



Kaushik Basu, Barry Eichengreen, and Poonam Gupta From Tapering to Tightening: The Impact of the Fed's Exit on India

Sonalde Desai and Reeve Vanneman

Enhancing Nutrition Security via India's National Food Security Act: Using an Axe Instead of a Scalpel?

Shampa Bhattacharjee, Viktoria Hnatkovska, and Amartya Lahiri The Evolution of Gender Gaps in India

Shamika Ravi and Sofi Bergkvist Are Publicly Financed Health Insurance Schemes Working in India?

Sandip Sukhtankar and Milan Vaishnav Corruption in India: Bridging Research Evidence and Policy Options

EDITED BY SHEKHAR SHAH, ARVIND PANAGARIYA SUBIR GOKARN

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EDITED BY Shekhar Shah Arvind Panagariya Subir Gokarn

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Editors' Summary

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PURPOSE

This *India Policy Forum 2014–15* comprises papers and highlights of the discussions at the 11th **India Policy Forum (IPF)** held in New Delhi on July 15–16, 2014. The IPF explores India's rapidly evolving and sometimes tumultuous economic transition and its underlying reform process using policy-relevant, rigorous, empirical research. The IPF is sponsored and organised by NCAER, the National Council of Applied Economic Research in New Delhi. NCAER has collaborated from the very first IPF in 2004 with the Brookings Institution in Washington, D.C., including the publication of the first IPF volume by the Brookings Press before publication shifted to India.

An international research panel of India-based and overseas scholars with an abiding interest in India supports this initiative through advice, active participation at the IPF, and the search for innovative papers that promise fresh insights. An international advisory panel of distinguished economists provides overall guidance. Members of the two IPF panels are listed below.

Papers appear in this publication after revisions based on IPF discussants' comments and the guidance provided by the IPF editors. To allow readers to get a sense of the richness of the conversations that happen at the IPF, discussants' comments are also included here, as is a summary of the general discussion on each paper. The papers represent the views of the individual authors and do not imply agreement by the board, officers or staff of NCAER, or Brookings.

Starting in 2011, the IPF began the practice of ending with an **IPF Policy Roundtable**. The 2014 IPF featured a Roundtable on "The State and the Enterprise: How Should the New Indian Government Reset the Relationship?" The names of the Roundtable panellists are noted at the end of the Editors' Summary.

As in past years, the 2014 IPF featured the **Annual IPF Lecture**, this time on "India: Changing Mindsets, Accelerating Growth, Reducing Inequality," delivered by Surjit Bhalla, a member of NCAER's Governing Body and Chairman, Oxus Investments. The 2014 IPF Lecture can be viewed on www.ncaer.org.

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These supporters have almost all been with the IPF since its inception. Their support reflects the deep commitment of these organizations and their leadership to rigorous policy research that helps promote informed policy debates and evidence-based policymaking in India.

CORRESPONDENCE

Correspondence about papers in this volume should be addressed directly to the authors (each paper contains the email address of the corresponding author). All author affiliations in the papers are as of the IPF Conference in July 2014. Manuscripts are not accepted for review because the IPF Volume is devoted exclusively to invited contributions. Feedback on the IPF volume itself may be sent to: The Editor, India Policy Forum, NCAER, 11, Indraprastha Estate, New Delhi 110002, or to ipf@ncaer.org.

NCAER TEAM

NCAER is responsible for the planning, organization, publication, and fund-raising for the India Policy Forum. The editors are deeply grateful to the following NCAER staff for their dedication and hard work on the IPF:

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Editors' Summary

he India Policy Forum (IPF) celebrated its 11th anniversary at the 2014 conference in New Delhi on July 15 and 16. This volume of the *India Policy Forum* journal contains the papers presented at the conference, the comments of the formal discussants, and a summary of the floor discussion of each paper. As in previous years, the five IPF papers cover topics that have dominated the discussion of Indian economic policymaking and the economy itself in recent years.

The first IPF 2014 paper presents an assessment of the impact on India of the US Federal Reserve's tapering talk in May 2013, and the lessons to be learnt from that for the future. The second paper uses the longitudinal panel data from the National Council of Applied Economic Research's (NCAER's) India Human Development Survey (IHDS) to answer the question of whether we can expect India's National Food Security Act (NFSA) to reduce the problem of malnutrition. The third paper examines the distributional impact on women of India's rapid economic growth during the past three decades, focusing on labor market characteristics and outcomes for women relative to men. The fourth paper asks the question of whether India's publicly funded health insurance schemes, providing fully subsidized cover for a limited package of secondary and tertiary inpatient care, are working for the population below the poverty line. The IPF 2014 volume concludes with the fifth paper discussing corruption in India and seeking to bridge the available research evidence to the policies that could be used to tackle corruption.

The Impact of "Tapering Talk" on India and its Lessons

On May 22, 2013, Chairman Ben Bernanke first spoke of the possibility of the Fed tapering its security purchases. This and subsequent statements, collectively known as "tapering talk," had a sharp negative impact on emerging markets. India was among those hardest hit: between May 22nd and the end of August 2013, the rupee depreciated (by 18 percent at one point); bond spreads widened; and stock markets declined sharply. The reaction was sufficiently pronounced for the press to warn that India might be heading toward a full blown crisis that may require it to seek assistance from the International Monetary Fund. Kaushik Basu, Barry Eichengreen, and Poonam Gupta in their IPF paper examine the impact of this tapering talk on India and lessons

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for how India should prepare itself for the end of quantitative easing by the Fed.

The authors maintain that the impact on India was strong for two reasons. First, the country's large and liquid financial markets had received significant volume of capital flows in prior years, making it a convenient target for investors seeking to rebalance away from emerging markets. Second, India's macroeconomic vulnerabilities had increased significantly in prior years, heightening its susceptibility to capital outflows and limiting policy room to address the shock of the Fed's tapering talk.

In an earlier paper referenced in their IPF paper, Eichengreen and Gupta (2014) analyzed the impact of the Fed's tapering talk on exchange rates, foreign reserves, and equity prices in a broad cross-section of countries between May 2013 and August 2013. They find that an important determinant of the impact was the volume of capital inflows received in prior years and the size of local financial markets. Countries receiving larger inflows and with larger and liquid markets experienced more pressure on their exchange rates, reserves, and equity prices. Evidently, investors were better able to rebalance their portfolios away from such countries. India ranks high in terms of the size and liquidity of its financial markets and the extent of capital flows it received in prior years.

In addition, emerging markets that allowed their real exchange rate to appreciate and their current account deficit to widen during the period of quantitative easing saw larger impacts. Precisely these vulnerabilities had built up in India in prior years. The country's current account deficit rose from about 1 percent of GDP in 2006 to nearly 5 percent in 2013, while its real exchange rate appreciated markedly. Its fiscal deficit increased, and inflation, at roughly 10 percent, was stubbornly high. These macroeconomic weaknesses surfaced, moreover, in the midst of a sharp growth slowdown. Although foreign reserves were considered comfortable by some metrics, the protection they provided had declined unmistakably since 2008.

