Research Summary
Developing country governments spend hundreds of billions of dollars every year on programs and policies intended to reduce poverty. But the gap from allocating funds to achieving impact is large: even well-meaning policies are hard to implement, vulnerable to corruption and elite capture, and can have unintended harmful side-effects. My research examines these obstacles to ending extreme poverty.

Specifically, my research focuses on corruption’s causes, consequences, and potential cures. Work under the first heading aims to understand various forms of corruption, including theft in public programs and the capture of public subsidies. Under the second, I study the consequences of corruption, including direct and indirect effects. Under the third, I examine and evaluate the efficacy of concrete interventions that might combat corruption.

My approach to this work combines three elements: the rigorous empirical techniques of contemporary applied microeconomics research (experiments and quasi-experiments), a grounding in theory, and a deep understanding of the institutional context. My research seeks to answer pressing questions in the academic literature while providing much-needed evidence on how to improve policy in the developing world. While my primary field is development economics, my research also touches upon core questions in labor and public economics. I note these connections below in summarizing my work.

Understanding Leakage, Corruption, and Capture
As Banerjee et al. (2012)1 state, “it is impossible to understand policy [in developing countries] without understanding corruption.” My research on understanding corruption focuses on two areas. The first uses a principal-agent framework combined with original data to explore how bureaucrats respond to incentives and constraints. The second explores the capture of public subsidies by rural politicians, focusing on the political economy of agricultural cooperatives.

The theoretical literature on corruption has long recognized that wage incentives along with the threat of punishment may help discipline corrupt agents. In “Corruption Dynamics: The Golden Goose Effect” (AEJ: Economic Policy, 2013), Paul Niehaus and I explore how illicit future rents work analogously to efficiency wages. We show that theoretically, increased opportunities for future rent extraction should lead agents to extract less rent today, in order to preserve “the goose that lays the golden eggs.” We then test this theory in the context of India’s National Rural Employment Guarantee Scheme (NREGS), a program that provides 100 days of guaranteed employment to rural households and is the largest workfare program in the world. We compare official records of program payments to our own household survey data to measure corruption and trace out the effects of an exogenous increase in the scheme’s statutory wage to test the theory. We find that golden goose effects reduce the total elasticity of theft with respect to this shock by roughly 64% as compared to the static marginal effect. This result suggests that dynamics matter for both calibrating incentives and interpreting policy experiments, since temporary pilots and

permanent programs generate different dynamic incentives. The results also provide indirect support for models of electoral discipline and for the efficiency wage hypothesis itself. The paper was recognized by the AEA with the Best Paper Award for 2014 (papers published in the last three years) for *AEJ: Economic Policy*.

Our work on corruption in the NREGS led us to ask how theft from public funds might distort fiscal policy. A basic principle of public finance is that marginal costs of social spending should equal its marginal benefits. But, if funds are embezzled, then optimal policy should also incorporate the marginal rate of leakage, since marginal benefits are potentially lower than they would otherwise be. In “*The Marginal Rate of Corruption in Public Programs*” (Journal of Public Economics, 2013), Paul Niehaus and I present the first empirical analysis of marginal rates of corruption. Using the same data and the NREGS statutory wage increase as in the previous paper, we find that beneficiaries received none of the wage increase even though prior to the shock they received, on average, full statutory wages. We explore two theories that might explain the difference between marginal and average rates of corruption: theories of “voice,” in which threat of complaints limits corruption, and theories of “exit,” in which outside options in the private sector limit rent extraction. While our evidence supports the latter, it also highlights the value of identifying which constraints on rent extraction are binding. The work has also generated considerable policy interest: the summary piece I wrote on this paper for the Ideas for India website is one of their most downloaded articles.

Direct embezzlement of public funds is not the only way in which corruption distorts policy impact in developing countries. Public funds may be captured in other, more subtle ways, and in quasi-public institutions as well. In “*Sweetening the Deal? Political Connections and Sugar Mills in India*” (AEJ: Applied Economics, 2012), I examine the role of political connections, focusing on sugar cooperatives that are large beneficiaries of subsidized agricultural credit. Chairmen of these cooperatives are often politicians running for state or national elections. I find that prices paid to farmers for cane during election years decline when the chairman is a politician, suggesting that funds may be embezzled for electoral finance purposes. However, I also find evidence that once elected, chairmen pay back farmers with higher prices made possible by diverting agricultural credit to their cooperatives. Understanding this latter mechanism is key to appreciating the quid pro quo behind the political economy of campaign finance that underlies corrupt activity in India.

