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Reversal of gender gaps in child development: Evidence from young children in India

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HIGHLIGHTS

- We analyze unique Indian longitudinal data of early cognitive development.
- We find steep caste and gender gradients in cognitive development.
- There is strong evidence of a reversal of gender gaps for the upper caste.
- Upper caste girls perform better than boys at age 5 but they do worse afterwards.
- This indicates that differential investments occur before enrollment decisions.

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ABSTRACT

This paper provides unique evidence of a reversal of gender gaps in cognitive development in early childhood. We find steep caste and gender gradients and few substantive changes once children enter school. The gender gap, however, reverses its sign for the upper caste, with girls performing better than boys at age 5 but thereafter following the general pattern in India of boys performing better.

1. Introduction

Early disparities in child development are a concern for at least two reasons. First, low levels of development at early ages make it difficult for children with early delays to accumulate skills later in life (Cunha and Heckman, 2007). As Cunha and Heckman argue, "capabilities beget capabilities". Second, because children in poor households are more likely to exhibit delays early in life, inadequate levels of cognitive development are one way in which poverty is transmitted across generations. This transmission is of particular concern in societies in which inequality is high.

India has a long history of socioeconomic inequalities related to households belonging to a certain caste. Gang et al. (2008) found that differences in educational attainment explain about 25% of the poverty gap between the historically disadvantaged scheduled caste and scheduled tribe (the so-called lower caste [LC]) and non-scheduled Hindu households (upper caste [UC]). For this reason, the Indian government recently introduced policy interventions targeting the LC. Moreover, as the gender education gap in the majority of developing countries is falling, that gap is still rising in India (Ganguli et al., 2011).

This paper presents evidence on the age patterns of a measure of cognitive development for Indian children 5–12 years of age by caste and gender. Given the strong associations between child development and later outcomes, the research describing the

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characteristics of children with deficits before they enter school and tracing the evolution of these children as they age is important.

To our knowledge, only a handful of earlier studies seek to measure socioeconomic differences in early childhood in developing countries using panel data. Longitudinal studies from Ecuador and Peru show substantial differences in cognitive development between children of higher and lower socioeconomic status (Schady et al., forthcoming). Other studies use single cross sections of data from low-income countries (Fernald et al., 2011).

For India, recent research using nationally representative data documents the persistence of gender, caste, and religion gaps in school participation and attainment (Asadullah et al., 2013). Even the later years of liberalization have not been accompanied by a complete closure of social gaps in schooling (Desai and Kulkarni, 2008). However, most such research focuses on primary, secondary, and tertiary education. Self and Grabowski (2011) use a cross section of household survey data from Uttar Pradesh and Bihar in India and show no evidence of gender bias in participation in early childhood education programs. However, they do find evidence of consistent gender bias among poor households in the sample.

Our paper substantially extends earlier work on caste and gender gaps. We highlight three important contributions not addressed before due to the lack of appropriate data. First, we present results by both caste and gender. This approach allows us to better understand the dynamics of skill formation for different groups. The literature has so far focused only on either caste or gender. Second, we exploit the distinctive longitudinal structure of the data to analyze how deficits in receptive language ability observed at young ages evolve as children enter the early school years in a developing country. We also explore what part of the gap is due to discrimination and what part can be attributed to observable characteristics by means of an Oaxaca–Blinder decomposition. Our main finding of a reversal in the gender gap is possible because the nature of the data allows us to observe children's test scores at age 5, before they enter formal school.[1] We also use another cohort of children to extrapolate our findings to children as they enter secondary school, which provides a picture of disparities by caste and gender over the first 12 years of life. Third, our research indicates that (unobserved) differential investments occur even before the enrollment decisions are made, while some of the existing literature has generally posited that gender bias in educational resource allocation manifests itself in Indian households via non-enrollment of girls (Kingdon, 2005). Our findings support the early literature on the topic (Kishor, 1993).

2. Data and methods

The data are from the longitudinal Indian survey of the Young Lives (YL) project.[2] Beginning in 2002, YL surveyed approximately 3000 children (in two cohorts, younger and older) from the Indian state of Andhra Pradesh. We first examine the younger cohort of children, who were 6–18 months of age at the initial survey (Round 1). The subsequent surveys were conducted when the children were age 5 (Round 2) and age 8 (Round 3).[3] After stating our main results, we extrapolate our findings by examining the older cohort of children, who were surveyed at age 12 and given the same cognitive test. The variable used is the Peabody Picture Vocabulary Test (PPVT), an internationally recognized test of vocabulary recognition widely used as a general measure of cognitive development (Dunn et al., 1986).

We use seven-month moving averages of the internally standardized PPVT and split the sample into two groups of children: those in the UC and those in the LC. We further split the sample by gender.

3. Results

3.1. Main findings from younger cohort

The upper panel of Fig. 1 shows age patterns in the caste gradients in child development, while the middle and bottom panels show these patterns by gender (UC in the left panels and LC in the right panels). The top panel shows that, first, by age 5, the majority of differences between castes are already apparent. The z-scores of the UC children are 0.20–0.30 standard deviations (SDs) greater than those of LC children. Second, gradients apparent among 4- to 5-year-old children seem to widen as these children enter the first years of primary school in Round 3 (i.e., the difference between castes increases to 0.50 SD). UC children maintain and even improve their vocabulary throughout primary school, yet LC children's scores seem to be worsening over time.

The left figure in the middle panel of Fig. 1 shows UC females have z-scores consistently higher than those of their male counterparts at age 5 years. Conversely, z-scores for 5-year-old LC females are consistently worse than those of LC males.

Finally, the bottom panel in Fig. 1 plots the same relation for 8-year-old children. The reversal of the lines in the left figure shows that the UC trend among 5-year-olds, where females performed better than males, is overturned by age 8, and females perform considerably worse than their male counterparts. The z-scores for 90-month-old UC males is around 0.70 SD larger than the z-scores for females of the same age. This substantial gender gap is consistent for all data points in Round 3. Unlike the gap for UC children, the gender gap for the LC 8-year-olds remains consistent with the one at age 5.

Clearly, the caste gap is greater than the gender gap by age 8, yet the gender gap within each socioeconomic class shows the performance of females is worse, with a smaller disparity in the LC than in the UC. However, the most noteworthy finding in Fig. 1 is the changing performance of UC females, which is better than their male counterparts at age 5 but then falls considerably behind by age 8.

3.2. Decomposing the gender gap

We now make an attempt to deepen our understanding of the gender gradients by caste by carrying out some basic decompositions in the spirit of Oaxaca (1973) and Blinder (1973). For that, we decompose the boy–girl PPVT gap into explained (in terms of family background, region, schooling and child characteristics) and unexplained components. The Oaxaca decomposition estimates in Table 1 reveal that, for the UC, the PPVT gap explained by observed characteristics included in our model decreased from a sizable 44.9% at age 5 to a mere 8.7% at age 8. Having said this, 55.1% and 91.3% of the UC PPVT gap at ages 5 and 8, respectively, remain unexplained by our covariates. The latter could be seemingly related to more gender discrimination occurring at age 8, which is consistent with our analysis of Fig. 1 (i.e., the reversal of the lines).

Turning to consider the gap in the PPVT for the LC, our decomposition estimates (lower half of Table 1) indicate that the gender disadvantage is largely unexplained by background variables

[1] Primary school in India starts with grade 1 at age 6.

[2] See http://www.younglives.org.uk/.

[3] The 162 female UC children and 221 male UC children form a total of 383 UC children in the sample, while 266 female LC children and 304 male LC children constitute a total of 570 LC children in our sample. We follow these 953 children from age 5 to age 8.