

COMPARATIVE ANALYSIS ON THE EFFICIENCY OF PUBLIC EXPENDITURE IN EDUCATION IN MUNICIPALITIES OF SOUTHEAST PARÁ

ANÁLISE COMPARATIVA DA EFICIÊNCIA DOS GASTOS PÚBLICOS NA EDUCAÇÃO EM MUNICÍPIOS DO SUDESTE DO PARÁ

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ABSTRACT

The general objective of this research is to verify if the allocation of public spending on public education is efficient in the municipalities of southeastern Pará, comparing with the performance indicators by Data Envelopment Analysis (DEA). The research regards the allocation of public spending on education and the relationship of spending with the Basic Education Development Index (IDEB). Regarding the objectives this research is characterized as descriptive and exploratory, which used bibliographic and documentary research. Secondary data were collected with reference to the years 2009 and 2017. As a main result it is found that the municipalities are allocating the resources received to invest in elementary education, but further progress is needed to improve education, as the one that spends more is not always the one that allocates best its resources, as shown by school performance indicators.

Keywords: Efficiency of Public Expenditure. Public Education. State of Pará.

RESUMO

O objetivo geral da pesquisa é verificar se a alocação dos gastos públicos com a educação pública é eficiente nos municípios do sudeste paraense, fazendo uma comparação com os indicadores de desempenho por meio da Análise Envoltória de Dados (DEA). A pesquisa considera a alocação dos gastos públicos na educação e a relação desses gastos com o Índice de Desenvolvimento da Educação Básica (IDEB). Quanto aos objetivos esta pesquisa se caracteriza como descritiva e exploratória, que se utilizou de pesquisa bibliográfica e documental. Os dados secundários foram coletados tendo como referência os anos de 2009 e 2017. Como principal resultado constata-se que os municípios estão alocando os recursos recebidos para investir na educação fundamental, mas é necessário avançar mais para melhorar a educação, pois nem sempre o que gasta mais é o que melhor aloca seus recursos, como está demonstrado com os indicadores de desempenho escolar.

Palavras-Chave: Eficiência de gastos públicos. Educação Pública. Estado do Pará.

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1 INTRODUCTION

The quality of education made available to the population is linked to human development. Thus, the improvement in educational services tends to generate positive effects in other aspects of people's lives, such as better work opportunities and access to health.

Thus, the way resources are allocated for the promotion of education is important for society as a whole. For this reason, studies carried out in the country prove that resources need to be well allocated to generate positive results, as there is a correlation between spending and data presented by the Basic Education Development Index (IDEB), which is used as a parameter to evaluate the quality of education (SOUSA et al., 2016; FIRMINO; LEITE FILHO, 2018).

It is important to know the performance of educational services, especially when it comes to public spending on public education, as this allows providing useful information for accountability to society and improving decision making by public managers. In recent years, studies have been carried out on the efficiency of resource allocation, in order to analyze the relationship of investments that are passed on to municipalities with educational performance indicators according to the National Institute of Educational Studies and Research (INEP), like Wilbert and D'abreu (2013); Fabre, Schlup and Pandini (2017); Costa et al. (2015); and Castro and Sousa (2018), who describe whether public entities are efficient in the use of their resources in education.

This research is justified by the fact that it emphasizes the allocation of public resources and investment in education, reflecting on the development that can be generated and its contribution to the reduction of social inequality, providing individuals with the expansion of their intellectual vision and training to enter the job market.

The State of Pará is made up of 144 municipalities, however, to compose the study sample, the 39 municipalities of the Mesoregion Southeast Paraense were used, making use of information collected for the years 2009 and 2017, tabulated using the Data Envelopment Analysis software (DEA).

Thus, the general objective of the research is to verify whether the allocation of public spending on Education in Elementary Education is efficient in the municipalities of southeastern Pará, making a comparison with the performance indicators.

The research is based on the study developed by Scherer et al. (2016), who analyzed the efficiency of Brazilian states regarding public spending on education, based on their relationship with IDEB, Approval, Failure and Dropout Rates.

Taking as a parameter what Scherer et al. (2016), this research can contribute to the formulation of public policies in the educational area, when verifying if the management is efficiently allocating its resources and its potential return to society, having conditions to be the basis for other studies.

2 THEORETICAL BACKGROUND

This section is designed to explore general aspects related to the evaluation of public policies, with reference points on the normative structure of the right to education and the calculation of public spending on education.

