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RAP
BRAZILIAN JOURNAL OF PUBLIC ADMINISTRATION

Forum: Practical Perspectives

Fiscal management, public management efficiency and socioeconomic development of Ceará municipalities

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The role of public administration in society is to manage public assets to provide better social welfare, promoting greater socioeconomic development. The efficient use of public resources is a basic principle for public management to fulfill this role. In addition, the transparency and control offered by fiscal management are factors that optimize results in the public sector, since they lead public managers to apply best managerial practices. In this context, this work analyzes the effects of fiscal management and public management efficiency on municipal socioeconomic development. Data from the 184 municipalities in the Brazilian state of Ceará, from 2007 to 2013, are analyzed using DEA and linear regression. The results indicate that fiscal management and public management efficiency positively influence municipal socioeconomic development, which indicates that public managers should seek better management efficiency and follow rules of fiscal control.

Keywords: fiscal management; public management efficiency; socioeconomic development; municipalities.

Gestão fiscal, eficiência da gestão pública e desenvolvimento socioeconômico dos municípios cearenses

A administração pública tem o papel na sociedade de gerenciar o patrimônio público de modo a proporcionar melhores níveis de bem-estar social, promovendo maior desenvolvimento socioeconômico. A utilização eficiente dos recursos públicos apresenta-se como um princípio básico para que a gestão pública alcance seus objetivos. Além disso, a transparência e o controle, proporcionados pela gestão fiscal, apresentam-se como fatores capazes de otimizar os resultados no setor público, uma vez que conduzem os gestores públicos a boas práticas gerenciais. Nesse contexto, este artigo analisa os efeitos da gestão fiscal e da eficiência da gestão pública no desenvolvimento socioeconômico municipal. Utilizou-se a análise envoltória de dados (*data envelopment analysis* – DEA) e regressão linear para analisar os 184 municípios cearenses, no período de 2007 a 2013. Os resultados indicam que a gestão fiscal e a eficiência da gestão pública influenciam positivamente o desenvolvimento socioeconômico municipal, sinalizando que os gestores públicos devem melhorar a eficiência de sua gestão e observar as regras de controle fiscal.

Palavras-chave: gestão fiscal; eficiência da gestão pública; desenvolvimento socioeconômico; municípios.

Gestión fiscal, eficiencia de la gestión pública y desarrollo socioeconómico de los municipios del estado de Ceará

La administración pública tiene la función en la sociedad de gestionar el patrimonio público para proporcionar mejores niveles de bienestar social, promoviendo un mayor desarrollo socioeconómico. La utilización eficiente de los recursos públicos se presenta como un principio básico para que la gestión pública alcance sus objetivos. Además, la transparencia y el control, proporcionados por la gestión fiscal, se presentan como factores capaces de optimizar los resultados en el sector público, ya que conducen a los gestores públicos a buenas prácticas gerenciales. En ese contexto, este trabajo analiza los efectos de la gestión fiscal y de la eficiencia de la gestión pública en el desarrollo socioeconómico de los municipios. Se utilizó el análisis envolvente de datos –DEA– y la regresión lineal para analizar los 184 municipios de Ceará, de 2007 a 2013. Los resultados indican que la gestión fiscal y la eficiencia de la gestión pública influyen positivamente en el desarrollo socioeconómico municipal, lo que señala que los gestores deben mejorar la eficiencia de su gestión y observar las reglas de control fiscal.

Palabras clave: gestión fiscal; eficiencia de la gestión pública; desarrollo socioeconómico; municipios.

DOI: http://dx.doi.org/10.1590/0034-761220180234x
ISSN: 1982-3134
Article received on July 4, 2018 and accepted on May 8, 2019.
[Translated version] Note: All quotes in English translated by this article's translator.

1. INTRODUCTION

Public administration's primary goal is to maximize society's well-being by optimizing public resources. Public managers must adopt strategies that meet the demands of the population, efficiently using the resources available to achieve socioeconomic development (Alonso, Clifton, & Díaz-Fuentes, 2015; Motta, 2013).

The sources of Brazilian municipalities' revenues are local taxes and transfers from federal and state governments (Costa, Ferreira, Braga, & Abrantes, 2015; Moutinho, 2016). The social accountability and control over public managers is performed using mechanisms of control and transparency (Alcântara, Pereira, & Silva, 2015), such as the Brazilian 1988 Federal Constitution (Brasil, 1988) and the Supplementary Law 101, known as the Brazilian Fiscal Responsibility Law (FRL) (Brasil, 2000; Gerigk & Clemente, 2011). The FRL establishes limits to the action of public managers (Azevedo, 2013; Gerigk & Clemente, 2011).

