

## India-Central programme research projects



### 1. Macroeconomics and financial sector

#### **Changes in global financial regulatory regimes: Implications for India**

*Viral V. Acharya (New York University)*

This paper attempts to explain the changes to financial sector reforms under the Dodd-Frank Act in the United States and Basel III requirements globally; their unintended consequences; and, the risks to currently fast-growing nations such as India from transition of the global financial sector to these changes. The note also provides some broader lessons for India concerning financial sector reforms, government involvement in the financial sector, possible macro-prudential safeguards against spill-over risks from the global economy, and finally, management of government debt and fiscal condition. The paper also looks at the new capital and liquidity requirements under Basel III reforms and argues that Basel III, like its predecessors, is fundamentally flawed as a way of designing macro-prudential regulation of the financial sector

#### **Foreign investors under stress: Evidence from Indian firms**

*Nirvikar Singh (University of California Santa Cruz), Ila Patnaik (Ministry of Finance), Ajay Shah (National Institute of Public Finance and Policy)*

Emerging market policymakers have been concerned about the financial stability implications of financial globalisation. These concerns are focused particularly on behaviour under stressed conditions. Do tail events in the home country trigger off extreme responses by foreign investors and is there any asymmetry between the responses of foreign investors to very good versus very bad days? Do foreign investors have a major impact on domestic markets through large movements of funds? Do extreme events in world markets

induce extreme behaviour by foreign investors, thus making them vectors of crisis transmission? This paper examines these questions for India, using a modified event study methodology focused on tail events in two phases. In the first phase, the authors use daily data for Indian stock market returns, net FII inflow, the US S&P 500, and the Volatility Index from 2000-2011; a total of 3,561 observations. In the second phase, daily data on company stock price returns and company-level FII flows for 2,000 firms for the period 2003-2011 is used, along with US S&P 500.

### **How do regulators influence mortgage risk? Evidence from an emerging market**

*Tarun Ramadorai (Oxford University), John Campbell (Harvard University)*

This paper uses microeconomic data from India to explore the effects of rapidly changing regulation on mortgage lending and mortgage risk. The authors adopt an alternative approach in this paper, tracing the effects of mortgage regulation over time within a single country. They find evidence that regulation has important effects on rates and defaults. They also find evidence suggestive of learning by the mortgage provider in a turbulent regulatory environment.

### **How important are credit constraints for small firm growth?**

*Kunal Sen (University of Manchester), Rajesh Raj (Centre for Multi-Disciplinary Research)*

This study focusses on the role of financial constraints in determining the lack of transition of firms from the very small family firms (OAMEs) which are the predominant type of firm in the informal sector to the larger firms that employ non-family labour (DMEs and NDMEs). The unit level analysis is supplemented with panel data analysis of 364 districts over the period 1995-2010, where the effects of financial development on firm transition at the district level are estimated. The results suggest that financial constraints play an important role in firm transition from OAMEs to NDMEs, and then to DMEs. However, finance constraints seem to matter more for the NDME-DME transition than the OAME-NDME transition. Firm capabilities seem to matter significantly too, for example, firms which maintain accounts are twice as likely to make the transition versus firms which do not. Access to electricity, the firm's location in urban areas, and whether the firm has experienced an expansion in its operations previously matter greatly in firm growth.

### **Improving access to finance for entrepreneurs in developing countries**

*Shawn Cole (Harvard Business School), Martin Kanz (Harvard University) and Leona Klapper (The World Bank)*

One of the most important issues in developing countries is how to finance SMEs. Although microcredit and new forms of financial inclusion are increasingly prominent in the literature, much empirical evidence shows that banks are still the main financial actors. This study focuses on loan officers' risk propensity and finds that, among other conclusions, that performance incentives affect lending decisions. The authors conduct an experiment with commercial bank loan officers to test how performance compensation affects risk-assessment and lending. High-powered incentives lead to greater screening effort and more profitable lending decisions. This effect is, however, muted by deferred compensation and limited liability, two standard features of loan officer compensation contracts. They find that career concerns and personality traits affect loan officer behaviour, but show that the response to incentives does not vary with traits such as risk-aversion, optimism or overconfidence. Finally, they present evidence that incentive contracts distort the assessment of credit risk, even among trained professionals with many years of experience.

### **Long run-effects of repayment flexibility in microfinance: Evidence from India**

*Rohini Pande (Harvard University), Erica Field (Duke University), John Papp (Independent Researcher), Natalia Rigol (Massachusetts Institute of Technology)*

Financiers across the world structure debt contracts to limit the risk of entrepreneurial lending. But debt structures that reduce risk may inhibit enterprise growth, especially among the poor. Using a field experiment, the authors quantify the short and long-run trade-offs associated with the classic microfinance debt contract. They contrast the classic contract which requires that repayment begins immediately after loan disbursement with a contract that provides a two-month grace period before repayment begins. The shift to a grace period contract increased short-run business investments and long-run profits, implying average return to capital of over 8% per month. However, they also observe a significant increase in the variance of profits and a tripling of default rates. In this manner, early initiation of repayment reduces risk to financiers but also reduces the potential impact of microfinance on microenterprise growth and household poverty.

