

Research Statement

Ajay Shenoy

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My research aims to explain the gap in aggregate production between rich and poor countries. I study three ways in which production is warped by imperfect markets and dysfunctional institutions: factor and financial market failures, persistent historical shocks, and political favoritism.

My research combines the empirical rigor of development economics with the theoretical lens of macroeconomics. For example, my job market paper derives a new method to answer a macroeconomic question: how much production misallocation comes from factor and financial market failures. But by applying the method to rice farmers in Thailand I get more credible results than I would in the developed country settings more commonly studied by macroeconomists. The second chapter of my dissertation approaches a question about the structure of poor economies—why households in poor countries do not specialize in one job—by studying Thai villages where exogenous changes in risk and credit let me test two possible answers. My work on historical shocks uses multigenerational panel data to test the microeconomic predictions of macroeconomic models of growth. The third chapter of my dissertation studies how farmers respond to the outcomes of village elections to infer whether bad political institutions stifle investment. By applying micro methods to macro problems I can ask questions I find interesting and still get answers I find credible.

Distortions in Production: Factor and Financial Market Failures

My job market paper measures the misallocation of land, labor, and capital between firms. Earlier research suggests misallocation may explain why countries like India and Thailand are much poorer than the U.S., but existing work cannot link misallocation to its causes. I develop a method to measure and separate misallocation caused by factor and financial market failures. With perfect markets each firm's optimal allocation depends only on two sets of parameters: its productivity and the common production function. I use a dynamic panel approach to estimate the parameters, then use the parameters to calculate the optimal allocation. I define total misallocation—misallocation from both factor and financial market failures—to be the increase in output from optimal reallocation. To separate the cost of each market's failure I exploit how factor markets govern the firm's mix of inputs. When factor markets are perfect, a firm can optimally divide its spending between inputs. By perfecting each firm's mix of inputs while holding its scale constant, I place a lower bound on the aggregate gains from perfecting factor markets, and by then perfecting scale I place an upper bound on the gains from subsequently perfecting financial markets. I then decompose the growth in aggregate output into three sources: the accumulation of factors, the increase in productivity, and the efficiency of allocations. The decomposition lets me calculate how aggregate output would have grown if factor allocations had not improved.

My method assumes factor and financial market failures cause all misallocation; I apply it to survey data from Thailand's rice sector because rice production fits the assumption well. I find surprisingly little misallocation. The overall cost is 15 percent of output in 1996 and falls to 4 percent by 2008. By then most misallocation is caused by factor markets rather than financial markets. Compared to factor accumulation and rising productivity, decreases in misallocation contributed little to aggregate growth. A quasi-experimental credit program reduced misallocation by a statistically significant but small amount, and as expected the program worked almost entirely by improving financial markets. My results suggest that imperfect markets need not cause much misallocation. They also suggest that earlier work on misallocation, which focuses on financial markets, may have been wrong to ignore factor markets.

My second chapter explores the fundamental idea that specialization is efficient and tests between two theories of why households in poor countries do not specialize. According to one theory the poor do not specialize because relying on one income source is risky. The other theory assumes a household cannot grow any one business without making a lumpy investment, forcing it to run many undersized businesses.

I build a model of risky income and test its predictions by measuring the response of Thai rice farmers to more volatile prices. In the model, households pay fixed costs to enter economic activities and enter more when their primary activity becomes riskier. I test the prediction by identifying which households in a monthly panel expect a rice harvest soon. Higher volatility in the price of rice raises the riskiness of their income. By comparing the response of farmers who expect a harvest to the response of farmers who do not, I identify the causal effect of riskier income on specialization. I confirm that risk causes households to enter more activities. Since the farmer does not yet have her harvest, the mean and variance of the rice price change her number of economic activities without directly affecting this month's revenue. I can use her response to the mean and variance as instruments for the number of economic activities. Two-stage least squares confirms that additional activities lower household revenue, the opposite of what a naïve OLS regression finds. Next I exploit a quasi-experimental government program to test whether, as the lumpy investment theory predicts, a relaxation of credit constraints decreases the number of activities. I find no evidence to support this alternative theory. The results suggest imperfect insurance forces households to under-specialize, and their many businesses may be less a sign of entrepreneurial spirit than of costly self-insurance. Small loans do not solve the problem, but better insurance might.