The literature points to the performance of the public management as a critical factor for municipal development when working to improve priority areas such as education, health, and infrastructure, offering conditions for socioeconomic development (Debnath & Shankar, 2014). Efficiency is the optimal combination of resources in a productive process to achieve maximum results. In public management, efficiency consists of optimizing the use of resources, obtaining the maximum possible supply of public goods and services both in quantitative and qualitative terms (Hauner & Kyobe, 2010; Mukokoma & Dijk, 2013; Peña, 2008).

Based on the notion of efficiency applied to public management, this article analyzes the effects of fiscal management and public management efficiency in local socioeconomic development, examining a group of municipalities in the Brazilian State of Ceará.

The study found that fiscal management and public management efficiency positively affect socioeconomic development in the municipalities.

This analysis contributes to the literature by examining public management efficiency as an element with the potential to influence socioeconomic development. The social relevance of the study lies in the choice of observing municipalities located in a state of the Northeast of Brazil, which is a region historically marked by poor income distribution and low levels of quality of life (Câmara, Carvalho, Silva, L. L. F. Souza, & E. M. Souza, 2016), in addition to the local government's low capability of tax collection (Fontinele, Tabosa, & Simonassi, 2014). These conditions increase the importance of efficiency in public management.

2. THEORETICAL FRAMEWORK

2.1 Government, society, and fiscal management

Government is an agent responsible for decisions on economy, public policies, taxation, and management models that affect citizens' lives (Motta, 2013). The government, as a representative of the society's collective interests, is a discussion that converges with the economic concept presented by Coase (1960). The author examines the complexity of firms and their characteristics, mentioning that the government could be considered a super firm with the power to interfere in the economy, affecting both the market and society as a whole.

Public choice theory (Buchanan & Tullock, 1962) suggests that the particular interests of the public manager may not be aligned with the interests of the collectivity, which may result in decisions privileging the individual's interest on the expense of the common good, incurring in moral hazard, as observed in agency theory (Jensen & Meckling, 1976). This problem appointed by the public choice theory entails in legal mechanisms of control to reduce conflicts of interest and to avoid the lack of control over governments. The Brazilian Fiscal Responsibility Law has been identified as a milestone regarding public management control and strengthening of instruments of fiscal planning and management. The legislation establishes standards of control, transparency, planning, and accountability in public management (Gerigk & Clemente, 2011; Laureano, Wartchow, Rosso, & Macagnan, 017; Leite & Fialho, 2015; Leite, Santiago, Otoni, Veloso, & Ferreira, 2015; Sousa et al., 2013).

Higher fiscal management standards tend to be associated with better instruments of social accountability and control over public management. Fiscal management, therefore, is suggested as a way to promote efficient public management, offering conditions for socioeconomic development. The relationship between fiscal management and efficient public management for socioeconomic development is expressed in the following hypothesis:

Hypothesis 1: Fiscal management positively affects socioeconomic development.

2.2 Public sector efficiency and socioeconomic development

Efficiency is the optimal relation between resources and products, i.e., efficiency is maximizing production while minimizing the resources applied. The concept is related to the means to achieve an objective, going beyond the objective per se (Peña, 2008; Rodrigues, 2017).

Efficiency in the public sector has been gaining space in literature. Efficiency in the public sector can be associated with optimizing the application of resources, improving the quality of services provided to the population (Šťastná & Gregor, 2011). Also, efficiency in the public sector is a factor that may contribute to socioeconomic development (Adam, Delis, & Kammas, 2011).

The Brazilian Federal Constitution puts efficiency as one of the principles of public administration[1]. In addition, efficiency in public administration is related to the capacity of the state to provide goods and services to increasing society's welfare (Chiechelski, 2005).

Thus, it is possible to say that efficiency indicators in public administration are related to social aspects (Šťastná & Gregor, 2011), and are consequently associated with the expansion of socioeconomic development, quality of life, and happiness among citizens (Debnath & Shankar, 2014). Based on this argument, a second hypothesis is proposed:

Hypothesis 2: The efficiency of public management positively affects socioeconomic development.

[1] According to the Article 37 of the 1988 Brazilian Federal Constitution, "The government entities and entities owned by the government in any of the powers of the Union, the States, the Federal District, and the Municipalities shall obey the principles of lawfulness, impersonality, morality, publicity, and efficiency [...]."