### **Macroeconomic take-off and distributional churning in India**

*Amartya Lahiri (University of British Columbia), Viktoria Hnatkovska (University of British Columbia)*

The past 25 years have witnessed a remarkable economic catch-up by the historically discriminated against scheduled castes and tribes (SC/STs) in India towards non-SC/ST levels in the terms of their education attainment levels, their occupation choices as well as their wage and consumption levels. In this paper, the authors document that these aggregate data patterns mask empirically significant sectoral heterogeneity in the evolution of the caste gaps in wages. Wage gaps have declined in services widened in agriculture and stayed unchanged in manufacturing between 1983 and 2008. They develop a multi-sector model with two types of agents to show how aggregate total factor productivity shocks along with a process of structural transformation can induce a convergence between the two groups without any other concurrent redistributive policy changes as long as there exists an initial affirmative action policy in education and/or jobs for the relatively disadvantaged group. The researchers provide some indirect evidence in support of this channel by examining the convergence patterns of Muslims who were not covered by such affirmative action policies

### **Note on reserve currencies**

*Menzie Chinn (University of Wisconsin)*

This project examines the likelihood that the current reserve currencies will retain their status in the near future, given the persistence in the composition of reserve holdings. However, since we do not have complete data on the switchovers in lead reserve currencies, a great deal of uncertainty attends any forecasts. Hence, it is possible that new reserve currencies might appear with greater rapidity than anticipated. Of the candidates for new reserve currencies among the major emerging economies, the Renminbi (RMB) is the most plausible. However, even under optimistic assumptions regarding economic growth and financial development, RMB status as a major reserve currency is some time off. A role for regional reserve currency status in the near future is much more likely. The advent of a multi-reserve currency world is unlikely to have negative consequences for global financial stability (and might be stability-enhancing). However, achieving the prerequisites for reserve currency status will force sacrifices in terms of policy autonomy.

### **Role of derivatives in India's financial development**

*Rangarajan Sundaram (New York University)*

The annals of financial history are littered with stories of corporations and financial

institutions which collapsed when a deterioration in market conditions led to massive losses in the derivatives portfolio – occasionally, even in cases where the derivatives were being used to hedge existing exposures. The potentially lethal cocktail of leverage and volatility makes it vital that users understand fully the risks of the instruments, and regulators the systemic impact of volatility spikes. India’s derivatives markets, both OTC and exchange traded, have seen rapid growth over the last decade, and with relatively few sputters. The successes are visible and real – several Indian exchanges rank among the world’s top exchanges in terms of number of derivatives contracts traded; and there have been no large scale derivatives disasters of the sort that have roiled the advanced economies. But problems lurk not far beneath the surface. This paper peels away the layers and discusses the role of derivatives in financial markets and their development.

### **Saving behaviour in India: Understanding the differences across castes**

*Viktoria Hnatkovska (University of British Columbia), Amartya Lahiri (University of British Columbia)*

The past three decades in India have witnessed a sharp reduction in the historically large gaps in the education levels, occupation choices and wages of the backward castes called SC/STs relative to the rest of the population. This paper examines how these changes have impacted the saving behaviour of the two groups by analysing NSS household survey data on consumption and employment/ unemployment between 1983 and 2010. The results suggest that while the saving rates of SC/STs exceeded that of non-SC/STs in 1983, this excess saving of SC/STs declined during 1983-2010 period. A decomposition of consumption into durables and non-durables reveals that this trend also extends to durable goods consumption of the two groups. A decline in wage uncertainty facing SC/STs may have contributed to the saving convergence between them and non-SC/STs.

### **State ownership and systemic risk: Evidence from the Indian financial sector during 2007-09**

*Viral V. Acharya (New York University), Nirupama Kulkarni (University of Berkeley)*

This paper analyses the performance of banks in India during the period 2007-09 in order to study the impact of ownership structure on bank vulnerability to a crisis. They use the 38 public and private sector banks for stock market data and refer to 2008 as the ‘crisis’ period. They find that in the private sector, vulnerable private-sector banks - based on ex-ante measures of exposure to a crisis - performed worse than safer banks; however, the opposite was true for state-owned banks. They explain this puzzling result by analysing the behaviour of deposit and lending growth of banks. The vulnerable private-sector banks

experienced deposit withdrawals and shortening of deposit maturity relative to other private-sector banks. In contrast, vulnerable state-owned banks relatively grew their deposit base, more so in term deposits, and increased their loan advances, at cheaper rates, and especially to public sector firms. These results are consistent with greater market discipline on private-sector banks and the lack thereof on state-owned banks which are able to access credit cheaply even after underperformance as they have access to stronger government guarantees and forbearance.

