_____

"WHAT IS THE DIAGNOSIS, DOCTOR?": FINANCIAL HEALTH ASSESSMENT MODEL FOR SMALL BRAZILIAN MUNICIPALITIES IN THE NORTHEAST ACCORDING TO THE 10-POINT TEST

Marco Túlio José de Barros Ribeiro, Dr.[d1]
Wellington Silva Porto, Dr.[d2]
Luiz Carlos Miranda, Ph.D[3]
Raimundo Nonato Rodrigues, Dr.[4]
Yony de Sá Barreto Sampaio, Ph.D[5]
[1, 2] **PhD students by the Post-Graduate Program in Accounting Sciences of the Federal University of Pernambuco (PPGCC/UFPE)**
[3, 4, 5] **Professors of the Post-Graduate Program in Accounting Sciences of the Federal University of Pernambuco (PPGCC/UFPE)**

ABSTRACT

Contributing to the availability of tools aimed at performance measurement adapted to the Brazilian reality, this study aims to present a model for assessing the financial condition for small brazilian municipalities in the Northeast with up to 20,000 inhabitants according to the 10-Point Test. For evaluation, the study developed by Brown (1993), with the necessary adaptations of the financial indicators to the Brazilian reality according to the research of Diniz, Macedo and Corrar (2012), will be based on the study. The evaluation stages consist of the calculation of the ten indicators proposed for each small municipality in the Northeast, a comparison of the city indicator in relation to similar municipalities and the proper classification of the financial condition. The accounting data and number of inhabitants of the municipalities will be those made available by FINBRA, a database linked to the Brazilian Public Sector Accounting and Tax Information System (SICONFI) for the most current year available (2016) and duly exported to the Excel worksheet. The proposal is to segregate the municipalities according to the population size, totalizing four groups. For each of the four groups, a Box and Whisker (boxplot) model will be established to evaluate the empirical data distribution, using the RStudio environment (version 1.1.383) present in the software R (version 3.4.3). The financial crisis that afflicts all levels of Brazilian government has given a boost to the reform of the public finance landscape. It is in this scenario that the model described in this article contributes to the continuous evaluation of the small Northeastern cities with up to 20,000 inhabitants, providing a quick and intuitive tool, as opposed to other sophisticated and expensive techniques that overload the management time and the public budget municipal.

KEYWORDS: financial condition; performance measurement; small municipalities; 10-Point Test.

1.INTRODUTION

The financial crisis that afflicts all levels of Brazilian government has given a boost to the reform of the public finance landscape. This situation leads to a decrease in tax bases, with restrictions on the

_____

expansion of the revenue collection process and increasing demands for public services to meet the needs of the population.

According to Ammons, Smith and Stenberg (2012), the 2008 global recession severely affected the ability of municipalities to meet their obligations to the population. The studies of Carmeli (2008), Levine and Scorsone (2011), Hilvert and Swindell (2013), Luby (2014) and Perlman (2014) collaborate in this sense when they reflect that the financial pressures are the result of the increase of the attendance challenges of public service demands. For most municipalities around the world, the financial condition is a continuous struggle.

According to Epstein and Mcfarlan (2011), the term "financial condition" is usually associated with similar expressions such as fiscal health, financial health, financial performance, fiscal stability and fiscal strength, referring to an organization's ability to provide uninterrupted services. Shah (2010) portrays the capacity of an organization to meet its obligations to creditors and stakeholders. The research by Wang, Dennis and Tu (2007) and Rivenbark and Roenigk (2011) examined fiscal stability based on long-term budgetary, financial, service and solvency indicators. In addition, financial health can be defined differently according to the author's focus. For example, Kioko (2013) defines how the government's ability to meet its short- and long-term obligations without compromising the current quality of services. Chaney, Mead and Schermann (2002) and Aikins (2011) have examined the term as changes in equity over a period of time. However, the common characteristic is to evaluate the financial health of an organization with the purpose of analyzing the influence on the capacity to meet the demands of the interested parties.

With the evaluation of the municipal financial condition, this may be able to identify how to meet public needs, how to use resources and how to proceed so that it can be more productive, according to Williams (2003). The importance of financial condition assessment was illustrated by Wang and Liou (2009) as a comparative control to what is done with the evaluation of human health, a financial condition that, in a municipality, is considered a complex and multidimensional issue.

Given the dynamics of the Brazilian economy, it is imperative that governments, especially small municipalities, increasingly perceive the need to have a broader view of their financial health, as does a person seeking a medical diagnosis for the disease that torments him. Therefore, this article has the following research problem: how to evaluate the financial condition of small Brazilian municipalities?

Brazil is a particularly relevant case because of the large number of small municipalities that are the result of a fragmentation process created with the Federal Constitution of 1988, according to Gomes, Alfinito and Albuquerque (2013). The results of the study pointed out that larger municipalities are more likely to manage revenues and expenditures better than smaller municipalities, which are mostly 20,000.

As a way of establishing a financial health assessment tool for municipal management, Brown (1993) constructed a model known as the 10-Point Test for financial indicators of a municipality with a population of at most 100,000 people. Maher and Nollenberger (2009) point out that the model consists of four fundamental financial factors, with respect to the perspective of revenue, expenditure, operating position and debt structure. Contributing to the availability of tools aimed at performance measurement adapted to the Brazilian reality, this study aims to present a model for assessing the financial condition for small municipalities in the Northeast with up to 20,000 inhabitants according to the 10-Point Test.

The strength of the 10-Point Test lies in its benchmarking, according to Rivenbark, Roenigk and Allison (2010). The idea of the present study is justified in relation to efforts to provide a more focused measurement tool to the financial condition of a smaller local government, as highlighted by Rivenbark and Roenigk (2011), since such measurement should be rapid and effective and also improve the availability of comparative data. According to Brazil (2015), approximately 70% of Brazilian municipalities are constituted by up to 20,000 inhabitants and those located in the Northeast Region represent 25% of the total population. total of small towns.

For the development of the article, Section 2 will discuss the theoretical contributions regarding the municipal financial condition, the constructs of the Model 10-Point Test and previous studies. Already in Section 3, the methodology for reaching the research objective will be detailed, aiming at the analysis of the results in Section 4 and, finally, the research conclusion evidenced in Section 5.

_____

_____

2 REVIEW OF THE LITERATURE
2.1 Financial condition in municipalities

For Wang, Dennis and Tu (2007) and Kioko (2013) financial condition refers to the ability of a government to fulfill its obligations, be it in the form of debt or service on an ongoing basis. In this regard, Hruza (2015) emphasizes that the provision of necessary services and materials for society is an irreplaceable role for government in the era of modern democracy. Some researchers present different terms associated with the financial condition, according to Table 1:

Table 1: Terms Associated with the Financial Condition.

Research	Association
Kloha, Carol and Kleine (2005) Trussel and Patrick (2009)	Fiscal strength or effort (Fiscal distress): described as a condition that threatens a municipality while maintaining public functions that are considered essential to the public service.
Cabaleiro, Buch and Vaamonde (2012) Cuadrado-Ballesteros, Mordan and Garcia-Sanchez (2013)	Financial health: the main requirement in achieving the goal of any entity.
Crosby and Robbins (2013) McDonald (2017)	Fiscal health: the government's determining capacity to meet the needs of local society, with the availability of revenue streams.
Arnett (2014) Brusca, Rossi and Aversano (2015)	Financial sustainability: ability to manage expected revenue and predict long-term financial risks, without affecting revenue reduction or redundancy of expenses.

