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# Learning in India's primary schools: How do disparities widen across the grades?

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## ABSTRACT

Using a large-scale household survey, we investigate how disparities in learning change over the primary school cycle. Even controlling for other factors, household wealth and parental schooling drive sizeable gaps in learning, increasing in magnitude over the school grades. Gender gaps also widen, although only among the poorest. In contrast to other countries, overage status is positively associated with learning early on, but its importance dissipates by later grades. While the importance of factors varies across states, household wealth predominates. The analysis highlights the importance of tackling disadvantage associated with poverty early, to avoid its effects on learning becoming entrenched.

## 1. Introduction

The growth in enrolment in many low- and lower middle-income countries over the past 15 years has been accompanied by an uncomfortable realisation: attending school does not guarantee learning. Of the estimated 250 million children not learning the basics, around half have spent at least four years in school (UNESCO, 2014). In order to rectify this, it is essential to identify the key sources of learning disparities to better identify and support those being left behind.

Studies from wealthier countries demonstrate that learning disparities develop from the earliest years and become increasingly entrenched over time. However, evidence on disparate learning trajectories from low- and middle-income countries is less readily available. We contribute to this body of research by analysing how determinants of learning change over the primary school cycle in rural India. As the world's second most populous country and home to low levels of learning among its poorest households, rectifying educational opportunities in India will be essential to attaining the global sustainable development goals on education.

We model the power of five characteristics – household wealth, gender, mothers' schooling, fathers' schooling, and overage status – in predicting how learning disparities change over the primary school grades. By accounting for the intersecting nature of these characteristics, we are able to assess their importance relative to one another. This has important implications for practice because identifying how factors change over the primary school cycle can help policymakers focus on those that exacerbate gaps over time, rather than those that dissipate.

We find that poverty supersedes all other characteristics as a predictor of learning disparities. Even when controlling for other sources of disadvantage, the gap between the poorest and richest widens through the primary school grades. First-generation school-goers and girls also increasingly fall behind over the primary cycle, although the latter is true predominantly among poorer children. In contrast to research on sub-Saharan Africa, overage status is linked to higher learning levels early on, but this relationship dissipates by the later primary school grades. Given India's internal heterogeneity, with the exception of household wealth, these factors vary in importance across states.

The paper proceeds as follows: Section 2 reviews key literature on how learning disparities develop in childhood with respect to children's background characteristics as a means to inform our research questions. Section 3 describes the data that we analyse, and Section 4 outlines our methodological approach. We then present results (Section 5), and follow this with a discussion of their implication for research and policy (Section 6).

## 2. Framing the research: evidence on the causes of learning disparities

Among wealthier countries, there is clear evidence that the early years are crucial to disparities in children's cognitive development (Carneiro and Heckman, 2002, 2003). In the UK, on average, five year-olds from richer households are already 15 months ahead of those from poorer households in vocabulary development (Blanden and Machin, 2010). Looking earlier on, longitudinal data from the US (Cunha et al., 2010) and UK (Jerrim and Vignoles, 2013) demonstrate that learning

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disparities are visible before children start school, even detecting socio-economic gaps in cognitive development by age 22 months (Feinstein, 2003). While research varies between claiming that learning disparities then widen throughout schooling (Feinstein, 2003; Goodman et al., 2009) or are simply maintained (Duncan and Magnuson, 2011; Reardon, 2011), there is a consensus that gaps are sizeable and do not diminish.

By comparison, we know far less about disparities in learning trajectories in low- and lower-middle income countries. Evidence on trajectories for student populations on average though make clear that overall levels of progress are disappointing (Asadullah and Chaudhury, 2015; Das, 2013; Muralidharan and Zieleniak, 2013; Pritchett and Beatty, 2015; Singh, 2014). More than half of children in grade 5 are unable to read a text at a level expected in grade 2 (ASER India, 2014). Research on a student cohort in Andhra Pradesh, India, found that most foundational learning happens in grades 1 and 2, meaning that those who had yet to learn foundational skills by this early stage were unlikely to catch up (Muralidharan and Zieleniak, 2013). This point is corroborated by data from a range of learning assessments across India indicate that only around one in 10 of those who lack a basic literacy or numeracy skill are able to gain this skill after an additional year of schooling (Bhattacharjea et al., 2011; Educational Initiatives, 2010; Pritchett and Beatty, 2015).

Unfortunately, progress among the most disadvantaged children is likely to be far worse than these average levels, given the body of evidence exploring educational inequalities in low- and lower-middle income countries. In India, as with many other countries, prior research has identified considerable disparities in access to primary schooling (see, for example, Kingdon 2002; Agrawal, 2014; Asadullah et al., 2013; Asadullah and Yalonetzky, 2012) and in differential access to private and government provision (for example, Alcott and Rose, 2015; Bangay and Latham, 2013; Chudgar and Creed, 2016; Kelly et al., 2016; Maitra et al., 2011; French and Kingdon, 2010; Woodhead et al., 2013a, 2013b; Singh and Bangay, 2014; Singh and Sarkar, 2015).

