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Citizenship: U.S.A.

Fields of Concentration:

Development Economics
Financial Economics

Desired Teaching:

Development Economics
Financial Economics
Applied Econometrics

Comprehensive Examinations Completed:

2005 (Oral) Development Economics, Macroeconomics (*with distinction*)
2004 (Written) Microeconomics, Macroeconomics

Dissertation Title:

Essays on Rural Asset Market Efficiency

Committee:

Professor Dean Karlan
Professor Christopher Udry
Professor Sendhil Mullainathan

Expected Completion Date: May 2009

Degrees:

Ph.D., Economics, Yale University, expected May 2009
M.Phil., Economics, Yale University, 2005
M.A., Economics, Yale University, 2004
B.A., Economics with Minor in Mathematics, Stanford University, 2002

Research Grants:

National Science Foundation Grant, Dissertation Research in Economics, 2007 – 2009
Russell Sage Small Grant in Behavioral Economics (with Keith Gamble), 2008
Whitebox Advisors Behavioral Research Grant (with Keith Gamble), 2007

Fellowships, Honors and Awards:

John F. Enders Summer Fellowship, Yale University, 2008
Finalist (top 5), Hamilton Project Policy Innovation Competition, 2007
Ryoichi Sasakawa Young Leaders' Fellowship, Yale University, 2004 – 2005
Economic Growth Center Prize, Yale University, 2003 – 2007
Graduate School of Arts and Sciences Fellowship, Yale University, 2003 – 2007
Yale University Summer Fellowship, 2004, 2005, 2006
National Science Foundation Graduate Research Fellowship Honorable Mention, 2002
Fulbright Scholar to India, 2002-2003

Teaching Experience:

Teaching Fellow, Financial Markets, Yale University, Spring 2009 (scheduled)
Head Teaching Fellow, Financial Markets, Yale University, Spring 2008
Teaching Fellow, Introduction to Microeconomics, Yale University, Fall 2007
Teaching Assistant, Randomized Evaluations, Jameel Poverty Action Lab, Summer 2006

Research Experience:

Field Work, Indian household survey design and implementation, 2006 and 2007
Research Assistant, Yale University, Professor Chris Udry, Fall 2005
Research Assistant, Yale University, Professor Robert Shiller, Summer 2005
Research Assistant, Yale University, Professor Eduardo Engel, Summer 2005

Language Skills:

English (native), Hindi (intermediate)

Papers:

“Adverse Selection in Asset Markets: Theory and Evidence from the Indian Market for Cows,” (Job Market Paper)

“Allocative Efficiency in Asset Markets: Evidence from Calf Sex Shocks” (Dissertation Chapter 2)

“The Return to Capital in Rural India: Estimates from Cow Prices” (Dissertation Chapter 3)

“The Return to Capital in Ghana,” (2006), *American Economic Review, Papers and Proceedings*, 388-393. (with Christopher Udry)

“How Segregated Framing of Portfolio Results by Asset Affects Investors' Decisions: Evidence from a Lab Experiment,” mimeo, July 2008. (with Keith Gamble)

“There's Something About Ambiguity,” mimeo, August 2008, *under review*. (with Sheree Bennett, Gharad Bryan, Tiffany Davenport, Nancy Hite, Dean Karlan, Paul Lagunes and Margaret McConnell)

Referee Service: *American Economic Review, Review of Economics and Statistics, World Bank Economic Review*

Conference Presentations:

Northeast Universities Development Consortium Conference, Boston University, November 2008

References:

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Dissertation Abstract:

My dissertation provides new evidence on the efficiency of rural livestock markets in developing countries. I focus on the market for dairy cows and buffaloes, the largest livestock asset class in rural India with approximately 85 million households owning at least one dairy animal. Chapter 1 provides the first evidence that adverse selection, a fundamental form of market inefficiency, plays an important role in determining trading volume and pricing in the Indian market for dairy animals. Chapter 2 utilizes a previously unused natural experiment, the sex of calves born in a household, to study the allocative efficiency of rural asset markets. Chapter 3 estimates the return to capital implied in equilibrium dairy animal prices, and shows these estimates are high relative to rates of return in developed countries. This reflects financial market inefficiencies that restrict capital flows to rural India.