Source: Own elaboration from the researched articles.

Within the range of terms regarding the financial condition of a municipality, there is a conceptual tendency regarding the ability of a government to meet its financial obligations in a timely manner, together with the maintenance of public services to society.

Given the multidimensional aspect of municipal financial condition and its complexity, McDonald (2017) presents four aspects that can be considered: (1) ability to meet financial commitments in a timely manner; (2) ability to meet financial obligations over a fiscal year; (3) ability to honor your long-term obligations; and (4) municipal capacity to finance government programs and public services required by law. Under these aspects, the author points out, the municipality is in response to the needs of the citizen, considering the demands that are placed over time, and can also withstand unforeseen interruptions such as economic problems and demographic dynamics.

2.2 The contribution of Brown (1993): the 10-Point Test Model

Kenneth Brown comes to make a contribution in assessing the financial condition of governments, especially for small counties. The article describes a short test of financial condition so that municipal finance managers can evaluate their cities, with respect to the population with up to one hundred thousand inhabitants. Called the 10-Point Test, the proposal suggests using 10 key financial metrics, so that the manager rates his or her city and compares with others as to performance. The motivation behind the model is the need for a fast and effective diagnostic tool without the need for analytical techniques that are costly and time-consuming.

The author uses an official government database, called the Government Finance Officers Association (GFOA), for the year 1989, to use the municipal financial assessment methodology in relation to

_____

_____

four basic financial factors of a city: revenues (3 indicators), expenditure (1 indicator), operational position (3 indicators) and debt structure (3 indicators).

It also describes three steps necessary for the evaluation, as described below:

(a) **Calculation of the indicators** for the municipality to be evaluated;

(b) **Comparisons between cities**: using the indexes for all 750 municipalities of the database with a population of up to one hundred thousand inhabitants. The author divided the 750 cities into four population groups, that is, cities between 50,000 and 100,000 inhabitants, cities between 30,000 and 50,000, cities between 15,000 and 30,000, and cities with less than 15,000 inhabitants. The author then separated the groups into quartiles, totaling four parts of 25% each.

(c) **Assignment of points for each of the indicators:** Each quartile is assigned a score ranging from -1 to +2. This scale is intended to allow only cities with indicators above the 3rd quartile to achieve a positive overall score. Thus, for the overall classification of the municipality evaluated, the author proposes the following measurement "rule": if the municipality has added 10 points or more of all the proposed indicators, it is among the best; if it is between 5 and 9, it is better than most; if it is between 1 and 4, it is on average; On the other hand, if it is between 0 and -4, it is worse than most; and, if it is -5 or less, the evaluated municipality is among the worst.

At the end Brown (1993) further emphasizes that, given the difficult environment in which a city operates, managers need to assess the financial situation on an ongoing basis. The suggested interpretations of the punctuation technique are based on the assumption that all ten indicators are equally important. It suggests this equation of weight by the possibility of some indicator being given more importance than another, because of the municipal management preferring ratios that favor more performance over other less favorable ones.

2.3 Previous studies

Analyzes of the financial condition have been carried out both in the international scenario and internally in Brazil. In this regard, previous studies are presented with the aim of identifying the main findings about the process of evaluating financial health in public entities.

In the studies consulted are the contributions of Cohen et al. (2012), Rusmin, Astami and Scully (2014), Clark (2015) and Spreen and Cheek (2016). The national studies are the studies of Diniz et al. (2012), Gomes, Alfinito and Albuquerque (2013) and Souza, Andrade e Silva (2015).

The research of Cohen et al. (2012) sought to model an assessment of municipalities according to their financial conditions and to distinguish those who have a solid financial position from those who perform poorly in the context of Greek municipalities. The model is developed through a multicriteria decision-making methodology, based on a simulation approach that allows to examine a large number of different assessment scenarios. In the second step, the results of the simulation analysis were aggregated to build an operational assessment model, which can be used to evaluate the performance of any municipality at any point of time. The simulation process was implemented with ten thousand scenarios, each corresponding to a distinct and randomly generated evaluation model. In particular, the study applied to the case of 364 Greek municipalities for fiscal year 2007, in order to measure the efficiency of the model to identify municipalities with poor financial situation, showing that the designed model presents stability when applied.

Rusmin, Astami and Scully (2014) examine the association between demographic characteristics and differences in financial position in local governments in Indonesia. There is research highlighting data on demographic characteristics and financial statements audited by the Supreme Audit Body of 419 Indonesian local governments for FY07. The demographic attributes were location, scope, mandate, gender, HDI, and size in terms of population numbers. The results suggest that the reach and location of municipalities helps explain the variables of financial condition, so that the larger the population of a municipality, the greater the capacity to finance general services and the greater the possibility of obtaining own revenues.

_____

_____

Already Clark (2015) evaluated the reliability and validity of the Financial Condition Index (FCI), as a method of diagnosing the financial condition in municipalities. The main sources of work data are Comprehensive Annual Financial Reports (CAFRs) from 117 counties in Ohio. The data were accessed through a Bloomberg Terminal, in the time cut from 2004 to 2010. Altogether there were eleven indicators, three in the "cash" dimension, two in the "budget" dimension, three in the "long term" dimension and three in the "service". The results suggest the additional need to use other techniques depending on the population size or economic condition of a community. It also suggests that FCI should not be used as a universal technique.

The study of Spreen and Cheek (2016) aimed to assess whether the monitoring of the fiscal situation by a state government causes the improvement of the financial condition in municipal governments. They addressed the use of state monitoring, in particular, based on the Michigan Fiscal Stress Indicator System (MFSIS). Of the nine system indicators, the authors used seven of them, four financial management indicators and three environmental indicators. They employed a model to test whether Michigan municipal governments performed better on all indicators compared to their peers in the states of Illinois, Indiana and Wisconsin, the latter three states without an official monitoring program. The results show that there were no statistically significant differences between the financial positions of Michigan municipalities and their peers in neighboring states, suggesting that state governments are not affected by the financial condition of municipalities.

The results of the surveys listed so far show, in general, when assessing financial health, models that depend on a series of variables to describe the financial condition of a government are limiting to the very scope of the system (for example, the FCI and the MFSIS). As put forward by McDonald (2017), although there is encouragement from surveys for a single measurement, such efforts must be made with caution. It is in this aspect that the Brown (1993) model provides an objective and simple, for example, the evaluation of short-term financial health for municipalities, showing fiscal indicators applicable to the Brazilian reality, as can be explained in the following studies.

Diniz, Macedo and Corrar (2012) examined a global picture of economic and financial performance in 122 Brazilian municipalities. The authors also point out that most municipalities are under financial pressure, since there is a great dependence on intergovernmental transfers, high indebtedness and high fixed costs, causing a limitation to fiscal stability. Of the 122 municipalities, only 15 reached satisfactory economic-financial performance. The results also reveal that, for 2007, only the per capita expenditures on health, urban planning and sanitation showed a significant relation with the financial efficiency scores of the municipalities. They also point out that the analysis by means of indicators provides useful information for municipal officials to examine finances, in the same proposal put forward by Brown (1993), for a rapid evaluation of the municipal financial condition, encouraging the dissemination of the model for a better monitoring by the of their performance.

