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Research Statement

My research broadly falls under the binding theme of educational equity, and I investigate the ways in which teachers and their interactions with students can shape both students' educational outcomes and explain differences between different groups of students. My job market paper examines how teachers influence both cognitive and non-cognitive skills for girls and boys in elementary and middle school, in the context of reading skills- where boys typically lag behind girls. To understand the role of teachers in these disparities, I estimate gender-specific teacher value-added measures, distinguishing between cognitive and non-cognitive outcomes. This approach allows me to assess the impact of being assigned a highly effective teacher for one's own gender on performance in later grades. These findings contribute to the literature on teacher effectiveness by constructing separate value-added measures for cognitive and non-cognitive skills, allowing a nuanced understanding of the role teachers play in addressing gender gaps in student performance.

Additionally, my research delves into areas like affirmative action in Indian higher education and the impact of female faculty in STEM fields. In one paper, we examine whether faculty hired through affirmative action in Indian engineering colleges perform comparably to their peers. Contrary to popular belief, we find that these faculty members provide instruction of equal or slightly higher quality. In another project, we explore the impact of female faculty on assessment outcomes and non-cognitive measures (confidence and anxiety) across gender in Indian engineering colleges, showing that female students perform better and report reduced anxiety with female instructors, while male students benefit from a more balanced view of gender roles.

Together, these projects illustrate the importance of representation and supportive teaching environments in education. Through my research, I hope to develop a nuanced and evidence-based understanding of how teachers, and their interactions with their students, can both exacerbate or bridge equity gaps in education.

Job Market Paper

Persistent gender gaps in academic achievement remain a critical concern for educators and policymakers. While substantial research has examined mathematics achievement, where boys typically outperform girls, less attention has been paid to reading achievement, where boys consistently lag behind girls, with gaps that manifest in elementary school, and persist through higher education. These disparities are particularly concerning given the growing evidence that reading proficiency is a crucial determinant of educational attainment and future labor market outcomes. Reading skills play a significant role explaining college enrollment, suggesting that gender gaps in reading achievement may be a key driver of broader educational attainment disparities between males and females.

Understanding how to address these reading achievement gaps requires examining multiple dimensions of the education production function. Teachers can have lasting impacts across multiple dimensions of student development, through both cognitive outcomes measured by test scores and non-cognitive outcomes captured by teacher-assigned grades, absences, and classroom behaviors. Teachers' impacts on non-cognitive measures is an important and growing area of research, since non-cognitive outcomes are found to be independently important predictors of students' long-term success, distinct from test scores. However, their gender-differentiated impacts

on non-cognitive skills remains under-explored. Given that boys systematically lag behind girls in non-cognitive skills, in addition to lagging behind in cognitive reading skills, understanding how teachers can differentially impact male and female students' reading skills in both dimensions could provide crucial insights for addressing these persistent gender gaps.

In my job market paper, I investigate the gender-differentiated impacts of teachers on students' reading skills in both cognitive and non-cognitive dimensions, using a teacher value-added approach with administrative data from the state of North Carolina. Using these data, I first report three key descriptive findings. Firstly, between grades 3 and 8, girls on average outperform boys in cognitive reading skills (i.e., standardized tests), by around 0.12 to 0.14 standard deviations. Secondly, I find substantial disparities between boys and girls using a novel predictive metric of in-class performance called *anticipated grades*.[1] Boys consistently lag behind girls in anticipated grades (conditional on tests scores), across both mathematics and reading assessments, and these gaps persist through elementary and middle school. Specifically, for reading anticipated grades, the gender gap in anticipated grades conditional on test scores grows from 0.1 standard deviation units in 3rd grade to 0.33 standard deviations in 5th grade. Finally, using gender-differentiated value-added measures of teacher effectiveness, I find that teachers with higher overall value-added typically have higher values of boy-specific effectiveness relative to their girl-specific effectiveness in their anticipated grade value-added, for both math and reading. This pattern does not emerge in test scores.

