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# Analyzing the importance of financial resources for educational effectiveness

## The case of Brazil

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### Abstract

**Purpose** – Much has been done in the public organization performance management field and there are some established theories that account for what would improve performance, but there is little strong empirical evidence about the determinants factors to performance in developing countries. This paper aims to contribute to the knowledge in this area by providing some empirical evidence about the importance of management and resource for the local government performance.

**Design/methodology/approach** – The paper presents a cross-sectional investigation carried out with a sample of Brazilian municipalities. Data come from reliable sources, namely official databases. In order to ensure causality, regression and correlation analysis was carried out with the data. Educational outcomes were chosen as the dependent variable for measuring performance.

**Findings** – The analysis indicates that financial resources are paramount in producing performance to the extent that resource availability increases educational effectiveness, and dependence on intergovernmental transfer of financial resources reduces the effectiveness a great deal. Some other issues, such as mayoral quality have little or no importance upon performance.

**Originality/value** – The study corroborates some established ideas and challenges others. An example of the latter is the notion that the quality of political leadership (the mayor) is a determinant factor for performance. An example of the former is that more money is likely to represent better performance if the local government is able to raise money for itself instead of relying solely on transferences from upper tie authorities.

**Keywords** Brazil, Performance measurement, Local government, Public spending, Educational effectiveness

**Paper type** Research paper

## Introduction

Performance management has been an important area for discussion in developing countries since the spread of new public management in the 1980s (Hood, 1995). In Brazil, it became mandatory with the Federal Bureaucracy Reform Plan of 1995. Since then, the government on the three levels – federal, state and municipality – has adopted managerialism in order to improve public service effectiveness. Despite the proliferation of papers, books and studies on this theme, there is always scope for enhancing understanding as a mean for improving public service performance, particularly in the setting of a developing country.

In this investigation, we explore the impact of government expenditure on public service effectiveness in municipalities. We examine whether more money promotes better performance and whether other determinant factors influence public service

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performance at the local level. In terms of the tax burden, municipalities contribute with only 5.2 percent while the federal government contributes with 48 percent, states 24.2 percent and revenue from pensions 22.6 percent (Brasil, 2010). The situation of the majority of Brazilian municipalities is that they have been increasingly dependent on transfers from federal and state governments as they are not able to raise sufficient money locally. For example, in 2010 the federal government transferred 50 billions Brazilian Real to local government, amounting to 16 percent of the municipalities' overall budget.

According to the literature, finance is a critical resource, but not the only one. Other types of resource, regulation, market structure, organization and management are also important (Boyne, 2003; Rainey and Steinbauer, 1999). According to Boyne (2003) the relationship between finance and performance has been extensively investigated in public services, including education. For example, Gupta *et al.* (2002), focussed on the effects of public expenditure on education and health care based on cross-section analysis in developing and transitional countries. Rajkumar and Swaroop (2008) study public spending, governance and outcomes, and find that governance is a mediating variable between spending and outcomes. Meier and O'Toole (2002, p. 634) use overall budget as the independent variable, which they regarded as a strong predictor of the success of school districts in of Texas in their model.

Nonetheless, even if the subject was as straightforward and mundane as it is supposed to be (Boyne, 2003), there would still be space for exploring whether spending makes a difference in educational effectiveness. In Brazil, the federal constitution sets out that municipalities have to spend a minimum of 25 percent of their tax revenues on education. Theories have been offered in the literature to explain municipal performance. For instance, Avellaneda (2009b) used the mayor's education background and the mayor's job-related experience to measure mayoral quality, and to test its impact on educational performance. Meier and O'Toole (2002) used "additional salary paid to school superintendents over and above the normal determinants of salary" as a measure for managerial quality. Rainey and Steinbauer (1999) suggested the importance of leadership as a determinant factor in performance. In the same line of thinking, Boyne (2003) indicated five groups of factors that are likely to improve performance. Looking at the extant literature, one can be certain that the connection between determinant factors and performance is in an advanced stage as there are several feasible explanations on how public organizations can accomplish effectiveness. However, the way municipal governments manage financial resources in order to improve effectiveness remains an open question. Furthermore, there is a paucity of empirical works focussing on explaining determinant factors to performance in developing settings.

In this paper, we aimed to explore the importance of financial resources as a determinant of the educational effectiveness of Brazilian municipalities. We analyze over 500 municipalities whose populations range from 1,000 to 700,000 inhabitants. The analysis indicates that financial resources can be seen as an important factor, but also suggests the importance of good financial management in order to reduce dependence on transfers from federal and state governments.

Since the development of new public management, the Brazilian Government has been pursuing high levels of performance in several areas. To this end, the Ministry of Planning issued recommendations to help public managers to develop performance indicators. The model employed is very similar to the 3Es and IOO models, but other dimensions were added in the system (Brasil, 2010).