The research by Gomes, Alfinito and Albuquerque (2013) provides empirical evidence on the determinant factors that influence municipal performance. The results suggest that, based on Brazilian municipal data, larger cities are more likely than smaller ones to manage revenues and expenses. The other conclusion of the investigation is about the antecedents of the city hall. Despite the low level of statistical association between financial performance and city hall quality (a set of age, educational background and previous administrative experience), the level of statistical association is somewhat higher when analyzing only the educational plan. This fact indicates that local government managers need to be better prepared to fulfill their responsibilities as tasked with the functions of the municipality. In terms of political ideology, the evidence gathered in this research does not imply that this is likely to be considered a problem in terms of financial performance.

Finally, Souza, Andrade and Silva (2015) set out to analyze the efficiency in the allocation of public resources earmarked for elementary education and its relation with the financial condition in the Brazilian municipalities for the year 2012. The results revealed that the municipality of São Paulo/SP was the one that presented the greatest allocation of resources for elementary education and Mauá/SP was the one that

_____

_____

allocated less resources for the year researched. Among the 75 municipalities analyzed, 12 were considered efficient regarding the application of expenditures with elementary education. They also point out that the use of efficiency analysis tools is relevant for Public Management, since efficiency is one of the constitutional principles that Public Administration must observe. Finally, they point out that the evaluation of the financial condition aims to contribute to the public managers can observe how their management is, which may stimulate the search for greater efficiency in the use of public spending and results-based management.

3.METHODOLOGY

The idea is to evaluate, within a group of small Northeastern municipalities, which maintain financial perspectives and similar characteristics, validation references for inference about the financial condition. Thus the small municipality that presents better financial indexes may be a reference to the other municipalities.

For evaluation, the study developed by Brown (1993), with the necessary adaptations of the financial indicators to the Brazilian reality according to the research of Diniz, Macedo and Corrar (2012), will be based on the study.

The evaluation stages consist of the calculation of the ten indicators proposed for each small municipality in the Northeast with up to 20,000 inhabitants, a comparison of the city indicator in relation to similar municipalities and the proper classification of the financial condition. The proposal is to segregate the municipalities according to the population size, totalizing four groups, according to Table 2.

Table 2: Division of municipalities according to population

Population range	Label
Up to 5,000 inhabitants	Group A
Between 5,001 and 10,000 inhabitants	Group B
Between 10,001 and 15,000 inhabitants	Group C
Between 15,001 and 20,000 inhabitants	Group D

Source: Own elaboration based on Brown (1993)

Thus, there are four basic financial factors for a city: revenue, expenditure, operating position and debt structure, totaling ten indicators, as evidenced in Table 3.

Table 3: Financial Condition Indicators

Financial Factors	Indicator	Relation	Interpretation
Income	1-Per capita income	$\dfrac{Total\ Income}{Number\ of\ inhabitants}$	The **bigger** the better
	2-Own income share	$\dfrac{TCI - CT}{Total\ Income}$	The **bigger** the better
	3-Income share of transfers	$\dfrac{CTI}{Total\ Income}$	The **smaller** the better
Expense	4-Coverage of expenses	$\dfrac{Current\ Income}{Total\ Expense}$	The **bigger** the better
Operational position	5-Operational participation	$\dfrac{Current\ Expense}{Total\ Expense}$	The **smaller** the better
	6-Resources to cover fall of collection	$\dfrac{Financial\ surplus}{Total\ Income}$	The **bigger** the better
	7-Funds to cover short-term obligations	$\dfrac{Availabilities}{Current\ Bonds}$	The **bigger** the better

_____

_____

Indebtedness	8-Commitment of current incomes to short-term obligations	$$\frac{Short - Term\ Obligation}{Net\ Current\ Income}$$	The **smaller** the better
	9-Per capita debt	$$\frac{Consolidated\ debt}{Number\ of\ inhabitants}$$	The **smaller** the better
	10-Commitment of current revenues to indebtedness	$$\frac{Consolidated\ debt}{Net\ Current\ Income}$$	The **smaller** the better

Legenda:

TCI – Total Current Income;

CT – Current Transfers

CTI - Current Transfer Income

Source: Brown (1993) and Diniz, Macedo and Corrar (2012)

For each of the four groups, a Box and Whisker (boxplot) model will be established to evaluate the empirical distribution of the data, using the Rstudio environment (version 1.1.383) present in software R (version 3.4.3). The ends are the upper and lower quartiles, so that the box covers the interquartile range. The median is marked by a vertical line inside the Box. And whiskers are the two lines outside the box that extend to the highest and lowest observations. In other words, the median is the midpoint below and above where 50% of small townships are. The lower quartile is 25% of the cities and, in the upper part, the other 25% of the municipalities.

The accounting data and number of inhabitants of the municipalities will be those made available by FINBRA, a database, according to Brazil (2018), linked to the Accounting and Fiscal Information System of the Brazilian Public Sector (SICONFI) for the most recent year available (2016) and duly exported to the Excel worksheet.

After this will be done the calculations of the indicators proposed for each municipality. Next, the score for the ten indicators for the municipality to be evaluated will be assigned, so that if the city indicator is between the lowest observed value of the group and the 1st quartile, it receives -1 score. If it is between the 1st quartile and the 2nd quartile, it receives a value of 0. If it is between the 2nd quartile and the 3rd quartile, it receives a value of 1. And if it is between the 3rd quartile and the highest observed value, it receives a score of 2. At the end, adding the points and according to Table 4, if the municipality meets 10 points or more, the city is among the best (great). If the grade is between 5 and 9, the county is better than most (good). For the score between 1 and 4, the city is in the average (regular). However, if it is between 0 and -4, the situation is worse than most (bad). And finally, if the grade is -5 or less, the municipality is among the worst (very bad).

Table 4: Score Regarding Financial Condition Assessment

Punctuation	Evaluation
10 or more	Among the best (great)
5 a 9	Better than most (good)
1 a 4	On the average (regular)
0 a -4	Worse than most (bad)
-5 or less	Among the worst (lousy)

Source: Elaboration itself as of Brown (1993)

Thus, the proposal provides a quick and easy to understand communication, aiming at the disclosure of management in relation to the citizens of a city.

_____

_____

4. ANALYSIS OF RESULTS

This article proposes an evaluation tool for financial condition for small municipalities in the Northeast with up to 20,000 inhabitants, according to the 10-Point Test model.

Four basic financial factors were considered in the analysis: revenue (indicators 1-3), expenditure (indicator 4), operational position (indicators 5-7) and indebtedness (indicators 8-10). In general, the following steps compose the model: calculation of the indicators, comparison of similarly sized city indices presented in this article and classification of financial condition of some municipality based on the previous step.

4.1 Calculation of indicators

Initially, the test consists of obtaining the 10 indexes of a city. A calculation tool is provided (Table 5) in which it can be used to summarize the municipal indicators, thus obtaining the financial condition score.

Table 5: Financial Condition Assessment Sheet

Indicator (1)	Indicator of Your City (2)	Quartile (3) - Circle the quartile according to the indicator of your City				City Score (4) - Write your score
		Quartile 1 (0-25%)	Quartile 2 (25-50%)	Quartile 3 (50-75%)	Quartile 4 (75-100%)	
1	_____	-1	0	1	2	_____
2	_____	-1	0	1	2	_____
3	_____	-1	0	1	2	_____
4	_____	-1	0	1	2	_____
5	_____	-1	0	1	2	_____
6	_____	-1	0	1	2	_____
7	_____	-1	0	1	2	_____
8	_____	-1	0	1	2	_____
9	_____	-1	0	1	2	_____
10	_____	-1	0	1	2	_____
Add the score of the financial condition of your city						_____

Source:Elaboration itself as of Brown (1993)

After the calculation, the indices can be inserted in part 2 of Table 5. Already the parts 3 and 4 should only be filled after the comparison with the small cities of the Northeast of the database and the appropriate score.