### **The viability of the special drawing rights as an international reserve asset** *Maurice Obstfeld (University of California Berkeley)*

The Special Drawing Right (SDR) is an unconditional claim to the hard-currency reserves of other International Monetary Fund (IMF) members and certain other prescribed holders. After the large IMF allocations of August-September 2009, SDRs still account for only 2 percent of lower-income country reserves and less than 4 percent of global reserves. Denominating more global reserves in SDR would affect exchange rate volatility among the main reserve currencies primarily to the extent that it reduced potential official demand shifts among those currencies. Were more countries to peg to the SDR as a result, however, their effective nominal (and probably real) exchange rate volatility would fall. Adding China's yuan to the SDR basket, given its current policy of heavy management against the U.S. dollar, would effectively increase the dollar's weight in the SDR basket. Since the yuan is not an international reserve currency, the rationale for tying the SDR's value to the yuan at the present time is unclear. An enhanced international liquidity safety net, whether based on the SDR or on some system of credit lines centered on the IMF, would enhance the IMF's power and thus calls for complementary reforms in governance structure.

## **2. Manufacturing, productivity, and labour markets**

### **Determinants of clusters in Indian manufacturing: The role of infrastructure, governance, education, and industrial policy** *Gunjan Sharma (University of Missouri), Ana Fernandes (The World Bank)*

This paper investigated the determinants of spatial concentration and entry within manufacturing across states in India. Using an unbalanced panel of 180 industries spread across 16 major Indian states over the time period 1985-2007, the authors estimated the effect of location (state) characteristics interacted with characteristics that make industries naturally more prone to concentrate in locations (states) of certain types on spatial concentration and entry. The results show that governance, infrastructure and the

availability of skilled labour are important determinants of increased concentration and entry. Moreover, the estimates indicate that state characteristics associated with lower distance to foreign markets, lower costs of accessing domestic suppliers, or lower costs of doing business matter for the impact of licensing, FDI and trade reforms on concentration and new entry. There is also evidence that less substitutable inputs (e.g., roads) raise spatial concentration while more substitutable inputs (e.g., electricity) do not.

### **Does management matter?: Evidence from India**

*Nick Bloom (Stanford University), Benn Eifert (University of California Berkeley), Aprajit Mahajan (Stanford University), David McKenzie (World Bank), John Roberts (Stanford University)*

To investigate whether differences in management practices across firms can explain differences in productivity in developing countries, the PIs ran a management field experiment on 20 large Indian textile firms of about 300 employees. They provided free consulting on management practices to randomly chosen treatment plants and compared their performance to a set of control plants. They find that adopting these management practices raised productivity by 17% in the first year through improved quality and efficiency and reduced inventory, and within three years led to the opening of more production plants. Why had the firms not adopted these profitable practices previously? The results suggest that informational barriers were the primary factor explaining this lack of adoption. Also, because reallocation across firms appeared to be constrained by limits on managerial time, competition had not forced badly managed firms to exit.

### **Learning and earning: Evidence from a randomised evaluation in India**

*Pushkar Maitra (Monash University), Subha Mani (Fordham University)*

This paper estimates the short-and-medium-run effects of participating in a subsidised vocational training program aimed at improving labour market outcomes of women residing in low-income households in a developing country. The PIs combine pre-intervention data with two rounds of post-intervention data from a field experiment to quantify the short-and-medium-run effects of the programme. In the short-run, they find that program participants are significantly more likely to be employed, work additional hours, and earn more. These short-run impact estimates are all sustained in the medium-run. They also identify credit constraints, local access, and lack of proper child care support as important barriers to program participation and completion. They are able to rule out two alternative mechanisms – signaling and change in behaviour that can drive these findings.

## **Management practices in retail, education and healthcare sectors in India**

*Daniela Scur (Centre for Economic Performance), Nick Bloom (Stanford University), Renata Lemos (Centre for Economic Performance)*

This project presents an in-depth descriptive look at the state of management practices in India. Using a unique dataset measuring the quality of management practices across countries and sectors, the PIs find a consistent pattern of poor management practices in India in comparison to higher income countries across all the sectors studied: manufacturing, retail, education and healthcare. If we accept the link between good management and higher productivity, these findings suggest that poor management practices could be a factor behind the lower levels of development of many countries. Particularly in manufacturing and retail, the low average score is mainly due to a large tail of badly managed firms, which is thin or non-existent in higher income countries. Ownership structures, competition, education and informational barriers seem to be important drivers of the quality of management practices. Finally, when looking across regions, they also find that management quality varies in tandem with levels of development.

## **Sugar mills: Ownership, productivity and crop choice**

*Sandip Sukhtankar (Dartmouth College), Sendhil Mullainathan (Harvard University)*

This project examines the effect of firm ownership structure on firm behavior and the economic outcomes of upstream suppliers by comparing privately owned sugar mills to cooperatives and public mills in India. In this setting, government support for cooperative and public mills allows meaningful variation in ownership structure to be observed, while the “command area” zoning system - whereby mills are given monopoly power to operate within an assigned area - helps tackle the identification challenge. The borders of command areas allow for a geographic regression discontinuity design, where underlying soil, weather, and institutional characteristics are exactly the same but ownership structure changes across boundaries. Using satellite images overlaid on digital maps to measure sugarcane grown along the borders, and a survey to determine the effects of crop choices on farmer welfare, the results show that private mills encourage sugarcane production. Greater cane cultivation is tied to better credit provided by private mills, and results in higher income and consumption for land-poor farmers.