2.1 Evaluation of public policies

The State Reform experienced by several countries around the globe, including Brazil, caused a shift in the public agenda, which together with democratic ideals of social participation in public management and transparency, boosted interest in public policies and action governmental (TREVISAN; BELLEN, 2008).

Public policy studies, understood as a set of government actions (PETERS, 1998), led to research on public policy evaluation, which, despite the lack of consensus, serves to provide information, verify the efficiency in the allocation of resources and to legitimize the State, with greater emphasis on one of them according to the historical period (DERLIEN, 2001).

In this way, the evaluation can be classified in several ways, but, in general, it allows examining the relevance, efficiency, effectiveness and impact of public policies (TREVISAN; BELLEN, 2008). It turns out that the evaluation requires some care in the selection of indicators, so that there is correspondence between the policy that is intended to be evaluated and the criteria used to assign it a certain value.

There is an intrinsic assumption that state action can be analyzed scientifically (SOUZA, 2006). Therefore, if policies can be assessed for relevance, efficiency, effectiveness and impact, when it comes to assessing policies related to education, the research focuses on using some form of measurement of state actions in this area.

According to Law No. 9,394 of 1996, basic education covers Early Childhood Education, Elementary Education and High School, comprising processes that should facilitate the student's coexistence in his community and prepare him for the exercise of citizenship and insertion in the market (BRASIL, 1996). It is a fundamental right recognized in the Federal Constitution of 88, which constitutes a duty of the State to implement it (BRASIL, 1988).

Thus, when considering the importance of public education for society, the importance of monitoring public resources destined to this area is evident, in order to verify the results of these expenditures (FIRMINO; LEITE FILHO, 2018). With the guiding thread of the various possible ways of evaluating educational policy and the limits of time, resources and space, the concentration in one form of evaluation allows to examine in more detail the relationship between costs and results, to improve the decision-making process and benefit the population as a whole and, in this sense, it is justified to prioritize the analysis by the efficiency criterion.

2.2 Efficiency in public education

Education is an instrument for the intellectual development of people, which requires the use of management techniques capable of improving the allocation of resources invested in this sector (MACÊDO et al., 2015). Thus, investing in education and, more specifically in public education, influences the increase in the level of knowledge and professional training of the citizen, which demonstrates that the evaluation of the application of resources seeks to implement and improve the quality of the education offered (MATIAS et al ., 2018).

Education is, thus, a fundamental aspect to change society, improve the individual's life condition and allow the development of skills related to professional training in the market (SOUSA et al., 2016). In view of the components that involve the improvement of systems to meet social demands, it is up to public managers to make decisions to improve efficiency in the application of public spending, expanding results and evolving their educational indicators (CASTRO; SOUSA, 2018).

It is considered that in order to optimize the correlation between the goods and services offered and what is consumed, the government needs to adapt the method to be introduced by the administration, in order to try to minimize expenses and in return improve the service to be made available for society (BORGES; PEREIRA, 2014).

Thus, based on the normative structure defined in the Constitution of 88, in art. 211, c / c Paragraph 2 and Paragraph 3, the Union, the Member States, the Federal District and the Municipalities will organize their educational systems in collaboration, with the Municipalities acting primarily in primary and early childhood education and the States and the Federal District acting primarily in primary and secondary education. (BRASIL, 1988).

Therefore, when evaluating basic education in the public sector, the main schools are municipal and / or state, since the Union, by exclusion, ends up acting mainly in higher education, even though with its actions it ends up influencing basic education.

In these terms, for the public entity to be considered efficient, there must be an increase in the performance of students with minimum costs, and the manager must apply public resources to obtain quality in the provision of this service, making sure that there is maximum possible use (FABRE; SCHULUP; PANDINI, 2017).

In this sense, the government prioritizes points for the provision of public services and the investments to be applied, thus aiming to obtain better yield and quality by maximizing benefits for society, always in search of practices to be adopted to achieve efficiency (RECH; COMUNELLO; GODARTH, 2014).

The most appropriate way to allocate public expenditure is to analyze the results achieved through the performance presented in government services, thus making comparisons as resources are applied and carrying out practices that bring benefits to the community (WILBERT; D'ABREU, 2013).