**Consequences of Corruption**

How does the corruption documented above affect the well-being of citizens? Theoretical arguments have been made both ways: corruption could be distortionary due to its illicit nature, or may “grease the wheels” of the economy by bypassing cumbersome regulation. My work examines both the direct as well as indirect consequences of corruption.

The first paper examines the consequences of political interference in sugar cooperatives on their economic activity and the financial outcomes of their farmer-shareholders (“*Does Firm Ownership Structure Matter? Evidence from Sugar Mills in India,*” under review). Cooperatives were created with government financial support to help farmers against supposedly exploitative private mills. Given the evidence above, it is not obvious that farmers are better off under cooperatives versus private
mills. I rely on regulation in the sugarcane market to help identify the effects of ownership structure on farmer outcomes. Sugar mills – both private and cooperative – have monopsony power to operate within an assigned area, and the borders of these “command areas” allow for a geographic regression discontinuity design: soil, weather, and institutional characteristics are equivalent but ownership structure changes across boundaries. Using survey data combined with satellite image data to directly measure sugarcane grown along the borders, I find that cooperative mills rather than private mills that discourage sugarcane production. Moreover, the worst off – land-poor farmers – fare better under private mills, with higher income and consumption.

In “The Impact of Corruption on Consumer Markets: Evidence from the Allocation of 2G Wireless Spectrum in India” (Journal of Law and Economics, 2015), I investigate the effect of corrupt allocation of wireless telecom spectrum licenses on the consumer cellular phone service market. In what became a huge public scandal, ineligible crony firms received valuable rights to provide cellular service. Using exogenous variation in the amount of spectrum available (based on the defense forces’ spectrum requirements), which determined the number of corrupt firms in a given region, I find that this number has no impact on the number of subscribers, prices, usage, revenues, competition, and measures of quality. While this is a surprising result, it has a simple economic explanation: licenses and spectrum were sold off by original awardees to competent firms. Meanwhile, fierce competition in the telecommunications sector may have prevented negative effects on consumer markets. The broader lesson is thus that factors such as the ability of firms to sell assets and the level of competition in a market can help predict how distortionary corruption may be.

In addition to direct impacts on consumers, corruption could also potentially affect harder-to-measure outcomes such as trust in government, discouragement of non-crony firms, or spillovers to other sectors of the economy. Such indirect effects are the focus of “General Equilibrium Effects of (Improving) Public Employment Programs: Experimental Evidence from India” (draft under revision, with Karthik Muralidharan and Paul Niehaus). In this paper, we estimate the general equilibrium effects experimentally, using large-scale randomized assignment of a new payments system for NREGS. This intervention (described below) reduced corruption in NREGS, which made the program a better work alternative for rural agricultural laborers. Thus, the intervention affected rural labor markets: it raised private-sector wages and household earnings substantially. We do not find evidence of corresponding labor market distortions, as private sector labor supply increases weakly. Meanwhile, most of households’ increased earnings (88%) are from the private sector as opposed to NREGS, underscoring the importance of measuring indirect and general equilibrium impacts.

Combating Corruption
An important constraint in combating corruption in developing countries is the lack of implementation capacity, the importance of which has been highlighted by a recent theoretical literature. One potential investment in state capacity involves secure payments infrastructure: simply the ability to transfer money to beneficiaries. Payments systems based on direct transfers to bank accounts linked to biometrically authenticated IDs have generated enormous enthusiasm around the world; India’s nationwide biometric-based Unique Identification system (Aadhaar) has enrolled nearly a billion residents, making it one of the most important policy initiatives anywhere.
Yet there is little if any empirical evidence on whether such systems may be transformative in practice. Karthik Muralidharan, Paul Niehaus, and I examine this question in "Building State Capacity: Evidence from Biometric Smartcards in India" (2nd round revise and resubmit requested, American Economic Review). In particular, we evaluate the impact of a biometrically authenticated payments system ("Smartcards") on beneficiaries of employment (NREGS) and pension (SSP) programs in the Indian state of Andhra Pradesh, using possibly the largest randomized experiment in history: 157 sub-districts and 19 million people. While the logistical challenges of putting this system into place at scale meant the implementation was incomplete, we find that Smartcards improved program performance significantly. In particular, payments were faster, more predictable, and less corrupt, while program access did not suffer. Gains were broad-based, beneficiaries overwhelmingly preferred Smartcards to the status quo, and the investment was cost-effective. These results highlight the value of investing in public goods such as implementation capacity, and they suggest that such investments can pay off even in the short run.