### 3. Agriculture

#### **Adoption of water-saving infrastructure in agriculture: The case of laser levellers**

*Nathan Larson (University of Virginia), Sheetal Sekhri (University of Virginia) and Rajinder Sidhu (Punjab Agricultural University)*

Water tables are falling rapidly, in large part due to the fact that individuals do not bear the social marginal cost of the water they use; free water extraction is a property right attached to land ownership, and the electricity needed to pump water to the surface is highly subsidised. The authors argue that the use of water-saving technologies, in particular, laser levelling is a logical solution to this problem. Their study examined social networks and adoption patterns in a small set of villages, with the goal of forming recommendations about how social networks might be harnessed in a large-scale intervention to promote water-saving technologies. In the pilot survey, over 800 farmers in the districts of Amritsar and Jalandhar in the state of Punjab were interviewed about their perceived benefits and obstacles to adopting laser levelling. The follow-up study comprised five villages with a total of 479 land-owning households. It is found that large farmers are more likely to adopt laser levelers and policies such as subsidies for small farmers and precise information dissemination about returns to adoption for medium to large farmers can also be explored in the future.

#### **Middleman margins, credit and information constraints: Potato markets in West Bengal, India**

*Dilip Mookherjee (Boston University), Pushkar Maitra (Monash University), Sandip Mitra (Indian Statistical Institute), Sujata Visaria (Hong Kong University of Science and Technology)*

This paper investigates how potato farmers in West Bengal sell their crop to local traders, the determinants of farm-gate prices and margins earned by traders. Specifically, the PIs examine the role of asymmetric information regarding prices in neighboring wholesale markets where local traders resell these potatoes. Farmers in randomly chosen villages were provided information about daily wholesale prices. In one treatment the information was provided on public noticeboards, in the other it was relayed privately to randomly chosen farmers. Net of marketing costs, traders earn margins in the range of 55 to 100% of farm-gate prices. Information provision resulted in no change in average margins, but the private information intervention caused farm-gate prices and traded quantities to co-move more with wholesale prices. The evidence is inconsistent with long term implicit contracts allowing risk to be shared between farmers and traders. Instead, the results can be

explained by a model of ex post bargaining, in which low outside options of farmers prevent informational interventions from having significant impacts.

### **Potato traders in West Bengal: A survey of contractual relations and market structure**

*Dilip Mookherjee (Boston University), Pushkar Maitra (Monash University), Sandip Mitra (Indian Statistical Institute), Sujata Visaria (Hong Kong University of Science and Technology), Alberto Motta (University of New south Wales)*

This study consists of a pilot survey of a random sub-set of phorias (middlemen) and larger traders who operate in 72 villages of West Medinipur and Hugli districts and their corresponding potato markets. The goal of the study is to understand the nature of contractual relations between farmers and phorias on the one hand, and between phorias and wholesale traders that they sell to on the other hand. The surveys will enable the PIs to obtain systematic information on market structure, trader costs and profits, entry barriers, contractual relations across successive layers of the supply chain, and the nature of competition at each layer. Eventually, the objective is to obtain a richer understanding of the organisation of these bottom-most layers of the supply chain, that will both explain magnitudes of observed margins and pass-through of external price shocks to farmer earnings, as well as enable them to predict the effect of various policies intended to enhance efficiency of the supply network and pass-through to farmers.

## **4. Urbanisation and land**

### **Constraints and prospects of financing via municipal bonds in India: An analysis with case studies**

*Sanjay Banerji (University of Nottingham), Krishna Gangopadhyay (Independent Economist), Ashok Thampy (Indian Institute of Management, Bangalore) and Zilong Wang (University of Nottingham)*

In order to meet challenges created by growing urbanisation, Municipal Corporations in India need to incur huge expenditure to support urban infrastructure. In this paper, the authors conduct case studies with two major municipal corporations, Kolkata Municipal Corporation (KMC) and Bruhat Bangalore Mahanagar Palike (BBMP) to draw lessons for other municipal Corporations for both efficient implementation of infrastructure projects and means to finance such activities via a multitude of platforms including placement of municipal bonds. Their study reveals that in spite of recent revenue augmenting or cost saving reforms (like e-governance or Accrual based accounting at the ward level), constraints on municipal financing in both places emerge due to poor debt capacity,

inadequate collection of revenues and presence of multiple decision making bodies that often lead to project delays and cost over runs.

**JNNURM: An opportunity for environmentally sustainable urbanisation**

*Kavita Wankhade (Indian Institute for Human Settlements)*

The project undertook an analysis of the sustainability of the JNNURM, the largest chunk of public sector funding channeled into urban India till date. It sought to answer the following question: To what extent have considerations of environmental sustainability been incorporated (explicitly and implicitly) in the vision and programme design of JNNURM? To understand whether environmental sustainability has a place in JNNURM, the study examined the programme at multiple levels for sustainability markers, including a case study of Nanded, a JNNURM City in Maharashtra, to contextualise their enquiry.

