



## School-level resource allocation and education outcomes in Sri Lanka

Ashani Abayasekara\*, Nisha Arunatilake

*Institute of Policy Studies of Sri Lanka, 100/20, Independence Avenue, Colombo 7, Sri Lanka*



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### ABSTRACT

Sri Lanka's public education system suffers from poor examination outcomes and wide disparities in academic achievement across schools. Using School Census data for the year 2016 and a multilevel modelling technique, we examine the link between school-level resources and student performance at the O-Levels. Controlling for several factors, we find that schools with larger shares of in-field and experienced teachers and qualified principals perform better at the O-Levels. Teacher commitment—measured by teacher absenteeism—also matters. Our findings hold several policy implications for improving the equity of school-level resource allocation and, subsequently, educational outcomes in Sri Lanka.

### 1. Introduction

It is now well accepted that a highly-skilled well-educated workforce is essential for Sri Lanka to remain competitive. Under the education structure of the country, successful performance at the General Certificate in Education (GCE) Ordinary Level (O-Level) examination – undertaken by students completing secondary schooling – is a pre-requisite for most further education courses. These include the GCE Advanced Level (A-Level) examination—which also serves as the university entrance examination—and many vocational training programs. To qualify for the A-Levels, a student needs to obtain six ordinary passes and at least three special passes with a pass for the first language (Sinhala or Tamil) and mathematics at the O-Levels (Minsitry of Education of Sri Lanka (MOE, 2008). In 2015, close to half the students (45%) either failed or only conditionally passed the O-Levels<sup>1</sup> due to failing mathematics (MOE, 2016a). In the same year, 11% of Sinhala medium students and 19% of Tamil medium students failed O-Levels due to not obtaining a pass in their first language (Ibid).

Concerns of low achievement rates have been compounded by wide disparities in education outcomes across provinces and schools in the country. Less privileged schools, mostly attended by poorer students in rural areas, lag behind more privileged schools in terms of academic achievement (MOE, 2016a; World Bank, 2005). While Sri Lanka's free education policies adopted since 1945 have played an important role in improving equitable access to education, they have not been successful

in ensuring that the quality of education is as equitable. Existing evidence indicates similar disparities in school resources—including both physical facilities and teacher and principal quality—across schools (Arunatilake, 2006; NEC, 2016).

A more equal distribution of school resources can allow students to use these resources more efficiently, thereby improving overall academic performance. Further, in maximizing the efficiency of government educational budget allocations, it is important that scarce state funds are directed towards developing resources that have a strong bearing on educational outcomes. In this study we examine the link between school-level resource allocation and education outcomes in Sri Lanka. In particular, we examine the impact of several school, teacher, principal, and provincial characteristics on student performance at the O-Levels.

Reflecting its policy significance, a vast amount of research has explored the relationship between resources devoted to schools and educational outcomes, spanning several decades. In a meta-analysis of close to 400 studies of student achievement in the United States over a three-decade period, Hanushek (1997) concludes that there is no strong or consistent relationship between school resources and student performance. More recent studies find strong and positive relationships between teacher qualifications and education outcomes across the country (Clotfelter et al., 2010; Hill et al., 2005; Rockoff, 2004; Salloum et al., 2017).

Studies focusing on developing countries can be traced to

*Abbreviations:* MOE, Ministry of Education of Sri Lanka; EQI, education quality inputs; NEREC, National Education Research and Evaluation Center; NEC, National Education Commission; HLM, hierarchical linear modelling; DCS, Department of Census and Statistics of Sri Lanka; SLEAS, Sri Lanka Education Administration Service; SLPS, Sri Lanka Principals Service; SLTS, Sri Lanka Teachers Service

\* Corresponding author.

E-mail address: [ashani@ips.lk](mailto:ashani@ips.lk) (A. Abayasekara).

<sup>1</sup> Since 2014, students meeting all other requirements but with a failure in mathematics can pursue A-Level studies, conditional on obtaining a pass in mathematics within two years (MOE, 2014a).

Heyneman and Loxley (1983), who explore the effects of school quality on primary-level student achievement in science in both high- and low-income countries across diverse continents including Africa, Asia, Latin America, and the Middle East. They find that the effect of school resources and teacher quality – in terms of teacher education, verbal ability, time spent preparing lessons, and membership in professional organizations – on academic performance is relatively greater in low-income countries. Akiba et al. (2007) analyze the 2003 Trends in International Mathematics and Science Study data for a mix of 46 developed and developing countries and show that countries with better mathematics teacher quality—measured as the percentage of students taught by mathematics teachers who are fully certified, who majored in mathematics or mathematics education, and who have 3 or more years of teaching experience—produce higher mathematics achievement among eighth graders.

Reviews of the evidence available on improving education outcomes in developing countries point to policies that focus on improved pedagogy, teacher knowledge of the subjects they teach, and interventions that improve school governance and teacher accountability, as being the most effective (Glewwe et al., 2011; Glewwe and Muralidharan, 2015). McEwan (2015) assesses 77 randomized experiments that evaluate the impacts of school-based interventions on learning in developing country primary schools, including Sri Lanka. He concludes that the largest effects are from treatments that provide computers or instructional technology, teacher training, smaller classes, student and teacher performance incentives, and instructional materials. Willms and Somer (2001) employ hierarchical linear modeling to examine the relationships between language and mathematics achievement and school practices in 13 Latin American countries. Across all countries, they conclude that the most effective schools tend to be those with high levels of school resources, frequent testing of students, high level of parental involvement, and good classroom discipline.