4.2 Comparison of the indices with the database of small municipalities in the Northeast

Based on SICONFI's accounting data for the most current financial year (2016), a database was prepared with 853 small municipalities in the Northeast with up to 20,000 inhabitants. For better segregation of results, the 853 cities were divided into four population groups (A, B, C and D), according to Table 6.

_____

_____

Table 6: Database for evaluation of the financial condition of small Northeastern municipalities

Indicator	GROUP A Up to 5000 inhabitants (155 cities) Quartile				GROUP B Between 5001 and 10000 inhabitants (244 cities) Quartile			
	1 (0-25%) WORSE	2 (25-50%)	3 (50-75%)	4 (75-100%) BEST	1 (0-25%) WORSE	2 (25-50%)	3 (50-75%)	4 (75-100%) BEST
1	R$ 3500 or less	R$ 3500 to R$ 4129	R$ 4129 to R$ 4836	R$ 4836 or more	R$ 2411 or less	R$ 2411 to R$ 2768	R$ 2768 to R$ 3089	R$ 3089 or more
2	0.01 or less	0.01 to 0.03	0.03 to 0.04	0.04 or more	0.02 or less	between 0.02 and 0.03	between 0.03 and 0.06	0.06 or more
3	0.96 or more	between 0.93 and 0.96	between 0.89 and 0.93	0.89 or less	0.96 or more	between 0.93 and 0.96	between 0.88 and 0.93	0.88 or less
4	1.07 or less	between 1.07 and 1.13	between 1.13 and 1.18	1.18 or more	1.04 or less	between 1.04 and 1.09	between 1.09 and 1.15	1.15 or more
5	0.95 or more	between 0.92 and 0.95	between 0.89 and 0.92	0.89 or less	0.95 or more	between 0.93 and 0.95	between 0.90 and 0.93	0.90 or less
6	0.07 or less	between 0.07 and 0.25	between 0.25 and 0.47	0.47 or more	(0.01) or more	between(0.01) and 0.17	between 0.17 and 0.40	0.40 or more
7	0.52 or less	between 0.52 and 1.23	between 1.23 and 2.67	2.67 or more	0.52 or less	between 0.52 and 1.02	between 1.02 and 2.16	2.16 or more
8	0.12 or more	between 0.07 and 0.12	between 0.04 and 0.07	0.04 or less	0.14 or more	between 0.07 and 0.14	between 0.04 and 0.07	0.04 or less
9	R$ 532 or more	between R$ 280 and R$ 532	between R$ 154 and R$ 280	R$ 154 or less	R$ 387 or more	between R$ 200 and R$ 387	between R$ 113 and R$ 200	R$ 113 or less
10	0.12 or more	between 0.07 and 0.12	between 0.04 and 0.07	0.04 or less	0.14 or more	between 0.07 and 0.14	between 0.04 and 0.07	0.04 or less

| Indicator	GRUPO C Between 10001 and 15000 inhabitants (270 cities) Quartile	GRUPO D Between 15001 and 20000 inhabitants (184 cities) Quartile

_____

	1 (0-25%) WORSE	2 (25-50%)	3 (50-75%)	4 (75-100%) BEST	1 (0-25%) WORSE	2 (25-50%)	3 (50-75%)	4 (75-100%) BEST
1	R$ 2272 or less	R$ 2272 to R$ 2483	R$ 2483 to R$ 2797	R$ 2797 or more	R$ 2199 or less	R$ 2199 até R$ 2424	R$ 2424 até R$ 2733	R$ 2733 or more
2	0.03 orless	between 0.03 and 0.05	between 0.05 and 0.08	0.08 or more	0.03 or less	between 0.03 and 0.05	between 0.05 and 0.08	0.08 or more
3	0.94 or more	between 0.91 and 0.94	between 0.86 and 0.91	0.86 or less	0.94 or more	between 0.91 and 0.94	between 0.86 and 0.91	0.86 or less
4	1.02 or less	between 1.02 and 1.08	between 1.08 and 1.14	1.14 or more	1.05 or less	between 1.05 and 1.09	between 1.09 and 1.14	1.14 or more
5	0.95 or more	between 0.93 and 0.95	between 0.89 and 0.93	0.89 or less	0.95 or more	between 0.93 and 0.95	between 0.89 and 0.93	0.89 or less
6	0.01 or less	between 0.01 and 0.14	between 0.14 and 0.34	0.34 or more	(0.01) or less	between (0.01) and 0.16	between 0.16 and 0.33	0.33 or more
7	0.36 or less	between 0.36 and 0.78	between 0.78 and 1.68	1.68 or more	0.42 or less	between 0.42 and 0.78	between 0.78 and 1.96	1.96 or more
8	0.17 or more	between 0.09 and 0.17	between 0.05 and 0.09	0.05 or less	0.15 or more	between 0.07 and 0.15	between 0.04 and 0.07	0.04 or less
9	R$ 415 or more	between R$ 238 and R$ 415	between R$ 131 and R$ 238	R$ 131 or less	R$ 349 or more	between R$ 172 and R$ 349	between R$ 107 and R$ 172	R$ 107 or less
10	0,17 or more	between 0.09 and 0.17	between 0.05 and 0.09	0.05 or less	0.15 or more	between 0.07 and 0.15	between 0.04 and 0.07	0.04 or less

Source: Elaboration itself from Brown (1993) and Brazil (2018)

Based on Table 3 presented in the Methodology Section, the interpretation will change for each indicator, where some ratios will be favorable if they are smaller, while others will be favorable if they are high. Of the 10 indicators, 5 are favorable if they have lower values (3, 5, 8, 9 and 10) and the other 5 ratios are favorable only if they have higher values (1, 2, 4, 6 and 7). Interpretations can thus be defined on the basis of each boxplot for evaluation of the empirical distribution of the 4 data groups and described in Graph 1.

_____

Indicator 1
Graph 1: Per capita income of population groups A, B, C, and D
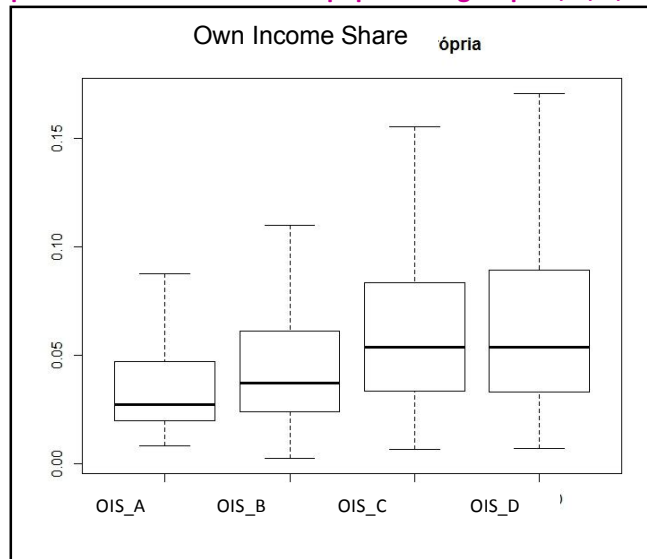
Per capita income
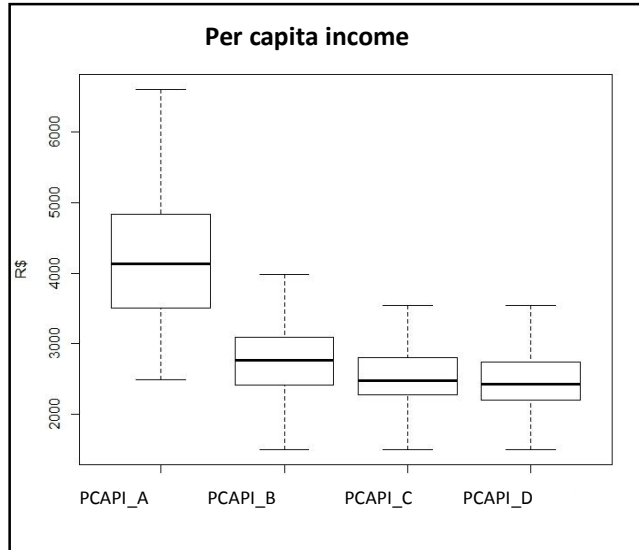
Source: Own elaboration

