZIL

ANDRÉ SEKUNDA GALLINA
Universidade Estadual do Oeste do Paraná. ***Address:*** *Rua Campos do Jordão, 106, Jardim Ipê | 85869-680 | Foz do Iguaçu/PR | Brazil.*
http://orcid.org/0000-0001-9684-8353
andresekunda@gmail.com

ARLOS ELEODORO SEIXAS RISDEN JUNIOR
Universidade Estadual do Oeste do Paraná. ***Address:*** *Rua Aluísio Ferreira de Souza, 765 | Jardim Florença | 85867-295 | Foz do Iguaçu/PR | Brazil.*
http://orcid.org/0000-0002-7499-2482
arlosrisdenjr@gmail.com

JÚLIO CÉSAR FERREIRA
Universidade Vale dos Rios dos Sinos. ***Address:*** *Rua Belarmino de Mendonça, 816| Centro | 85851-100 | Foz do Iguaçu/PR | Brazil.*
http://orcid.org/0000-0002-6953-1964
juliocesar300@hotmail.com

ABSTRACT

Using the Human Capital and Cognitive Resources theories, this study aimed to verify the influence of formal education in the management of municipalities in the brazilian southern region. For that, an econometric model was created for the analysis of the data, having as dependent variable the Fiscal Performance Index (FDI), formed by the Own Collection (OC) of each municipality divided by its respective Net Expenditure (NE), and as variable explanatory of the Degree of Education (DE) of each mayor elected in a scale of "Read and write" to "Higher education", in addition to other important indexes as control variables. GDP and Population, in addition to the Mayor's Age, are all positively influencing the municipality's fiscal performance, albeit to a lesser degree. Another important point is the explanatory power of the model, with a R^2 of 0.2454, much higher than research involving the complex phenomenon of municipal performance. Since in Brazil the requirement to compete and take up elective positions is only to know how to read and write and knowing that education is an essential way for the development of any country, this article aims to increase knowledge about the subject with the intention of provoking voters to broaden their analysis on the candidates, pondering their qualities in the field of formal education. At the end, it was concluded that the educational level positively influences the FDI, indicating that in cities with managers with a higher education level, fiscal performance tends to be higher.

Keywords: *Human capital. Formal education. Municipal management.*

Submission on 02/04/2019. **Review on** 03/25/2019. **Accepted on** 04/04/2019. **Published on** 05/13/2019.

1 INTRODUCTION

The executive manager of a municipality is responsible for the decisions and strategies regarding public policies (Avellaneda, 2008). Therefore, his experience and intelligence should be crucial to achieving the goal of a group, but the reality does not present itself so simple (Fiedler & Garcia, 1987). To achieve an excellent administrative performance, the transmission of administrator knowledge should acquire a policy way (Murphy, Blyth & Fiedler, 1992).

A mayor's ability for public management may be linked to his educational training, due to the possibility of anticipating the consequences of his actions and omissions (Avellaneda, 2008). The theories of Cognitive Resources and Human Capital are applied to verify the influence of the degree of education of the mayors in the financial performance of the municipalities (Silva & Filho, 2018).

If meritocracy had great weight in choosing the population by electing its managers, the risks of corruption could be lower, managers more motivated and better performance, the development of an *esprit de corps*,, long-term incentives for work, the prioritization of the welfare of the population (Rauch & Evans, 2000; Miller & Withford, 2007; Dahlström, Lapuente & Teorell, 2012; Gingerich, 2013; Charron, Dahlström, Fazekas & Lapuente, 2017).

In Brazil, mayors are responsible for governing the municipalities both in political terms and in administrative matters (Gomes, Alfinito & Albuquerque, 2013). As a way of measuring, in terms of management, the level of self-sufficiency of Brazilian cities, Gomes *et al.* (2013) proposed an index resulting from the sum of taxes on services and properties (own collection), divided by the total value of the expenses. The closer the result to 1, the lower the dependence of the municipality on external sources of revenues. Such index is used as a dependent variable in this study.

In a similar study, Silva and Filho (2018) used the IDF as the dependent variable in their study, in addition to the independent variables "educational level," "Population" and "GDP *per capita*" of the municipalities, in the cities of Paraíba between the years 2013 to 2016. In that *paper*, all these variables have been utilized, adding four new dependent variables in the econometric model, in the municipalities of the states of the Southern region of Brazil.

With the union of the Theory of Human Capital, in which education and training are considered the most important investments of an individual for his ascension, both professionally and financially (Becker, 1994), with the Theory of Cognitive Resources, in which the leaders who plan, decide and act with greater effectiveness are the most intelligent and competent (Fiedler & Garcia 1987), arises the question that governs this *paper*: What is the influence of the degree of formal education of mayors in the management of municipalities in the Southern region of Brazil?