Increasingly, studies in India have been complemented by research focusing on the extent and determinants of disparities of learning more specifically (for example, Borooah, 2012; Kingdon, 2007; Rolleston and James, 2015; Woodhead et al., 2013a). Poverty is found to be one of the key drivers of learning gaps across country contexts. Findings on disparities in sub-Saharan Africa (for example, Jones and Schipper, 2012; Spaul and Kotze, 2015; UNESCO, 2014) are mirrored in India, where poorer children are far less likely to learn foundational literacy and numeracy skills (Borooah, 2012; Rolleston and James, 2015). For example, across rural India, fewer than 25% of poorer children aged 11–13 are in school and have learned the basics, just half the rate of wealthier children (Rose et al., 2016). Like other countries included in the Young Lives study (Ethiopia, Peru and Vietnam), in Andhra Pradesh, India, the richest quartile made a greater improvement than did the poorest quartile in maths between ages 5 and 8 (Rolleston et al., 2014).

Gender is another key predictor of disparities, as unequal access to educational opportunities (Aslam, 2009; Azam and Kingdon, 2013; Maitra et al., 2011; Srivastava, 2006) has translated into considerable learning disparities across South Asia (Alcott and Rose, 2015; Asadullah and Chaudhury, 2015; Borooah, 2012; Kingdon, 2002). Among poorer households in Uttar Pradesh, for example, by age 10 girls have fallen 10 percentage points behind boys in developing basic numeracy skills (UNESCO, 2014). Such patterns are heavily entrenched, as Indian census data show that gender inequalities in literacy rates have remained consistent for decades (Kingdon, 2007).

Parental education is also important to children's learning. Among a range of predictors including wealth, occupation, religion, and caste, Chaudhuri and Roy (2009) emphasise parental education as the key household determinant of demand for education and a means for redressing gender disparities in access to schooling in India, although Pal (2004) argues that maternal education alone matters for girls. For those

children in India who do access school, parental education is a key predictor of the type of school attended (Muralidharan and Kremer, 2008; Muralidharan and Sundararaman, 2013). Parents with low levels of education are also less likely to be as aware as other parents of their children's progress (Banerjee et al., 2007), and evidence from Andhra Pradesh shows clear links between gaps in learning outcomes and parental education levels (Woodhead et al., 2013a).

Overage enrolment is another frequently identified source of educational disparities in the research literature. However, most of this research focuses on sub-Saharan Africa. In eastern and southern African countries, learning is lower among children in classes with more overage children, although this does not disproportionately hinder the poorest (Hungu and Thuku, 2010; Jones, 2014). Overage children perform worse in the later primary school grades in Kenya, even after controlling for pupil background factors and school characteristics (Hungu et al., 2014). In francophone Africa especially, this concern is exacerbated by the common practice of grade repetition (20% of primary school children repeat grades on average), which is detrimental to learning outcomes and occurs primarily among poorer children, thus deepening socioeconomic gaps in learning (Glick and Sahn, 2010).

There is not yet commensurate research on the impact of overage enrolment in India, although it may play a different role. On average, overage status is less common in India than in sub-Saharan Africa. These lower rates may be largely attributable to the policy of automatic promotion implemented in India 2009, although this is not always fully implemented (Bhattacharjea et al., 2013). Even so, according to ASER data, overage rates in rural primary schools in India for the lowest wealth quintile are comparable to national overage rates in countries such as Namibia, Zimbabwe and Niger (UNESCO, 2015).

Each of the identified factors – gender, wealth, mothers' schooling, fathers' schooling, and overage enrolment – has been identified in the past literature as a driver of learning disparities in low and lower-middle income countries. We take this forward by presenting evidence from large-scale data that assesses whether the importance of these factors changes over the primary school cycle. We estimate inferential models that account for key confounding variables models with recent data from rural India with the aim of identifying how learning disparities change over the primary school cycle. Our goal is not to try to identify causal relationships – e.g. that poverty 'causes' low levels of learning – but to identify those facing the greatest barriers to learning. To achieve this, we address the following research questions:

1. Which prior characteristics – gender, wealth, mothers' schooling, fathers' schooling, and overage enrolment – are associated with learning gaps in India, even when controlling for other sources of disadvantage?
2. Which of these characteristics increase gaps in learning trajectories over the primary school cycle?
3. To what extent does the importance of these characteristics across the primary school cycle differ across states?

### 3. Data and descriptive statistics

#### 3.1. Data source

To investigate our research questions, we analyse data from the Annual Status of Education Reports (ASER) in rural India. Established by Pratham, a non-governmental organization, ASER is an annual household survey conducted by volunteers in every rural district in India, the primary focus of which is collecting information on enrolment, literacy levels, and numeracy levels among 5–16 year-olds (Chavan and Banerji, 2013; Results for Development, 2015). ASER uses a stratified random-sampling survey design: every district in the country is surveyed, and then, within each district, 20 villages from the previous two years are re-surveyed and 10 more are selected at random. Within each of these 30 villages, the ASER team members selected and

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