

Research Article

# Education Expenses and Their Relationships with the Accounting Indicators of Capixabas Municipalities

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## Abstract

Currently, public managers have the challenge of combining intense demand for essential services for the population with limited financial resources. Due to this fact, they submit themselves to gradually seek more efficiency in decision making. The literature shows us that analysis via indicators extracted from accounting balance sheets is one of the vital mechanisms to contribute to this purpose. Thus, the research aimed to answer the following question: Are the accounting indicators, calculated through the balance sheets of the municipalities of Espírito Santo, related to the amount invested in education? Regarding the methodology, it is a bibliographic and quantitative research. To answer the research question, the following statistical methods were used: descriptive statistics, multiple linear regression and Pearson correlation. The results found indicate that some quotients used in the research, such as Budget Result Quotient (BRQ), Current Liquidity (CL) and Debt Composition (DC), showed a statistically significant relationship with the amount invested in education. Through the results, we note the importance of using accounting indicators to suggest ways that can help public managers in making a decision to invest more or not, that is, whether it is better to increase or reduce their assets and liabilities in order to increasingly improve the services provided to society, generating more efficiency and quality for its stakeholders.

## Keywords

Financial Health, Accounting Indicators, Education

## 1. Introduction

For Andrade, Teixeira and Fortunato [3] the collection of public resources from municipalities has not kept pace with the increase in social spending. Therefore, it is necessary for public administrators to look for options to improve spending performance in response to collective needs with the aim of meeting social demands and boosting economic growth.

In face of this scenario, it is important to highlight the area of accounting focused on the analysis and interpretation of public balance sheets through their accounting indicators, as its main objective, according to Matarazzo [13], is to try to

visualize a scenario about the performance of an entity over a period, in search of information that further contributes to pointing out a safe path for the entity to follow and making a more appropriate decision.

In this context, and considering the convergence to the international model, the data contained in the public sector's accounting statements are particularly relevant for generating good information and influencing management performance [1, 8, 16].

Among all the decision-making that a manager is suscep-

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**Received:** 26 June 2024; **Accepted:** 24 July 2024; **Published:** 30 August 2024



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tible to, those related to investments in education are one of the main ones, since, as per obligation of the Federal Constitution of Brazil, every municipality is obliged to invest 25% of the revenues annually. foreseen in their respective budgets in Early Childhood and Elementary Education development policies [6].

The objective of this article is to verify whether the accounting indicators calculated in the balance sheets of a municipality are related to the amount of investment in education.

For Zogbi et al [21], investments in education would be one of those that would most help in improving the allocation of resources and rectification of some market failures in providing this obligation to society. For example, investments in education would result in a significant gain in human capital.

In this context, the possibility of there being a relationship between the performance of public management in Espíto Santo municipalities and the amounts invested in education was verified.

To achieve this purpose, the analysis of public balance sheets and some indices applied to them will be used.

Thus, the following question and research topic emerges: “Are the accounting indicators, calculated from the balance sheets of the municipalities of Espíto Santo, related to the amount of investment in education?”

As a justification and research contribution, we highlight the importance of using balance sheet analysis instruments, which contribute to public management in decision-making, as well as verifying whether this fact influences spending on education, one of the most important public policies that the government must provide to society.

## 2. Theoretical Framework

### 2.1. Investment in Education

Caetano et al. [5] state that the 1988 Federal Constitution was a symbol of relevant changes in Brazilian municipalities, which began to have a considerable increase in revenues derived from financial transfers from the states and the Federal Government. However, the commitment to managing such values and offering fundamental social services to regional society in a more efficient manner has also increased.

Caetano et al. [5] contribute again to this research, with Arretche [4], emphasizing that, since the proclamation of the Federal Constitution of 1988, changes related to the attributions of municipalities, in which they would need to emphasize fundamental education and would compulsorily make the allocate 25% of the annual budget to educational policies.

Still in the work of Caetano et al. [5], a study prepared by De Souza Neto and Correia [9] is presented, in which the results found showed that student performance showed a significant relationship with the amount invested in education, demonstrating that the observed association is extremely relevant in the educational scope.

In his work, Sylwester [20] found that the difference in income leads to an increase in investments in the area of education, causing a negative consequence on the efficiency progress rate in a short space of time. However, in the long term, it presents a favorable result in the development rates of a location.

### 2.2. Analysis of Public Financial Statements Based on Indicators

The analysis of financial statements actually became paramount and mandatory in mid-1915, in the United States, when the Federal Reserve Board (the Central Bank of the United States) ordered that banks were only authorized to renegotiate loans from companies that presented their balance sheets analyzed at the time of obtaining the resource. This measure permanently sanctioned the use of financial statements to enable access to credit [14].