The specific factors contributing to the high fiscal and current account deficits in India also indicated increased economic and financial vulnerabilities. The rise in the budget deficit was due more to an increase in current expenditure (in response to the global financial crisis of 2008) than to a pick-up in public investment. The increase in the current account deficit, which was largely a mirror effect of increased current expenditure, was characterized by the diversion of private saving into the import of gold; it reflected a dearth of attractive domestic outlets for personal savings in a high inflation environment where real returns on many domestic financial investments had turned negative. Loose monetary policy in various advanced countries meanwhile made those deficits easy to finance, further limiting the pressure to compress them.

In response, the Indian authorities intervened in the foreign exchange market. They increased the overnight lending rate (the marginal standing facility rate) by 200 basis points. Gold imports being partly responsible for the large current account deficit, they raised import duties on gold and imposed quantitative restrictions. They opened a swap window for three public sector oil marketing companies to reduce exchange rate volatility and imposed new restrictions on capital outflows from residents.

The authors analyze the impact of these measures using event-study regressions. Specifically, they compare the exchange rate five days after the announcement of a new policy with its value five days prior to the announcement. They find that the measures in question were not very effective in stabilizing the exchange rate. In particular, the Reserve Bank of India's efforts to restrict capital outflows from residents and Indian companies had decidedly mixed effects. In the five days from when the announcement was made, exchange rate depreciation accelerated and portfolio equity flows and equity prices declined. Subsequently, the RBI announced new measures to attract capital through deposits targeted at the Indian diaspora and relaxed restrictions on outward investment that had been introduced previously. These new announcements, together with guidance from the US Federal Reserve about the continuation of Quantitative Easing (QE) for the moment, helped calm markets.

India's experience suggests that once a country is in the midst of a rebalancing episode, it can be difficult to counter the effects. It is better to put in place a medium-term policy framework that limits vulnerabilities, containing the spillover impact in the first place, while maximizing policy space. The authors argue that maintaining a sound fiscal balance, a sustainable current account deficit, and an environment conducive to investment are integral to such a framework. Less obvious elements include managing capital flows so as to encourage stable longer term flows while discouraging volatile short-term flows, avoiding excessive appreciation of the exchange rate through interventions using reserves and macroprudential policy, holding a larger stock of reserves, signing swap lines with other central banks, and preparing banks and corporates to handle greater exchange rate volatility. Finally, while implementing such a medium-term framework and adopting any emergency, crisis-management measures, they recommend that countries have in place a clear communication strategy to explain their actions to market participants.

Will India's National Food Security Act Improve Child Nutrition?

The NFSA, passed in September 2013, is one of the largest safety net programs in the world. The NFSA Bill had easy passage in Parliament: who would dare vote against food security? A key argument for the NFSA was that it would solve India's persistent child malnutrition problem. Sonal Desai and Reeve Vanneman explore whether and how the NFSA will do so. The Act legislates the availability of 5 kg of cereals per person per month at prices ranging from ₹1 to ₹3 per kg to about two-thirds of India's population through the government's Public Distribution System (PDS). The Act also provides nutritional supplements for young children and for pregnant and lactating mothers via the Integrated Child Development Scheme (ICDS). The financial cost of this extremely ambitious program is difficult to estimate, but some estimates peg it at ₹44,000 to 76,000 crore above and beyond the costs already being incurred for existing food security programs.

The NFSA seeks to respond to the troubling observation for India that the reduction in hunger and malnutrition has not kept pace with economic growth. In 2013, India ranked 63rd out of 120 countries in the Global Hunger Index. Much of this low ranking is driven by a very high proportion of underweight children in India. The National Family Health Survey of 2005–06 estimates that 43 percent of children under five are underweight and 48 percent have moderate to severe stunting.

In order to assess the potential of NFSA for reducing malnutrition, Desai and Vanneman address a number of questions: What are the determinants of under-nutrition in India? How successful are the two mechanisms at the core of NFSA—PDS and ICDS—in targeting these determinants? Are there any unanticipated effects? What is the likelihood that the massive program expansion envisioned by NFSA can be carried out within the present administrative framework? Should we be looking at any other policy options?

The results from the NCAER-Maryland IHDS of 2011–12 presented in their paper suggest two things: (a) access to PDS does not seem to be associated with better nutritional outcomes for children under five and (b) access to ICDS is associated with somewhat lower under-nutrition, although the reach of its programs is too narrow.

The authors support their conclusions with a propensity score matching of PDS users and non-users and of ICDS users and non-users. The authors treat PDS and ICDS use as a quasi-experimental situation in which "treatment" effects are estimated by matching users and non-users on up to 20 different characteristics, including location, economic status, household structure, sanitary conditions, caste, religion, and the child's age and gender. There are few differences between children from PDS households and the matched sample of non-PDS children. If anything, the PDS children are *more* often underweight than the comparison children, but the differences are not usually statistically significant. Further analysis reveals why PDS use may not have had the intended result of lower child malnutrition. While it is true that PDS households consumed more cereals, they also consumed *less* milk, pulses, and other foods not available in PDS shops. The result is that PDS households have lower food diversity, and it may be this lack of nutritional diversity, rather than the sheer lack of calories, that results in children's malnutrition.

The pessimistic conclusions from the matched sample analyses are further supported by a fixed-effects analysis comparing household changes in PDS use and changes in their consumption patterns from the longitudinal panel data from the 2004–05 and 2011–12 IHDS surveys. While PDS use is associated with more cereal consumption, it is also associated with more *nonfood* expenditures. It appears that household savings from PDS use are not spent on greater food diversity but on nonfood purchases that would not have any effect on malnutrition.

Finally, even state and national data on changes in child malnutrition over the last decade of PDS growth question whether more PDS use is associated with less malnutrition. States where PDS use grew fastest sometimes had substantial declines in malnutrition (e.g., Himachal Pradesh) and sometimes negligible declines (e.g., Kerala), while other states with good records of malnutrition declines had only modest growth in PDS use (e.g., Karnataka).

The available evidence leads the authors to suggest that we should be cautious about any expectation that increased cereal supply via PDS expansion would lead to substantial declines in under-nutrition.

The evidence for ICDS use is only slightly better. Differences between matched samples of children participating in ICDS programs versus nonparticipants show small benefits of lower underweight for the ICDS participants, but the differences are only marginally significant. Moreover, even these modest benefits are available only to a minority of Indian children: IHDS results show that only 14 percent of children received any ICDS food supplements in the last month.

These are sobering observations, since PDS and ICDS form the backbone of NFSA. ICDS is already supposed to be universal, and coverage of PDS has expanded substantially. But PDS growth may not be a solution to India's malnutrition challenge given the association between a cereal-focused PDS system and the decrease in dietary diversity the authors observe in the IHDS. Instead of relying on the blunt instrument of NFSA to address child malnutrition, a more refined, multipronged approach may be needed that focuses directly on malnutrition. Desai and Vanneman suggest four priority action areas.