**Land acquisition for business and compensation of displaced farmers**

*Maitreesh Ghatak (London School of Economics), Sandip Mitra (Indian Statistical Institute), Dilip Mookherjee (Boston University)*

This paper addresses the question of how farmers displaced by acquisition of agricultural land for the purpose of industrialisation ought to be compensated. Prior to acquisition, the farmers are leasing in land from a landlord, either a private owner or a local government. The authors identify three sets of incentive effects: the decision of the landlord to sell the land ex post to an industrial developer, and ex ante incentives of tenants and landlord to make specific investments in the agricultural quality of the land. Their main result is that under a broad class of circumstances, independent of equity considerations, efficiency considerations alone require farmers be over-compensated for their loss of agricultural income in the event of conversion.

## 5. Energy and environment

**Exploratory research on the impact of the Forest Rights Act 2006, on deforestation, tribal welfare, and poverty, with implications for implementation strategies**

*E. Somanathan (Indian Statistical Institute), Jean Marie Baland (University of Namur), Krishnaswamy (Ashoka Trust for Research in Ecology and the Environment), François Libois (University of Namur)*

When the United Progressive Alliance came to power in the Indian general elections of May 2004, it published a Common Minimum Programme in which it promised to end the eviction

of tribal and other forest-dwelling people from forest lands. The purpose of this project was to explore data availability in order to examine the feasibility of the following four research questions: (i) Did the Forest Rights Act (FRA) of 2006 lead to an increase in forest clearing in order to establish claims to individual title? (ii) Does community control lead to better forest protection and soil conservation than state forest department control? (iii) Has the FRA achieved its aim of “correcting historical injustices” by giving titles to the poor? (iv) How are claims to title mediated by political and other networks, caste, and status?

### **Federal versus regional control: Implications for groundwater resource in India**

*Sheetal Sekhri (University of Virginia)*

Federal versus regional control over provision of resources can have different implications for long run sustainability of natural resources. This paper examines the trade of between short term growth and long term conservation incentives of elected legislators from regional and national political parties for groundwater provision. Regional legislators have a stronger incentive to promote regional growth, which can lead to a rapid decline of resource stocks. On the other hand, regional parties are limited to contesting elections from the region, and hence have stronger incentives to conserve resources for future periods. These two effects can offset each other. This paper proposes and tests the hypothesis that under high cost of provision to the legislators, regional regimes can lead to conservation because they internalise inter-temporal externalities. The author use nationally representative data on groundwater from India, and an increase in the cost of groundwater provision for the legislators induced by the reforms in the electricity sector, to show that private competition induced in electricity sector leads to groundwater conservation under regional regime.

### **Improving urban air quality in India: Lessons from the Kolkata clean air regulations of 2009**

*Rohini Somanathan (Delhi School of Economics), Parikshit Ghosh (Delhi School of Economics)*

This paper analyses the change in the economic returns of auto-rickshaw drivers in Kolkata, roughly one year after they were required to shift to LPG in 2009 as per the Kolkata clean air regulations. The authors focus not only on the environmental impact of the regulations but also on its distributive consequences, especially the cost and profit flows of the affected segments of the transport industry. Based on a survey of 100 auto-rickshaw drivers at 12 gas filling stations across Kolkata in June 2010, they find that operating profits declined for many auto-drivers when they were forced to switch to autos fueled by LPG.

### **Information and fuel choices in unequal rural households**

*P.P. Krishnapriya (Delhi School of Economics)*

The project investigates the factors that affect household's choice of fuels and associated devices: how these choices are made when additional information about the costs and benefits associated with fuel used is provided, in particular, when there is unequal bargaining power among the members of the household. In order to explore these factors, the author studies fuel-related choices made by households in rural regions of Uttar Pradesh and Kerala over a period of three months. A sample of 723 households belonging to villages in Bijnor district in Uttar Pradesh and Thiruvananthapuram district in Kerala were interviewed in a baseline survey. The study is carried out through field experiments and the objective is to determine the kind of fuels or alternatives that should be promoted in these regions based on the price and availability data, and to find out the best possible medium for information and awareness campaigns. Alternatively, this may help in identifying the supply constraints for fuel related alternatives faced by the households.

### **Distributional effects of air quality legislation in India**

*Rohini Somanathan (Delhi School of Economics), Parikshit Ghosh (Delhi School of Economics)*

A concern with the health effects of air pollution in India has led to court-mandated clean air plans in many Indian cities. The resulting transitions to clean fuels and new vehicles have been smooth and speedy in some cases and violent and protracted in others. One reason for these varied experiences may be differences in the costs and benefits of the new technology to those most affected by it. Based on a survey of 100 auto rickshaw drivers in Kolkata in the summer of 2010, the authors find that operating profits declined for many auto-drivers when they were forced to switch to autos fueled by LPG. The largest increases in costs were faced by drivers who rented (rather than owned) their autos. Rents doubled after the change and there were no substantial fuel savings for many of these drivers because they relied on cheap adulterated fuel, rather than petrol, prior to the switch-over. These distributional effects may be important for understanding both the political resistance to clean air policies and their welfare implications.

