



Private school effects in urban and rural India: Panel estimates at primary and secondary school ages



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ABSTRACT

I present the first value-added models of learning production in private and government schools in India using unique panel data from Andhra Pradesh state. I examine the heterogeneity in private school value-added across different subjects, urban and rural areas, medium of instruction, and across age groups. Further, I also estimate private school effects on children's self-efficacy and agency. In rural areas, I find a substantial positive effect (>0.5 SD) of private schools on English, no effect on Mathematics and heterogeneous effects on Telugu for 8–10-year old students; at 15 years, there are modest effects (<0.2 SD) on Mathematics and Telugu receptive vocabulary. I find no evidence of a positive effect in urban areas or on psychosocial skills. Results on comparable test domains and age groups correspond closely with, and further extend, estimates from a parallel experimental evaluation.

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1. Introduction

The share of private schools in total enrolment has risen substantially across both urban and rural areas in India in the past 15 years (Kingdon, 2007), now accounting for about 30% of enrolment in rural areas (Pratham, 2013); students in these schools perform much better on average in test scores (Muralidharan and Kremer, 2008); and frequently it seems that private schools achieve this better performance even with much lower expenditure per pupil than government schools (Desai et al., 2008).

In this paper, I answer three questions using a unique longitudinal dataset collected by the Young Lives study in Andhra Pradesh state, which has tracked two cohorts of children through multiple rounds of data collection at household and school level between 2002 and 2011. First, I estimate value-added models (VAMs) of learning achievement to evaluate whether, and to what extent, the better test performance of children in private schools is attributable to schools. Second, I examine whether the impact of private schools on test scores is heterogeneous across different tests, different age groups, different languages of instruction and across urban and rural areas. Third, I attempt to assess if private schools have a differential impact on psychosocial ('non-cognitive') skills of children, specifically their self-efficacy and agency.

These questions are central to the understanding of the implications of the rise of private schools for the educational sector in India. Establishing whether the private school premium is causal, and whether it is heterogeneous, is essential for understanding whether the rapid proliferation of private schools can be expected

to improve the abysmally low learning levels in Indian schools and, if so, in which domains and by how much; this is also essential for understanding the likely implications for inequality in test scores in India, which is already among the highest in the world (Das and Zajonc, 2010). Finally, an assessment of the impact of private schools on psychosocial skills is relevant in light of a large interdisciplinary literature, including recent studies in economics, that documents their importance both in the production of learning skills and on later life outcomes (e.g. Bandura, 1982, 1993; Cunha and Heckman, 2008; Cunha et al., 2010).

In rural areas, I find that value-added in test scores for students in private schools is substantially greater in English compared to government school students, moderately greater in receptive vocabulary and not worse in Mathematics between the ages of 8 and 10 years; in Telugu, the local language, children in English-medium private schools do worse than government school students but children in Telugu-medium private schools perform as well while still out-performing government school students in English. At the age of 15 years, children in private schools significantly outperform government school children in Mathematics and Telugu receptive vocabulary, although estimated effect sizes remain relatively modest and only about 20 to 40% of the (unconditional) cross-sectional difference in test scores. In urban areas, I find no evidence of a causal private school effect on test scores.

Private school students display higher cross-sectional levels of agency and self-efficacy than government school students. However, these differences invariably disappear upon inclusion of socio-economic controls and lagged achievement; in short, I do not find any evidence of a causal private school effect on psychosocial skills.

Box 1

Cognitive tests in Young Lives.

Cohort	Round 1 (2002)	Round 2 (2007)	Round 3 (2010)	School survey (2011)
Older cohort	8 years old	12 years old	15 years old	
	Raven's test	PPVT Mathematics	PPVT Mathematics Telugu (cloze)	[Not covered]
Younger cohort	6–24 months old	5 years old	8 years old	9 years old
		PPVT CDA quantitative	PPVT Writing Mathematics	Mathematics Telugu English

PPVT refers to the Peabody Picture Vocabulary Test-III adapted for use in Telugu.
CDA refers to the Cognitive Development Assessment quantitative sub-scale.

This paper makes significant contributions to the literature on the impact of private schools in India. It is the first paper in this literature to use individual-level panel data to estimate value-added models of achievement; it is the only study to cover both primary and secondary school aged children across urban and rural areas; in comparison to previously published work (discussed in Section 2), the analysis makes use of considerably more detailed test measures and background information in each survey wave; and finally, it is the first study to look at differences in the psychosocial skills across private and government schools.