Therefore, the main objective is to analyze the influence of the degree of formal education of the mayors in the management of the municipalities in the Southern region of Brazil, aiming to increase the knowledge on the subject, intending to provoke the voters to broaden their analysis on the candidates, considering their qualities in the field of formal education, this study is justified by the need for good public managers to be chosen, with experience on decisions that influence the whole population.

The object of study was delimited by the southern region of the country, in the years 2013 to 2016, a period that represents the totality of a political mandate in relation to the mayors elected in 2012. They are 1,191 municipalities in total, 399 from Paraná, 295 from Santa Catarina and 497 from Rio Grande do Sul. Data have been collected at the SICONFI, FIRJAN, IBGE, MPF and TSE portals, in addition to the dependent variable IDF (Tax Performance Index), calculated according to the authors Gomes *et al.* (2013). For data analysis, an econometric model of fixed effects has been run.

In addition to the introduction, four other sections compose the scope of this article. Following is the theoretical basis, addressing the Theory of Cognitive Resources and the Theory of Human Capital, succinctly and objectively, in addition to a figure with the theoretical

structure according to the necessity of this study. The next topic presents the methodology used, the variables employed in the created econometric model and their respective sources. A descriptive analysis of the data and the results obtained via the model are shown in the fourth topic. The final considerations complete the work in the fifth and last section.

2 THEORETICAL FOUNDATION

This section presents the essential concepts and the minimum literature necessary for the appropriate understanding of the topics discussed throughout this *paper*. As a first topic, the Theory of Cognitive Resources is highlighted, followed by a summary on the Theory of Human Capital. These two form the theoretical foundation of this study. Finally, recent studies on the subject are presented.

2.1 Cognitive Resource Theory

In their work "New approaches to effective leadership: Cognitive resources and organizational performance" Fiedler e Garcia (1987) proposed a new discussion on leadership. Despite the obviety that the level of experience and the intelligence of a leader should be crucial to achieving the goal of a group, previous researches have shown that it is not so simple.

The authors based the theory on two assumptions: intelligent and competent leaders plan, decide, and act more effectively than leaders with less intelligence and competence; leaders of working groups communicate their plans, decisions, and strategic actions in the form of guidelines (governing behavior).

In order to obtain a performance according to the management objectives, the knowledge and experience acquired by the manager have to be transmitted to the group, in a policy way, showing how the work must be done and with the team's fulfillment of these instructions (Murphy *et al.* 1992).

The theory of cognitive resources predicts that intelligence imposes a higher weight in situations of low *stress* level, while experience contributes more effectively when the group faces a high level of *stress* (Fiedler & Gibson, 2001).

Cognitive resources, according to Jackson and Matusitiz (2017), refer to the combined skills of a group, the experience of the leader, and their ability to make decisions. For successful management in stressful situations, a leader must possess intelligence and experience, in addition to being responsible for the maintenance of the group unit, with a favorable and propositive environment (Jackson & Matusitiz, 2017).

Leite, Brighenti, Silva and Júnior (2015) studied the relationship between cognitive aspects in corporate financial performance in Chilean and Brazilian companies. The results showed that companies' financing decisions have their results positively affected in companies managed by people with cognitive bias.

In his study "Municipal performance: does mayoral quality matter?" Avellaneda (2008) explains that, in the development of municipal public policies, without necessarily a professional administrator, the responsible for decisions and strategies is the mayor.

The author identifies that the capacity of a prefect for management may be linked to his educational training, because it allows for anticipation of the consequences of his actions or omissions. It would be expected that the more educationally qualified is a mayor, the more sensible will be his decisions. This individual performance influences organizational performance (Avellaneda, 2008).

This relationship between educational formation and organizational performance leads to the theme of the next topic, in which the basic concept necessary on the Human Capital Theory for this study will be presented.

2.2 Human Capital Theory

For Becker (1994), author of the work "Human Capital: a theoretical and empirical analysis with special reference to education", education and training are the most important investments in human capital. The salary of the most educated people are almost always well above average, especially in less developed countries.

With relation to public policies, Tingjin (2012) demonstrated that the Human Capital Theory is a powerful tool to explain the speed of ascension in public offices in Chinese municipalities.

The correlation found in that study showed that employees with greater human capital stand out due to the economic performance of their jurisdictions, quickly climbing the steps of their professional ladder, which leads them to having greater chances of indication as mayor of more prosperous cities (Tingjin, 2012).

Several authors indicate that this choice, by meritocracy, applied to the public sector, could reduce the risks of corruption, including the recruitment and promotion of servers more motivated and with better performance, with the development of an *esprit de corps*, long-term incentives for arduous work with prioritization of the population's welfare (Rauch & Evans, 2000; Miller & Withford, 2007; Dahlström *et al.* 2012; Gingerich, 2013; Charron *et al.* 2017).