### **Third-party environmental auditing**

*Michael Greenstone (University of Chicago), Esther Duflo (Massachusetts Institute of Technology), Rohini Pande (Harvard University) Nicholas Ryan (Yale University)*

In many regulated markets, private, third-party auditors are chosen and paid by the firms

that they audit creating a conflict of interest. The field experiment over two years in Gujarat sought to incentivise accurate reporting by altering the market structure for environmental audits of industrial plants. There are three main results. First, auditors systematically reported plant emissions just below the true emissions. Second, the treatment caused auditors to report more truthfully. Third, treatment plants reduced their pollution emissions. The results suggest reformed incentives for third-party auditors can improve their reporting and make regulation more effective.

## 6. Health and education

### **Belief formation of the returns to schooling and how to de-bias incorrect beliefs**

*James Berry (Cornell University), Lucas Coffman (Ohio State University)*

This study investigates how poor households in rural and urban Rajasthan form beliefs about the value of additional years of schooling. Previous studies have documented that poor populations in developing nations hold downwardly biased beliefs of the returns to schooling; they do not think schooling is as valuable as it actually is. It has been shown that providing correct beliefs about average wages for adults with high levels of schooling can significantly and substantially increase schooling attainment. Using a survey with 402 households in the Ajmer district of Rajasthan, India, the authors are able to gain some preliminary insights into the complicated process of subjective belief formation about the returns to schooling. This project aims to understand how such interventions can be made more effective by understanding the source of the original bias.

### **Cognitive effects of supplementary school feeding programme**

*Farzana Afridi (Indian Statistical Institute), Bidisha Barooah (Delhi School of Economics), Rohini Somanathan (Delhi School of Economics)*

The authors use the exogenous policy shock of the extension of provision of school meals to upper primary grades in public schools in Delhi to study the effects of school meal intake on the cognitive effort of students within the classroom. Using individual level data on the performance of students in effort games both before and after the extension of the program, they find that the provision of meals significantly improved the classroom effort of students in grade seven.

### **Defining teacher quality in India**

*Mehtabul Azam (Oklahoma State University), Geeta Kingdon (Institute of Education)*

Using administrative data from private schools, located in one Indian district, that matches 8,319 pupils to their subject specific teachers at the senior secondary level, the authors estimate the importance of individual teachers on student outcomes in the high-stake senior secondary exam (at the end of twelfth-grade). They control for prior achievement at the secondary level (at the end of tenth-grade) to estimate the value added of a teacher over a two year course, and define a good teacher as one who consistently gets higher achievement for students. In addition to the prior achievement, they exploit the fact that students took exams in multiple subjects during their senior secondary exam to control for pupil fixed effects. They find a considerable variability in teacher effectiveness over a two year course—a one standard deviation improvement in teacher quality adds 0.38 standard deviation points in students score. Furthermore, consistent with studies in the US, they find that although teacher quality matters, the observed characteristics explain little of the variability in teacher quality.

### **Gender differences in health investments: Evidence from health care providers in India**

*Rajshri Jayaraman (ESMT, Berlin), Debraj Ray (New York University), Shing-Yi Wang (New York University)*

A central feature of many developing countries is the presence of significant gender differentials in health outcomes. One potential factor which can account for this is that females seek treatment later than males. A contrasting hypothesis is that females receive differential care at the medical facility. This paper examines gender differentials in the seeking and treatment of eye care. Diagnostic and surgical outcomes are studied using a unique dataset comprising a sample of 60,000 patients who sought treatment over a 3-month period in 2012 at the Arvind Eye Hospital in India. At the time of presentation to an eye care facility, women have worse diagnoses than men across all available indicators of symptomatic illness. In contrast, males and females do not differ significantly in their “best corrected visual acuity” and there are no gender differences in other indicators of surgical care. For asymptomatic disease, there is no significant difference between males and females: intraocular eye pressure and a high cup-to-disk ratio, which are correlates of glaucoma, are not significantly different across gender. The findings for symptomatic illness suggest that women seek treatment later than men for perceptible illness. That no such gender differential exists for asymptomatic disease suggests that women do not necessarily go for preventive check-ups at a lower frequency than men.

### **Information provision and the quality of education in rural India**

*Farzana Afridi (Indian Statistical Institute, Delhi Centre), Bidisha Barooah (Delhi School of Economics), Vegard Iversen (University of Manchester)*

This study analyses whether providing information on the absolute and relative quality of schooling to the stakeholders affects the behaviour of service providers in both the public and the private sector. A Randomised Controlled Trial (RCT) framework is used to study the effect of providing report cards of students' scores as well as non-academic measures of school quality to parents and schools in 70 villages in Ajmer district of Rajasthan. Stakeholders in education in each of the five control groups received a different type of report card with indicators of school quality such as test scores of students in a test. The results suggest that private and public schools respond to information differently. In keeping with previous studies, it is found that providing information to households or schools has no effect on improving the quality of public schools. Private schools however respond positively to information. This effect is higher for private schools which face competition from other private schools. The policy implication of the findings is that information is effective where there is accountability.