Identify the undernourished: Malnutrition is a stealthy enemy, particularly in childhood. Parents often do not realize that their children are undernourished until they suffer from severe malnutrition. Without accurate statistics on malnutrition, it is impossible to detect whether public programs are working or not.

Address acute malnutrition immediately: International standards suggest that treatment in an inpatient facility should be considered for children who are three or more standard deviations below the reference median height-for-age or weight-for-age. Since nearly a fifth of Indian children are classified in this category, the Indian Academy of Pediatricians suggests hospitalization for such children under 6 months and home-based therapy for older children.

Address proximate causes of moderate malnutrition: Moderate malnutrition —children between two and three standard deviations below the reference median—forms the bulk of undernourished children in India. Lack of dietary diversity and poor child feeding practices may be at fault for this undernutrition. Providing parents with specific information about their children's nutrition status through national nutrition days could be an important tool for focusing attention on malnutrition. Micronutrient deficiencies could also be handled through food fortification.

Promote balanced diets and disease control: While access to food through the PDS will help increase caloric availability, increasing access to fruits, vegetables, and milk is even more important in creating a balanced diet. Disease control via improved water and sanitation should also play an important role in reducing malnutrition. But we need to know more definitively whether sanitation programs that build toilets are actually associated with decreased disease prevalence and lower child malnutrition. Water quality within the household has also not received sufficient attention. Considerable contamination takes place as water moves from the treatment plant to consumption within the household.

The Evolution of Gender Gaps in India

India's economy grew rapidly during the past three decades. The distributional impact of this rapid growth on women however remains unclear. In their paper, Shampa Bhattacharjee, Viktoria Hnatkovska, and Amartya Lahiri explore the impact of India's rapid economic growth on labor market characteristics and outcomes for women relative to men. Using data from six consecutive rounds of the employment–unemployment schedule of the National Sample Survey covering the period 1983–2010, they study the evolution of gaps in education attainment rates, occupation choices, and wages in India across male and female full-time workers. Their primary finding is that there has been a significant decline in the male–female gaps in these indicators over the last three decades. While women are still disadvantaged in educational attainment, their condition has improved significantly during this period.

The authors find that the relative male–female gap in years of schooling has declined from nearly 4.0 percent to 1.7 percent over the period 1983–2010. In order to identify the educational level at which convergence in the relative gap is taking place, the authors divide educational status into five broad categories: illiterate, some education, primary, middle, and secondary and above. Their results show that over time the share of women has increased in every educational category beyond the lowest category of illiterates. There has also been a significant reduction in the absolute gender gap for the lowest four education categories. However, these positive trends are somewhat sullied by a significant rise in the absolute gap between males and females in the top-most educational category of secondary education and above.

In terms of occupational choice, the paper finds that both male and female workers are leaving agriculture, but males are doing so at a faster rate. While females have significantly increased their employment share in white collar jobs, the under-representation of women in blue-collar jobs and over-representation in agrarian jobs has increased over the period 1983–2010.

The authors find that there has been a significant drop in gender wage gaps for most of the income distribution. A large part of the decline in the gender gap or convergence for the 10th and 50th percentiles of the wage distribution is accounted for by measured individual attributes, particularly education. However, the convergence in the 90th percentile of the wage distribution was mostly due to unmeasured factors, since the measured attributes of this group actually predict that the gender wage gap should have risen instead of falling. A reduction in gender discrimination in highly paid white collar jobs could be one of the channels through which wage convergence at the 90th percentile is taking place, but the authors are not definitive about this and suggest that more detailed investigation is needed.

Another important result of this paper is that the gender gaps in education and occupation have declined at a much faster rate for younger cohorts, consisting of men and women 16–25 years old. Since their results also suggest that the convergence in education largely explains the convergence in wages, the authors expect gender gaps in wages to reduce further in the coming decades as younger cohorts of relatively more educated women and men replace older ones.

An important contribution of this paper is that it aggregates the evidence on gender gaps from the national micro data to generate measures of the national gap in labor market characteristics and wages and then examines the trends over time. The previous literature that has analyzed gender differences in labor market outcomes has mostly concentrated either on just a few districts or states, or if using a nationally representative sample, only on one year.

The authors stress that there are some important issues that their paper does not address. First, it does not take into account trends in female labor force participation rates in India. A number of existing studies suggest that there is a U-shaped relationship between female labor force participation rates and economic development. However, in the Indian context, empirical evidence on such a U-shaped relationship between economic development and female labor force participation is mixed. Existing studies suggest that female labor participation rates vary between rural and urban areas and across sub-rounds of the NSS data. Thus, female labor force participation is a complex issue that requires much more detailed analysis.

Second, the paper focuses on between-group inequalities, not withingroup inequality. The declining inequality between males and females as shown in this paper might be accompanied by a widening of inequality within females. More work is required to determine the overall pattern of inequality in India during the last 30 years. Finally, the paper shows all-India trends and not state-specific trends. Given the differences in policies across states, systematically exploring cross-state differences could help us identify the channels through which the convergence is taking place. The authors intend analyzing all three sets of issues in subsequent work and are encouraged to do so.

Are Publicly Financed Health Insurance Schemes Working in India?

Since 2003, various government sponsored health insurance schemes have been implemented in India to offer financial protection against catastrophic health shocks to the poor. Several state governments have taken the initiative to roll out their own state-financed health insurance schemes, and these were followed by the Union government rolling out the largest of such schemes, the Rashtriya Swasthya Bima Yojna (RSBY).

These schemes provide fully subsidized cover for a limited package of secondary and tertiary inpatient care, targeting the population below the poverty line. Given the rapid expansion of health insurance schemes by the Union and state governments in India, it is important to analyze their impact on financial risk protection and health outcomes. The need for evaluation is also crucial as the Government of India is reviewing other options for health financing reforms. Shamika Ravi and Sofi Bergkvist analyze the impact of these state sponsored health insurance schemes in their IPF paper, find limited impact of these government sponsored health insurance schemes, and discuss the policy implications of their findings.

What will India's health care system look like in the next two decades? Depending on policies undertaken over the next few years, India could end up like the US, which spends 18 percent of GDP on health, or like Singapore which spends 4 percent (or somewhere in between), in order to achieve roughly similar outcomes as is the case for these two countries. Most agree that India needs a strong primary care system that is publicly funded and focuses on preventive and public health measures. Beyond this agreement, there are divergent views on what financing methods to adopt. India's current system is largely out-of-pocket payments, with tax breaks provided for health insurance. Between 2003 and 2010, several state governments in South India adopted publicly-funded insurance models for secondary and tertiary care for the poor. The Union Government followed with the RSBY Scheme in 2008. Towards the end of their term in 2014, the United Progressive Alliance government's favored instrument was single-payer universal health coverage-free care at all levels to everybody, mainly through entitlements backed by government funding and purchase of health services.