Another point to be highlighted about the Human Capital Theory relates to technology, the greater the qualification and the preparation of the population, the greater the capacity of innovation in technologies, utilizing them in the best way in the production process, increasing the chances of a positive result (Viana & Lima, 2010).

Silva and Filho (2018) concluded in their work that by verifying the existence of a relationship between the financial performance of the municipality and the degree of education of the public manager, it is demonstrated the application of Human Capital Theories and Cognitive Resources in the light of public municipal management.

In addition to the academic aspect, the authors warn about the usefulness of this information for electoral justice, aiming at seeking strategies in the sense of greater demand in the education of candidates to the position of chief of the municipal executive, in order to obtain better-prepared municipal public managers for financial management.

2.3 Theoretical Framework

Then, as a complement to the above-mentioned referential, it is presented in table 1, the theoretical structure of the study, with the exposition of the main authors that support the research discussions, as a way to evidence and synthesize the previously built knowledge on the subject.

Table 1 - theoretical structure of the research

Cognitive Resources Theory	
Fiedler & Garcia (1987)	New approaches to effective leadership: Cognitive resources and organizational performance
Murphy *et al.* (1992)	Cognitive resource theory and the utilization of the leader's and group member's technical competence
Fiedler & Gibson (2001)	Determinants of effective utilization of leader abilities. Concepts for Air Force Leadership
Avellaneda (2008)	Municipal performance: does mayoral quality matter?
Leite *et al.* (2015)	Cognitive aspects in the corporate financial performance of Brazilian and Chilean companies
Jackson & Matusitiz (2017)	Understanding Somali Piracy through cognitive resources theory
Human Capital Theory	
Becker (1994)	Human Capital: a theoretical and empirical analysis with special reference to education

Viana & Lima (2010)	The human capital theory and the economic growth
Tingjin (2012)	The promotion logic of prefecture-level mayors in China
Charron *et al.* (2017)	Careers, Connections, and Corruption Risks: Investigating the impact of bureaucratic meritocracy on public procurement processes
Silva & Filho (2018)	The Influence of Education Level of the Public Manager on Financial Performance of Municipalities

Source: research data (2019)

We discussed the main conceptual elements regarding the investigation of this research, and then the methodological procedures that guided the accomplishment of the work will be presented, evidencing the steps given by the authors in order to achieve the verified results.

3 METHODOLOGICAL PROCEDURES

As outlined in the previous sections, and in view of the object of this study, we seek to analyze the influence of the level of schooling in the municipal financial performance of the municipalities in the Southern region of Brazil in the period from 2013 to 2016.

Initially, we justified the choice of the period because it represents a closed political mandate of each mayor in the sample of municipalities, a fact that allows for performing a more adequate inference about each analyzed municipality. In addition, the availability of access to the period data also conditioned the choice of the time in question.

The sample consisted of all 1,191 municipalities in the Southern region of the country, with 399 municipalities from the state of Paraná, 295 from the state of Santa Catarina and 497 from the state of Rio Grande do Sul. The data are laid out in a slightly unbalanced panel. Even though in some of the periods there was no available data, the municipality had been maintained, since no restriction has been verified in working with an unbalanced panel. Besides, eventual situations of absence of data were punctual, which does not affect the analysis and inferences about the sample.

The data used in the research have been mostly collected at the SICONFI government portal. The Accounting and Tax Information System of the Brazilian Public Sector - SICONFI is a public tool aimed at receiving accounting, financial and tax statistics from 5,570 municipalities, 26 states, the District Federal Government and the Union. The data are accessible to the external public, which is why it was possible to perform the data collection.

From within SICONFI, the accounting data of the municipalities employed in the research have been extracted, which were necessary for the construction of the model dependent variable. Information such as the population of the sample municipalities, have been collected also at the SICONFI portal. In addition, the IFDM – FIRJAN Municipal Development Index and the IFGF – FIRJAN Tax Management Index have been collected, both directly from the FIRJAN portal. Information related to GDP has been extracted from the IBGE portal. The national ranking of transparency, also modeled as a model control variable, was extracted from the MPF portal on the Internet.

The personal information on the municipal public managers, employed in the research, such as level of schooling, age and marital status were collected in the electoral data repository, directly from the TSE portal on the Internet. An observation regarding the degree of schooling refers only to the date when the data have been collected, and it is not possible in this study to deal with any changes occurring during the term of the mandate.

Regarding the dependent variable to be tested, it is the IDF – Financial Performance Index. The variable is calculated as the ratio between the city's own collection, by means of fees and taxes on services and properties, and the expenses liquidated. This variable has been used as a dependent, because, effectively, it represents the effort of the public manager in the collection

of resources to the municipality, being, therefore, susceptible to test by the Theory of Cognitive Resources and measured by the level of schooling.

Such variable, presented by Gomes *et al.* (2013) and used by Silva and Filho (2018) in a study similar to the present, may reflect the ability to manage public resources by the head of the municipal executive (Silva & Filho, 2018). Regarding the other variables, greater explanations are excused, since they are easy to understand.