In terms of the budget, education services consume a significant amount of public expenditure in Brazil. In 2009, education expenditure was equivalent to 26 percent of the total amount of public expenditure in local government. Education is the highest expenditure of municipalities in Brazil. Health expenditures while other expenditure, namely administrative, urbanization, pensions and other functions represented, respectively, 13, 10, 5 and 23 percent (Brasil, 2011). Education services are, therefore, one of the most important services provided by Brazilian municipalities in terms of expenditures on employees and investments.

The paper is structured as follows. In the next section, we present the theoretical framework on which the analysis is based, focussing on the performance management literature with more emphasis on the determinant factors to performance. This is followed by a description of the research methods, and the presentation of results and conclusions.

## Analyzing public services performance

According to Boyne (2004), public sector performance may be a political issue as it is likely to be questioned by service users, tax payers, civil servants, citizens, politicians and society as a whole. Each group is likely to have a perspective that suits its specific interests. Each is likely to perceive performance criteria in a different way (Boyne, 2004). Following this line of thought, there is no universal criterion able to measure whether performance is good or bad. Nonetheless, public services have tangible elements, such as quantities of output, time cycles and some quality criteria, which can underpin performance appraisal as an objective measurement. These elements are likely to be assessed in the same way by different people and in different settings.

### *Dimensions for measuring performance*

The literature on public service performance measurement indicates two overall models for assessing performance. According to Boyne (2002), these models are the 3Es, standing for economy, efficiency and effectiveness, and the IOO model, standing for input, output and outcome. Economy means the cost of acquiring inputs for the service to be provided while maintaining the quality of service and process. For instance, indicators of the economy could be the cost of contracting, training and keeping personnel, materials and equipment. Efficiency is the effort of delivering services to society. Usually, efficiency is measured as the ratio between outputs and inputs. Effectiveness is the most difficult dimension of performance due to the variety of concepts (Campbell, 1977). Cameron (1986) suggested eight definitions for effectiveness, ranging from the traditional goal model to the high-performing systems model.

In the IOO model, personnel, raw material and equipment represents the whole set of inputs that are used in order to run the activities to be carried out. These include everything needed for delivering services to society. As a unit of measurement, financial resources are used to make the measurement process more objective. According to Boyne (2002), inputs are the least revealing aspect of organizational performance as services cannot be provided without expenditure. In the public service domain, inputs are human resources, materials and financial resource available to facilitate government actions. However, inputs can be a good measure of performance if the intention is the assess how the organization deals with resource dependence (Pfeffer and Salancik, 2003). On the other hand, products are measures of services already delivered to society, and it works an assessment of how effective a given organization is on transforming input into outputs (Sharman, 1995), and how good is the goal setting process (Rainey and Steinbauer, 1999). Educational services may be

provided (there are schools available for the local population), but results may not be achieved (people do not get the skills to become both a citizen and a professional). Therefore, outcomes are not simply outputs, but they encompass the impact (positive or negative) that the service has on society. In the public service domain, outcomes indicate the benefits provided to the population that a given public policy is intended to reach. For instance, Gill and Meier (2001) used exam pass rate as a measure of outcomes of school districts in Texas.

**Public service effectiveness**

According to Cameron and Whetten's (1983) goal model, effectiveness can be measured by the extent to which a given organization accomplishes its stated goals. Keeley (1978) suggested three approaches for framing the goal model, namely the official-goal model, the operative-goal model and the system-resource model. The official-goal model refers to the general purposes of the organization, which is defined at the time of its establishment. The operative-goal model refers to the current purposes the organization at some specific moment. In the system-resource model, Yuchtman and Seashore (1967, p. 898) defined organizational effectiveness "in terms of its bargaining position, as reflected in the ability of the organization, in either absolute or relative terms, to exploit its environment in the acquisition of scarce and valued resources."

In this investigation, the effectiveness concept is connected to the official-goal model as municipalities have the legal duty to provide primary education for the local population. Researching schools in the USA, Ostroff and Schmitt (1993, p. 1347) identified "four performance domains: (1) students' achievement (output quality), (2) students' satisfaction (external evaluation), (3) students' self-efficacy, or concept of their own ability (internal control), and (4) school efficiency."

**Determinant factors for public service performance**

The literature proposes a set of factors likely to explain public service performance (Andrews *et al.*, 2009; Boyne, 2003; Rainey and Steinbauer, 1999). Boyne (2003), supported by an exhaustive literature review, suggested resources, regulation, market structure, organization and management as sources of public service improvement. Nonetheless, he pointed out that this field is far from being fully understood, due to the different empirical results found in similar cases. Therefore, the literature does not provide variables whose effect on performance is undeniable and unquestionable.

In relation to resources, Boyne (2003, p. 369) argued, "Higher public expenditure is a sufficient condition for improvement because this must result in a higher quantity and/or higher quality of public services." But studies on public expenditure have produced non-significant results in most cases, due to bureaucratic idiosyncrasies. In a landmark study of organizational effectiveness, Pfeffer and Salancik (2003) suggested that effectiveness is influenced by the organization's ability to command the necessary resources it employs in its daily operations. In this line of thinking, Rainey and Steinbauer (1999) argued that financial resources are associated with task design and mission valence and that would mean that as having the adequate amount of money an organization would have better conditions to reach its targets.