Graph 1 indicates that higher values suggest a greater ability to obtain revenue. This feature is observed especially in the municipalities of the database belonging to Group A (with population up to 5000 inhabitants).

Indicator 2
## Graph 2: Own Income Share of population groups A, B, C, and D

Own Income Share   ópria

Source: Own elaboration

In turn, Graph 2 indicates that small Northeastern municipalities belonging to population groups C and D have larger proportions, indicating that they do not have some reliance on onlendings by other entities of the federation (States and Union), thus strengthening own revenue generation.

_____

_____

Indicator 3

Graph 3: Share of transfer incomes from population groups A, B, C, and D
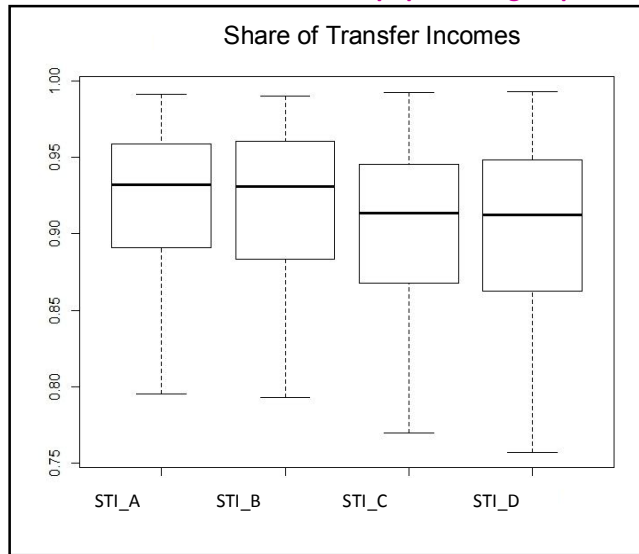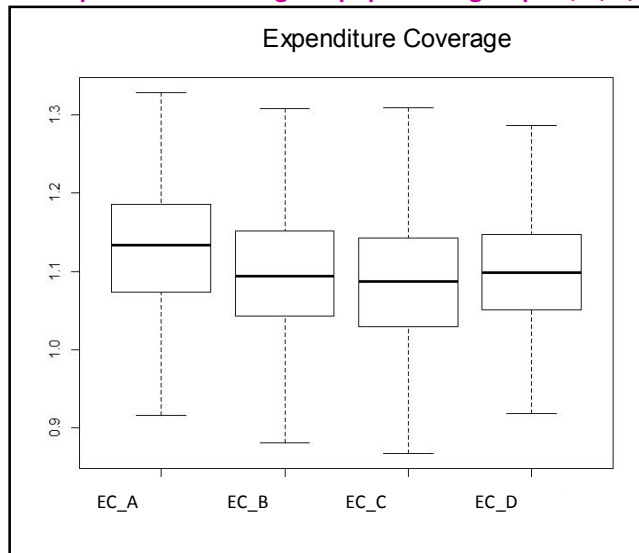

Source: Own elaboration

Graph 3, on the other hand, shows that groups C and D have some advantage over population groups A and B. A lower proportion suggests that the small city does not depend so much on revenues of transfers.

Indicator 4

**Graph 4: Expenditure coverage of population groups A, B, C, and D**

Source: Own elaboration

Graph 4 shows a certain balance between the 4 population groups studied, with a small advantage shown by Group A, cities with up to 5000 inhabitants. A higher proportion suggests that city infrastructures are being maintained as far as coverage of expenditure is concerned.

_____

_____

Indicator 5
**Graph 5: Operational participation of population groups A, B, C, and D**
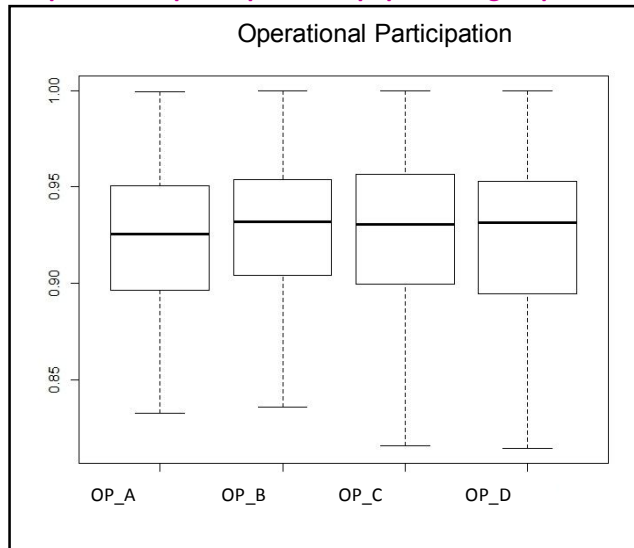
Source: Own elaboration

The interpretation of indicator 5 shows a discrete concentration of the municipalities of the database in terms of the population groups C and D, indicating that lower proportions have better operational participation, since the expenses with infrastructure are smaller than in relation to the total expenses.

Indicator 6
Graph 6: Resources for coverage of fall of collection of population groups A, B, C, and D
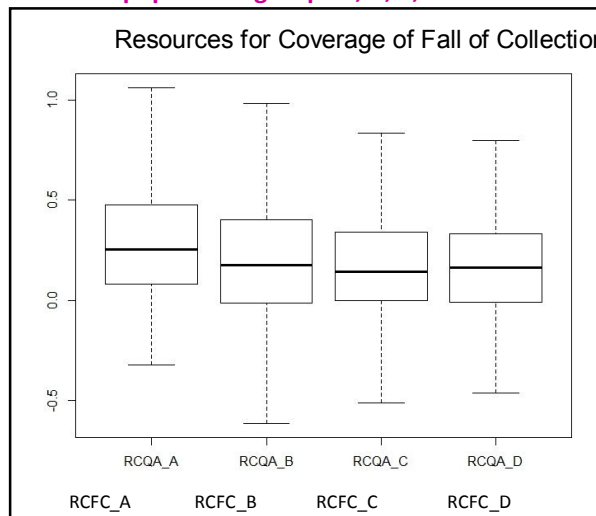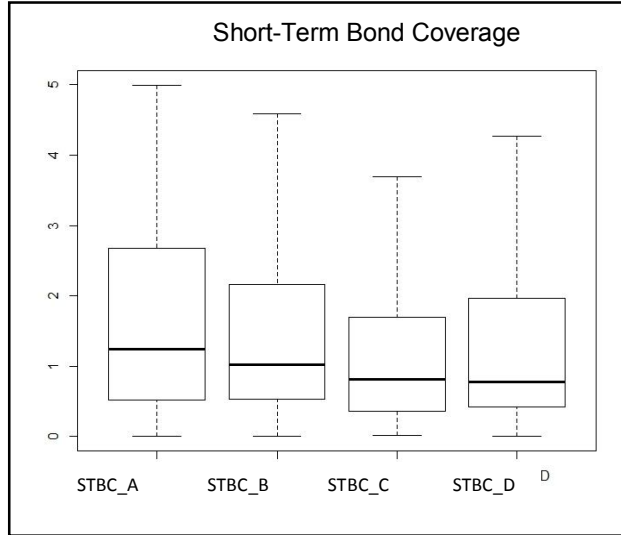