Insurance is widely recognized as a poor platform for health care financing because it suffers from information asymmetries, particularly when, as in a developing country setting, the asymmetries are acute. In a voluntary insurance market there is an adverse selection problem: people who buy insurance on average are more likely to be sicker than the rest of the population. This makes the pool of the insured riskier on average than the entire population, thereby making pricing and the functioning of the insurance market difficult. Most developed countries, such as the US, have therefore made health insurance mandatory to overcome adverse selection. The other big problem that arises due to information asymmetry is moral hazard. Neither patients nor physicians have the incentive to control costs, and therefore overuse or abuse. This leads to massive cost inflation, making the insurance system unsustainable. The US is a good example, spending close to double of what most other developed countries spend.

Although the government-funded health insurance schemes have existed earlier in India, this latest push starting in the early 2000s is a new form of government resource allocation to health care in India. Almost all public financing of health care in India was earlier directed towards governmentowned and government-operated health service delivery systems. Nearly all these schemes target the below-poverty-line (BPL) populations, but their intent is to reach universal coverage eventually. The BPL lists vary across schemes. The state schemes use a more extensive BPL list, and in Andhra Pradesh, e.g., the *Arogyashri* scheme covers nearly 80 percent of the population. The RSBY uses the BPL list set by India's erstwhile Indian Planning Commission.

The authors review the several studies on the impact of the new publicly financed health insurance schemes (PFHIS). Most careful studies have found that the share of health care in household expenditure has declined marginally since the PFHIS were introduced. This decline is largely due to significant fall in out-patient expenditures, not in-patient expenditures. Data indicates that most out-of-pocket health care expenditure is for outpatient care and mainly covers the cost of drugs. The recently introduced PFHIS, however, focus on tertiary and secondary health care services. The authors note this strong disconnect between the recent health financing reforms and the source of the health burden on average Indian households.

The data shows that the utilization rate of PFHIS is a fraction of the utilization rate in the private health insurance market. For every 1,000 beneficiaries enrolled, the utilization rate is 64 admissions per year in private voluntary health insurance products but only 25 admissions per year for RSBY and 22 admissions per year for *Yeshasvani* in Karnataka. The authors' illustrative analysis using NSSO data corroborates the finding that the PFHIS are not providing financial protection against health care cost shocks in the short run.

Ravi and Bergkvist suggest that the factors that have been highlighted in the literature should form the basis for future policy experimentation in health financing reforms in India. These include health insurance for OPD, financial literacy for beneficiaries, government investment in health infrastructure including MIS, and an alternate health financing instrument in the form of medical savings accounts.

Corruption in India: Bridging Research Evidence and Policy Options

Corruption has become an increasingly salient issue in India, spawning both enormous interests from the media as well as a large amount of academic research. Yet there is a large gap between what has captured the media's attention, the policy options under discussion or being implemented, and the actual evidence drawn from empirical research on corruption. For example, academic evidence supports the popular perception that corruption is widespread and endemic; but it also suggests that the costs of day-to-day corruption are just as large, if not larger, than those of the scams that dominate headlines. The public, politicians, and media are largely unaware of the national cost of day-to-day corruption. Relying on such data and rigorously evaluated causal relationships, Sandip Sukhtankar and Milan Vaishnav in their IPF paper attempt to bridge the gap between evidence and policy to better understand the causes and consequences of corruption in India and to suggest some solutions to address its spread.

The paper begins with a consideration of the underlying drivers of corruption, identifying two deep causes—the lack of enforcement capacity and regulatory complexity—and two proximate causes—inadequate regulation of political finance and shortcomings in public sector recruitment and postings. Cross-country evidence suggests that corruption is highest in lower middleincome countries, which have heavily regulated economies but do not yet boast adequate enforcement capacity, the precise and unfortunate juncture at which India finds itself. In addition, India also faces additional distinct problems. Loopholes in, and lack of enforcement of, election finance laws mean that the funding of elections is awash with black money, typically unaccounted cash, fueling corruption across numerous sectors. Meanwhile, recruitment, transfers, and postings of public employees, particularly at lower levels of the public service, are often conducted on the basis of bribes rather than merit, and the wage and incentive structures do not adequately reward performance and punish malfeasance.

The authors next turn to summarizing the empirical literature on the extent of corruption in India. In order to make sense of this vast literature, they classify corruption into three categories according to the nature of the corrupt actions taken by officials: facilitative, collusive, and extractive. Facilitative corruption involves officials charging fees or bribes for activities that they should be doing in the first place; collusive corruption involves officials breaking or bending rules to benefit bribers; and extractive corruption involves officials simply stealing funds from the government or private parties, either through harassment or stealth. The authors find detailed

research evidence of corruption in all these categories, despite the difficulty in uncovering, in particular, collusive corruption; and also evidence of the harm caused by corruption, e.g., by allowing incompetent drivers to obtain driving licenses in exchange for bribes.

Having documented the extent of corruption and its costs, the paper then turns to evidence on the relative effectiveness of strategies to combat corruption. The authors categorize solutions into those related to information/ bottom up monitoring; technology; financial incentives; electoral reform; legal reform; and policy reform. They find that there is very little evidence to support the idea that greater transparency, information, and community based efforts have a significant impact on reducing corruption on their own. These interventions work best when they transfer bargaining power to citizens and beneficiaries. This caveat is also true for some technological interventions, especially those interventions—like direct benefit transfers—that bypass middlemen and corrupt officials. Unsurprisingly, there is also evidence that incentives matter. Sukhtankar and Vaishnav find much to commend in the sensible and wide-ranging legislative agenda to combat corruption, including the proposed Right to Service and Public Procurement bills. However, what is most important for combating corruption is not the law on paper but the implementation of the law; the binding constraint, as always, is the government's desire and ability to punish corrupt officials and politicians.

Finally, the paper discusses the conditions under which political elites might acquire the desire and ability to implement the law, drawing on both contemporary evidence from India and historical evidence from societies that have evolved out of patronage politics and toward a pro-development equilibrium. Political space to address corruption may be created when politicians have access to other financial flows that can compensate for foregone rents, when they pursue retribution against opponents, or when strong political movements arise to push through pivotal changes. Of these, only the third scenario is likely to provide sustained change. Meanwhile, a challenge in enacting anticorruption reforms is that many politicians currently in power may be criminal or corrupt. An even more fundamental problem is that voters are affirmatively electing (and often re-electing) such individuals. Nonetheless, some encouraging signs of change on this front are visible, as voters increasingly identify economic issues such as economic development as more important than clientelistic ones.

The anticorruption agenda in India is massive as are the stakes. Left unaddressed, corruption can not only hamper India's ability to grow its economy and provide opportunities for its young, growing population, but also runs the risk of negatively impacting popular perceptions of democracy and the rule of law. Sukhtankar and Vaishnav suggest that there is, however, a silver lining for anticorruption reformers: the literature is replete with successful examples of logistically simple solutions that can be implemented at minimal cost. They feel that while the ability of these solutions to fully circumvent weak public sector institutions has its limits, the potential gains from even incremental reform suggest that such an agenda should be pursued with great urgency.