In the particular case of education, Gupta *et al.* (2002) found empirical support for the hypothesis that public spending on basic education improves the social rate of return. Baldacci *et al.* (2003) found evidence that increasing public spending would end up on better social outcomes. In the same vein, Rajkumar and Swaroop (2008) suggest an association between public education spending and outcomes. Gill and Meier (2001, p. 10) used

financial resources as a variable for explaining school outcomes in the form of "per-student instructional funds, average teacher's salary, and percentage of funds received via state aid." These studies corroborate the idea that financial resources are very likely to be an important determinant factor to educational outcome. In a World Bank study with 50 developing and transitional countries, Gupta *et al.* (1999) concluded that expenditure allocation improves attainment in schools.

Local government revenue is often composed by taxes raised locally, non-taxes and intergovernmental transfers (Mello, 2000). It is different from country to country, but, basically, local government relies on revenue from property, sales and income as taxes collected locally (Hoene and Pagano, 2008). Mello (2000, p. 366) suggested non-taxes revenues as "user charges, rents, royalties, fees" among other services provided by the local authority to citizens. In other countries, municipalities are not entitled to legislate upon income relying mainly on the property and service sales taxes as sources of local revenue (Martell, 2008).

In terms of expenditure, the literature indicates several ways of figuring out how money is spent by public agencies on education. Some recurrent indicator relates to the amount of the average money spend per capta (Meier and Keiser, 1996) and per pupil (Bohte, 2001). The extant knowledge is still not conclusive on the effects of expenditure of educational effectiveness as positive or negative (Boyne, 2003). The problem probably relies on taking expenditure as whole variable and not taking into account that it comprehends a set of variables that are very likely to have effect on performance if taken separately as it seems to be the case of expenditure on personnel. Better qualified and better paid teachers are likely to have an effect on performance (Crescenzi, 2005).

Another issue related to finance management in intergovernmental relationships it Fiscal federalism (Watts, 1998). According to this theory, regulatory ties are likely to hinder local government capacity to raise revenues locally (Mello, 2000) and to improve its borrowing capacity (Martell, 2008). In this study, the idea is to assess the effect revenue is likely to have on performance, but it would unveil other issues related to fiscal federalism (Shannon and Edwin Kee, 1989). Due to this, one can assume that the higher the mount of intergovernmental transfers, and consequently the higher the dependence on this kind of revenue, the lowest the mayor's discretion on managing financial resources and, therefore, performance.

From the ideas presented above, we propose the following hypothesis:

*H1*. Educational effectiveness is positively associated with the amount of revenue a given public organization is able to acquire.

Management has also been suggested as a feasible explanation of public service performance (Rainey and Steinbauer, 1999; Boyne, 2003). Avellaneda (2009a) argued that managerial quality is fundamental to the success of public programs. Moynihan and Pandey (2005) tested the impact of culture, structure and technology on organizational effectiveness. Rainey and Steinbauer (1999) proposed a set of factors through which the effectiveness of public agencies could be improved. Other variables likely to improve public service effectiveness are leadership, organizational culture, human resources management and strategy (Boyne, 2003; Andrews *et al.*, 2009; Mahoney and Weitzel, 1969; Kaplan and Norton, 1992). Huselid *et al.* (1997) demonstrated that human resource management is a determinant factor in a firms' financial performance.

Management capacity is regarded as highly relevant to organizational performance (Boyne, 2003; Rainey and Steinbauer, 1999). Andrews and Boyne (2009) suggested

management capacity as a combination of several concepts related to work a manager does in a daily basis, and they are related to managing capital, finance, human resource, information technology and leadership. In the case of local government, depending on the form of government adopted, management capacity is paramount to performance (Mouritzen and Svara, 2002). Investigating municipal financial performance, Avellaneda (2009b, p. 470) employed the concept of mayoral quality as compound of "educational background and job related expertise," and she regarded that information and knowledge are critical issues for a good leader. It would follow that the better knowledge and information a leader has, the more likely is success in terms of taking the right decision. Knowledge is not the only cognitive resource likely to influence a leader's performance. There is also room for intuitive human behavior to impact performance (Nonaka, 1991, 1994). While scientific knowledge is taught at school, intuitive knowledge is learnt through personal experience. Thus, previous professional experience could be regarded as a determinant factor in performance, as well as formal education (Avellaneda, 2009b). In addition, experience is also seen as positively associated to performance (Fernandez, 2005) in the extent that it enlarges managerial scope of decision. From these considerations, we propose the following hypothesis:

*H2.* Educational effectiveness is positively associated with mayoral quality in terms of educational background and professional experience.

