

Research Statement

How can developing countries accelerate their growth? My work focuses on two important pathways for growth: transforming rural labor markets and state capacity. My job market paper combines these interests, studying how governments can promote agricultural mechanization and its labor market effects through a randomized controlled trial at the labor market level. On rural labor markets, I also have projects studying the long-run impacts of land reforms on labor markets using historical variation and drivers of rural-urban migration. On state capacity, I have projects focused on frontline bureaucrats' performance and elite bureaucrats' career trajectories. The technology in my job market paper has significant environmental implications, and I am working with co-authors to explore these in more detail in future work.

Rural Labor Markets

In my job market paper, *"Labor Market Effects of Agricultural Mechanization: Experimental Evidence from India,"* I study how mechanization impacts wages for the mechanized task, which would theoretically slow the pace of structural transformation. I randomized a government mechanization program across 342 rural labor markets, which enabled me to capture the program's effects on labor markets and non-adopting farmers. I designed the program in partnership with senior bureaucrats to overcome challenges in government agriculture extension. Farmers need both capital and skill to mechanize. By combining government farmer training infrastructure with rentals, the scheme tripled the uptake of a technology that replaces manual rice transplanting. Farm profits increased, and the labor market changed. Mechanization led to a 7% decrease in days of labor demanded for transplanting, which translated to a 6% decrease in piece-rate transplanting wages. In this study, the labor market did not fully absorb labor displaced by mechanization. Based on my experiment, I developed a quantitative model that shows mechanization subsidies are more equitable and efficient when workers have higher reservation wages and better access to new jobs. The study illustrates the importance of labor market structure in maximizing the benefits of mechanization for workers, farmers, and structural transformation.

Another substantial project studies the long-run labor market implications of land reform in Telangana in a project titled *"Land and Power in Labor Markets and Service Delivery"* (joint with Kartik Srivastava at Harvard University). The project exploits the persistent effect of 18th and 19th-century feudal land grants on modern-day land concentration. We study how formerly feudal villages where smallholders never got land tenure face worse labor market and service delivery outcomes in the present day. We find wages for female agricultural labor are lower but do not affect male wages. The mechanism is likely the same as my job market paper, women in rural India face limited outside options. There is also evidence that local elites restrict the public outside option of a government jobs scheme, NREGS. While there is no difference in NREGS provision during the agriculture off-season, formerly feudal villages offer 90% fewer person-days of work during the peak season. I am interested in future work that seeks to reduce rural labor market frictions, especially for women, given its importance for reducing structural inequities and fostering inclusive growth.

I am also interested in understanding the drivers of rural-urban migration in my project *"Risky Moves: labor market risk and migratory destinations."* I study how internal migration flows in Brazil respond to changes in the variance of wages, not just their mean. Migrants face uncertainty over which urban job

they will match with, and it is reasonable that changes in the distribution of potential wages affect flows. I augment the standard quantitative spatial model to include a degree of risk aversion so that workers care about the variance rather than just the mean wages at their destination. I also built a version focused on mean wage and unemployment. I use trade and agricultural shocks to show changes in migrant flows respond not just to instrumented changes in mean wages but also to instrumented changes in wage variance. To move the project forward, I hope to analyze more data, possibly from other settings, that can convincingly connect wage distribution changes to the ex-ante risk faced by migrants.

This paper was inspired in part by my undergraduate senior honors thesis. I leveraged female marriage migration norms and rich data from the Matlab demographic surveillance system in Bangladesh to study the importance of networks in facilitating rural-urban migration. For this project, I conducted qualitative interviews in Dhaka, where migrants emphasized the role of networks in de-risking job search. In future work, I would like to expand this analysis to other demographic surveillance systems. I also plan on continuing this mixed methods approach. I took a PhD course on qualitative methods in the sociology department and conducted many in-depth interviews as part of my job market project.

State Capacity

Research identifying labor market or migration frictions as barriers to growth can only be put into action if governments have the capacity to implement programs. An essential part of my job market paper was designing an intervention that the Government of Telangana had the capacity to implement. Government agriculture extension systems are notoriously ineffective. The government's main interest in my job market project was to see if engaging local political leaders could create bottom-up pressure for frontline workers to do their jobs. There is some evidence this worked. Another successful aspect of the program design is that bureaucrats are much more careful about entering accurate monitoring data associated with financial transactions. Because the rental transactions had money associated with them, the bureaucracy was very careful about recording the rentals.

My other project in Telangana, *"The Promises and Pitfalls of Monitoring Bureaucrat Performance: Experimental Evidence from Village Secretaries"* (w/Advitha Arun, Siddharth George, Naveen Kumar, and Karthik Muralidharan), studies a case where over-reporting was a serious issue. We worked with the Government of Telangana to randomize the roll-out of a monitoring platform for the village equivalent of a city manager panchayat secretary. Unlike most jobs in the personnel economics literature, these secretaries are responsible for a wide range of tasks that they manage to accomplish with a range of assistants- plumbers, electricians, revenue assistants-. Thus, third-party outcome measurement is impractical, and many outcomes in the monitoring platform have to be self-reported. A scorecard aggregating these self-reported metrics led to an overall increase in self-reported scores but not actual development as measured by independent audits. However, the treatment effects were quite heterogeneous; large fractions of secretaries worked harder in response to the scorecards, but the ones that gamed the system, reporting higher scores while performing worse, offset the diligent secretaries. We also observe secretaries switching efforts to tasks given higher weight in the scorecard even though they do not correspond to citizen's weights.

The difficulty of monitoring core civil service jobs also makes it more difficult to create merit-based career progression. In the project *"Leaning in or Pushing Down: Do female leaders help other women achieve career successes in the Indian bureaucracy?"* with Vivian Aluoch we explore gender discrimination within India's elite civil service. We exploit the fact that the gender of the chief secretary

in four or nine years cannot be anticipated when bureaucrats are quasi-randomly allocated to states. These chief secretaries play a large role in determining the job postings of bureaucrats, which in turn determine their eventual ability to reach the most coveted positions at the top of the bureaucracy. We find that female chief secretaries hurt female bureaucrats' chances of eventually getting these top jobs at the early transfer window and help in the later window. A possible mechanism is that the prestigious jobs in the early career window tend to be remote postings where women might face greater discrimination, whereas prestigious jobs in the later career window are in the state capitals. The results emphasize the need for developing better performance measurement systems within the bureaucracy so that governments no longer need to rely on gameable or discriminatory signals.

Future Directions

The technology in my job market paper has major implications for both the water consumption and greenhouse gas emissions of rice. Because of this, I forged research partnerships with both private sector carbon credit start-up, google research, and Kathy Baylis and Robert Heilmayr (UCSB) to better measure and model the climate impacts of farmers adopting direct seeded rice. I also started working with Nick Ryan (Yale) to explore a payments for ecosystem services extension of my job market paper. We have signed an MOU with the government of Karnataka for this project and are in the process of raising additional funding. I am also exploring how AI chatbots can improve agriculture extension in partnership with Digital Green and Aprajit Mahajan. I hope to continue my rural labor markets and state capacity workstreams as well as I form additional research partnerships. Notably, most large-scale interventions in agricultural systems require a deep understanding of labor markets, state capacity, and the environment. One of the things I look forward to most in the transition from PhD student to faculty is the ability to form large research teams that can address all of these factors with the care they deserve.