### **Seasonal effects of water quality on maternal and infant health in India**

*Elizabeth Brainerd (Brandeis University), Nidhiya Menon (Brandeis University)*

This paper examined the impact of fertiliser agrichemicals in water on infant and child health using data on water quality combined with data on the health outcomes of infants and children from the Demographic and Health Surveys of India. Because fertilisers are applied at specific times in the growing season, the concentrations of agrichemicals in water vary seasonally and by agricultural region as some Indian states plant predominantly summer crops while others plant winter crops. The identification strategy exploits the differing timing of the planting seasons across regions and differing seasonal prenatal exposure to agrichemicals to identify the impact of agrichemical contamination on various measures of child health. The research shows that children exposed to higher concentrations of agrichemicals during their first trimester experience worse health outcomes on a variety of measures. Disaggregated runs reveal that the effects are largest amongst the most vulnerable groups - children of uneducated poor women living in rural India.



### **The enigma of malnutrition in India**

*Seema Jayachandran (Northwestern University), Rohini Pande (Harvard University)*

This research uses data from 2004 to 2014 for 26 countries to make comparisons between South Asia and Africa, examining how the regional gap in child malnutrition varies with demographic and other characteristics. Specifically, how does child malnutrition vary with a child's gender and birth order? How much does poor maternal health explain? The policy aim of the project is to provide new facts that help us understand the root causes of malnutrition in India and inform policy-making to improve maternal and child nutritional outcomes.

### **Culture and the health transition: Understanding sanitation behaviour in rural north India**

*Diane Coffey (r.i.c.e.), Dean Spears (r.i.c.e.)*

This IGC and the research institute for compassionate economics (r.i.c.e.) project explores why, despite India's level of economic development, adoption of sanitation has been extremely slow. The researchers find that social and cultural forces that are unique to India explain its high rates of open defecation. The study presents quantitative and qualitative evidence that Hindu practices of purity and pollution, as well as India's unique history and renegotiation of untouchability complicate the adoption of the kinds of simple, inexpensive latrines that have been used to reduce open defecation and improve health in rich countries before they were rich and in other developing countries. The research found it is a mistake to believe that rural sanitation in India is principally an infrastructure shortage. The problem is not access. Demand for latrines is constrained by cultural practices concerning ritual impurity.

### **Rural-urban migration, groundwater depletion and rural infrastructure**

*Ram Fishman (George Washington University), Meha Jain (Columbia University) and Avinash Kishore (International Food Policy Research Institute, New Delhi)*

The authors document patterns of rural-urban migration and employment shifts in a region that is facing on-going depletion of groundwater resources in Northern Gujarat, India. Given that migration typically does not occur due to one singular risk, their study assessed the multi-factorial drivers of migration. Interviews were conducted in 10 villages in Northern Gujarat that were especially water scarce due to unique geological conditions. Further, the authors randomly select 50 additional villages and in each village, about 5% of household were then randomly selected for the survey. The survey results reveals that migration and

employment shifts were dominated by the Patel caste - the dominant landowning caste in the region. Migration by younger males in this group is highly prevalent, and is correlated with the degree of water depletion, land scarcity, and family ties to workers who have previously migrated to urban areas. These results suggest that social and economic factors, including caste type, land holding size, and social networks, mediate the ability of households to respond to groundwater depletion via migration to urban centres.

## 7. Governance

### **Does female leadership impact on the quality of public goods? Evidence from a public poverty alleviation programme in Andhra Pradesh, India**

*Farzana Afridi (Indian Statistical Institute), Vegard Iversen (University of Manchester), M.R. Sharan (J-PAL)*

The researchers used the nation-wide policy of randomly allocating village council headships to women to identify the impact of female political leadership on the governance of projects implemented under MG-NREGA. Using primary survey data, they find more programme inefficiencies and leakages in village councils reserved for women heads: political and administrative inexperience make such councils more vulnerable to bureaucratic capture. When using a panel of audit reports, governance improves as female leaders accumulate experience. These results suggest that female political leadership may generate gains in governance but only after the initial, gendered disadvantages recede.

### **Motivating knowledge agents: Can incentive pay overcome social distance?**

*Erlend Berg (University of Bristol), Maitreesh Ghatak (London School of Economics), R Manjula (Institute for Social and Economic Change), D Rajasekhar (Institute for Social and Economic Change), Sanchari Roy (University of Warwick)*

This paper studies the interaction of incentive pay and social distance in the dissemination of information about a public health insurance programme. The authors analyse theoretically as well as empirically the effect of incentive pay when agents have pro-social objectives, but also preferences over dealing with one social group relative to another. They analyse data from a randomised field experiment undertaken across 151 villages in South India, in which local agents were hired to spread information about the programme. The agents were paid either a flat fee or a variable rate that depended on the level of knowledge about the programme in the eligible population. They find that incentive pay improves knowledge transmission to households that are socially distant from the agent, but not to households similar to the agent.