The main objective of analyzing balance sheets from the extraction of their indicators is to try to visualize a scenario in relation to the performance of an organization over a period, in search of information that helps, in an additional way, to direct a safe path to be taken. followed by the entity [13].

Andrade, Teixeira and Fortunato [3] define analysis of indicators as the safest way and state that the use of these quotients, extracted from pre-established formulas, allows the analyst makes a prediction about slopes and calculates the results found with standardized indices.

### 2.3. Previous Studies

Soares et al [19] used economic-financial evaluation indicators to verify the management of municipalities in Santa Catarina with the aim of building a ranking between these cities. The main indicators analyzed in the research were: immediate liquidity, current liquidity and debt composition.

The results found indicate that the Budget Result Quotient (BRQ) does not undoubtedly influence debt behavior, it should be noted, however, that, in order to execute this tax rule, it is necessary to observe the other rules tested. This fact confirms the argument that the means of budgetary restrictions lead to positive results in the degree of deficit in the most important Brazilian municipalities.

Ibarra, Sandoval and Sotres [10] related the performance index of state governments in Mexico with variables economic, demographic, political and regional, using multiple linear regression with ordinary least squares.

It was found that Gross domestic product (GPD) per capita, population, revenue and expenditure per capita and the geographic location of the States significantly explain the variations in the dependent variable, that is, the performance index.

Nobre [14] investigated, using regressions, the relationship between the financial condition and the fiscal transparency situation in the cities of Paraíba. The author realized, through the statistical model presented, that financial condition is a

determining aspect of transparency. In this way, it proved that, when financial health presents evolution and development, transparency in the dissemination of information also demonstrates growth.

## 2.4. Hypothesis

Thus, based on the question, the objective, the justification for the research and the theoretical framework, we intend to find answers to the following hypothesis:

H1 = there is a relationship between accounting indicators and investment in education

From this, it is expected that, among the existing accounting indicators, those chosen for this article will influence the total amount that a municipality invests in this important public policy.

## 3. Methodology

This study focused on the population of the 78 (seven-

ty-eight) municipalities in the state of Espíto Santo and the database collected to form the index analysis refers to the financial years from 2013 to 2017 of the municipalities in Espíto Santo.

To test the research hypothesis, the following indicators were considered as independent variables: Budget Result Quotient (BRQ), Immediate Liquidity (IL), Current Liquidity (CL), Debt Composition (DC) and General Debt (GD).

As a dependent variable, investment in education per capita was taken into account and, as control variables, per capita revenue, per capita expenditure, the IFGF index and the GDP of the municipalities were observed.

The data used disregards the mandatory 25% according to the Federal Constitution, as we assume that municipalities have already invested at least that amount in Education.

Thus, Table 1 presents a summary with the variables used in the research and their appropriate captions, classifications, calculation methodologies, theoretical bases and forms of collection.

**Table 1.** Summary of the performance indicators used in this research.

| Variables            | Subtitles                         | Classification       | Calculation Methodology  | Theoretical basis                        | Collection method                         |
|----------------------|-----------------------------------|----------------------|--|--|---|
| INVEDUp <sub>c</sub> | Investment in Education           | Dependent Variable   | -  | Arretche [4]; Amaral e Menezes Filho [2] | Computerized Data Control of ES (cidadES) |
| BRQ                  | Budget Result Quotient            | Independent Variable | Revenue realized/ Expenditure executed                               | De Sousa Neto [9]                        | City Hall Transparency Portal             |
| IL                   | Immediate Liquidity               | Independent Variable | Availability/ Current liabilities                                    | Soares et. Al [19]                       | City Hall Transparency Portal             |
| CL                   | Current Liquidity                 | Independent Variable | Current assets/ current liabilities                                  | Nobre [14]                               | City Hall Transparency Portal             |
| DC                   | Debt Composition                  | Independent Variable | Current liabilities/ (current liabilities + non-current liabilities) | Soares et. Al [19]                       | City Hall Transparency Portal             |
| GD                   | General Debt                      | Independent Variable | Current liabilities + non-current liabilities/ total assets          | Nobre [14]                               | City Hall Transparency Portal             |
| Recpc                | Revenue per capita                | Control Variable     | -  | Ibarra, Sandoval e Sotres [10]           | IBGE E-mail Address                       |
| IFGF                 | FIRJAN Index of Fiscal Management | Control Variable     | -  | Ibarra, Sandoval e Sotres [10]           | FIRJAN E-mail Address                     |
| Gpdp <sub>c</sub>    | GPB per capita                    | Control Variable     | -  | Ibarra, Sandoval e Sotres [10]           | IBGE E-mail Address                       |

According to the Accounting Manual Applied to the Public Sector (MCASP) [17], the BRQ indicates the association of the revenue executed with the expenditure that was committed, signaling the presence of a deficit or surplus. The IL demonstrates the organization's financial ability to immediately meet its short-term obligations, considering only the amounts

available from cash registers and banks.