In terms of organization structure, there are two aspects to be taken into account. They are organizational size and the degree of formalization (Child, 1972; Pheysey *et al.*, 1971; Pugh *et al.*, 1963). Organizational size has been researched as a factor likely to improve performance (Judge, 1994; Hrebiniak and Alutto, 1973). Big organizations are expected to have market power in order to negotiate with suppliers to achieve the necessary resources (Boyne and Walker, 2005). On the other hand, small organizations are expected to have more flexibility to respond to turbulence and environmental changes (Quinn, 1985). The other aspects related to the organization are formalism and centralism. Organizational size in the public sector domain can be measured by several ways. One of them is the number of the population to be served in the area (Andrews and Boyne, 2010), another can be number of personnel or employees (Damanpour, 1992; Brewster *et al.*, 2006), and the total amount of revenue (Weinzimmer *et al.*, 1998). In line with the arguments above, we proposed the following hypothesis:

*H3.* Educational effectiveness is positively associated with organizational size.

From the perspectives proposed by Boyne (2003), Rainey and Steinbauer (1999), Meier and O'Toole (2002) and others, we have chosen financial resources, mayoral quality and organizational size as the focus of the present study. Figure 1 demonstrates the municipal performance model that is tested in this study.

## Methods

As an objective investigation based, mainly using quantitative methods to test pre-defined hypotheses, we are trying to explain educational effectiveness as the consequence of three determinant factors: organizational size, managerial quality and financial resources. Data are from a probabilistic sample of 10 percent of the Brazilian cities, the local authority in charge of basic public education in Brazil. The statistical error of the sample is of 4 percent. Due to the heterogeneity of municipalities, both

regional and population density, we have adopted stratified random sample to produce a representative sample in terms of states and population ranges. Brazil adopted long ago the strong-mayor form of local government (Mouritzen and Svara, 2002), in which mayors are both political leaders and managers. In order to connect mayoral quality with educational effectiveness, the investigation focusses on the year of 2009 for which reliable and audited data on educational effectiveness is available.

*Independent variables*

As stated before, the determinant factors to performance employed in this investigation are threefold: organizational, financial resources and mayoral quality. The variables for measuring financial resources were taken from credible databases developed and maintained by Brazilian federal government departments, namely FINBRA[1], SIOPS[2]. The variables are:

- the overall municipal budget;
- funds transferred from federal government in the form of Basic Education aid (Fundeb), which is the main source of funds transferred from federal and state governments to municipal education secretaries; and
- transfers from federal government in the form of Municipal Participation Fund (FPM), which is an intergovernmental transfer to attend the requirements of the 1988 federal constitution.

We also composed some additional variables to comply with the extant theory on financial performance, as presented above, and they are:

- the ratio of Fundeb to the municipality overall budget, which measures the level of dependence of a given municipality on transfers from Fundeb; and
- the ratio of FPM and the overall budget, which represents the level of dependence of a given municipality on transfers from FPM.

Worth to mention that both funds, namely Fundeb and FPM, are transferred down from federal government to municipalities according to the number of students enrolled in basic education and to the total of population.

In addition to financial resources, we believed that mayoral quality is likely to be a good predictor to performance. The following variables were chosen to depict mayoral quality[3]: the mayor's level of formal education, the mayor's previous administrative experience, and the mayor's age. These variables relate to both cognitive (educational level) and intuitive knowledge (age and previous experience). The mayor's educational level is represented by an ordinal variable that ranges from 1 (first stage of primary education) to 7 (completed undergraduate level). Previous professional experience is

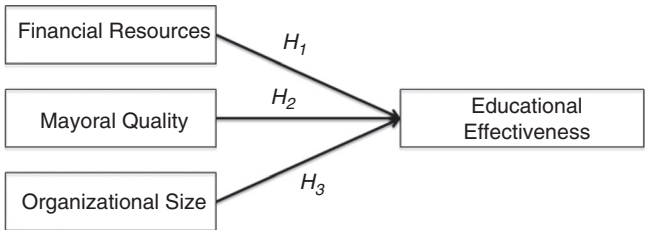


**Figure 1.**
Theoretical model of educational effectiveness

**Source:** Elaborated by authors

represented by a dummy variable that takes the value 0 (the mayor has no previous administrative experience) or 1 (the mayor was re-elected). Age is represented by a scale variable.

The population of the municipality is the measurement of organizational size. We adopted this measure for matching the criterion by which financial resources are transferred down from federal and state to local governments (Martell, 2008). Data were collected from the Brazilian Geography and Statistics Institute (IBGE)[4], organization in charge of demographic data. The logarithms of some of the variables were considered in order to mitigate skewness.

*Dependent variable*

The dependent variable is the Index of Basic Education Development (IDEB), which was collected from the National Institute for Education Studies and Research (INEP) web site[5]. According to the INEP (Brasil, 2011), the IDEB is a performance indicator created in 2007 for representing, in a single indicator, two concepts for measuring the effectiveness of the basic public education: namely educational flux and pass rate. Educational flux means the length of time a pupil takes to finish the basic education segment. Pass rate is the average grade of a pupil has achieved in Math and language. Educational flux is obtained from a census responded by every single school in Brazil (the total of school is around 200,000). The pass rate is based on an assessment test that INEP carries out with municipalities every year (Prova Brasil and Saeb[6]). The IDEB is an index varying from 0 to 10.