To investigate the gender-differentiated impacts of teachers on students reading scores and anticipated grades, I adapt the approach of Chetty et al (2014) to allow for heterogenous effects of the same teacher on boys and girls. I find that the impacts of having an effective 4th grade teacher on both reading test scores and anticipated grades persist through middle school for both boys and girls. Furthermore, I find contemporaneous positive impacts on boys' reading grades when they are assigned to effective 4th grade teachers, with no negative impact on girls- suggesting that effective teachers contemporaneously reduce the gender gaps in reading skills. Preliminary analysis suggests that these results are in part (but not entirely) driven by effective teachers improving under-performing students (who happen to be boys in the context of reading skills). In further analyses, I intend to explore the gender-differentiated impacts of teachers on other non-cognitive measures such as absences, suspensions, and grade repetition, adapting the framework of Jackson (2018).

These findings deepen our understanding of how teachers influence reading outcomes for boys and girls in distinct ways. By examining both cognitive measures like test scores and non-cognitive measures like anticipated grades, this research explores one potential mechanism that could bridge or exacerbate persistent gender gaps in reading achievement. Recognizing these differences offers a starting point for developing more effective strategies to address these disparities.

Other Dissertation Chapters

Beyond my job market paper, my dissertation explores two additional questions in education policy. One chapter examines affirmative action in Indian higher education, analyzing the productivity of faculty hired under a quota-based policy, in a setting where hiring constraints are

[1] Course grades are "anticipated" by teachers, because grades are typically not finalized at the time when standardized tests are being conducted and data is being collected by the state. However, these measures serve as useful proxies of the final grade a student receives.

especially likely to bind. In India, colleges are required to reserve approximately 50 percent of faculty hires for individuals from disadvantaged caste and social class groups. We collect and analyze data from a nationally representative sample of 50 engineering and technology colleges in India, some of which randomly assign students to classrooms. We find that "reservation category" faculty (i.e, those hired through the affirmative action policy) have lower levels of education, lower professorial ranks and fewer years of experience in academia than "general category" faculty who are not hired through reservations. Yet, even with lower qualifications, we find no evidence that reservation category faculty provide lower quality instruction across a wide range of measures that include course grades, follow-on course grades, standardized test scores, dropout, attendance, graduate school plans, and graduation. In fact, we find that, at least for immediate effects on course grades, students taught by reservation category faculty perform slightly better than students taught by general category faculty. We find no evidence of positive "teacher-like-me" effects of reservation category faculty on the relative course performance and longer-term outcomes of reservation category students. Furthermore, even in the face of potential discrimination and resentment against faculty hiring quotas, general category students perform slightly better in classrooms taught by reservation category faculty than general category faculty. The findings have implications for the heated debates over affirmative action programs found in many countries around the world- since we explore this question in the context of an extremely lucrative major across multiple universities in the most populous country in the world.

In my third chapter, we investigate gender disparities across multiple dimensions in STEM education in India, and the role played by female faculty in addressing these disparities. Leveraging random assignment of students to instructors across multiple engineering colleges in India, we find that being assigned to a higher share of female faculty improves female students' academic achievement and reduces STEM-related anxiety. The effects are strongest for female students with lower prior achievement and confidence. Additionally, exposure to female faculty shifts male students' beliefs about gender and STEM ability, moving them away from traditional stereotypes. These findings underscore the broader role of representation in fostering an inclusive and equitable learning environment.

Future Research Agenda

Building on my dissertation, I plan to expand my research in three directions. In one project, we examine how residential and school segregation along caste lines in India contributes to differences in school amenities and academic achievement. By linking administrative education data with census data, we aim to explore the relationship between the relative concentration of underrepresented caste groups in schools and villages, and heterogeneity in schools' and students' outcomes. In a second project, we study the spillover effects of having a successful high school football team, on academic and behavioral outcomes for high school students. Using administrative data from Texas merged with public records of high school football matches, we investigate whether a school's football team success affects educational attainment, student discipline, and long-term outcomes. This project will provide new insight into how school-wide extracurricular success shapes academic environments, particularly through peer effects and cultural shifts that extend beyond student-athletes. Finally, I will investigate how confirmation bias affects belief updating in gendered STEM environments. Specifically, I will test whether individuals process information about gender disparities in STEM differently depending on the source. Using an ex-

perimental approach, I aim to understand how biases shape responses to corrective information and what this means for policy interventions aimed at addressing biased beliefs about gender.