The CL Quotient demonstrates the total that an institution can use in values in the short term to meet its current obligations. DC represents the amount of short term in relation to the composition of total debt and reveals the percentage of asset that is supplied by third party values.

According to Firjan's website [11], the IFGF control variable is made up of five indicators: Investments, Own Revenue, Liquidity, Personnel Expenses and Debt Cost. The methodology used allows for both relative comparison as for global; in other words, the index does not just determine an annual portrait, being possible to be confronted over the years. The reading of this indicator is as follows: the score varies between 0 and 1, where the most suitable is approximately 1, as reflects that the municipality's fiscal administration in the period observed presents better conditions.

Due to the characteristics of the data from the aforementioned study, descriptive statistics of the variables were performed. Also, we chose to work with multiple linear regression, to the years analyzed.

In the study, the Pearson Correlation Matrix Test was also applied to investigate the correlation between the variables. For data analysis, the software will be used Stata CorpLP, version 800-STATA-PC, which will calculate the following regression model:

$$\text{INVEDUpc} = \beta_0 + \beta_1(\text{BRQ})_{it} + \beta_2(\text{IL})_{it} + \beta_3(\text{CL})_{it} + \beta_4(\text{DC})_{it} + \beta_5(\text{GD})_{it} + \beta_6(\text{Repc})_{it} + \beta_7(\text{IFGF}) + \beta_8(\text{gdpbpc})_{\text{erroit}}$$

It is noteworthy that the statistical model was inspired by the work of Nobre [14]; Andrade, Teixeira and Fortunato [3], Ibarra, Sandoval and Sotres [10] and OECD Corporate Governance Factbook publishing [15].

## 4. Results

In accordance with what was defined in the methodology, this research used three statistical methods of analyzing variables: descriptive statistics, correlation test of Pearson and multiple linear regression.

Below is Table 2, with the descriptive statistics of these variables.

**Table 2.** Descriptive statistics.

| Variables | Observations | Average   | Standard deviation | Min. (in thousands of reals) | Max. (in thousands of reals) |
|-----------|--------------|-----------|--------------------|------------------------------|------------------------------|
| INVEDUpc  | 390          | 535,29    | 382,25             | 116,51                       | 3.890,95                     |
| BRQ       | 390          | 5,946359  | 14,69626           | 0                            | 133,20                       |
| IL        | 390          | 8,03918   | 14,58157           | 0                            | 121,40                       |
| CL        | 390          | 9,882077  | 15,20497           | 0,60                         | 117,50                       |
| DC        | 390          | 0,457327  | 0,3085271          | 0                            | 1,90                         |
| GD        | 390          | 0,3437018 | 0,5958124          | 0                            | 6,00                         |
| Repc      | 390          | 3.759,17  | 4.210,48           | 0                            | 44.265,85                    |
| IFGF      | 390          | 31.189,96 | 83.931,45          | 6.780,25                     | 815.697,80                   |
| gdpdp     | 390          | 0,5594324 | 0,1204146          | 0                            | 0,85                         |

From the result presented in the dependent variable INVEDUpc, it can be seen that that, on average, the municipalities of Esp fto Santo invested around R\$535.29 in education per inhabitant, in addition to the constitutional limit of 25%, in the period from 2013 to 2017, with the minimum amount invested being around R\$ 116.51 and the maximum being R\$ 3,890.95.