The Annual 2014 IPF Lecture and IPF Policy Roundtable

Though not included in this IPF volume, the 2014 IPF featured the traditional Annual IPF Lecture, given this year by NCAER Governing Body Member Surjit Bhalla. Bhalla spoke on "India: Changing Mindsets, Accelerating Growth, Reducing Inequality," focusing on the political, policymaking, and implementation challenges that the new Indian government of Prime Minister Modi will have to face up to if India is to regain the path of high economic growth with increasing opportunity and lower inequality.

Since 2011, and true to its purpose, the IPF has now routinely featured a concluding Policy Roundtable. The panelists on the 2014 IPF Policy Roundtable engaged energetically on the topic of "The State and the Enterprise: How should the new Indian Government reset the Relationship?" The Roundtable reflected growing concerns about the patchwork of laws and regulations affecting private enterprise in India, some derived from pre-Independence days, and, in contrast, the laws that a modern 21st century economy should have for its firms and workers to be competitive in a globalized world. The Roundtable was expertly chaired by Arvind Panagariya (Columbia University and NCAER), with a distinguished panel comprising Vijay Joshi (Oxford), Mihir Desai (Harvard), K.P. Krishnan (Ministry of Finance), and Surjit Bhalla (Oxus Investments and NCAER).

Materials on both the IPF 2014 Lecture and Policy Roundtable are available on NCAER's website, www.ncaer.org. A video recording of the IPF Lecture can also be viewed there.

Transitions

With this 11th issue of the *IPF Volume*, we also bid goodbye to Barry Bosworth, one of the three Founding Editors of the *IPF Volume* since it

was first published following the first IPF in 2004. Barry has, above all, kept a steady hand on the tiller all these years, often doing more than his share of the work among the three IPF Editors. Barry continues as a senior fellow in the Economic Studies Program and the Robert V. Roosa Chair in International Economics at the Brookings Institution. NCAER is grateful to Barry for his decade long contributions to the India Policy Forum. NCAER is also pleased to welcome Subir Gokarn, Research Director at Brookings India, in Barry's place.

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From Tapering to Tightening: The Impact of the Fed's Exit on India[§]

ABSTRACT The episode of volatility starting on May 22, 2013, when Federal Reserve Chairman Ben Bernanke first spoke of the possibility of the US central bank "tapering" its security purchases, had a sharp negative impact on emerging markets. India was among those hardest hit. The rupee depreciated by 18 percent at one point, causing concerns that the country was heading toward a financial crisis. This paper contends that India was adversely impacted because it had received large capital flows in prior years and had large and liquid financial markets that were a convenient target for investors seeking to rebalance away from emerging markets. In addition, macroeconomic conditions had weakened in prior years, which rendered the economy vulnerable to capital outflows and limited the policy room for maneuver. Measures adopted to handle the impact of the tapering talk were not effective in stabilizing the financial markets and restoring confidence, implying that there may not be any easy choices when a country is caught in the midst of rebalancing of global portfolios. We suggest putting in place a medium-term policy framework that limits vulnerabilities in advance, while maximizing the policy space for responding to shocks. Elements of such a framework include a sound fiscal balance, sustainable current account deficit, and environment conducive to investment. In addition, India should continue to encourage stable longer term capital inflows while discouraging volatile short-term flows, hold a larger stock of reserves, avoid excessive appreciation of the exchange rate through interventions with the use of reserves and macroprudential policy, and prepare the banks and firms to handle greater exchange rate volatility.

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Keywords: Balance of Payments, Economic Management, Macroeconomic Policy, Macroeconomic Vulnerability, Monetary Policy

JEL Classification: F32, F33, F38, E58

1. Introduction

On May 22, 2013, Federal Reserve Chairman Ben Bernanke first spoke of the possibility of the Fed reducing, or tapering, its security purchases. This "tapering talk," as it came to be known, had a sharp negative impact on financial conditions in emerging markets.¹ India was among those hardest hit. Between May 22, 2013, and the end of August 2013, the rupee depreciated by 18 percent, bond spreads increased, and equity prices fell. The reaction was sufficiently pronounced for the press to warn that India might be heading toward a full-blown financial crisis, requiring the country to seek IMF assistance.²

In this paper, we ask three questions about this episode. Why was the impact of the Fed's announcement on India so severe? How effective were the policy measures undertaken in response? How can India prepare itself for the normalization of monetary policy in advanced economies and more broadly to react to global liquidity cycles?

Eichengreen and Gupta (2014) analyzed the impact of the Fed's tapering talk on exchange rates, foreign reserves, and equity prices in emerging markets between April and August 2013.³ They established that an important determinant of the impact was the volume of capital flows that countries received in prior years and the size of local financial markets. Countries receiving larger inflows of capital and with larger and liquid financial markets experienced more pressure on their exchange rates, reserves, and equity prices once the Fed's "tapering talk" began. This may be interpreted as showing that investors are better able to rebalance their portfolios away

1. The period of the tapering talk is generally referred to that between May 22, 2013 and September 18, 2013.

2. See e.g., "India in crisis mode as rupee hits another record low," http://money.cnn. com/2013/08/28/investing/india-rupee/ (Accessed April 30, 2015); "India's Financial Crisis, Through the Keyhole," http://www.economist.com/blogs/banyan/2013/08/india-s-financial-crisis (Accessed April 30, 2015).

3. Subsequently the Federal Reserve started tapering its purchases of securities in December 2013, reducing it by \$10 bn each month. It has since then tapered six more times, each time by \$10 bn and is expected to end the program in October, 2014, with a last reduction of \$15 bn in the purchase of securities.

from an emerging economy when the country in question has a relatively large and liquid financial market.

This paper elaborates the Indian case. India ranks high in terms of the size and liquidity of its financial markets and the extent of capital flows it received in prior years. It thus was an easy target for investors seeking to rebalance away from emerging markets.

In addition, Eichengreen and Gupta show that the emerging markets that allowed their real exchange rates to appreciate and their current account deficits to widen in the period of quantitative easing felt a larger impact. Such vulnerabilities had developed in India too in prior years. In addition, the country's fiscal deficit had increased, and inflation at about 10 percent was stubbornly high. These macroeconomic weaknesses had surfaced in the midst of a sharp growth slowdown. Although the level of foreign reserves was considered comfortable by some metrics, effective coverage had declined since 2008.

The specific factors contributing to the high fiscal or current account deficit in India also indicated increased economic and financial vulnerabilities. The increase in fiscal deficit was due to an increase in current expenditure (in response to the global financial crisis of 2008, the headwinds of which were palpable by early 2009), rather than to a pick up in public investment. The increase in current account deficit, largely a mirror image of the increased current expenditure, was characterized by the diversion of private savings into the import of gold. It reflected a dearth of attractive domestic outlets for personal savings in a high inflation environment, where real returns on many domestic financial investments had turned negative. Loose monetary policy in the advanced countries made those deficits easy to finance, further relieving the pressure to compress them. Rebalancing by global investors when the Fed broached the subject of tapering highlighted these vulnerabilities.