*Analysis*

The first task was to check whether the independent variables are statistically associated with educational effectiveness. To this end, we calculated the correlation tests as proposed by Bryman (2008). Between two scale variables, we employed the Pearson moment correlation test while between ordinal, dummy and scale variables, we employed the Spearman rank correlation coefficient, which is suggested when data are non-parametric. Both tests require a significance level of 95 percent ($<0.05$) in order to ensure reliability.

After inferring the statistical association, we estimated the extent to which the dependent variable depends on each independent variable, by using the multiple linear regression (Aiken *et al.*, 2003). This tool makes it possible to infer whether there is a relationship between quantitative and categorical data. According to Aiken *et al.* (2003), there are some assumptions about the relationship between $X$ and $Y$ variables in linear regression: first, the dependent variable is a linear function of a specific set of variables; second, the error has a normal distribution and it is neither self-correlated nor correlated with $X$ variables; third, the observation of the explanatory variables can be regarded as fixed on repeated samples; fourth, there is no exact linear association between explanatory variables and fifth, there are more observations than explanatory variables.

The assumptions may be violated by several ways, and in the following we offer evidence that they were not violated. The first assumption can be violated if a feasible explanatory variable is not included in the model, or if there is not a linear relationship between $X$ and $Y$ variables. To avoid these violations, we took the logarithms of the explanatory variables, in order to approximate linearity. The second assumption is likely to be violated by the presence of heteroscedasticity and by the presence of autocorrelation in residuals. As the investigation employs a cross-sectional design,

autocorrelation is not an issue (Verbeek, 2008). In order to reduce heteroscedasticity, we took logarithms of some variables in order to avoid outliers. As the $Y$ variable was collected from a public database, we assume that it has the same value in repeated samples and; therefore, the third assumption is satisfied. In relation to the fourth assumption, there is the problem of multicollinearity, which would arise in the case of high correlation between $X$ variables. To ensure the assumption was valid, we tested for correlation among the whole set of variables.

The equation for the linear regression, which is used to assess the influence of each explanatory variable ($X$) on the resultant variable ($Y$), is represented as follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta n X n + \mu$$

where $Y$ represents the dependent variable, $\alpha$ is a constant, $\beta$ is the angular coefficient of each variable $X_{n,}$ and $\mu$ represents the possible variables that have not been included in the model.

## Results

Table I presents the descriptive statistics for the whole set of variables. The variables Log Fundeb, Log FPM, Log Overall Budget and Log Population were introduced to ensure the linear regression assumptions of normality. The smallest city in the sample has a population of 1,127 while the largest population is of 660 thousand inhabitants. The lowest overall budget was of four million Brazilian Real per year, and the highest is over one billion Brazilian Real per year. The youngest mayor was 22 and the oldest 83 years old. The least educated mayor had not completed the first stage of the primary education, and the most educated has completed undergraduate level.

Some results indicate an association between variables, which is the case of the ratio Fundeb/Overall Budget, which has a negative relationship as Table II

| Variables | Minimum | Maximum | Mean | SD |
|---|---|---|---|---|
| Fundeb | 200,727.56[a] | 135,950,398.93 | 5,500,644.95 | 10,102,076.82 |
| Log Fundeb | 5.30 | 8.13 | 6.44 | 0.48 |
| FPM | 2,505,665.37 | 59,961,946.98 | 7,837,292.31 | 6,952,211.56 |
| Log FPM | 6.40 | 7.78 | 6.81 | 0.25 |
| Overall Budget | 4,158,846.00 | 1,125,056,222.73 | 35,293,365.93 | 83,870,759.89 |
| Log Overall Budget | 6.62 | 9.05 | 7.24 | 0.41 |
| Fundeb/Overall Budget | 0.03 | 0.48 | 0.18 | 0.09 |
| FPM/Overall Budget | 0.03 | 0.82 | 0.41 | 0.15 |
| Mayor's Age | 22 | 83 | 48.88 | 9.38 |
| Population | 1,127 | 666,469 | 25,001.09 | 52,033.35 |
| Log Population | 3.05 | 5.82 | 4.07 | 0.48 |
| Total expenditure with primary education | 361,426.87 | 197,414,964.17 | 7,365,428.15 | 13,622,980.64 |
| Total enrolment primary education | 84 | 42,778 | 2,564.98 | 4,161.01 |
| Pop, age from 7 to 14 years | 150 | 22,564 | 2,748.67 | 3,321.77 |
| IDEB 2009 | 2.3 | 8.0 | 4.5 | 1.05 |
| Mayor's educational level | 1 | 7 | – | – |
| Mayor's previous experience | 0 | 1 | – | – |

**Note:** [a]Values in Brazilian Reais
**Source:** Data Analysis

**Table I.**
Descriptive analysis of the data

| Independent variables | Educational effectiveness (IDEB) Pearson moment correlation | Significance | Status |
|---|---|---|---|
| Log Fundeb | −0.096 | 0.025 | Selected |
| Log FPM | 0.115 | 0.007 | Selected |
| Log Overall Budget | 0.154 | 0.000 | Selected |
| Fundeb/Overall Budget | −0.555 | 0.000 | Selected |
| FPM/Overall Budget | −0.128 | 0.003 | Selected |
| Mayor's Age | 0.153 | 0.000 | Selected |
| Log Population | −0.002 | 0.954[a] | – |

**Note:** [a]Pearson's moment correlation test not significant (significance > 0.05)
**Source:** Data analysis

**Table II.**
Correlation calculation results

demonstrates. The other variables have small correlations, although they are highly statistically significant.