Source: Own elaboration

A higher proportion of resources to cover fall in collection was identified for municipalities with up to 5000 inhabitants, according to what is shown in graph 6. For those municipalities that show a negative

_____

_____

result of the indicator, there is the presence of a financial deficit, representing that there are not enough resources to overcome a fall in revenue collection.

Indicator 7
Graph 7: Short-Term Bond Coverage for population groups A, B, C, and D
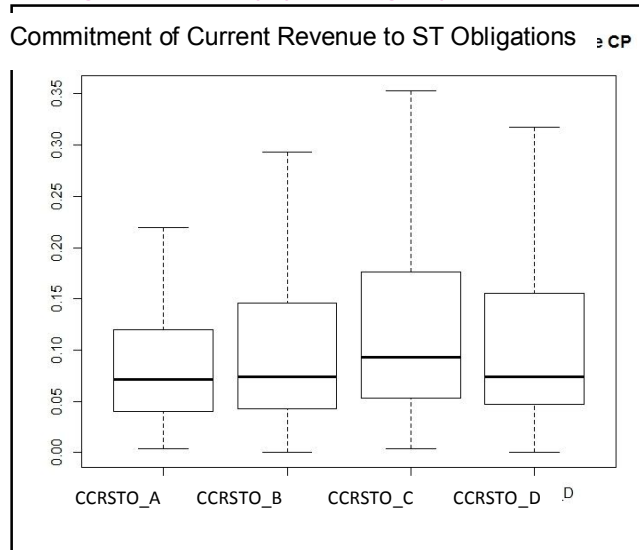

Source: Own elaboration

Therefore, Graph 7 shows high proportions in the population groups studied, suggesting that there are resources to cover short-term obligations for municipalities that have this characteristic.

Indicator 8
**Graph 8: Commitment of Current Revenue to Short-Term Obligations (CP) of population groups A, B, C, and D**

Source: Own elaboration

_____

_____

Indicator 8, on the other hand, when presented by a low proportion suggests that the short-term obligations of Northeastern municipalities with this characteristic can be met with the normal flow of current revenues. Graph 8 shows, however, that population groups B, C and D have a higher commitment of current income to CP bonds than the municipalities of group A.

Indicator 9
Graph 9: Per capita debt of population groups A, B, C, and D
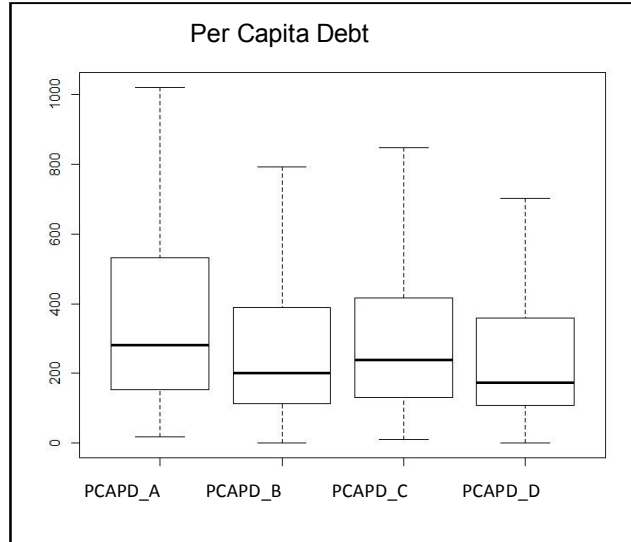
Source: Own elaboration
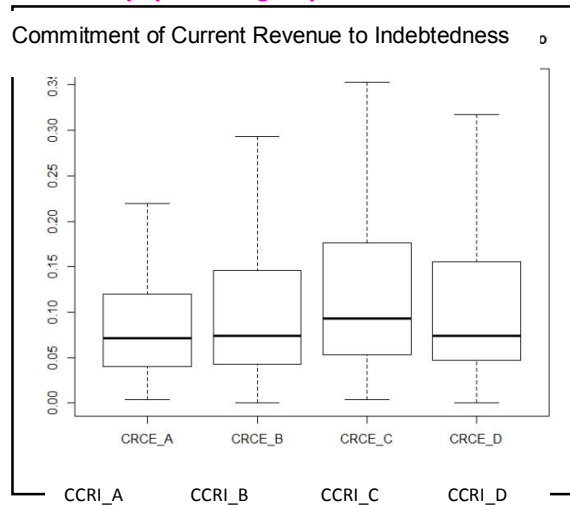
In this ratio, lower values suggest that there is a control of the ability to repay municipal debt. Municipalities with higher per capita debt are prone to difficulties in financial management, if they do not have enough resources to cover them.

Indicator 10
Graph 10: Commitment of Current Revenue to Indebtedness of population groups A, B, C, and D

Source: Own elaboration

_____

_____

And, indicator 10 shows as an interpretation that a lower proportion for small municipalities may suggest that the entities honor their debts without compromising current income (RCs). A fact demonstrated by graph 10 is a high dependence on CRs to cover the indebtedness of those entities with such a characteristic.

Before proceeding to the last step for classification, part 3 of the Financial Condition Assessment Form, as shown in Table 5, can be filled by the municipal manager at this stage, where the quartile should be marked according to the city's indicator, in comparison with the database for the evaluation of financial health of small municipalities in the Northeast of Brazil up to 20,000 inhabitants.

4.3 Classification of financial condition

For each quartile a score ranged from -1 to 2. The goal of this scale is that only cities with relationships above quartile 3 (50th percentile) score positive. To obtain the general score, add the points in part 4 of Table 5. For example, for the municipalities of Gurjão/PB, Abaíra/BA, Pendências/RN and Vertentes/PE cities with, respectively, 3,376, 9,226, 14,751 and 19,976 inhabitants:

Table 7: Financial Condition Assessment Sheet of the Municipality of Gurjão/PB

Indicator (1)	Indicator of Your City (2)	Quartile (3) - Circle the quartile according to the indicator of your City				City Score (4) - Write your score
		Quartile 1 (0-25%)	Quartile 2 (25-50%)	Quartile 3 (50-75%)	Quartile 4 (75-100%)	
1	R$4572	-1	0	1	2	1
2	0,02	-1	0	1	2	0
3	0,86	-1	0	1	2	2
4	1,15	-1	0	1	2	1
5	0,90	-1	0	1	2	1
6	0,61	-1	0	1	2	2
7	0,01	-1	0	1	2	-1
8	0,08	-1	0	1	2	0
9	R$340	-1	0	1	2	0
10	0,08	-1	0	1	2	0
Add the score of the financial condition of your city						**6 (better than most)**