3. METHODOLOGY

3.1 Model

The model expressed in Equation (1) is used to evaluate the effect of fiscal management and the effect of public management efficiency (EFIC) (presented in item 3.2 of this article) on the municipal socioeconomic development. Fiscal management is approximated by the FIRJAN Fiscal Management Index, while the municipal socioeconomic development is approximated by the FIRJAN Municipal Development Index (IFDM).

$$IFDM = \beta_0 + \beta_1 IFGF + \beta_2 EFIC + \beta_3 GDP + \beta_4 YEAR + \varepsilon \quad (1)$$

The model also includes the Gross Domestic Product (GDP) – natural logarithm of GDP – an indicator of the size of the municipality and its economic activity, and the year of the observation (YEAR), a dummy variable for each year, which assumes value 1 for the observations of the specific year and 0 for the others.

The models are estimated by ordinary least squares (OLS) and feasible generalized least squares (FGLS). The FGLS estimation technique considers possible heteroscedasticity between the error terms of the model and is also able to treat contemporary and serial correlation.

3.2 Index of public management efficiency

In order to measure the efficiency of public management, efficiency indicators were calculated in three dimensions: a) education; b) health; and c) employment and income. Data envelopment analysis (DEA) was used for the calculation of the efficiency indicators and, later, a weighting between the dimensions was elaborated to obtain the Efficiency Index of the Public Management (IEGP), based on Costa et al. (2015).

The DEA method is a non-parametric technique that allows the measurement of the ratio of multiple inputs to obtain a variety of products, based on the perspective of relative efficiency (Drew, Kortt, & Dollery, 2015). This method was widely reported by Charnes, Cooper, and Rhodes (1978) as an empirical method that leaves behind some assumptions and overcomes limitations of traditional methods of efficiency measurement (Mukokoma & Dijk, 2013). Afonso, Schuknecht, and Tanzi (2010) suggest that the DEA is suitable for performance and efficiency analysis in the public sector. It should be noted that the DEA method generates an indicator of relative efficiency since the production limitation is calculated from the decision-making units (DMUs) present in the sample.

The study used the BCC model (Banker, Charnes, & Cooper, 1984) of the DEA with an output orientation, considering the units that present low levels of input consumption as units operated with increasing returns to scale, and vice versa. Thus, the DEA BCC allows for variation in maximum efficiency, considering the economy of scale; this fact provides a better comparison between DMUs of different sizes, as occurs in this study (Peña, 2008). The output-oriented DEA examines efficiency from the perspective of the DMU's ability to maximize its products while maintaining the volume of resources. This orientation was chosen observing the role of the public manager to allocate available resources, aiming at expanding the supply of public services.

The inputs and outputs used are present in the literature on efficiency in the public sector (Box 1).

BOX 1 VARIABLES USED TO CALCULATE PUBLIC MANAGEMENT EFFICIENCY

Dimension	Variable	Use in the model	Other studies using the variables
Education	Expenditure on education per capita	*Input*	Costa et al. (2015); E. H. Diel, F. J. Diel, Schulz, Chiarello, and Rosa (2014).
	Number of educational institutions	*Outputs*	E. H. Diel et al. (2014); Macêdo, Kloeppel, Rodrigues, and Scarpin (2015); Scarpin, Macêdo, Starosky, and Rodrigues (2012).
	Number of teachers		E. H. Diel et al. (2014); Macêdo et al. (2015); Scarpin et al. (2012).
	Number of students enrolled		E. H. Diel et al. (2014); Macêdo et al. (2015); Scarpin et al. (2012).
	Students performance (percentage of approved students)		Costa et al. (2015); E. H. Diel et al. (2014).
Health	Expenditure on health per capita	*Input*	G. B. Braga, Ferreira, and B. B. Braga (2015); Costa et al. (2015); Schulz, Gollo, Rosa, and Scarpin (2014); Souza and Barros (2013); Varela, Martins, and Fávero (2012); Varela and Pacheco (2012).
	Families registered in the family health program (PSF)	*Outputs*	G. B. Braga et al. (2015); Varela et al. (2012); Varela e Pacheco (2012).
	People registered in the family health program (PSF)		Costa et al. (2015); Gonçalves, Santos, Dias, and Ferreira (2012); Schulz et al. (2014); Varela et al. (2012).
	Health professionals in the national health system (SUS)		Souza and Barros (2013).
	Health units in the national health system (SUS)		Gonçalves et al. (2012); Schulz et al. (2014); Souza e Barros (2013).
	Number of immunization		Costa et al. (2015); Schulz et al. (2014).
Employment and income	Public expenditure on employment and income per capita (Labor; Agriculture; Industry; e Commerce and services	*Input*	Costa et al. (2015).
	Per capita GDP	*Outputs*	Beuren, Moura, and Kloeppel (2013).
	Number of formal employment		Costa et al. (2015).