To assess statistical association between scale and ordinal and nominal variables, we used Spearman's rank correlation coefficient, which is shown in Table III. According to this calculation, neither independent variable is a reliable explanation for educational effectiveness as the relationships are not statistically significant. Although suggested in other studies, such as Avellaneda (2009a), we did not find empirical support for the hypothesis that mayoral quality (cognitive and intuitive knowledge) explains educational effectiveness, and, therefore, municipal performance in this service.

As a result of the preceding analysis, we concluded that organizational size is not likely to be regarded as a determinant factor of performance, which is for instance consistent with other studies (Boyne, 1995, 1996a, b). We focussed instead on financial resource and managerial variables as there is a slight correlation between the mayor's age and municipal effectiveness. After this exploratory analysis, we were able to conduct the linear regression analysis in order to assess the effect of each explanatory variable on municipal effectiveness, and then develop the structural equation for educational effectiveness. This analysis was conducted with the following independent variables: Log Fundeb, Log FPM, Log Overall Budget, Fundeb/Overall Budget, FPM/Overall Budget and Mayor's Age.

Table IV presents the multicollinearity test that was used to ensure that the fourth assumption of the linear regression model was not violated. Pearson's moment correlation rank indicates that the variables Fundeb/Overall Budget, FPM/Overall Budget and Mayor's Age are not strongly associated with each other and are, therefore, suitable for inclusion in the linear regression equation. The other variables, Log Fundeb, Log FPM and Log Overall Budget are correlated. The variable Log Overall Budget was also chosen for inclusion because of its strong correlation with the effectiveness variable.

| Explanatory variables | Educational effectiveness Spearman rank correlation | Significance |
|---|---|---|
| Mayor's educational level | 0.052 | 0.221* |
| Mayor's previous experience | 0.026 | 0.546* |

**Note:** *Values are not statistically significant ($p > 0.05$)
**Source:** Data analysis

**Table III.**
Spearman's rank correlation coefficient ($\rho$)

The analysis indicates that the most important determinant factor of performance in this model is financial resources as there is empirical evidence to support the three financial variables, though two of them could be related to managerial skills as seems to be the case of Fundeb/Overall Budget and FPM/Overall Budget. As these two variables assess the degree of dependence of a given municipality has on transfers, a higher value indicates a greater dependence on money over the collection of which the municipality has little discretion as it is calculated based on the number of pupils being served at schools and on the number of population. The other variable is the Overall Budget.

For this new set of independent variables, the analysis indicates that they are likely to explain around 35 percent of the variance in the educational effectiveness indicator as Table V demonstrates. Due to the low value for $r^2$, we include a variable $\mu$, which may be needed to account for the residual variables that are not included in this study.

According to the Table VI, the model has statistical significance as the significant $F$-value indicates ($<0.05$), and at least one variable is likely to explain municipal effectiveness.

Table VII shows that the variable FPM/Overall Budget should be disregarded because of its significant $t$-value, which does not reach statistical significance. The results for the other variables are statistically significant, and consequently they are included in the model. As soon as the variable FPM/Overall Budget is removed from

**Table IV.**
Multicollinearity test of the dependent variables (Pearson's moment correlation test[a])

| Variables | Log Fundeb | Log FPM | Log Overall Budget | Fundeb/Overall Budget | FPM/Overall Budget | Mayor's Age |
|---|---|---|---|---|---|---|
| Log Fundeb | 1 | – | – | – | – | – |
| Log FPM | 0.861 | 1 | – | – | – | – |
| Log Overall Budget | 0.910 | 0.933 | 1 | – | – | – |
| Fundeb/Overall Budget | 0.454 | 0.142 | 0.076 | 1 | – | – |
| FPM/Overall Budget | −0.621 | −0.355 | −0.646 | −0.028 | 1 | – |
| Mayor's Age | 0.143 | 0.189 | 0.184 | −0.085 | −0.095 | 1 |

**Note:** [a]All correlations are regarded as significant (significance $<0.05$)
**Source:** Data analysis

**Table V.**
Dependence relationship of the educational effectiveness indicator

| Model | $R$ | $r^2$ |
|---|---|---|
| 1 | 0.593 | 0.351 |

**Source:** Data analysis

**Table VI.**
Significance of the educational effectiveness indicator model

| Model | Sum of squares | df | Mean square | $F$ | Sig. $F$ |
|---|---|---|---|---|---|
| Regression | 216.514 | 4 | 54.129 | 74.117 | 0.000 |
| Residual | 400.209 | 550 | 0.730 | – | – |
| Total | 616.723 | 554 | – | – | – |

**Source:** Data analysis

the model, the statistical significance of the model rises above 95 percent as Table VIII indicates.