I attempt in this paper to also add to a recent and growing literature, mostly from studies in the United States, on the robustness and reliability of value-added approaches to modeling achievement production. In particular, the richness of the data allows me to test some of the assumptions implicit in value-added models and quantify the extent to which any violations may bias estimated private school effects in these data. Using the Raven's test from two periods ago as a proxy, I show that bias due to selection on ability into private schools does not appear to be significant. I further show that controlling for lagged parental assessments of a child's academic performance and for parental aspirations with regard to a child's education does not alter the size or statistical significance of estimated private school effects from value-added models. This indicates that dynamic sorting, which may be caused due to decision-makers having access to different or more detailed information about children than just their previous test scores, also does not seem to be a major source of bias in these estimates.

Furthermore, part of the data used in this paper are contemporaneous to data collected by Muralidharan and Sundararaman (2013a, MS hereafter) for children of the same age, in the same state and tested on partly the same domains of learning. The MS study offers experimental variation, induced through the randomized assignment of school vouchers in a representative set of communities in Andhra Pradesh, and thus offers an ideal comparison for the results in this paper to assess the presence and extent of systematic bias that may still be present in value-added models. As I document, the pattern of causal effects reported here, on a comparable set of indicators for a comparable cohort of children, is very similar to the MS study; this is, to my knowledge, the first comparison of experimental and value-added estimates for the effect of selection into different schools in a developing country and the first such comparison using independently drawn samples in any setting. In addition to documenting similar results for one sample of children, I extend the results of MS substantially by presenting results on older children of secondary school age, on children in urban areas and on non-curricular test domains (receptive vocabulary) and psychosocial skills. The MS study is focused exclusively on the curricular outcomes of children in rural areas aged about 8 to 10 years at the time of testing.

These results have important implications. Combined with the significantly lower per-pupil expenditure in private schools, discussed

in Section 2, this indicates that private schools are considerably more productive than government schools on average. The much better performance of private school students in English may plausibly contribute a significant labor market premium for these children in the future; recent evidence using nationally representative data from 2005 suggests an increase in hourly wages by 13% for men who can speak a little English and up to 34% for those who can speak it fluently (Azam et al., 2013). However, the insignificance or relatively modest size of the private school premium in most dimensions (with the exception of English) indicates that the spread of private schooling alone, without concomitant reforms across the education sector, will not lead to very appreciable improvements in the low levels of learning in Indian schools as measured by achievement in Mathematics or the ability to read and write.

The robust performance of value-added models, in a developing country setting with decidedly non-random selection across school types, may have methodological and practical relevance. While experimental evidence, preferably on representative samples and with minimal attrition, remains very desirable for measuring the causal effects of different educational inputs and interventions, such data are unlikely to be always available or always feasible to collect; the results in this paper support the reliability of value-added estimates using panel data in these settings.

The results in this paper may resonate more broadly than merely Andhra Pradesh or the Indian context. Low-fee private schools have increased their share in enrolment across several developing countries; in many countries in Latin America, Asia and Africa, they also seem to outperform government schools in test scores (Alderman et al., 2001; Andrabi et al., 2011; Bold et al., 2011; Jimenez et al., 1991). Given the similarity in findings on several dimensions of schooling across South Asia and these different contexts, evidence from India may have relevance for these contexts as well.¹ Similarly, the methodological question about the presence and extent of any bias in value-added models is also relevant across different contexts.

The rest of this paper is structured as follows: Section 2 presents the background and context of the schooling sector in India; Section 3

¹ For instance, the insignificant or modest gains from input-based measures seems to hold across South Asian and African contexts (see Glewwe et al., 2013; Kremer et al., 2013; McEwan, 2013) as do institutional issues of teacher absenteeism (Chaudhury et al., 2006), low rates of attainment (Glewwe and Kremer, 2006) and equal or greater productivity of contract or para teachers (Atherton and Kingdon, 2010; Duflo et al., 2012; Muralidharan and Sundararaman, 2013b). For example, comparing their results on an extra contract teacher in Kenya to those of Muralidharan and Sundararaman (2013b) from the state of Andhra Pradesh, Duflo et al. (2012) note that "[Muralidharan and Sundararaman, 2013b] find average test score gains very similar to those we observe, as well as reductions in civil-service teacher presence, suggesting that very similar forces may be at play in a different geographic and institutional context." (p. 24). While this study cannot itself claim external validity beyond the state of Andhra Pradesh in India, it is plausible that the results have some relevance for other Indian states and perhaps more broadly.

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