According to Souza et al. (2016), who evaluated the efficiency of public resources applied in December 2014 to elementary education in municipalities in Espírito Santo, the way the resource is allocated demonstrates the importance it has to improve student performance and contribute to its development.

As for Scherer et al. (2016), knowing how to invest public resources is a complicated task, as it requires some planning on the part of the public administration so that society can be served in the best possible way, promoting the well-being of all. This study analyzed the efficiency of basic education in Brazilian states in 2013, demonstrating its importance in obtaining satisfactory results.

According to Macêdo et al. (2015), human capital is the resource that most contributes to growth and increased opportunities for all. Thus, based on this line of thought, the researchers were concerned with analyzing whether resources are being allocated efficiently in municipalities in the state of Paraná between the years 2005 to 2009, concluding that the smaller municipalities tend to have more efficient management.

According to Firmino and Leite Filho (2018), with the increase of resources destined to the educational area, it is essential to monitor the expenses incurred, monitoring whether their application is being done correctly by the management, to assess the efficiency of the public finances. This survey was carried out for the years 2007 and 2009, demonstrating how fragile the municipalities are in terms of the quality of expenditures applied to basic education.

As for Fabre, Schlup and Pandini (2017), the main way to develop socially is through education, so it is essential to monitor the allocation of this resource to ensure that the

improvement of a society's economic well-being more egalitarian. His study examined the performance of students from small municipalities in the state of Santa Catarina from 2011 to 2014, concluding that there is no relationship between public spending and student performance.

According to Matias et al. (2018), the presence of centralized exams influences educational performance; distribution of decision-making power between schools and government agencies; teacher qualification; distribution of decision-making power over the education system between levels of government; quality of the school's infrastructure; degree of competition between public and private schools; and socioeconomic status of students.

There are factors, thus, related to non-controllable student performance, such as students' income, and elements that can be controlled and directly related to public spending, such as the infrastructure of educational institutions.

Therefore, to analyze the results achieved, the Basic Education Development Index (IDEB) was used as a performance indicator, created in 2007 with the aim of monitoring the quality of education offered in the public service through the analysis of two components: the rate of academic achievement and the average of exams applied by the National Institute of Educational Studies and Research Anísio Teixeira (INEP) (INEP, 2019). IDEB serves to measure the level of learning, which uses the performance of Prova Brasil, and the Basic Education Assessment System (Saeb), held every two years.

3 METHOD

As for the objectives, this research is characterized as descriptive and exploratory, which used bibliographical and documentary research. To perform the efficiency analysis of the municipalities, the Data Envelopment Analysis (DEA) was used, which is a tool capable of evaluating the efficiency related to the application of resources (SILVA FILHO; et al, 2016).

The calculations performed in the DEA are determined by the variables called by the input program, which are the inputs and outputs that are products (WILBERT; D'ABREU, 2013). For this research the inputs used were the budgets destined for education divided by the number of students enrolled in the selected municipalities and for the outputs Educational Indicators were used, such as IDEB, approval rate, failure and abandonment of each of the municipalities for the years 2009 and 2017.

The years were selected for the purpose of comparison and temporal evaluation of the evolution of investments, indicators and efficiency, considering that they are the most distant from each other available on the platform. As the IDEB result is released every 2 years, the last year available is 2017.

The State of Pará consists of 144 municipalities, however, to compose the study sample, only 39 in the southern and southeastern region of Pará were used. Table 1 identifies the municipalities.

Table 1 – Municipalities that make up the Southeast Mesoregion of Pará

Abel Figueiredo Água	Goianésia do Pará	Rondon do Pará
Azul do Norte	Itupiranga	Santa Maria das
Bannach	Jacundá Marabá Nova	Barreiras
Bom Jesus do Tocantins	Ipixuna	Santana do Araguaia São
Brejo Grande do	Novo Repartimento	Domingos do Araguaia
Araguaia Breu Branco	Orilândia do Norte	São Félix do Xingu
Canaã dos Carajás	Palestina do Pará	São Geraldo do Araguaia
Conceição do Araguaia	Paragominas	São João do Araguaia
Cumarú do Norte	Parauapebas	Sapucaia
Curionópolis	Pau D'Arco	Tucumã Tucuruí
Dom Eliseu	Piçarra	Ulianópolis
Eldorado dos Carajás	Redenção	Xingura
Floresta do Araguaia	Rio Maria	

Source: Elaborated by the authors, based on research data (2019)

Secondary data referring to the total invested by municipality in education and the number of students enrolled in basic education were obtained directly from the website of the National Fund for Education Development (FNDE) through the Electronic Money Direct Program at the School List of Executing Units (PDDEREx), in which values were collected. IDEB data were taken from the INEP website (2019).