Source: Own elaboration from Brown (1993) and the data collected

Table 8: Financial Condition Assessment Sheet of the Municipality of Abaíra/BA

Indicator (1)	Indicator of Your City (2)	Quartile (3) - Circle the quartile according to the indicator of your City				City Score (4) - Write your score
		Quartile 1 (0-25%)	Quartile 2 (25-50%)	Quartile 3 (50-75%)	Quartile 4 (75-100%)	
1	R$2284	-1	0	1	2	-1

_____

2	0,05	-1	0	1	2	1
3	0,89	-1	0	1	2	1
4	1,02	-1	0	1	2	-1
5	0,84	-1	0	1	2	2
6	0,07	-1	0	1	2	0
7	1,77	-1	0	1	2	1
8	0,07	-1	0	1	2	1
9	R$167	-1	0	1	2	1
10	0,07	-1	0	1	2	1
Add the score of the financial condition of your city						**6** **(better than most)**

Source: Own elaboration from Brown (1993) and the data collected

Table 9: Financial Condition Assessment Sheet of the Municipality of Pendências/RN

Indicator (1)	Indicator of Your City (2)	Quartile (3) - Circle the quartile according to the indicator of your City				City Score (4) - Write your score
		Quartile 1 (0-25%)	Quartile 2 (25-50%)	Quartile 3 (50-75%)	Quartile 4 (75-100%)	
1	R$2720	-1	0	1	2	1
2	0,08	-1	0	1	2	1
3	0,91	-1	0	1	2	1
4	1,20	-1	0	1	2	2
5	0,98	-1	0	1	2	-1
6	0,04	-1	0	1	2	0
7	3,89	-1	0	1	2	2
8	0,01	-1	0	1	2	2
9	R$101	-1	0	1	2	2
10	0,01	-1	0	1	2	2
Add the score of the financial condition of your city						**12** **(better than most)**

Source: Own elaboration from Brown (1993) and the data collected

Table 10: Financial Condition Assessment Sheet of the Municipality of Vertentes/PE

Indicator (1)	Indicator of Your City (2)	Quartile (3) - Circle the quartile according to the indicator of your City				City Score (4) - Write your score
		Quartile 1 (0-25%)	Quartile 2 (25-50%)	Quartile 3 (50-75%)	Quartile 4 (75-100%)	
1	R$2183	-1	0	1	2	-1

2	0,06	-1	0	1	2	1
3	0,91	-1	0	1	2	1
4	1,06	-1	0	1	2	0
5	0,85	-1	0	1	2	1
6	0,74	-1	0	1	2	2
7	2,29	-1	0	1	2	2
8	0,06	-1	0	1	2	1
9	R$130	-1	0	1	2	1
10	0,06	-1	0	1	2	1
Add the score of the financial condition of your city						**9** **(better than most)**

Source: Own elaboration from Brown (1993) and the data collected

For the above examples, although each of the four cities belongs to a specific group, the results showed that they are municipalities with a favorable score. It is worth noting that cities in the database do not provide a random sample of all small Brazilian municipalities, being restricted to northeastern cities with up to 20,000 inhabitants, as initially characterized in the present study.

5. CONCLUSION

The article aimed to present a model for assessing the financial condition for small brazilian municipalities in the Northeast with up to 20,000 inhabitants according to the 10-Point Test.

The model suggests that managers from small Northeastern municipalities compare 10 key financial indicators of their city with similar indicators calculated from SICONFI's accounting data for the most currently available financial year (2016). A database was developed with 853 small municipalities in the Northeast, with up to 20,000 inhabitants, where, for better segregation of results, the 853 cities were divided into four population groups (A, B, C and D).

The interpretation of the model consisted of changing each indicator, where some ratios would be favorable if they were smaller, while others would be favorable if they were high. Of the 10 indicators, 5 are favorable if they have lower values (3, 5, 8, 9 and 10) and the other 5 ratios are favorable only if they have higher values (1, 2, 4, 6 and 7). Interpretations could thus be defined based on each boxplot to evaluate the empirical distribution of the 4 data groups.

The rating scale included a relative (better or worse) aspect, rather than absolute terms (good or bad). It may be that a city has a low score compared to most counties in the database and is not necessarily in precarious (or bad) financial conditions. In this situation it is necessary to carry out a more comprehensive study of the financial condition of the case in question in future researches. Also, as a study proposal, it is proposed to expand the scope of the database beyond the northeastern municipalities, covering small cities of other Regions of Brazil, as in the North and South of Brazil.

The financial crisis that afflicts all levels of Brazilian government has given a boost to the reform of the public finance landscape. It is in this scenario that the model described in this article contributes to the continuous evaluation of the small Northeastern cities with up to 20,000 inhabitants, providing a quick and intuitive tool, as opposed to other sophisticated and expensive techniques that overload the management time and the public budget municipal.

REFERENCES

AIKINS, S. K. An examination of government internal audits' role in improving financial performance. **Public Finance and Management**. vol. 11 (4), p. 306-337, 2011.

_____

_____

AMMONS, D. N.; SMITH, K. W.; STENBERG, C. W. The future of local government: will current stresses bring major, permanent changes? **State and Local Government Review**. vol. 44 (1), p. 64s-75s, 2012.

ARNETT, S. State fiscal condition: ranking the 50 states (working paper no. 14-02). Arlington, VA: Mercatus Center, George Mason University, 2014.

BRASIL. **Pesquisa de Informações Básicas Municipais – Perfil dos Municípios Brasileiros**. Ministério do Planejamento, Orçamento e Gestão (MPOG), 2015. Disponível em: <http://www.ibge.gov.br>. Acesso em: 22 de maio de 2017.

_____. FINBRA – Finanças do Brasil. **Sistema de Informações Contábeis e Fiscais do Setor Público Brasileiro – Secretaria do Tesouro Nacional – Ministério da Fazenda (SICONFI/STN/MF)**. Disponível em: <http://tesouro.fazenda.gov.br/contas-anuais>. Acesso em: 18 de dezembro de 2017.

BROWN, K. W. The 10-point test of financial condition: toward an easy-to-use assessment tool for smaller cities. **Government Finance Review.** p. 21-26, 1993.

BRUSCA, I.; ROSSI, F. M.; AVERSANO, N. Drivers for the financial condition of local government: a comparative study between Italy and Spain. **Lex Localis – Journal of Local Self Government**. vol. 13 (2), p. 161-184, 2015.

CARMELI, A. The fiscal distress of local governments in Israel: sources and coping strategies. **Administration & Society**. vol. 39 (8), p. 984-1007, 2008.

CABELEIRO, R.; BUCH, B.; VAAMONDE, A. Developing a method to assessing the municipal financial health. **American Review of Public Administration**. vol 43 (6), p. 729-751, 2012.

CUADRADO-BALLESTEROS, B.; MORDAN, N.; GARCIA-SANCHEZ, I. M. Is local financial health associated with citizens quality of life?**Social Indicators Research**. vol. 119, p. 559-580, 2014.

CHANEY, B. A.; MEAD, D. M.; SCHERMANN, K. R. The new governmental financial reporting model: what it means for …. **The Journal of Government Financial Management**. vol. 51 (1), p. 26-31, 2002.

CLARK, B. Evaluating the validity and reliability of the Financial Condition Index for local governments. **Public Budgeting & Finance**. vol. 35 (2), p. 66-88, 2015.