Table 2 indicates the variables employed in the research, its construction (when applicable), the expected signal, as well as the location in which they were collected.

Table 2 - research variables

Variable	Variable type	Expected Signal	Author(s)	Construction
IDF	Dependent	.	Gomes *et al.* (2013)	**IDF = AP/DL**, where AP = Own collection (that is, discounting the transfers); **DL** = Liquidated expenses.
GE	Explanatory	+	TSE	The TSE discloses the level of schooling of the mayors elected on a scale starting in "Able to read and write" to "Complete superior".
IFDM	Control	+	FIRJAN	It evidences the level of municipal development, calculated according to FIRJAN's own methodology. It is expected that in municipalities with better IFDM, a better IDF also occur.
IFGF	Control	+	FIRJAN	It evidences the degree of fiscal zeal of the municipality, calculated according to FIRJAN's own methodology. It is expected that in municipalities with better IFGF, a better IDF also occur.
PIBpc	Control	+	IBGE	It is expected that in municipalities with better GDP, a better IDF also occur.
POP	Control	+	SICONFI	It is expected that in municipalities with greater population, occurs a better IDF.
Transp. MPF	Control	+	MPF	It is expected that in municipalities with greater transparency, occurs a better IDF.
EC	Control	+	TSE	It will be tested whether municipalities with married public managers present better IDF.
ID	Control	+	TSE	It will be tested whether municipalities with older public managers present better IDF.

IDF: Tax performance index (dependent variable); GE: level of schooling; IFDM; FIRJAN Municipal Development Index; IFGF: FIRJAN Tax Management Index; Per Capita GDP: GDP *per capita*; POP: population; Transp. MPF: MPF transparency ranking; EC: civil status of the manager; ID: manager age.

Source: research data (2019)

Regarding the variable schooling level (EG), as evidenced in table 2, it is a qualitative variable starting with "Reads and writes", up to "Superior degree". To operationalize this variable in the model, the following delineated procedure has been employed.

When the mayor informed the TSE that he "reads and writes", he was assigned the numerical value of 2. When the information referred to "Incomplete elementary education", the value 3 was attributed. "Complete elementary school", the value 4. "Incomplete high school", 5. "Complete high school", the value 6. "Incomplete superior", 7 and finally "Superior degree" the value of 8 has been attributed.

Regarding the research variables and their essential considerations, the following was the regression model used:

$$IDF_{it} = \alpha + \beta_1 GE_{it} + \beta_2 IFDM_{it} + \beta_3 IFGF_{it} + \beta_4 PIBpc_{it} + \beta_5 POP_{it} + \beta_6 TranspMPF_{it} + \beta_7 EC_{it} + \beta_8 ID_{it} + \varepsilon_{it}$$

Where:

IDF: Tax performance index (dependent variable); GE: level of schooling; IFDM; FIRJAN Municipal Development Index; IFGF: FIRJAN Tax Management Index; Per Capita GDP: GDP per capita; POP: population; Transp. MPF: MPF transparency ranking; EC: civil status of the manager; ID: manager age.

The final model used was the fixed effects, considering that the tests of Chow, Breusch-Pagan and Hausman led to such conclusion. The sample *outliers* have been given due treatment, so as not to bias the results and inferences.

Succinctly, these are the main methodological notes necessary for the good understanding of the research's results. Any other points related to the model, or even to the tests performed, are discussed in the next section. That being said, we pass to the presentation and discussion of the results of the research, evidencing the main findings of the work.

4 PRESENTATION OF RESULTS

Table 3 shows the descriptive statistics. On average, the municipalities in the southern region of the country present an IDF of 0.183, indicating that their collection is insufficient to face all expenses of the period. In relation to the level of schooling (GE), the data indicate that, on average, only slightly more than a half of the public managers of the municipalities in the south of the country have a complete higher level, which, to a certain extent, causes astonishment, given the fact that a superior degree is more attainable these last years. This finding evidences that, even in a relatively developed region of the country, as is the Southern region, access to higher education, even for municipal public managers, is short of what would be expected.

Still on the GE, analyzing the distribution of the results by category, it has been verified that among the 1,173 mayors that composed the sample, only 4 (0.34%) reported schooling as "read and write", 89 (7.59%) "Incomplete elementary school", 69 (5.88%) as "Complete elementary education", 31 (2.64%) as "Incomplete high School", 305 (26%) as "Complete high school", 69 (5.88%) "Incomplete higher education" and finally 606 (51.66%) As "Superior degree".