Systematic investigations of the relationship between school resources and education outcomes in South Asia and Sri Lanka are limited. Asim et al. (2015) conduct a meta-analysis of 29 education-focused impact evaluations that use randomized control trials and quasi-experimental designs in South Asia. They find that programs targeting the supply-side of education—including teachers and schools—have a larger impact on improving learning outcomes, compared to initiatives that focus on increasing the demand for education in households and societies. Other existing literature on South Asia appears to be primarily focused on India. Kingdon (2006) uses a school fixed effects model to examine the relationship between teacher characteristics and student grades in 16 major Indian states and finds that holding a Masters-level qualification and pre-service training have significant but small effects on student achievement. Muralidharan and Sundararaman (2009), based on experimental evidence, show that two years of performance incentives to teachers could yield close to 0.3 and 0.2 standard deviation improvements in student mathematics and language scores, respectively. Banerjee et al. (2005) present evidence for the importance of teacher resources and computer-based learning on student outcomes using two experiments conducted in the Indian states of Mumbai and Vadodara.

A prior study for Sri Lanka is that of Aturupane et al. (2013), which investigates the determinants of learning among fourth grade students using the National Education Research and Evaluation Center (NEREC) survey conducted by the University of Colombo. They find principals' and teachers' years of experience to be important determinants of learning outcomes, in addition to child and household level variables such as educated parents, better nutrition, high daily attendance, and enrollment in private tutoring classes. However, this analysis is limited to primary-level student achievement, and its main focus is on student-level factors as opposed to school and teacher characteristics. To our knowledge, ours is the first study to examine the impact of school resources on O-Level performance in Sri Lanka.

The remainder of the paper proceeds as follows. Section 2 provides an overview of Sri Lanka's school education system. Section 3 presents our data and methods. The results are presented and discussed in Section 4. Section 5 concludes and offers policy implications.

## 2. Sri Lanka's school education system

Education in Sri Lanka is provided through an extensive network of schools, which stood at 11,021 in 2016 (Central Bank of Sri Lanka, 2016). Our study focuses on public schools, which, at 10,162, account for 92% of total schools (MOE, 2016b).<sup>2</sup> Since 1987, education administration in Sri Lanka has been decentralized, with more powers being given to provinces in the administration and management of education services. Under this new framework, schools are categorized into 'national' schools and 'provincial' schools (Arunatilake and Jayawardena, 2010). National schools come directly under the purview of the Central MOE. These are primarily elite and old central colleges that were established during the colonial period and retained by the central government. Several criteria for listing a school as a national school were established in 1985, which are reflective of schools with superior educational and other related facilities. Provincial schools come under the purview of the respective provincial ministries of education. There are nine provincial ministries of education, one per each province. As such, schools come under 10 different administrative units—the Central MOE and the nine provincial ministries of education. These education ministries are responsible for the planning, implementation, and management of all education programs (De Silva, 2003).<sup>3</sup>

Given this administrative structure, the performance of schools can be affected by the administrative capacity of the different ministries of education, in addition to school-level characteristics. Moreover, apart from the more obvious differences at the national and provincial MOE levels, socioeconomic disparities that exist in Sri Lanka at the provincial-level can have a bearing on the administrative capacity of each provincial MOE. For instance, it is reasonable to expect that education ministries located in provinces with higher GDP per capita or lower poverty levels would have better access to resources to perform their duties more effectively. As illustrated in Fig. 1, the Western Province, the location of the capital, Colombo, is the most affluent and accounts for over 40% of GDP, while the Northern province contributes to a mere 3.5%. The Western province also records the lowest poverty rate and highest urbanization rate. Poverty incidence is highest in the Uva and Northern provinces, while the North Western and North Central provinces record the lowest urbanization rates.

Sri Lanka's school education system commences at age 5, and consists of 13 years of schooling, organized into four levels: primary (grades 1—5), junior secondary (grades 6—9), senior secondary (grades 10 and 11), and collegiate (grades 12 and 13). Education is compulsory up to age 14 (grade 9) in the country. Students are subjected to three national-level examinations. The first is the grade five scholarship examination, faced by children in grade 5. The main objective of this exam is to provide subsidies to economically disadvantaged talented students to pursue further education in better schools (Sedere et al., 2016).<sup>4</sup> The second is the GCE O-Level examination, undertaken by

<sup>2</sup> Other types of schools include assisted and autonomous private schools which offer both the local syllabus and the British system, and Pirivenas (monastic colleges, similar to seminaries, where Buddhist priests in Sri Lanka are educated).

<sup>3</sup> Within a province, schools are also grouped into education zones, and zones are in-turn grouped into education divisions. The divisional and zonal education offices come directly under the purview of the provincial education offices, and there is also significant overlap in the responsibilities of each level. It is therefore unlikely that these additional levels have a significant individual influence on the functioning and performance of schools.

<sup>4</sup> This is not a compulsory examination, and is of most importance to students who aspire to move into better quality schools for their secondary- and collegiate-level education.

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