Consequently, the following linear regression equation emerges as an explanation for educational effectiveness. According to the model, educational effectiveness in Brazil is explained by the amount of money a municipality is able to gather (Log Overall Budget), by the degree of independence a given municipality has from intergovernmental transfers (Fundeb/Overall Budget) and by the relative experience (intuitive knowledge) of the mayor (Mayor's Age).

Educational Effectiveness = 2.506 + 0.386 (Log Overall Budget) − 6.639 (Fundeb/Overall Budget) + 0.008 (Mayor's Age) + $\mu$

The equation indicates that the higher the budget a municipality is able to agree upon (by raising taxes collected locally and by reducing dependence upon intergovernmental transfers), the better the educational effectiveness (pupils completing the basic education on the expected period on time and achieving better results on Math and language). The model also indicates that the mayor's experience is likely to improve educational effectiveness, although the coefficient is small (0.008). It is likely to mean that more experienced mayors would have more sense on providing education with the proper resources. On the other hand, municipalities need to work to reduce dependence on intergovernmental transfers, which can be explained by some sort of comfort zone (Mello, 2000). According to our model, the higher the dependence on external revenue (Fundeb/Overall Budget), the lower is the educational effectiveness. This evidence could be unveiling an important issue on organizational management, which is the managerial discretion a manager needs to have in order to exert his/her abilities to improve performance (Williamson, 1963). This is a suggestive rather than conclusive issue of the paper, but it indicates that more studies ought to be done in this matter. The intercept, indicating the case where transfers are zero, indicates that the minimum expected IDEB is 2.506.

| Model | Unstandardized coefficients *B* | SE | Standardized coefficients $\beta$ | *t* | Sig. *t* |
|---|---|---|---|---|---|
| (Constant) | 2.918 | 0.773 | – | 3.777 | 0.000 |
| Log Overall Budget | 0.340 | 0.096 | 0.163 | 3.550 | 0.000 |
| Fundeb/Overall Budget | −6.616 | 0.410 | −0.560 | −16.138 | 0.000 |
| FPM/Overall Budget | −0.230 | 0.310 | −0.034 | −0.742 | 0.458 |
| Mayor's Age | 0.008 | 0.004 | 0.073 | 2.070 | 0.039 |

**Source:** Data analysis

**Table VII.** Significance of the multiple regression parameter for the educational effectiveness indicator: model 1

| Model | Unstandardized coefficients *B* | SE | Standardized coefficients $\beta$ | *t* | Sig. |
|---|---|---|---|---|---|
| (Constant) | 2.506 | 0.530 | – | 4.729 | 0.000 |
| Log Overall Budget | 0.386 | 0.073 | 0.185 | 5.259 | 0.000 |
| Fundeb/Overall Budget | −6.639 | 0.409 | −0.562 | −16.232 | 0.000 |
| Mayor's Age | 0.008 | 0.004 | 0.071 | 2.029 | 0.043 |

**Source:** Data analysis

**Table VIII.** Significance of the multiple regression parameters for the educational effectiveness indicator: model 2

## Discussion

This study started with nine independent variables that were proposed to explain municipal effectiveness. The starting point was studies that suggest five groups of determinant variables to explain public service performance (Rainey and Steinbauer, 1999; Boyne, 2003). From these variables, the present study focusses on financial resources, management and organizational size. Financial resources were quantified using the variables on intergovernmental transfers, and local sources of revenue. Managerial quality was evaluated using the mayor's level of formal education (cognitive knowledge), the mayor's experience and the mayor's age (intuitive knowledge). Organizational size was measured by population size.

The analysis was carried out with a representative sample of Brazilian municipalities. Only three of the independent variables were found as reliable sources of explanation of educational effectiveness. They are the level of dependence on external sources of revenue (Fundeb/Overall Budget), which has negative impact upon performance, the overall budget, and, with a small influence, the mayor's experience (Mayor's Age).

In the regression equation, one can see that financial resources are of paramount importance for the effectiveness of the educational services provided for the local population. The empirical evidence we found in this investigation makes it possible to accept the first hypothesis, in which financial resources positively influence educational effectiveness, which is the case of the positive association between the overall budget and educational effectiveness. According to Boyne (2003) financial resources are not an essential condition for improving public service performance, and performance is more likely to depend on bureaucrats' ability to fritter away money. In the case of this investigation, we found empirical evidence that the higher the amount of money available in the overall budget the more improved the effectiveness would be, and this is consistent with other results in the literature. We also found evidence about resource dependence in the extent that reliance on intergovernmental transfers is likely to impede effectiveness.