Assuming that the analysis of this study focused on the 78 municipalities of the Esp fto Santo, over five years, we would

have 390 observations, however, it can be seen that not all variables obtained this number of observations, a fact that is explained by the lack of availability of all indicators used in the analysis. Table 3 presents the Pearson Correlation Matrix with the correlations between all variables. According to Callegari-Jacques et al. [7], the aforementioned test has The objective is to calculate the degree of correlation between two or more variables:

**Table 3.** Persion Correlation Test.

|          | INVEDUpc | BRQ | IL | CL | DC | GD | Repc | gdpdp | IFGF |
|----------|----------|-----|----|----|----|----|------|-------|------|
| INVEDUpc | 1,000    |     |    |    |    |    |      |       |      |

|       | INVEDUpc | BRQ   | IL    | CL    | DC       | GD      | Repc  | gpdpc | IFGF |
|-------|----------|-------|-------|-------|----------|---------|-------|-------|------|
| BRQ   | 0,414    | 1,000 |       |       |          |         |       |       |      |
| IL    | 0,066    | 0,718 | 1,000 |       |          |         |       |       |      |
| CL    | 0,631    | 0,601 | 0,867 | 1,000 |          |         |       |       |      |
| DC    | -0,742   | 0,299 | 0,050 | 0,065 | 1,000    |         |       |       |      |
| GD    | 0,089    | -0,17 | -0,14 | -0,14 | -0,03    | 1,000   |       |       |      |
| Repc  | 0,420    | 0,759 | 0,815 | 0,585 | 0,239    | -0,09   |       |       |      |
| IFGF  | 0,398    | 0,776 | 0,674 | 0,589 | 2.103,00 | -0,0071 | 0,972 | 1,00  |      |
| gpdpc | 0,398    | 0,197 | 0,193 | 0,150 | - 0,055  | -0,1297 | 0,176 | 0,272 | 1,00 |

The author suggests that the Correlation Matrix test be interpreted as shown in [Table 4](#):

**Table 4.** How to interpret the Pearson Correlation test.

| Parameters           | Interpretation                            |
|----------------------|---|
| If $0,00 < p < 0,30$ | There is weak linear correlation          |
| If $0,30 < p < 0,60$ | There is moderate linear correlation      |
| If $0,60 < p < 0,90$ | There is strong linear correlation        |
| If $0,90 < p < 1,00$ | There is a very strong linear correlation |

Therefore, the correlation matrix shown in [Table 3](#) indicates a correlation weak between the independent variables IL and GD in relation to the dependent variable, as interpreted by Callegari-Jacques et al. [7]. However, the variables CL and DC present a strong correlation (0.6327 and -0.7422, respectively) with the dependent variable INVEDUpc. This demonstrates evidence that the two variables are important and relevant to the tested econometric model.

After carrying out the Pearson Correlation test, a linear

regression was applied multiple, through which the 78 municipalities of Espíto Santo were analyzed in the period from 2013 to 2017.

The regression model sought to answer the research question whose objective was check whether the accounting indicators are related to the amount invested in education in the municipalities of Espíto Santo. To avoid bias in the model, we related control variables that sought to optimize results and expand possibilities of analysis.

**Table 5.** Analysis of the proposed regression model

| Variables | Coefficient | Standard error | Probability |
|-----------|-------------|----------------|-------------|
| BRQ       | 58,42189    | 2,527064       | 0,041*      |
| IL        | 97,24315    | 3,185379       | 0,054*      |
| CL        | -20,04404   | 2,474683       | 0,41        |
| DC        | -95,17113   | 65,01842       | 0,004**     |
| GD        | -60,40132   | 31,18878       | 0,88        |
| Repc      | 0,92320     | 1,021859       | 0,014*      |
| IFGF      | 0,45669     | 0,131116       | 0,73        |

| Variables      | Coefficient | Standard error | Probability |
|----------------|-------------|----------------|-------------|
| GBPDpc         | 355,59570   | 148,5324       | 0,017*      |
| Observations   | 390         |                | -           |
| R <sup>2</sup> | 0,31        |                |             |

Based on the results obtained in Table 5, it is possible to identify that not all independent variables have a statistically significant relationship in relation to the dependent variable.

The independent variables CL and GD do not present statistical significance ( $p\text{-value} > 0.10$ ), therefore there is no analysis to be done. The other variables, namely, BRQ, IL and DC are significant at a significance level between 1% and 5% ( $p\text{-value} < 0.01$  and  $< 0.05$ ). This demonstrates that they are related to the dependent variable INVEDUpc.

Based on this finding, we can carry out an analysis of the formula presented in the theoretical framework, in which we observe that the BRQ index is executed revenue divided by the expenditure incurred. So, to show improvement, we can interpret that municipalities received more revenue than expected or failed to execute some planned expenditure. In this way, there was a surplus of resources that enabled greater investment in education, demonstrating that this indicator is related directly with the amount invested in this public policy.