I. Adverse Selection in Asset Markets: Theory and Evidence from the Indian Market for Cows [Job Market Paper]

I develop and test a model of adverse selection in the market for dairy animals in rural India. I exploit a particular feature of dairy animals to perform new types of adverse selection tests. The observability of a particular animal's quality changes over time due to naturally occurring lactation cycles. When in lactation, it is possible for buyers to test an animal's milk for quality,

observe information about the quantity of milk produced, and observe that the animal is fertile. When a milk animal is dry, it is impossible to test its milk quality, and in certain cases even difficult to prove that the animal is fertile. I present a model of trade in an asset whose quality observability changes over time and derive predictions on trading volume and prices. Despite the adverse selection problem, trade is generated in the model because dairy owners have different valuations for animals of the same fundamental quality. For example, a household experiencing an income shock may have a low valuation for a dairy animal as it requires money for consumption immediately. These valuation shocks cause some owners to sell relatively high quality dry animals and thus produce positive amounts of trading in equilibrium.

I test the model using two data sets from rural India, the Indian Crops Research Institute for the Semi-Arid Tropics (ICRISAT) household panel survey from 1975 – 1984, and the Rural Economic and Demographic Survey (REDS) nationally representative cross-sectional survey from 1999. First I test whether markets with less information observability (i.e. the market for dry dairy animals) exhibit low trading volume relative to markets with greater information observability (i.e. the market for milking dairy animals.). I find strong evidence that the volume of trade in dairy animals closely follows the milking season. I show this pattern holds for both dairy buffaloes and dairy cows, despite the fact they have different seasonal patterns in milking. This provides evidence that the correlated seasonality in milking and trading seasons is not due to some third unobserved household specific factor like seasonality in consumption needs. I also present evidence to confirm a pricing prediction of the model. The model shows that exogenous income shocks, such as those induced by poor rainfall, will lead to higher prices in dry animals as owners of high unobservable quality dry animals are forced to sell. These asset fire sales improve the quality composition of dry animals because these households are selling due to the negative shock, not due to adverse selection. I test and find evidence for the prediction that the market for dry animals has higher prices in bad times relative to the market for milking animals.

The welfare implications of this form of adverse selection are potentially large. Dry periods for dairy animals are approximately 160 days per year in rural India; thus, dry periods are long enough to make an adverse selection problem in the dry animal market important. Beyond welfare reductions due to unconsummated transactions, the adverse selection problem may also lead to poverty traps because poor rural households tend to use such assets as buffer-stocks. If poor households foresee being forced to sell high quality dry animals for low prices, they may be less likely to invest in dairy animals in the first place. Adverse selection problems in rural asset markets can play an important role in limiting income growth for the poor.

II. Allocative Efficiency in Asset Markets: Evidence from Calf Sex Shocks (in progress)

Efficient markets allocate assets to the highest value users. This paper utilizes a previously unused natural experiment, the sex of calves born, to test whether rural asset, credit, and insurance markets result in the efficient allocation of productive assets across households. While anecdotal evidence suggests that households lucky to have female calves have larger herd sizes in the future, I will test this hypothesis using data from a two thousand household survey that I designed and am currently implementing in rural north India. If credit, asset, and insurance markets are complete, we expect dairy animals to be allocated optimally amongst households and

the exogenous calf sex shocks should play no role in determining per animal productivity or equilibrium dairy farm size conditional on household wealth. I will estimate the magnitude of both the efficiency costs and the effects on inequality of the misallocation of these assets. By testing how the sex of calves born in the past affects later productivity per cow I will present a direct measure of the loss in aggregate productivity due to assets not being owned by the most productive households. By measuring wealth differences induced by the calf sex shocks I can estimate the inequality effects due to the luck induced allocation of these assets. Anecdotes suggest that female calves are worth substantially more than male calves in India because milk demand is much larger than beef demand. This paper will also discuss the potential for a new micro-insurance product to help cow owners hedge the risk of having male versus female calves.

III. The Return to Capital in Rural India: Estimates from Cow Prices (in progress)

This paper contributes a new methodology for estimating the equilibrium rate of return in a rural economy. In an efficient market, asset prices are equal to the expected value of the future cash flows produced by the asset discounted at a risk-adjusted discount rate. Using data on dairy inputs and outputs from the REDS 1999 nationally representative survey, I present maximum likelihood estimates of the equilibrium discount rate implied in the asset prices and cash flows generated by dairy animals in rural India. The model's baseline estimates suggest equilibrium discount rates between 50-60 percent per year. These estimates are consistent with other recent work on developing country micro-enterprises that find high rates of return, and provide more evidence for the existence of financial market failures that prevent capital flows to rural enterprises.