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# Managerial effort under asymmetric information: The case of public schools in Brazil

Alessio Tony C. Almeida\*, Hilton M.B. Ramalho, Ignacio T. Araujo Junior

*Graduate Program of Economics, Federal University of Paraíba, Brazil*

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## Abstract

This paper uses a principal-agent model to investigate how public school managers react to government incentives based on previous school performance. Using data from the Brazilian Student Evaluation Exam (Prova Brasil – PB) and the School Census, we estimate a managerial effort function by quantile regression. The findings show a regular non-linear relationship between managerial effort and lagged school performance, indicating that marginal effort is decreasing when a previously ineffective school manager becomes effective on reaching a performance goal. This evidence is in line with the adopted theoretical approach and provides new parameters for educational policies designs.

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*JEL classification:* I21; H52; H40

*Keywords:* School management; Managerial effort; Educational goals; Asymmetric information

## Resumo

Este artigo usa um modelo de principal-agente para investigar como os gestores de escolas públicas reagem à incentivos do governo baseados no desempenho escolar anterior. Utilizando dados da Prova Brasil (PB) e do Censo Escolar, estimamos uma função de esforço gerencial por regressão quantílica. Os resultados mostram uma relação não-linear regular entre o esforço gerencial e o desempenho escolar desfasado, indicando que o esforço marginal decresce quando um diretor de escola anteriormente ineficaz se torna efetivo ao atingir uma meta de desempenho. Esta evidência está em linha com a abordagem teórica adotada e fornece novos parâmetros para o desenho de políticas educacionais.

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*Palavras-chave:* Gestão escolar; Esforço gerencial; Metas educacionais; Informação assimétrica

\* Corresponding author.

*E-mail addresses:* [alessio@ccsa.ufpb.br](mailto:alessio@ccsa.ufpb.br) (A.T.C. Almeida), [hilton@ccsa.ufpb.br](mailto:hilton@ccsa.ufpb.br) (H.M.B. Ramalho), [ignacio@ccsa.ufpb.br](mailto:ignacio@ccsa.ufpb.br) (I.T. Araujo Junior).

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## 1. Introduction

In Brazil, one can say that the purpose of universal primary education has been achieved. According to the Population Censuses of 1991 and 2010, conducted by the Brazilian Institute of Geography and Statistics ([Instituto Brasileiro de Geografia e Estatística – IBGE, 2013](#)), the school attendance of individuals between 6 and 14 years of age reached 96.7% in 2010, from a frequency rate of 75.5% at the beginning of the 1990s; furthermore, the population's illiteracy rate at 15 years of age or older decreased from 20.1% to 9.6%, a result possibly associated with the universalization of elementary education in the country.

Despite this improvement, the quality of education in Brazil is well below the levels observed in developed countries. According to the report of results from the Programme for International Student Assessment (PISA) of 2012, provided by the Organization for Economic Cooperation and Development (OECD), Brazil is in 58th place among the 65 countries evaluated in the average score in mathematics, surpassed by Latin American countries such as Costa Rica, Uruguay, Mexico, and Chile ([OECD, 2014](#)). In this environment of low-quality education, the increase in average schooling in Brazil may not have the expected effectiveness in economic growth, given the direct relationship between the development of cognitive skills and the dynamism of an economy ([Hanushek and Woessmann, 2008](#); [Hanushek, 2013](#)).

A relevant question for empirical research on education is the understanding of the role of public schools in producing real differences for students in learning gains and not merely replicating the socioeconomic conditions that are beyond the control of school management ([Hanushek, 1986](#)). In this sense, the institutional dimension that governs incentives for the degree of commitment of public school manager<sup>1</sup> is critical to the quality of the educational system, especially when the mechanisms to control managerial effort are not well defined and/or have informational restrictions on behalf of the authorities responsible for all schools of a given region.

Studies on education have revealed that the school manager, as the school's leader, plays an important role in the educational outcomes of students ([Eberts and Stone, 1988](#); [Brewer, 1993](#); [Ross and Gray, 2006](#); [Gates et al., 2006](#); [Robinson et al., 2008](#); [Béteille et al., 2011](#); [Coelli and Green, 2012](#); [Miller, 2013](#)). According to [Béteille et al. \(2011\)](#), this role proves to be greater in schools with an unfavorable socioeconomic context, low levels of educational performance, and a greater number of inexperienced teachers.

Additionally, the effects of the management on school performance occur through a variety of mechanisms, including the following: the motivation of the school's staff, composed of officials and teachers; the articulation of educational vision and goals; the resolution of interpersonal conflicts at school; the allocation of school resources; and the development of organizational structures to support teaching and learning ([Eberts and Stone, 1988](#); [Ballou and Podgursky, 1995](#); [Grissom and Loeb, 2011](#); [Loeb et al., 2012](#)).

In Brazil, much of the literature has been devoted to researching the relationship between the socioeconomic background of students and the results on educational performance indicators ([Gomes-Neto and Hanushek, 1994](#); [Soares and Andrade, 2006](#); [Machado and Gonzaga, 2007](#); [Sampaio et al., 2011](#); [Almeida, 2014](#)). The documented results confirm the relevance of the socioeconomic background of students in academic performance, showing that Brazilian schools generally have little effect on cognitive gains.

In this context, the literature on school management remains in its infancy, meaning much of the evidence found is based only on empirical relationships. On the other hand, as noted by [Ferris \(1992\)](#), the interests of the public administration (principal) and the school manager (agent) cannot be the same. The school manager may have either different conceptions, multiple purposes and definitions of educational performance or other goals that conflict with the objectives of the public administration ([Dixit, 2002](#)). Such purposes are both legitimate and uncontradictory, but they compete with each other for the scarce resources that schools have. Thus, the principal-agent conflict can arise when higher authorities (such as state and local governments) and the school manager choose different purposes.

In this paper we use a theoretical principal-agent model that incorporates asymmetric information in the relationship between local government administration and school manager. In particular, we explore how managers react to government signaling mechanisms based on previous performance (achieving educational goals).

<sup>1</sup> In this paper, the term school manager is used as equivalent of school principal to avoid confusion with the expression of the principal-agent model.

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