Table 3
Descriptive Statistics

	N	Medium	Average	Min.	Max.	Coeff. Var.
IDF	4690	0,183	0,153	-1,251	2,357	0,738
GE	4690	6,706	8	2	8	0,242
IFDM	4690	0,728	0,734	0	0,913	0,134
IFGF	4690	0,524	0,539	0	0,957	0,268
PIBpc	4690	27984.530	24315.180	0	289932	0,572
POP	4690	23872.660	7042.500	0	1864416	3,525
Transp.MPF	4690	3,212	0	0	10	1,134
EC	4690	0,803	1	0	1	0,495
ID	4690	50,633	50,490	24,899	79,364	0,182

IDF: Tax performance index (dependent variable); GE: level of schooling; IFDM; FIRJAN Municipal Development Index; IFGF: FIRJAN Tax Management Index; Per Capita GDP: GDP per capita; POP: population; Transp. MPF: MPF transparency ranking; EC: civil status of the manager; ID: manager age

Source: research data (2019).

Referring to IFDM, the municipalities in the South of the country present, on average, grade 0.728, showing a good level of municipal development, at least when compared to the national average. With relation to the population, on average, the municipalities of the South of

the country present an amount 23,872 inhabitants, a result consistent with the quantity of municipalities of the South region.

In relation to age, on average, the municipal public managers of the Southern region were 50 years old, indicating that they are already mature people, with extensive previous experience accumulated in the service of the municipal public administration.

Table 4 shows the correlation matrix of the variables. It has been verified that the variable of interest, which is, the tax performance index, maintains a statistically significant correlation, which indicates the existence of statistical relationships between them, and not arising from mere assumptions.

Table 4
Correlation matrix

	IDF	**GE**	**IFDM**	**IFGF**	**PIBpc**	**POP**	**Transp. MPF**	**EC**	**ID**
IDF	1								
GE	0.17***	1							
IFDM	0.26***	0.13***	1						
IFGF	0.24***	0.06***	0.15***	1					
PIBpc	0.18***	0.07***	0.21***	0.11***	1				
POP	0.37***	0.12***	0.15***	0.07***	0.10***	1			
Transp. MPF	0.14***	0.02	-0.04**	-0.08***	0.14***	0.04***	1		
EC	-0.10***	-0.01	0.05***	0.00	-0.02	-0.07***	-0.01	1	
ID	0.10***	-0.16***	0.04***	-0.03**	0.05***	0.05***	0.11***	0.11***	1

IDF: Tax performance index (dependent variable); GE: level of schooling; IFDM; FIRJAN Municipal Development Index; IFGF: FIRJAN Tax Management Index; Per Capita GDP: GDP per capita; POP: population; Transp. MPF: MPF transparency ranking; EC: civil status of the manager; ID: manager age
**Significant at 10%; **Significant at 5%; ***Significant at 1%.*
Source: research data (2019)

No variable is highly correlated with another, which is interesting for the purpose of the model, since the existence of high levels of correlation between the variables could send inferences based on the data.

From the correlation matrix presented in table 4, we highlight the correlation between the IDF and the GE (level of schooling), of 0.17, significant at 1%, evidencing the existence of relation between these variables. Obviously these relationships will all be the object of regression analysis, but the correlation matrix already provides a good preliminary idea of what will get verified below, when analyzing the regression model.

Table 5 shows the result of the regression model run. As reported in the methodological section, the most adjusted model for the data was the fixed effects one. According to Gujarati and Porter (2011), the fixed effects model relies on the heterogeneity among individuals, allowing each one of them to have its own intercept. This difference can take place, even still according to Gujarati and Porter (2011), to special aspects of each. In the case of the present study, because they are municipalities of the states of the Southern region of the country, these differences can result from the GDP, the geographic location, the potential of generating revenues from the municipality, its population, its educational level, among infinite others.

Table 5
Results of Linear Regression Model

IDF (dep)	Coeff.	P>t
GE	0.01	0.00
IFDM	0.25	0.00
IFGF	0.30	0.00
PIBpc	0.00	0.03

POP	0.00	0.00
Transp.MPF	0.00	0.54
EC	-0.03	0.00
ID	0.00	0.00
C	-0.29	0.00
R^2 Overall: 0.2454	F(8,1164) = 76.21	Prob > F = 0.0000

IDF: Tax performance index (dependent variable); GE: level of schooling; IFDM; FIRJAN Municipal Development Index; IFGF: FIRJAN Tax Management Index; Per Capita GDP: GDP per capita; POP: population; Transp. MPF: MPF transparency ranking; EC: civil status of the manager; ID: manager age

Source: research data (2019)

The term "fixed effects" is due, according to Gujarati and Porter (2011), to the fact that, although the intercept may differ between the municipalities, the intercept of each municipality does not vary with time, that is, is invariant.

As emphasized by Gujarati and Porter (2011), the intercept (with fixed effect) of each municipality varies using the technique of the dummy variable, mainly the technique of the variables dummies of differential intercept. However, it is attentive to the use of the aforementioned technique, including always k-1 dummies variables, thus escaping from the so-called dummy trap, perfect collinearity situation.