The authorities adopted a range of measures in response. They intervened in the foreign exchange market, hiked interest rates, raised the import duty on gold, encouraged capital inflows from nonresident Indians, established a currency swap window for oil importing companies, opened a swap line with the Bank of Japan, and restricted capital outflows from residents and Indian companies. We estimate the impact of these measures on the exchange rate and financial markets. Our results show that some of these measures, including the separate swap window for oil importing companies, were of limited help in stabilizing the financial markets. Others, like initiatives restricting capital outflows, actually undermined confidence.

These findings imply that there are no easy choices when a country is affected by a rebalancing of global portfolios. Hence, we suggest putting in place a medium-term policy framework that limits vulnerabilities in advance, while maximizing the policy space for responding to shocks. Elements of such a framework include holding a larger stock of reserves; avoiding excessive appreciation of the exchange rate through interventions using reserves and macroprudential policy; signing swap lines with other central banks where feasible; preparing the banks and the corporates to handle greater exchange rate volatility; adopting a clear communication strategy; avoiding measures that could damage confidence, such as restricting outflows; and managing capital inflows to encourage relatively stable longer term flows while discouraging short-term flows.⁴ A sound fiscal balance, sustainable current account deficit, and environment conducive for investment are other obvious elements of this policy framework.

2. The Effects of the Tapering Talk on India

As documented in Eichengreen and Gupta (2013), the Fed's tapering talk affected a large number of emerging markets. Using data for 53 emerging markets (which have their own currency and exchange rate), they calculated cumulative changes in exchange rates, stock prices, bond spreads and reserves between April 2013 and, alternatively, end of June, end of July, and end of August 2013. The resulting distribution of exchange rate changes over the months through August is in Panel A of Figure 1. The exchange rate depreciated in 36 of the 53 countries between April and June.⁵ Despite some subsequent recovery, by August exchange rates for 30 of the 53 countries remained below their levels in April. The average rate of depreciation in these 30 countries was over 6 percent, and exchange rates for about half the countries depreciated by more than 5½ percent.

Panel B provides further details on the distribution of exchange rate changes between April and August. The largest depreciation was experienced by Brazil, India, South Africa, Turkey, and Uruguay, where the exchange rate depreciated by at least 9 percent, and Brazil experienced the largest depreciation of 17 percent. Data for stock markets are available for fewer countries; 25 of the 38 countries for which we have the data

4. See Zhang and Zoli (2014) and the literature cited therein for the recent contributions on the use of macro prudential policies, in particular loan to value ratio, debt to income ratio, required reserves ratio, countercyclical provisioning and countercyclical capital requirements in Asian economies. See Cordella et al. (2014) on the use of reserve requirements as a countercyclical macroprudential tool in developing countries.

5. We extracted the data on exchange rate, reserves, and stock markets from the Global Economic Monitoring database of the World Bank on October 29, 2013.

FIGURE 1. Exchange Rate, Stock Market, and Reserves in Emerging Markets during the Tapering Talk

A: Distribution of % change in exchange rate over time shows that the effect spread and increased through August







(Figure 1 Contd)

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(Figure 1 Contd)

C: Cumulative effect on stock market index (% change) between April-August, 2013 is rather modest for India



D: Cumulative effect on external reserves (% change) during April-August, 2013, reserves declined by nearly 6% in India



Source: Data on exchange rates, reserves and stock markets are from the Global Economic Monitoring database of the World Bank. Calculations are based on end of month values. See Eichengreen and Gupta (2014) for details.

experienced some decline in their stock markets. The average decline in these 25 countries was 6.9 percent (Panel C, Figure 1). For six emerging markets (Chile, Indonesia, Kazakhstan, Peru, Serbia, and Turkey), the decline was more than 10 percent. In comparison, India had a relatively modest decline in its stock market (at month-end values). Reserves declined for 29 of 51 countries between April and August, with the largest declines seen in the Dominican Republic, Hungary, Indonesia, Sri Lanka, and Ukraine.⁶

Even though the Fed's tapering talk affected a large number of emerging markets, market commentary focused on five countries, Brazil, Indonesia, India, Turkey, and South Africa, christened as "Fragile Five." Table 1 summarizes the effect on these five countries. As is evident from the table, the exchange rates depreciated and reserves declined in all five countries, while equity prices declined in all but South Africa. The largest depreciation occurred in Brazil, the largest decline in stock prices was in Turkey, and the largest reserve loss was observed in Indonesia. Within this group India had the second largest exchange rate depreciation and the second largest decline in reserves.

This period was also marked by significant volatility. Highlighting the Indian case in Table 2, we show that the short-term volatility, measured by the standard deviation of percentage change in exchange rates, stock market prices, and reserves (using daily data for exchange rate and equity prices and weekly data for reserves) was quite large in summer 2013, compared to the previous months.

	Exchange rate depreciation	% change in stock prices	% change in reserves	
Brazil	17.01	-5.28	-3.07	
Indonesia	8.33	-14.21	-13.30	
India	15.70	-3.32*	-5.89	
Turkey	9.21	-15.38	-4.56	
South Africa	10.60	6.81	-5.05	
Brazil Indonesia India Turkey South Africa	17.01 8.33 15.70 9.21 10.60	-5.28 -14.21 -3.32* -15.38 6.81	-3.07 -13.30 -5.89 -4.56 -5.05	

TABLE 1.Effect of Tapering Talk on "Fragile Five" Countries(April-August, 2013)

Source: Calculated using data from the Global Economic Monitor database of the World Bank.

Note: *Decline in stock prices in India was about 10 percent if calculated using daily data between May 22 and August 31, 2013.

6. We dropped countries where events other than the tapering talk clearly dominated the impact on financial markets. For example, Pakistan where there was a large increase in stock prices due to developments unrelated to tapering—it had agreed to a \$5.3 billion loan from the IMF on July 5, boosting reserves and leading to rallies in stocks, bonds, and the rupee (Bloomberg, July 5, 2013). We also dropped Egypt where foreign reserves rose by 33 percent between April and July, 2013 due to aid from other countries.

	s.d. of % change in daily exchange rate	s.d. of % change in daily stock prices	s.d. of % change in weekly stock of foreign reserves
Tapering Talk: May 23, 2013– August 31, 2013	4.95	3.62	1.82
Previous three Months (Feb 21, 2013–May 22, 2013)	0.9	2.81	0.73
Previous one year (May 21, 2012– May 22, 2013)	1.71	6.92	1.05

TABLE 2. Volatility in India during the Tapering Talk (Standard Deviation of % Changes Using Daily or Weekly Data)

Source: Standard deviation calculated using daily data on nominal exchange rate and stock market index from Bloomberg; and weekly data on foreign reserves from the RBI.

3. Why Was India Affected So Severely?

The impact on India was large for two reasons. First, India's large and liquid financial markets had received significant volumes of capital flows in prior years, making it a convenient target for investors seeking to rebalance away from emerging markets. Second, macroeconomic vulnerabilities had increased in the years prior to the tapering talk, making it vulnerable to capital outflows and limiting the policy room to address the shock imparted by the Fed's tapering talk.