In addition to numerous mentions in US, European, and Indian media, this paper has had significant impact on policy. It formed the basis for an important chapter in the Economic Survey of India 2014-15, and was also influential in convincing state and national governments to stick with these initiatives (both Smartcards and Aadhaar).

Combating corruption is a daunting challenge, requiring political, legislative, and institutional reforms. Understanding the context helps in forecasting the conditions under which success might be achieved. In "Corruption in India: Bridging Research Evidence and Policy Options" (Brookings-NCAER India Policy Forum, 2015), Milan Vaishnav and I build on our in-depth knowledge of India to discuss the remedies that effectively tackle corruption. We point out first how lack of enforcement capacity and regulatory complexity are foundational characteristics of India’s institutions that allow for corruption, and note two more proximate causes: inadequate regulation of political finance and problems with public sector employment. In this context, transparency initiatives succeed only if they (or accompanying reforms) improve citizen bargaining power and solve coordination and collective action problems. Meanwhile, technological solutions could work but logistical challenges are significant and administrative willpower imperative. Finally, combating corruption requires the ability to implement laws rather than merely to write them.

Work in Progress
My ongoing work builds on my past research on governance to explore the rationale for and alternatives to seemingly inefficient policies. In two different studies, I tackle an old question in public economics – redistribution in cash or in-kind – in a setting where corruption is rife.

The first - “Policy Analysis by Revealed Preference: With an Application to Food Security” (with Karthik Muralidharan and Paul Niehaus) - involves an experiment that offers current recipients of a food transfer program (the PDS) the option to exchange those benefits for cash. We aim to measure the nutritional impact of the offer and to estimate the demand curve for the existing program by varying the value of the cash offer. Incorporating recipient choice in the experiment helps us tie together the two paradigms in modern applied microeconomics research: the revealed preference and impact evaluation approaches.
The second project - “Price Risk and Poverty” (with Lucie Gadenne, Sam Norris, and Monica Singhal) – examines the consequences of uninsured risk from local shocks to food prices. Relying on a structural empirical approach combined with policy variation, we explore the consequences for nutrition, child outcomes, and productivity, and examine whether price risk could provide a rationale in favor of in-kind transfers (e.g., in the form of food and fuel) relative to transfers in cash. Finally, we determine to what extent the effectiveness of in-kind transfers in providing insurance against price risk is undermined by corruption.

In addition to these projects in progress, Karthik Muralidharan, Paul Niehaus, and I are setting up a research unit in partnership with the Indian government to provide feedback on the most profound overhaul of its anti-poverty strategy in a generation. The reforms – a top priority of the government – involve opening up hundreds of millions of new bank accounts linked to biometric IDs to improve the design of anti-poverty programs with direct transfers in lieu of distortionary price subsidies. We will work closely with the government to conduct a series of rigorous experimental evaluations of the impact of rolling out these reforms, in the process promoting a culture of evidence-based decision-making at the heart of Indian policymaking.

Policy Impact
My work on understanding corruption has led to deep policy engagement with the highest echelons of the Indian government. I have worked with the Chief Economic Advisor (CEA) Dr. Arvind Subramanian on policies for sugar sector reform, and also currently serve as member of the Ministry of Rural Development’s Advisory Council on NREGS. This year, I was invited to present my research at the Delhi Economics Conclave, where other speakers included the Prime Minister, the Finance Minister, the CEA, and the Governor of the Reserve Bank of India.

Teaching and Service
My approach to teaching development economics reflects two tenets central to my research. First, I attempt to convey that information asymmetries and problems with institutions mean that markets function very differently in developing countries, making the study of this field of economics interesting and unique. Second, my students learn techniques to determine which economic relationships are indeed causal. These valuable skills are widely used in many fields of study and employment careers that students may chose to pursue in their lifetimes.

One of the most rewarding aspects of teaching is engaging my students with my own research through the Presidential Scholar program and research assistantships. I’ve worked with more than 25 students, and some have traveled to India to assist on my field-based projects.

My service to the broader economics community includes helping to organize and evaluate papers for the Northeast Universities Development Conference (NEUDC) in various years, as well as being an active participant of the Bureau for Research and Economic Analysis of Development (BREAD). Finally, I have also taught summer school for Indian PhD students through the International Growth Center (IGC) and executive education courses for J-PAL to help build research capacity in India.