It is not for the researcher to opt, freely, for a model of fixed, random or pooled effects. It is the data that forwards the decision, which is confirmed by means of the specific tests carried out to take that decision.

As has been said, all models' specification tests have been performed until the decision was made that the fixed effects model proved to be the most suitable for the data. Initially, the Chow test has been performed in order to evaluate between the pooled and fixed effects models.

Table 6 - Results of Chow test

F test that all u_i=0:	F(1172, 3511) = 9.71	Prob > F = 0,000

Source: research data (2019)

The result of the F statistic is shown in table 6. For the analysis and decision in relation to the pooled models and fixed effects, a model with fixed effects was run (command "fe" in Stata) and analyzed the value of "Prob. > F" indicated by the model.

Considering the result reported in the test (Prob > F of 0.000), the fixed effects model proved to be more adjusted to the data than the pooled one. Next, we should analyze the fixed effects model in the face of the random effects model. For such, the Hausman test was conducted, as shown in table 7.

Table 7 - Hausman test Results

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg
Test: Ho: difference in coefficients not systematic
chi2(11) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 147.44
Prob>chi2 = 0.0000

Source: research data (2019)

The test results indicate that the fixed-effect model, with safety (prob. 0.000) is preferable face to the random effects model. For these reasons, as affirmed, the model applied to the research was the fixed effects one.

In the result of the regression, indicated in table 5, it has been found that the R^2 of the model got 0.2454, which indicates a good explanatory power, considering the complexity of the

phenomenon analyzed. Thus, we concluded that almost 25% of the variations in the IDF are explained by the set of modeled variables.

Regarding the variables of the research, it is noteworthy, initially, that not all variables passed the T test, that is, not all of them showed to be statistically significant. As shown in table 5 above, the TranspMPF variable was not statistically significant. This way, no inference gets fit in relation to this variable. In relation to the other variables, some interesting findings have been verified. The first is in relation to the explanatory variable GE (education level). The coefficient associated with the variable proved to be highly significant, passing the T test to 1%. However, although highly significant from the statistical point of view, the variable has low explanatory power from the economic point of view. The coefficient associated with such variable was 0.01, evidencing that the level of education of public managers, in the sample analyzed, has little importance to explain the levels of fiscal performance of the municipalities of the sample.

The expectation was that this variable would present a higher coefficient, that is, would contribute more to the explanation of the municipal tax performance. Mayors more prepared educationally would present better conditions to manage the public thing and, in turn, would obtain better results for the municipalities. In the case of the sample, this was effectively verified, however, the educational level of the manager contributes little to the explanation of these results, which in some way frustrates the initial expectation in relation to this variable, however, in no way disbelieves the result, since it is highly significant, as already evidenced.

Also noteworthy are the results associated with IFDM and IFGF. Municipalities with the best indexes of municipal development (measured by the IFDM) have better IFD, that is, higher conditions to face their own resources expenses, with lower aid of transfers. The coefficient associated with IFDM was 0.25, highly significant both from the statistical point of view (p-value of 1%) and from the economic point of view, given it is one of the greatest coefficients of the model.

With relation to the IFGF, the model shows that municipalities with better tax management have better IDF, which comes to the expectation of the research. The IDF rightly evidences the lower dependence of transfers resources to face their expenses, and in municipalities with better tax management (IFGF), therefore, the indexes of the IDF should be the best. This fact has been confirmed by the research, since the coefficient associated with the variable IFGF, of 0.30, is highly statistically significant (p-value of 1%) as economically, since it is the highest coefficient of the model, that is, with the greatest explanatory power.

In relation to GDP per capita and the population, again there are two variables that presented significant coefficients. As for the GDP per capita, although the coefficient associated with the variable is statistically significant at 5%, economically this coefficient contributes almost anything to the explanation of the IDF (coefficient of 0.00). Municipalities with higher GDP should present a better IDF, and in fact, this is what the model evidenced, but the influence of GDP on IDF is very short, as were evidenced by the reported result. Therefore, in economic terms, the inference made is that, in terms of IDF, both municipalities with large or small GDP may present similar IDFs, since this variable was not economically relevant in the model.

In this same sense, it is the result associated with the population variable. It was hoped that in more populous municipalities, the IDF would be much higher than in smaller municipalities, but this is not the case the model evidenced. In fact, the coefficient associated with the population is positive, indicating that the greater the municipality, the higher the IDF, but the coefficient value is very low (0.00), indicating that, in practice, the size of the population has little influence on the IDF of the municipalities in the Southern region of the country.

Although the coefficients associated with such variables are low and contrary to the expected, in a similar study, Silva and Filho (2018) found a coefficient associated with the GDP of 0.00000774 and a coefficient associated with the population of 0.00000036, that is, equally very low results, indicating that in similar researches this behavior is common in relation to the variables GDP and population.