Source: Elaborated by the authors.

Efficiency indicators were obtained for the three dimensions considered: Health ($IEGP_{Health}$), Education ($IEGP_{Education}$), and Employment and income ($IEGP_{E\&I}$). Costa et al. (2015) suggest the grouping of the IEGP using weighting between the dimensions, using the expenses incurred in each of these dimensions as a criterion for the weighting. The authors argue that they have different amounts that can be approximated by the proportion of the value spent with the dimension, divided by the total amount spent on the three of them. Equation (2) represents the grouping of the IEGP by weighting, generating the $IEGP_{Total}$ indicator, which measured the construct 'efficiency of public management' (EFIC).

$$IEGP_{Total} = \theta IEGP_{Education} \times \frac{S_{Education}}{S_{Total}} + \theta IEGP_{Heath} \times \frac{S_{Heath}}{S_{Total}} + \theta IEGP_{E\&I} \times \frac{S_{E\&I}}{S_{Total}} \quad (2)$$

3.3 Sample and data collection

The sample consisted of the 184 municipalities of the Brazilian State of Ceará from 2007 to 2013. Data on the IFGF and the IFDM were collected from the website of the Federation of Industries of Rio de Janeiro (FIRJAN). The IEGP was calculated using the DEA method. The data that served as inputs and outputs for the construction of the IEGP were collected from public databases: a) Research and Economic Strategy Institute of Ceará (IPECE); b) National Treasury Secretariat (STN); c) Secretariat of Education of the State of Ceará (SEDUC); d) Health Secretariat of the State of Ceará (SESA); and e) Ministry of Social Development and Fight against Hunger (MDS). The GDP variable was collected on the website of the Brazilian Institute of Geography and Statistics (IBGE).

4. ANALYSIS AND DISCUSSION OF RESULTS

Table 1 presents the six estimated regression models of fiscal management (IFGF) and the efficiency of public management, observing its dimensions together ($EFIC_{Total}$) and the dimensions separately (education, health, and employment and income), taking into account the current effect and the lagged effect (one period). The fiscal management (IFGF) has shown a positive effect on municipal socioeconomic development (IFDM), as seen in all the estimated models (Panel A and Panel B) and as suggested by hypothesis 1. This result corroborates the study by Leite and Fialho (2015) and Leite et al. (2015) conducted in the Brazilian State of Minas Gerais; and the study conducted at the national level by Sousa et al. (2013). It is observed, therefore, that the implementation of public management control mechanisms has a favorable effect on socioeconomic development (Azevedo, 2013; Gerigk & Clemente, 2011).