For the assessment of efficiency levels, the scale varies according to the performance of the units from 0 to 1, where 0 is considered totally inefficient and 1 corresponds to the maximum level of 100% efficiency. The interval between variables was divided into four parts: 0.1 to 0.25 represents a low level; 0.26 to 0.50 is considered a medium grade; from 0.51 to 0.75 corresponds to a good degree and from 0.76 to 0.99 corresponds to the highest degree of efficiency of the scale (SCHERER et al., 2016). In this way, data collection and analysis of results were carried out.

4 RESULTS AND DISCUSSION

With regard to the municipalities, Table 1 provides information on the largest budgets for the year 2009 and 2017, which allows us to see which municipalities have spent the most on education.

Tabela 2 - The 5 municipalities with the highest Total Budget (FNDE) for the years 2009 and 2017

Municipalities	Budget 2009	Municipalitiess	Budget 2017
Marabá	R\$ 1,056,665	Marabá	R\$ 1,421,620
Eldorado dos Carajás	R\$ 654,895	Parauapebas	R\$ 1,076,040
Paragominas	R\$ 593,190	Paragominas	R\$ 664,980
Parauapebas	R\$ 522,896	Tucuruí	R\$ 536,940
Tucuruí	R\$ 426,534	São Félix do Xingu	R\$ 391,880

Source: Data collected from the FNDE website (2009-2017), adapted by the authors

According to Table 2, it can already be seen that the municipalities that spent the most on education in 2009 remained as those with the largest budget in 2017, except for Eldorado dos Carajás, which was in second place in spending in 2009, but was replaced by São Félix do Xingu in the list of municipal entities with the highest expenditure in 2017.

In the same sense, it appears that there was an increase in everyone's budget, except for Eldorado dos Carajás, because if he had maintained the same expenditure of 2009 in 2017, without any nominal increase, he would be among the municipalities with the largest budget in 2017. at the same time it is noted that Marabá had an increase of about 40% between 2009 and 2017 and Parauapebas had an increase of almost 50%. In the south and southeast of Pará these are also, on average, the largest municipalities in terms of population.

It turns out that the question is whether the expenses were reflected in teaching quality. Table 3 presents data related to IDEB showing the best indexes for the years 2009 and 2017.

Table 3 - The 5 highest IDEB scores by municipality for the years 2009 and 2017

Municipalities	IDEB – 2009	Municipalities	IDEB - 2017
Parauapebas	4.7	Ulianópolis	6.0
Ulianópolis	4.5	Paragominas	5.7
Ourilândia do Norte	4.4	Parauapebas	5.7
Paragominas	4.3	Rondon do Pará	4.9
Tucuruí	4.2	Rio Maria	4.8

Source: Data collected on the IDEB website (2009-2017), adapted by the authors, 2019

Table 3 shows that improvements have occurred in all municipalities with the highest scores between 2009 and 2017, but that except for Parauapebas, Paragominas and Tucuruí, the municipalities with the best performance, do not necessarily have the best results, and Tucuruí is not among the best for the year 2017.

Despite these results, this still does not answer the question about efficiency. To analyze whether the municipalities are efficient, the data collected were applied to the DEA, which projects the inefficiency of each unit, guided by inputs. Table 3 shows efficiency indexes of the municipalities in the south and southeast of Pará for the years 2009 and 2017 that obtained the best performance.

Table 4 - Efficiency data for the 5 most efficient municipalities for the years 2009 and 2017

Municipalities	2009	Municipalities	2017
Bannach	1.00	Bannach	1.00
Ulianópolis	1.00	Ulianópolis	1.00
Parauapebas	1.00	Rio Maria	0.99
Ourilândia do Norte	1.00	Abel Figueiredo	0.96
Pau D'Arco	1.00	Paragominas	0.95

Source: Data extracted from the SIADV3 program - Adapted by the authors

Table 4 shows that for 2009, except for the municipality of Parauapebas, which was both among the largest budgets and among the best IDEB scores, the municipalities that were more efficient in the ratio of spending and performance, are not necessarily those that perform more spending. For 2017, the same line of reasoning is maintained. However, in 2017 it is the municipality of Paragominas that appears among the municipalities with the highest budget and the best grades.