COHEN, S.; DOUMPOS, M.; NEOFYTOU, E.; ZOPOUNIDIS, C. Assessing financial distress where bankruptcy is not an option: an alternative approach for local municipalities.**European Journal of Operational Research**. vol. 218 (1), p. 270-279, 2012.

CROSBY, A.; ROBBINS, D. Mission impossible: monitoring municipal fiscal sustainability and stress in Michigan. **Journal of Public Budgeting, Accounting and Financial Management**. vol. 23 (3), p. 522-555, 2013.

DINIZ, J. A.; MACEDO, M. A. S.; CORRAR, L. J. Mensuração da eficiência financeira municipal no Brasil e sua relação com os gastos nas funções de governo. **Gestão & Regionalidade.** vol. 28 (83), 2012.

EPSTEIN, B. M. J.; MCFARLAN, F. W. Measuring the efficiency and effectiveness of a nonprofit's performance. **Strategic Finance**. Vol. 93 (4), p. 27-34, 2011.

GOMES, R. C.; ALFINITO, S.; ALBUQUERQUE, P. H. M. Analyzing local government financial performance: evidence from Brazilian municipalities 2005-2008. **Revista de Administração Contemporânea**. vol. 17 (6), p. 704-719, 2013.

HILVERT, C.; SWINDELL, D. Collaborative service delivery: what every local government manager should know. **State and Local Government Review**. vol. 45 (4), p. 240-254, 2013.

HRUZA, F. Public sector organization financial ratios recent development as a metterof financial innovation. **Investment Management and Financial Innovations**. vol. 12 (2), p. 88-93, 2015.

KIOKO, S. N. Reporting on the financial condition of the states: 2002-2010. **Journal of Public Budgeting, Accounting & Financial Management**. vol. 25 (1), p. 165-198, 2013.

KLOHA, P.; CAROL, S. W.; KLEINE, R. Developing and testing a composite model to predict local fiscal distress. **Public Administration Review**. vol. 65 (3), p. 313-323, 2005.

LEVINE, H.; SCORSONE, E. The great recession's institutional change in the public employment relationship: implications for state and local governments. **State and Local Government Review**. vol. 43 (3), p. 208-214, 2011.

_____

_____

LUBY, M. J. Not all refinancing are created Equal: a framework for assessing state and local government debt refinancing measures. **State and Local Government Review**. Vol. 46 (1), p. 52-62, 2014.

MAHER, C. S.; NOLLENBERGER, K. Revisiting Kenneth Brown's '10-Point Test'. **Government Finance Review**. vol. 25 (5), p. 61-66, 2009.

MCDONALD III, B. Measuring the fiscal health of municipalities (working paper WP17BM1). **Lincoln Institute of Land Policy**, 2017.

PERLMAN, B. J. Refinancing state and local debt: decreased current costs or decreased future flexibility? **State and Local Government Review**. vol. 46 (1), p. 46-51, 2014.

RIVENBARK, W. C.; ROENIGK, D. J.; ALLISON, G. S. Conceptualizing financial condition in local government. **Journal of Public Budgeting, Accounting and Financial Management**. vol. 22 (2), p. 149-177, 2010.

RIVENBARK, W. C.; ROENIGK, D. J. Implementation of financial condition analysis in local government. **Public Administration Quarterly**. vol. 35 (2), p. 241-267, 2011.

RUSMIN, R.; ASTAMI, E.; SCULLY, G. Local government units in Indonesia: demographic attributes and differences in financial condition. **Australasian Accounting, Business and Finance Journal**. vol. 8 (2), p. 88-109, 2014.

SHAH, P. Evaluation of financial soundness through bivariate accounting based performance measurement. **Drishtikan: A Management Journal**. vol 1 (2), p. 352-369, 2010.

SOUZA, F. J. V.; ANDRADE, A. P. F.; SILVA, M. C. Eficiência na alocação de recursos públicos destinas ao ensino fundamental: um estudo da sua relação com a condição financeira de municípios brasileiros. vol. 15 (31), p. 81-99, 2015.

SPREEN, T.; CHEEK, C. Does monitoring local government fiscal conditions affect outcomes? Evidence from Michigan. **Public Finance Review**. vol. 44 (6), p. 722-745, 2016.

TRUSSEL, J. M.; PATRICK, P.A. A predictive model to fiscal distress in local government. **Journal of Public Budgeting, Accounting and Financial Management**. vol 21 (2), p. 578-616, 2009.

WANG, X. D.; DENNIS, L.; TU, Y. S. Measuring financial condition: a study of U.S. states. **Public Budgeting & Finance**. vol. 27 (2), p. 1-21, 2007.

WANG, X. D.; LIOU, K. T. Assesing the change in financial condition: an analysis of panel data from U.S. States.**Public Budgeting & Finance**. vol. 21 (2), p. 165-197, 2009.

WILLIAMS, D. W. Measuring Government in the Early Twentieth Century. **Public Administration Review**. vol. 63 (6), p. 643-659, 2003.

MARCO TÚLIO JOSÉ DE BARROS RIBEIRO
Doctoral candidate in Accounting Sciences, Federal University of Pernambuco (UFPE). Master in Accounting Sciences, Federal University of Pernambuco (UFPE). Professor of the Accounting Sciences course at the Faculty Frassinetti of Recife (FAFIRE) – Brazil. Accountant and degree in Mathematics from the Federal University of Pernambuco (UFPE).
E-mail: marcot_ribeiro@yahoo.com

_____

_____

WELLINGTON SILVA PORTO

Doctoral candidate in Accounting Sciences, Federal University of Pernambuco (UFPE). Master in Production Engineering, Federal University of Santa Catarina (UFSC). Accountant. Professor of the Academic Department of Accounting of the Federal University of Rondônia (UNIR) Vilhena – Brazil. Researcher of the Research Group Contemporary Studies in Accounting and Management – ECCONT and Research Group Management of Innovation and Technology – GEITEC.
E-mail: wsporto2009@gmail.com

LUIZ CARLOS MIRANDA

Phd in Agribusiness, University of Illinois - System (USA). Master in Accounting, University of São Paulo (USP). Economist and Accountant. Professor of the Department of Accounting and Actuarial Sciences at the Federal University of Pernambuco (UFPE). Areas of activity, such as researcher and consultant include: Costs, Management Accounting, Financial Accounting, Cost Accounting, Performance Indicators, Organizational Performance Measurement, Supply Chain Management and Controlling.
E-mail: mirandaphd@gmail.com

RAIMUNDO NONATO RODRIGUES

Phd and Master in Accounting, University of São Paulo (USP). Accountant. Professor of the Department of Accounting and Actuarial Sciences at the Federal University of Pernambuco (UFPE). Experience in Finance and Controllership, with emphasis on Economic-Financial Analysis of projects, Valuation, Business Consulting and Banking.
E-mail: rnrdg@uol.com.br

YONY DE SÁ BARRETO SAMPAIO

Phd and Master in Agricultural Economy, University of California System (USA). Agronomic engineer. Professor of the Department of Economic Sciences at the Federal University of Pernambuco (UFPE). Consultant to the World Bank and Adviser of the CAPES. CNPq Research Productivity Scholarship - Level 1A. Has experience in Economics, with emphasis on Growth, Fluctuations and Economic Planning.
E-mail: yonysampaio@gmail.com

_____

Available online at www.lbp.world