In terms of mayoral quality, the results are ambivalent to the extent that they neither corroborate nor refute the extant literature (Avellaneda, 2009b; Meier and O'Toole, 2002). We used formal education (cognitive knowledge) and job-related experience (intuitive knowledge) as measures of mayoral quality, but neither result was statistically significant. The mayor's age was also employed as a measure of mayoral quality (intuitive knowledge) in the extent that older people are likely to have gathered more experience in their lives. The relationships are quite weak, but experience seems to be an issue in a mayor's effectiveness in Brazil. We still need further empirical work in order to be able to accept mayoral quality as a determinant factor in performance, and we, therefore, concluded that the second hypothesis is undecided. Perhaps, this could be due to the multiple roles mayors play in Brazil as both political leader and manager. Of course, every municipality has a Secretariat in charge of educational matters, but, in the end, the mayor is responsible for success or failure of this function. In addition, the evidence that dependence on external sources of revenue is negatively associated with performance would reinforce the importance of managerial discretion. Therefore, further investigations are needed in order to bring more conclusive issues in this matter.

In relation to organizational size, we hypothesized that educational effectiveness is associated with organizational size. The results were inconclusive as the reliability test failed. These results are consistent with other studies (Boyne, 1995; Boyne, 1996b), and

we, therefore, concluded more studies ought to be conducted on this matter in order to accumulate sufficient empirical evidence to decide whether large or small public organizations perform better.

## Conclusion

This paper contributes to the extant literature on public service performance management by indicating determinant factors likely to influence the educational effectiveness and by providing empirical evidence on developing settings. The literature is comprehensive on this subject, but there is still a huge field to be explored due to the lack of robust empirical evidence about determinant factors that really shape performance.

The theoretical starting point was studies conducted in this field, such as Boyne (2003), Rainey and Steinbauer (1999) and Meier and O'Toole (2002). These studies argue that performance is a dependent variable affected by five groups of independent variables, namely resources, regulation, market structure, organization and management. These theories set the scene for selecting nine variables of a financial, organizational and managerial nature. Performance was defined in terms of the effectiveness in delivering public services. Educational services were chosen for the study because of their financial importance.

The investigation was carried out with a sample of municipalities from Brazil in a cross-sectional investigation. Association among variables was analyzed using two different types of correlation tests, namely Pearson's moment correlation and Spearman's rank correlation. After removing unreliable data, we conducted a linear regression analysis to identify the impact of each explanatory variable. The first statistical analysis indicated that, of the nine variables, three (educational background, previous administrative experience and population size) needed to be discarded as not statistically significant. After that, the multicollinearity test indicated that only three variables should be accepted and included in the linear regression analysis, and they were dependence on external sources of revenue, overall budget and mayor's experience.

The main conclusion of the investigation is that financial resources impact performance in a great deal. It impacts as more money would indicate higher effectiveness, and reliance on external sources of money would indicate lower effectiveness. Despite the fact that more experienced mayors are more likely to improve performance, evidence was poor in terms of mayoral quality contradicting previous studies. We regard the difference between our results and other empirical investigations due to the form of local government adopted in Brazil. In terms of theory building, the model proposed is able to explain 35 percent of the variation in the education effectiveness indicator, and further investigations should be done in this matter.

In terms of public finance, this study contributes to a building body of evidence that there is a need to examine local tax collection, and dependence from intergovernmental transfers. In terms of public service performance management, the results are at odds with the extant literature to the extent that we did not find empirical evidence that mayoral quality has an impact on the educational effectiveness. This impact is likely to be found in the level of managerial discretion mayors have in such strong-mayor form of government and with the level of regulatory federalism. The same can be said of organizational size. The literature suggests that size is likely to be an issue in organizational performance (Child, 1972; Hrebiniak and Alutto, 1973), although some

studies suggest otherwise (Boyne, 1996b). In this investigation, we did not find reliable empirical evidence to support the idea that large municipalities achieve better outcomes in educational services.

For future research, we suggest the inclusion of variables for measuring the impact of regulatory federalism and managerial discretion upon performance. For instance, regulation might be an influential issue, because of the nature of this kind of organization, whose actions are severely circumscribed by norms and rules. In terms of managerial skills, more variables should be included for a more comprehensive description of managerial issues. We also suggest that financial resources to be dismembered into personnel, equipments, and R&D (such as library, access to databases and access to the internet). In this study, we employed only mayoral quality in terms of cognitive and intuitive knowledge, but we did not explore leadership, coaching and other forms of managerial quality. Leadership is commonly regarded as representing an important influence on performance. We believe that cross-cultural investigations between different forms of local government are carried out it would help to clarify the mayoral quality matters in a great deal.

In addition to extending the range of variables, to improve the coverage of the present quantitative model, we would also suggest more qualitative, in-depth case studies, focussing on municipalities that have performance that is well above, or well below, average. Differences in the performance of rural and urban municipalities, and of different political orientation, might also be explored more fully.

## Notes

1. National Treasury Secretariat (www.tesouro.fazenda.gov.br/estados_municipios/index.asp).
2. Ministry of Health (http://portal.saude.gov.br).
3. Electoral Superior Court (www.tse.jus.br/eleicoes/eleicoes-anteriores).
4. www.ibge.gov.br
5. www.inep.gov.br
6. Two national exams created to assess educational outcomes.

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