Finally, the variables marital status and age have also been modeled as control. The hypothesis regarding these variables was that married managers and older managers would present a behavior of greater commitment in relation to the public thing (Müller, Fátima Rauski, Eyng, & Moreira, 2005; Iseri, Silva & Silva, 2012; Cunha, 2011).

Regarding marital status, the coefficient associated with the variable was -0.03, significant at 1%, and indicates that the IDF in municipalities managed by married managers is lower than the IDF of municipalities managed by single, separated or widowed managers. The fact is curious, because it opposes initial expectation for the variable, but given the absence of studies that model this variable in the context of this study, there are no comparative parameters in relation to this result. This finding can propel new researchers, in future researches, analyzing this variable and whether the behavior remains similar to the finding of this research.

Finally, with respect to age, once again the coefficient associated with the variable has been presented as expected. Age, with a coefficient of 0.00 and highly significant (1%) shows that municipalities with older managers have better IDFs. However, the economic relevance of this finding is low, given the coefficient reported (0.00), evidencing that age is not a factor with great weight in the explanation of the municipal IDF.

In view of the findings presented in this section, it was verified that the tax performance of the municipalities (IDF) is positively influenced by the level of education of the manager, a result that is dented to the dictates of the theories of Cognitive Resources and Human Capital.

That is, the higher the level of education of the public manager, the greater is its ability to manage the public thing, since the municipality managed by managers with higher levels of schooling has lower dependence on transfers resources, presenting greater capacity of generating resources for its maintenance.

The finding confirms the initial hypothesis of the study, evidencing that, in fact, better management passes, to some extent, by level of schooling of the manager. Of course, it is not intended to enter into details related to the technical staff of the city, the number of servants, the structure of work, and of so many other factors that influence the IDF, but fact is that the education of the manager is statistically and economically significant explanation of municipal financial performance.

This is a warning, especially for voters, in the sense that, on the occasion of the elections, training at the top level of the manager can also be one of the decisive elements that voters take into account at the time of the vote.

Of course, the results are not generalizable, being restricted to the municipalities of the southern region of the country contemplated in the sample. However, the findings raise several interesting points to be discussed in both academic and circles of conversation in the social bosom, especially regarding the level of schooling, focus of this research.

In simple terms, these represent the main findings of the research, as explained above. Then, the final considerations of this study are presented.

5 FINAL CONSIDERATIONS

In Brazil, the formal rule of the electoral process does not value cognitive capacity as an essential element of the electoral process. This occurs because the requirement to compete and assume elective positions is only minimal education, which in this case is knowing how to read and to write.

Despite this, it is understood that education is an essential way for the development of any country. Therefore, it is naturally more coherent that, for the assumption of elective positions, the leaders of the nation have high educational levels.

Given this, and assuming that more literate managers could obtain better results for their municipalities, this study aimed at analyzing the influence of the degree of formal education of mayors in the management of municipalities in the southern region of Brazil. To this end, we

analyzed all the mayors elected in 2012 of the 1,191 municipalities in the southern region of Brazil, which is formed by the states of Paraná, Santa Catarina and Rio Grande do Sul.

As the main findings, it was found that, on average, the municipal public managers in the southern region of Brazil studied up to high school and have, on average, 50 years of age at the time of their elective mandates.

Regarding the variables of interest of the present research, especially the degree of education, the results, accompanying what was expected according to the theoretical basis of the study, evidenced that there is a statistically significant relationship (1%) between the municipal tax performance and the level of education of the mayor, indicating that in cities with managers with higher educational level, the fiscal performance tends to be, on average, higher.

It is also noteworthy both GDP and Population as variables that positively influence the fiscal performance of the municipalities in the South region, but in a lower degree, given the coefficients reported in the model. The mayor's age was also statistically significant at 1%, indicating that the more experienced the municipal manager, the better the municipal tax performance tended to be. This finding may be related to the aggregate life experiences of managers, since older people have already undergone many life situations that younger people have not yet experienced, which guarantees them a greater *expertise* to act in face of adversity, which corroborates the theory of Cognitive Resources.

Regarding the explanatory power of the model, it has proved to be quite expressive, with a R^2 of 0.2454, much higher than researches involving the complex phenomenon of municipal performance.

Thus, responding to the research problem and confirming what was expected based on the theoretical foundation used, the degree of formal education of the mayors positively influences the management of the municipalities in the southern region of Brazil, since, on average, municipalities with more skilled managers from within the standpoint of formal education obtained better results related to fiscal performance.

This finding is quite significant and promising, but there is still much to be researched on the subject. In addition, the phenomenon of municipal management is extremely complex, and its understanding requires greater and deeper studies. No wonder the theme is very researched by the academy.