In their analysis of the impact of the Fed's tapering talk on the exchange rates, foreign reserves and equity prices of emerging markets between May 2013 and August 2013, Eichengreen and Gupta (2014) found that the countries with larger financial markets and larger capital inflows in the prior years experienced more exchange rate depreciation and larger reserve losses in the tapering-talk episode. Evidently, investors are more easily able to rebalance their portfolios away from an economy when the country in question has a relatively large and liquid financial market, possibly because they incur a smaller loss of value and need to withdraw only from a few large markets than sell their assets in many small markets. India ranks high in terms of the size and liquidity of its financial markets and the extent of the inflows it received in prior years (see Figure 2 and Table 3). Moreover, whether measured in absolute terms or as percent of GDP, India is among the top quartile of countries, or for some indicators among the top few emerging economies, for various measures of the size and liquidity of financial markets.

A second reason for the impact of the Fed's tapering talk on India was the macroeconomic imbalances apparent at its outset. Eichengreen and

FIGURE 2. Size and Liquidity of Financial Markets and the Effect on Exchange Rate during the Tapering Talk

A: Larger private external financing in 2010–12 implied larger exchange rate depreciation during the tapering talk



B: Larger financial markets proxied by the stock of portfolio liabilities in 2012 implied larger exchange rate depreciation during the tapering talk



(Figure 2 Contd)

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(Figure 2 Contd)

C: Larger financial markets proxied by stock market capitalization/GDP in 2012 implied larger exchange rate depreciation during the tapering talk



D: More liquid domestic markets, measured by turnover ratio in stock market implied larger exchange rate depreciation during the tapering talk



Source: Eichengreen and Gupta (2014).

	Number of countries	Mean	Median	Top quartile	India
Capital inflows in 2010–12, GFSR, bn \$	43	65.6	21	57	218
Stock market capitalization in 2012, bn \$, WDI	47	302	32.9	383	1,260
Stock of portfolio liabilities, 2012, IFS, bn \$	36	92	30.4	151	186
Stock market capitalization, % of GDP in 2012, WDI	47	52	36.3	61.8	68.6
Stock of portfolio liabilities % of GDP, 2012, IFS	29	22.4	21.7	33.2	10

TABLE 3. Size of the Financial Market and Cumulative Capital Inflows were Large in India prior to the Tapering Talk Compared to Other Emerging Markets (\$ billion or % of GDP)

Sources: Data on capital inflows, consisting of private inflows of bonds, equity, and loans is from the IMF's Global Financial Stability Report. Data on stock market capitalization is from the World Development Indicators; and the data on portfolio liability is from the International Financial Statistics.

Gupta show that the emerging markets that allowed their real exchange rate to appreciate and the current account deficit to widen during the period of quantitative easing saw a larger impact. India's current account deficit increased from about 1 percent of GDP in 2006 to nearly 5 percent in 2013, and its real exchange rate appreciated markedly. In addition, the fiscal deficit increased, and inflation at about 10 percent was stubbornly high (Figure 3). These macroeconomic weaknesses surfaced, moreover, in the midst of a sharp growth slowdown. Although the level of foreign reserves was considered comfortable by some metrics, the effective coverage they provided had declined since 2008.⁷ The policy interest rate was already high, the Reserve Bank of India (RBI) having raised it from 3.25 percent in December 2009 to 8.50 percent in December 2012. The large fiscal deficit and high policy rate implied little room for maneuver in fiscal and monetary policy.⁸

7. One might ask why if India was affected by the tapering talk it was not also affected by tapering itself once this began in December, especially insofar as most indicators of the health of macro economy did not improve much between the tapering talk and tapering itself. In our view what changed was the "event" itself. While the Fed's May 2013 tapering talk was unanticipated and triggered a large reaction from the market, the December 2013 policy change was better communicated in advance and entirely anticipated by the market. In addition, Indian authorities learned from the shortcomings of their initial policy response. Hence the response in December 2013 was better.

8. In a paper presented at India Policy Forum, 2013, Kapur and Mohan had cautioned that such macroeconomic imbalances indicated heightened vulnerabilities to a financial crisis.

FIGURE 3. Macroeconomic Imbalances were Apparent in India at the Outset of the Tapering Talk





Inflation was persistently high



(Figure 3 Contd)

(Figure 3 Contd)

Fiscal deficit was high



Current account deficit was increasing



(Figure 3 Contd)
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(Figure 3 Contd)

Reserve coverage had declined



Real exchange rate had appreciated



Sources: GDP, CSO; CPI Inflation, Citi Research; Gross Fiscal Deficit, Current Account Deficit, Reserve Bank of India; Reserves to M2 Ratio, IFS; Real Effective Exchange Rate (CPI based, six currency), RBI; Bilateral RER calculated using data from IFS. Years refer to fiscal years. Specific factors contributing to the high fiscal or current account deficit also indicated increased economic and financial vulnerabilities. The increase in fiscal deficit was due to an increase in current expenditure. The increase in expenditure was on account of the subsidies on petroleum, as the import price of oil increased, and prices were regulated and the increase in price was not passed on to the consumers; as well as debt waivers, pay commission awards, and expansion of the National Rural Employment Guarantee Act from 200 districts to 600 districts. Some increase in expenditure was also in response to the global financial crisis of 2008, the headwinds of which were palpable in India by early 2009.

The increase in current account deficit was largely a mirror image of the increased current expenditure. It was due to an increase in imports of oil, gold, and coal, the three items accounting for more than two-fifth of India's import basket. The increase was due to increase in the price of oil and gold, and their demand being rather inelastic; but also due to a decline in the domestic supply of coal. The increase in the import of gold reflected some deflection of private savings, reflecting a dearth of attractive domestic outlets for personal savings in a high inflation environment, where real returns on many domestic financial investments had turned negative (see Figure 4). Loose monetary policy in advanced countries meanwhile made those deficits easy to finance, further relieving the pressure to compress them.

India fared worse than the median emerging market on most of these indicators of the macroeconomic vulnerabilities, or worse than three-fourths of them for some of the more important indicators, including the level of debt, fiscal deficit, inflation, and reserves (Table 4).

	Number of			Bottom	
Variable	countries	Mean	Median	quartile *	India
Economic growth, 2012	53	3.01	3.27	1.41	4.7
Public debt % of GDP, 2012	52	47.68	44.10	59.60	66.70
Fiscal deficit % of GDP, 2012	53	3.14	3.30	4.80	7.97
Current account deficit % of GDP, 2012	53	2.89	3.10	7.47	4.79
Inflation, CPI, 2012	52	4.96	3.80	6.13	10.44
Reserves to M2 ratio, 2012	52	0.38	0.32	0.24	0.21
RER appreciation, % (during 2010–12)	50	3.00	2.50	4.29	3.54

TABLE 4. Comparison of Macroeconomic Variables for India with Other Emerging Markets in 2012

Source: Eichengreen and Gupta (2014).

Note: *Values refer to the country at the bottom 25 percentile for economic growth and reserves, and the country at the top 25 percentile for all other variables.