### **Local level estimates of corruption and theft in the energy sector in Uttar Pradesh, India**

*Miriam Golden (University of California Berkeley), Brian Min (University of Michigan)*

Utilising data from the power corporation of Uttar Pradesh, India's most populous state, the PIs studied the politics of electricity theft over a ten year period (2000–09). Their results show that electricity theft is substantial in magnitude. The extent of theft varies with the electoral cycle of the state. In years when elections to the State Assembly are held, electricity theft is significantly greater than in other years. Theft is increasing with the intensity of tube wells, suggesting that it is linked to unmetered electricity use by farmers. Incumbent legislative members of the state assembly are more likely to be reelected as power theft in their locality increases. Their interpretation of these various results is that power theft exhibits characteristics consistent with the political capture of public service delivery by local elites.

### **Political clientelism and government accountability in West Bengal: Theory and evidence**

*Dilip Mookherjee (Boston University), Sandip Mitra (Indian Statistical Institute), Pranab Bardhan (University of California Berkeley)*

The authors provide a theory of political clientelism, which explains sources and determinants of political clientelism, the relationship between clientelism and elite capture, and their respective consequences for allocation of public services, welfare and empirical measurement of government accountability in service delivery. Using data from household surveys in rural West Bengal, they argue that the model helps explain observed impacts of political reservations in local governments that are difficult to reconcile with standard models of redistributive politics.

### **Politician identity and religious conflict in India**

*Sonia Bhalotra (University of Essex), Irma Clots-Figueras (Carlos III Madrid), Lakshmi Iyer (Harvard Business School)*

This paper investigates the impact of Muslim political representation on religious conflict in India between 1980 to 2007. The authors code religion from name and construct updated conflict data from Times of India archives. The analysis is currently conducted at the district level. They instrument the share of Muslims elected to state assemblies from the index district with the share of Muslims who won against non-Muslims in close elections in that district. Preliminary results suggest that raising the share of Muslim politicians in state

assemblies results in a sizeable decline in the incidence of Hindu-Muslim riots, consistent with evidence that Muslims are more often the victims of such incidents. Some part of the total effect arises from positive selection of minority leaders. Our results are consistent with parochial politics and with theories that indicate the relevance of political identity for policy outcomes. They also suggests a cause of conflict, and hence a solution for the control of conflict, that has not been previously considered in the conflict literature.

### **Politician identity, policy implementation, and human development outcomes**

*Sonia Bhalotra (University of Essex), Guilhem Cassan (University of Namur), Irma Clots-Figueras (Carlos III Madrid), Lakshmi Iyer (Harvard Business School)*

This paper investigates whether the religious identity of state legislators in India influences development outcomes, both for citizens of their religious group and for the population as a whole. To control for politician identity to be correlated with constituency level voter preferences or characteristics that make religion salient, we use quasi-random variation in legislator identity generated by close elections between Muslim and non-Muslim candidates. The authors find that increasing the political representation of Muslims improves health and education outcomes in the district from which the legislator is elected. The researchers find no evidence of religious favoritism: Muslim children do not benefit more from Muslim political representation than children from other religious groups.

### **Role of information provision in improving public service delivery**

*Sheetal Sekhri (University of Virginia), Sriniketh Nagavarapu (Brown University)*

Informal monitoring and enforcement can increase the efficiency of public service delivery. The authors study the Targeted Public Distribution System of India and find that Scheduled Castes (SC) have a higher take-up of government subsidised food when facing SC delivery agents. They provide evidence suggesting that this effect works through increased informal monitoring and enforcement when the delivery agent is corrupt. They then estimate a structural model and show that the welfare that SC households would gain from lowering monitoring and enforcement costs – an amount equivalent to moving from a non-SC shopkeeper to a SC shopkeeper – are important, equaling approximately one-fifth of the average subsidy amount. Additionally, expanding the generosity of the program – as envisioned in the proposed National Food Security Bill - can perversely lower welfare for SCs and non-SCs due to increased incentives for black-marketing.

### **Public goods, location choice and the voting decisions of the urban poor**

*Abhijit Bannerjee (Massachusetts Institute of Technology), Rohini Pande*

*(Harvard University), Michael Walton (Harvard University), Anjali Bharadwaj (Satark Nagrik Sangathan)*

An old and new literature posits that cities underpin long-term economic dynamism, through the spatial concentration of skills and ideas. This project aims to highlight the constraints placed on such dynamism by low-quality infrastructure in a large Indian city, and to identify some of the contributing factors. To accomplish this, the authors make use of detailed survey data on the quality of social services available to Delhi slum-dwellers. They focus on slums because they are often the point of entry for rural-to-urban migrants. Failure to solve problems for slum-dwellers is not only an issue of human deprivation, but an impediment to India's continued growth and stability. Their analysis draws upon two surveys that were conducted in 2010: (i) one of a sample of over 5000 households across Delhi slums (ii) the other of 250 heads and members of Delhi Resident Welfare Associations. They find evidence of low-quality public good provision, with slum-dwellers reporting significant discontent about access to water and sanitation, but, interestingly, not about education and healthcare. Additionally, slum-dwellers often do not access the government transfers to which they are entitled. Lastly, slum-dwellers rarely report receiving help from NGOs