A similar interpretation can be established in relation to the other variable that presented positive relationship, the IL indicator, in which we verify that the calculation method is the ratio between availability and current liabilities. Therefore, in order to identify an improvement in this indicator, the municipality increased its availability, that is, it obtained more money in cash or in financial investments, or reduced its current liabilities, that is, reduced its debts with suppliers or short-term loans, for example. Consequently, there was a positive balance of resources, thus being able to provide greater investment in education.

Regarding the analysis of the other variable that showed significance, Debt Composition (DC), it can be stated, with 99% confidence, that with each point of increase in this indicator, investment in education per inhabitant decreases by R\$ 95.17.

Observing its calculation formula, that is, current liabilities divided by total liabilities (current liabilities + non-current liabilities), in order to increase this ratio, there is the following hypothesis: current liabilities during the analyzed period presented increase, that is, there was an increase in short-term debt, a fact that means there is no surplus of resources to be invested in society's demands, such as increasing in investments in education, which is our case study.

Another hypothesis that may have occurred that impacts the increase in EC is the reduction in non-current liabilities, that is, there was a reduction in some long-term obligation to

which the municipality was submitted. This leads us to believe that one of the guidelines for the management of the period analyzed was to reduce future debts instead of increasing investments, a circumstance that avoids the possibility of surplus resources to invest in demands educational and causes a reduction in the amount invested as well as the results found.

Another essential consideration that we can make in relation to this variable is that, by presenting a statistical relationship in the model proposed in this study, it is also according to the study by Malmeida and Vieira [12]. It is noteworthy that this author pointed out as one of the findings that there is a relationship between the composition of debt and the measurement of health government finances.

It appears that, in relation to the analysis of the Budget Result Quotient (BRQ), we can have two analyzes when comparing with previous studies. The first is that This indicator proved to be significant both in the analysis that we sought to carry out in this work as in the research by Ribeiro and De Souza [18], in which this demonstrated that it is quite relevant in analyzing the impact that the budget result had on public accounts.

Given the interpretation of the results of the relationship between indicators and the amount invested in education, the importance of using the results found to show some ways that can help public managers when make the decision to invest more or not in relation to what the legislation obliges them to do, that is, if It is better to increase or reduce your assets, your current liabilities, your non-current liabilities and, thus, increasingly improve the services provided to society.

## 5. Conclusion

The purpose of this article was to examine whether accounting indicators calculated in the balance sheets of a municipality are related to the amount of investment in education.

Based on the results presented, we can infer that the Budgetary Result Quotient (BRQ), Immediate Liquidity (IL) and Debt Composition (DC) had a statically significant relationship with the INVEDUpc variable; or in other words, these indicators influence and are related to the amount invested in education per capita, therefore, in these cases, we do not reject hypothesis H1.

However, in relation to the variables Current Liquidity (CL) and General Debt (GD), the results show that Hypothesis H1



must be rejected, as statistically it was not possible to establish any relationship between these indicators and the increase in amount invested in education per capita.

Therefore, we cannot fully conclude what was expected at the beginning of the research, as not all the quotients used in this content obtained a statistical relationship positive with the increase in investment in education per capita.

In carrying out the work, some limitations were noticed. The first was that some of the 78 municipalities in Espirito Santo had pending issues in presenting their annual financial statements. This fact hampered the analysis and audit of balance sheets presented, thus raising doubts regarding the consistency, reliability, and trustworthiness of the calculated indicators.

It is noteworthy that the aforementioned study brought contributions in order to encourage academia to deepen studies on balance sheet analysis and also presented ways more effective interpretation of accounting indicators to help the manager adopt a more consistent stance, for example, when it comes to investing more or not in some public policy in which they are guaranteed by law and to better control accounting groups of their balance sheets have become more effective when investing public resources.

As a suggestion for future research, it is recommended that this work be applied using other accounting quotients, that is, other investments in policies public services that municipalities are legally obliged to fulfill, for example, health and personnel and in other States of the Federation.

## Abbreviations

|          |  |
|----------|--|
| BRQ      | Budget Result Quotient                         |
| CL       | Current Liquidity                              |
| DC       | Debt Composition                               |
| GD       | General Debt                                   |
| GPD      | Gross Domestic Product                         |
| GPDpc    | Gross Domestic Product Per Capita              |
| IFGF     | FIRJAN Index of Fiscal Management              |
| IL       | Immediate Liquidity                            |
| INVEDUpc | Investment in Education                        |
| MCASP    | Accounting Manual Applied to the Public Sector |
| Recpc    | Revenue Per Capita                             |

## Author Contributions

Danilo Moraes Silva Scopel is the sole author. The author read and approved the final manuscript.

## Conflicts of Interest

The author declares no conflicts of interest.

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