When considering the evolution of spending on education between 2009 and 2017, it is also possible to see that there has been some improvement in all IDEB results, which allows us to conclude that more investments are needed, in addition, of course, to efficient management with a view to improvement of public education. However, in some cases spending has almost doubled, but rates have increased little between 2009 and 2017.

For example, among the 39 municipalities, 7 were classified in the average degree of efficiency for the year 2017 (Itupiranga, Eldorado dos Carajás, Jacundá, Goianésia do Pará, Santana do Araguaia and São Félix do Xingu). While 9 municipalities are at a good level of efficiency (São Domingos do Araguaia, Novo Repartimento, Conceição do Araguaia, Marabá, São João do Araguaia, Água Azul do Norte, Xinguara, Dom Eliseu, Floresta do Araguaia and Breu Branco).

The other municipalities are at a high level of efficiency, but they did not enter the top 5 for the year 2017 (Tucumã, Tucuruí, São Geraldo do Araguaia, Redenção, Nova Ipixuna, Brejo Grande do Araguaia, Rondon do Pará, Cumarú do Norte, Ourilândia do Norte, Pau D'Arco, Palestina do Pará, Curianópolis, Piçarra, Bom Jesus do Tocantins and Parauapebas).

Furthermore, this reveals that at a comparative level there are few municipalities in the south and southeast of Pará that can be considered inefficient, despite the fact that when including those that were classified in the good level above, there are still many that can improve the allocation of expenses.

Therefore, when it comes to increasing the allocation of resources, or making larger amounts available, prioritizing the 5 most efficient municipalities of 2017 would bring better results. These resources are more likely to be applied in an efficient and innovative way. At the same time, a greater allocation of resources in less efficient municipalities does not guarantee better results, if the inefficiency is not solved beforehand, that is, greater resources for inefficient units can translate into greater waste.

As part of the most efficient municipalities are small, the results of this research corroborate the work of Macêdo et al. (2015), for whom smaller municipalities tend to be more efficient. In addition, as part of the most efficient municipalities in 2009, they stopped being among the best in 2017, it is necessary to monitor the expenses incurred, as stated by Firmino and Leite Filho (2018).

Finally, it must not be forgotten that the degree of efficiency was measured at a comparative level. If the comparison were between municipalities in the Southeast, which naturally have a different reality, the outcome could have been different. In addition to being well known that there are Brazilian municipalities that have higher scores, such as Sobral / CE, which has a score higher than 8, while the best score of these analyzed Pará cities is 6 (INEP, 2019). This leads to another type of analysis, related to the effectiveness of public education, which can be conducted separately or in conjunction with an exam on efficiency.

In any case, it is necessary to look for ways to improve the efficiency and quality of public education, in order to build a more just and egalitarian country

5 FINAL CONSIDERATIONS

In this work, the efficiency of public spending on education in municipalities in the south and southeast of Pará was evaluated, using the DEA method, which makes it possible to fill an important gap in terms of evaluating the performance of these municipalities, in addition to highlighting the need to carry out public policy evaluation studies, either to advise public managers, or as a form of accountability to society.

The research demonstrated the importance of a good allocation of resources to develop policies capable of improving performance indicators such as IDEB. In addition, it was clear that the one that spends the most on public resources is not always the most efficient and even if greater contributions are needed in the educational area, if inefficiency problems are not resolved, increasing spending can lead to waste. Although there was an improvement in IDEB scores in municipalities between 2009 and 2017, it is necessary to take the government out of its inertia, to achieve even better performances. The losses of low quality in education are not restricted to students and teachers, but affect society as a whole.

The conclusions of the research are limited to the municipalities examined, despite the fact that their results serve as an initial parameter for the situation of education in Pará. The years analyzed also restrict the scope of the work, but it allows new research to use a longer period of time, either to corroborate or to refute the results found here.

Finally, there are limits that relate to the DEA itself, which compares only the universe of selected municipalities and whose results vary according to the inputs and outputs used, as well as the weight given to each one.

For future studies there is the potential to expand beyond the number of municipalities, the very variables to be analyzed in the area of education can be expanded, to check if the government is allocating resources efficiently can reveal new aspects to be considered, with a view to improve the quality of life of the population and generate development, materializing the constitutional right to education.

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