A new project considers why few people in poor countries have a steady job, why those who work for wages rarely earn enough to survive, and why most run a business or farm. I present a model in which financial market imperfections cause poor countries to have too many small businesses and too few good jobs. I show using firm-level data that the fraction of workers hired by the largest 1 percent of firms is higher in countries with higher income and lower in countries with weaker credit markets. I then build a span-of-control model of labor and enterprise in which a financial market imperfection distorts the size distribution of firms. Each firm requires a one-time startup investment. Since better ideas require larger investments, a credit constraint will prevent the most productive firms from starting. A credit constraint exists because borrowers can run away with the bank's money. Since

people who borrow larger sums are more likely to run, the bank will not finance the best ideas. In equilibrium only ideas of middling quality become firms, making the average firm less productive, which in turn lowers output and wages. The number of workers hired is lower and the number of firms created is higher. Whereas most models predict a lack of credit cuts the number of firms, my model predicts that a lack of credit makes too many firms. I plan to add capital and make the model dynamic to ensure its predictions hold if people can save to overcome the credit constraint. My goal is a model that makes clear predictions about how the size of a firm and the structure of an industry shift with the availability of credit.

Since my current projects suggest production is distorted by imperfect markets, my future projects will adjust our standard techniques for imperfect markets. One such project will use household data to extend what the literature calls structural techniques of production function estimation. By assuming a firm can choose the optimal level of intermediate inputs, such techniques back out each firm's productivity. Since the assumption is not plausible in poor countries I would use data on family labor, which is unconstrained, to modify the technique. The new technique would make it easier to estimate production functions, which in turn would make it easier to use my method for measuring misallocation. I could test whether factor and financial market failures cause as little misallocation among farmers in India, for example, as they do in Thailand.

Long-Run Effects of Historical Shocks

In 2012 Raj Arunachalam and I recruited graduate and undergraduate students to form the Income Dynamics Lab. The Lab runs several projects that study the long-run dynamics of income among rural Indian households to test models of aggregate economic growth.

One such project tests whether the way income grows in developing countries is stagnant. We derive simple tests of poverty traps, the ultimate form of stagnation, and run the tests on panel data that follows Indian households over three decades. Far from being trapped in poverty, households converge. We then ask whether the forces driving income growth remain unchanged. We adapt the Solow model to describe household income and run thousands of simulations under different combinations of parameters. When the parameters remain constant from 1969 to 1999 the model cannot match both the rate of convergence and the level of inequality. The model can only reconcile convergence with inequality by raising the variance of the shock to household productivity. We interpret the change as a rise in opportunity, and show it coincides with rise in educational mobility. The perception that life in poor countries never changes may be too pessimistic, and models that assume an unchanging world may be inaccurate.

Another project measures the long-run and intergenerational impact of severe childhood diarrhea. Doctors have been unable to answer whether childhood diarrhea still affects a person's health in adulthood, much less the health of her children. We answer the question by comparing the children of two groups of people: those who were young during diarrhea outbreaks and those not yet born. Our study may be the first to test whether childhood illness alters a dynasty's income trajectory. If it does, models of aggregate output may need to look beyond illness and healthcare today when calculating aggregate human capital.

Our next project will use a structural model to measure how much income mobility comes from each of three sources of growth: better education, better markets, and transition out of agriculture. Each source represents a different theory of how poor countries can grow rich. Since mobility shows how quickly a household moves up the distribution of income, a theory that explains mobility may also explain growth.

Political Favoritism

The third chapter of my dissertation uses a regression discontinuity to test whether voting for the loser of a village council election in India forces a household to pay more bribes to obtain public services. I link each household's report of how many officials it had to bribe to the outcome of the previous election. I assign each household the vote share of the candidate that the head of household voted for. When its vote share crosses 50 percent a household switches from the losing side to the winning side. I exploit the discontinuity to identify how much more often a losing household must bribe officials for services. I find that losers are 41 percentage points more likely to have to bribe a government official. I will next use data on social networks to test if households are punished for simply knowing the loser rather than voting for him. Then I will examine whether farmers who vote against the winner invest less after the election for fear of losing their harvest to greedy bureaucrats.

My other project, coauthored with Raj Arunachalam, will test whether winners of a parliamentary election in India are more likely to have schools built in the sub-districts where they live. We exploit a regression discontinuity similar that in my paper on bribery. We will compare school construction in sub-districts with a resident who just barely won the election to those with a resident who just barely lost. If members of parliament can divert school funding, the resulting misallocation of schools would lower aggregate human capital and through it aggregate production.