TABLE 1 **EFFECTS OF FISCAL MANAGEMENT AND EFFICIENCY IN THE SOCIOECONOMIC DEVELOPMENT OF THE MUNICIPALITY**

Panel A – Dependent variable = IFDM; Method: FGLS												
	(i)		(ii)		(iii)		(iv)		(v)		(vi)	
IFGF	0.0435	***	0.0523	***	0.0519	***	0.0427	***	0.0506	***	0.0521	***
$EFIC_{Total}$	0.1026	***			0.0945	**						
$EFIC_{Total\ t-1}$			0.0080		-0.0069							
$EFIC_{Education}$							0.1197	***			0.0327	
$EFIC_{Education\ t-1}$									0.0987	***	0.0799	*
$EFIC_{Health}$							0.0869	***			0.0709	*
$EFIC_{Health\ t-1}$									0.0665	**	0.0459	
$EFIC_{E\&I}$							0.0518	***			0.0456	***
$EFIC_{E\&I\ t-1}$									0.0434	***	0.0255	*
GDP	0.0298	***	0.0293	***	0.0295	***	0.0263	***	0.0268	***	0.0244	***
Constant	-0.0372		0.0576	*	-0.0194		-0.0812	*	-0.0517		-0.0731	
Observations (N)	1.275		1.091		1.091		1.219		1.039		1.013	
Municipalities (N)	184		184		184		184		183		182	
Wald (p value)	0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
Panel B – Dependent variable = IFDM; Method: OLS												
	(i)		(ii)		(iii)		(iv)		(v)		(vi)	
IFGF	0.0435	***	0.0523	***	0.0519	***	0.0427	***	0.0506	***	0.0521	***
$EFIC_{Total}$	0.1026	***			0.0945	**						
$EFIC_{Total\ t-1}$			0.0080		-0.0069							
$EFIC_{Total}$							0.1197	***			0.0327	
$EFIC_{Total\ t-1}$									0.0987	***	0.0799	*
$EFIC_{Education}$							0.0869	***			0.0709	**
$EFIC_{Education\ t-1}$									0.0665	**	0.0459	
$EFIC_{Health}$							0.0518	***			0.0456	***
$EFIC_{Health\ t-1}$									0.0434	***	0.0255	
$EFIC_{E\&I}$	0.0298	***	0.0293	***	0.0295	***	0.0263	***	0.0268	***	0.0244	***
$EFIC_{E\&I\ t-1}$	-0.0372		0.0576		-0.0194		-0.1552	***	-0.0517		-0.1400	**
Observations (N)	1.275		1.091		1.091		1.219		1.039		1.013	
R^2	0.4514		0.4045		0.5192		0.4747		0.5096		0.5046	
F	0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
Hausman	0.1246		1.000		1.000		1.000		0.9856		1.000	
VIF	1.60		1.52		1.50		1.64		1.60		1.91	

Source: Elaborated by the authors

Notes: The variance inflation factor (VIF) values of all independent variables that are between 1 and 10, indicating that there is no multicollinearity. Coefficients and errors are estimated by ordinary least squares (OLS) (Panel B) robust to heteroscedasticity. The Hausman test assesses whether there are systematic differences among the coefficient of each model (i to vi), estimated by random effects (Panel A) and fixed effects (Panel B). ***, ** and * refer to significance at the level 1%, 5% and 10%, respectively.

The efficiency of public management ($EFIC_{Total}$) also had a favorable effect on socioeconomic development, as proposed by hypothesis 2 (models i, ii, iii). A detailed analysis shows that the different dimensions of efficiency (education, health, and employment and income) have a positive influence on socioeconomic development (models iv, v, vi). This finding is in line with the literature on the importance of the quality of public management for socioeconomic development (Chiechelski, 2005; Mukokoma & Dijk, 2013; Scarpin et al., 2012; Šťastná & Gregor, 2011).

The study performed all validity tests. Also, the variance inflation factor (VIF) was tested to verify that there was no multicollinearity between the variables of the models. In addition, the research applied the Hausman test to observe the existence of the systematic differences among the estimation coefficients by random effects (Table 1, Panel A) and fixed effects (Table 1, Panel B), considering the null hypothesis the absence of systematic difference in coefficients. The Hausman test did not reject the null hypothesis that both estimates are consistent for all models (i to vi).

5. FINAL CONSIDERATIONS

This research analyzed the effects of fiscal management and public management efficiency in the socioeconomic development of the municipalities of the Brazilian State of Ceará. The findings support the hypotheses raised, demonstrating that both fiscal management (hypothesis 1) and public management efficiency (hypothesis 2) positively affect the socioeconomic development, in the case of municipalities of Ceará.

This research contributes to the public administration literature since it deepens the discussion about the interactions among fiscal management, public management efficiency, and socioeconomic development. Contributing to the advances of the public management models, particularly the managerial model that proposes management focused on results and with higher levels of efficiency and effectiveness, this article adds evidence and brings an empirical perspective.

From the social point of view, the research adds value by exploring data from municipalities of a state in the Northeast of Brazil, to understand the dynamics of the local public management and the role of public managers in promoting socioeconomic development. The findings of this research highlight the importance of proper management of public resources, not only of technical and managerial activities but also in terms of politics, which greatly influence the life of the population due to the direct impact of local government's decision-making on the collective social well-being.

The limitation of this study lies in the unavailability of more data related to the municipalities, which restricted the inclusion of other variables that could strengthen the analysis and the discussions about the factors that influence socioeconomic development. Future research may include elements that allow exploring the territorial interaction among the public administrations and the interrelations among the municipalities as a whole. Also, new studies may contribute by bringing comparative analysis among municipalities of different states and using other models capable of evaluating interactions among the analyzed constructs. Finally, this topic may benefit from further research on other possible determinants of socioeconomic development.

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