This occurs, in particular, by the fact that researches related to municipal management meet both the interests of managers and those of the citizens. For managers, studies that contribute to understand which factors can lead to a more efficient and promising public management undoubtedly add to the set of knowledge that these professionals seek in their formations to be more apt to drive the public machine. In the same way that, for the citizen, knowing more deeply the variables that lead to better management equips them with elements to improve the claim for better public services and a more professional management on the part of the managers, effectively, related to the very high tax burden that sustains the action of the public machine.

For future investigations, it is suggested the search for a new metric for the municipal financial performance, in particular testing the explanatory power of this model with another dependent variable.

Furthermore, research on other characteristics of the public manager, such as gender, partisan affiliation, and even its political-ideological positioning can shed more light on the theme, providing new findings that lead a way towards a greater understanding of the elements of public management, which, as said, is doubly beneficial: it contributes so much that managers better drive our cities and citizens, providing information to improve the process of social control of the public thing.

REFERENCES

Avellaneda, C. N. (2008). Municipal performance: does mayoral quality matter?. *Journal of Public Administration Research and Theory, 19*(2), 285-312.

Becker, G. S. (1994). Human capital revisited. In *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education* (3a,pp. 15-28). The university of Chicago press.

Charron, N., Dahlström, C., Fazekas, M., & Lapuente, V. (2017). Careers, Connections, and Corruption Risks: Investigating the impact of bureaucratic meritocracy on public procurement processes. *The Journal of Politics, 79*(1), 89-104.

Cunha, L. A. M. (2011). *A satisfação laboral e o compromisso organizacional dos colaboradores de uma empresa de comércio e reparação automóvel* (Doctoral dissertation).

Dahlström, C., Lapuente, V., & Teorell, J. (2012). The merit of meritocratization: Politics, bureaucracy, and the institutional deterrents of corruption. *Political Research Quarterly, 65*(3), 656-668.

Fiedler, F. E., & Garcia, J. E. (1987). *New approaches to effective leadership: Cognitive resources and organizational performance*. John Wiley & Sons.

Fiedler, F. E., & Gibson, F. (2001). Determinants of effective utilization of leader abilities. *Concepts for Air Force Leadership, 24*(2), 171-176.

Gingerich, D. W. (2013). *Political institutions and party-directed corruption in South America: Stealing for the team*. Cambridge University Press.

Gomes, R. C., Alfinito, S., & Albuquerque, P. H. M. (2013). Analyzing local government financial performance: evidence from Brasilian municipalities 2005-2008. *Revista de Administração Comtemporânea, 17*(6), 704-719.

Gujarati, D. N., & Porter, D. C. (2011). *Econometria Básica-5*. Amgh Editora.

Iseri, S. S., da Silva, L. P. M., & Silva, M. A. C. (2012). Consumo consciente-a percepção de acadêmicos da Universidade Federal de Mato Grosso do Sul (UFMS). *Anais do Sciencult, 3*(1), 219-228.

Jackson, M. K., & Matusitiz, J. (2017). Understanding Somali Piracy through cognitive resources theory. *Africa Review, 9*(1), 1-12.

Leite, M., Brighenti, J., Silva, T. P., & Júnior, N. C. A. C. (2015). Aspectos cognitivos no desempenho financeiro empresarial de companhias brasileiras e chilenas. *Congreso Iberoamericano de Contabilidad de Gestión,* Florianópolis, Santa Catarina, Brasil, 9.

Miller, G. J., & Whitford, A. B. (2006). The principal's moral hazard: Constraints on the use of incentives in hierarchy. *Journal of Public Administration Research and Theory, 17*(2), 213-233.

Müller, M., de Fátima Rauski, E., Eyng, I. S., & Moreira, J. (2005). Comprometimento organizacional: um estudo de caso no supermercado "Beta". *Revista Gestão Industrial, 1*(4).

Murphy, S. E., Blyth, D., & Fiedler, F. E. (1992). Cognitive resource theory and the utilization of the leader's and group member's technical competence. *Leadership quarterly, 3*(3), 237-55.

Postali, F. A. S., & Nishijima, M. (2011). Distribuição das rendas do petróleo e indicadores de desenvolvimento municipal no Brasil nos anos 2000S. *Estudos Econômicos, 41*(2), 463-485.

Rauch, J. E., & Evans, P. B. (2000). Bureaucratic structure and bureaucratic performance in less developed countries. *Journal of public economics, 75*(1), 49-71.

Silva, J. E., & Filho, M. A. S. (2018). A Influência do Grau de Instrução do Gestor Público no Desempenho Financeiro dos Municípios. *USP International Conference in Accounting*, 17.

Tingjin, L. (2012). The promotion logic of prefecture-level mayors in China. *China: An International Journal, 10*(3), 86-109.

Viana, G., & Lima, J. F. D. (2010). The human capital theory and the economic grouth. *Interações (Campo Grande), 11*(2), 137-148.