FIGURE 4. The Level and Quality of Fiscal Deficit and Current Account Deficit Indicated Vulnerabilities at the Outset of the Tapering Talk





(Figure 4 Contd)





Sources: Gross Fiscal Deficit, FDI, Gold Import, Current Account Deficit, Reserve Bank of India; Subsidies, Ministry of Petroleum and Natural Gas, Govt. of India; Investment, CSO; Portfolio Flows, Bloomberg.

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Drawing on Eichengreen and Gupta (2014), we consider the factors that were associated with the impact of the Fed's tapering talk on exchange rates, stock prices, and reserves. We calculate weighted average of changes in exchange rates, foreign reserves, and stock prices in two separate indices. Capital Market Pressure Index I is a weighted average of percent depreciation of exchange rate and reserves losses between April 2013 and August 2013, where the weights are the inverse of the standard deviations of monthly data from January 2000 to August 2013.

	% Exchange Rate	% Decline in
Capital Market	Depreciation	Reserves
Pressure Index I	σ exchange rate	σreserves

Capital Market Pressure Index II is similarly a weighted average of the percent depreciation of exchange rate, reserve loss, and decline in stock prices between April 2013 and August 2013.⁹

	% Exchange Rate	% Decline in	% Decline in
Capital Market	Depreciation	Reserves	Stock Market
Pressure Index II	σ exchange rate	σreserves	σ stock

We regress exchange rate depreciation, Index I, and Index II on macroeconomic conditions, financial market structure and institutional variables, estimating linear equations of the form:

$$Y_i = \alpha_k X_{k,i} + \varepsilon_i \tag{1}$$

where Y_i is exchange rate depreciation, Index I or Index II for country i between April–August 2013. The explanatory variables, X_k , include cumulative private capital inflows during 2010–12, stock of portfolio liabilities or stock market capitalization in 2012 as alternate measures of the size of financial markets; several alternate measures of macroeconomic conditions such as the increase in current account deficit, real exchange rate appreciation,

9. We construct these indices in a manner analogous to the exchange market pressure index in Eichengreen et al. (1995), which they constructed as a weighted average of changes in exchange rates, reserves, and policy interest rates, where the weights are the inverse of the standard deviation of each series. The number of countries for which we can construct the index declines from 51 for the first index to 37 for the second index. If we also include increase in bond yields in the index, the number of countries for which we would be able to construct it declines to 25.

foreign reserves, GDP growth, fiscal deficit, inflation, or public debt; and institutional variables such as the exchange rate regime, capital account openness, or the quality of the business environment.

Since these variables are correlated, we include only one of them at a time from each category (size of financial markets, macroeconomic variables, and institutional variables). Since the results are similar using different proxies, we report only a representative subset here. We take the values of the regressors in 2012 or their averages over the period 2010–12 (either way, prior to the Fed's tapering talk).¹⁰

Results show that the countries with larger financial markets experienced more exchange rate depreciation and reserve losses. Deterioration in the current account, the extent of real exchange rate appreciation, and inflation during the years of abundant global liquidity were associated with more exchange rate depreciation and larger increases in the composite indices in the summer of 2013 (Table 5, results are not reported here for specifications in which we include inflation, but are available on request.)

This helps us to understand why the same countries that had complained earlier about the impact of quantitative easing on their exchange rates also complained now about the impact of the tapering talk in the summer of 2013. The countries most affected by or least able to limit the earlier impact on their real exchange rates were the same ones to subsequently experience large and uncomfortable real exchange rate reversals, in other words. Standardized coefficients appropriate for comparing the coefficients of various regressors show that the coefficient of the size of financial markets is the largest followed by the coefficients of real exchange rate and current account deficit. We do not find any other macroeconomic or institutional variables to be associated significantly with the impact of the tapering talk on the exchange rate or other variables.

4. Policy Response

India announced a range of policies to contain the impact on its exchange rate and financial markets. Most emerging markets increased their policy

10. We also consider some other available measures of the size and liquidity of the financial markets. The alternate measures are strongly correlated with each other and give similar results. Results hold if we calculate the dependent variables for April–July, 2013. Since most of these variables are persistent and correlated across years, it turns out to be inconsequential whether we use the data for just one year or period averages. More detailed results are available in Eichengreen and Gupta (2014).

during April-August 2013						
	% change in		Index II: Exchange	% change in		Index II: Exchange
Dependent Variable	nominal excnange rate	index I: Exchange rate, reserve	rate, reserve, stock prices	nominal excnange rate	index I: Exchange rate, reserve	rate, reserve, stock prices
	(1)	(2)	(3)	(4)	(5)	(9)
Increase in Current Account Deficit in 2010–12, over 2007–09	0.25**	0.17*	0.33***	0.21**	0.07	0.23**
	[2.58]	[1.77]	[3.27]	[2.18]	[0.74]	[2.45]
Avg. Annual % Change in RER, 2010–2012				-0.37***	-0.35***	-0.54 * * *
				[2.82]	[3.21]	[3.66]
Size of Financial Markets (Private External Financing, 2010–12, Log)	1.42***	0.71**	0.58	1.20***	0.55**	0.23
	[3.85]	[2.65]	[1.19]	[3.16]	[2.15]	[0.41]
Reserves/M2 Ratio, 2012	-2.53	1.52	4.32	-1.15	1.45	4.88
	[0.73]	[0.46]	[1.03]	[0.40]	[0.51]	[1.43]
Observations	45	43	32	43	41	30
R-squared	0.43	0.24	0.29	0.49	0.36	0.43
Adj. R-squared	0.39	0.19	0.21	0.44	0.29	0.34
Source: Eichengreen and Gupta (2014).						

Regression Results for Factors Associated with Exchange Rate Depreciation and Capital Market Pressure Indices TABLE 5. Note: We calculate average annual % change in real exchange rate (RER) during 2010-12, an increase in RER is depreciation. Current account deficit is calculated as % of GDP, we take average annual increase in current account deficit during 2010–12 over 2007–09. Index I is constructed as a weighted average of exchange rate depreciation and reserve loss, and Index II as the weighted average of exchange rate depreciation, reserve loss and decline in the index for stock prices; weights are the inverses of the standard deviations of respective series calculated using monthly data from January 2000 to August 2013. Robust t statistics are in parentheses. *** indicates the coefficients are significant at 1% level, ** indicates significance at 5%, and * significance at 10% level. interest rates and intervened in the foreign exchange market to limit the volatility of the exchange rate and prevent exchange rate overshooting. The RBI similarly intervened in the foreign exchange market to limit the volatility and depreciation of the rupee, spending some \$13 billion of reserves between end-May and end-September. Intervention was especially concentrated between June 17 and July 7, when weekly declines in reserves were of the order of \$3 billion. The RBI increased its overnight lending rate (the marginal standing facility rate) by 200 basis points to 10.25 percent on July 15th and tightened liquidity through open market operations and by requiring the banks to adhere to reserve requirements more strictly.

Gold imports being partly responsible for a large current account deficit, the government raised the import duty on gold on June 5th, August 13th, and September 18th, increasing it from 6 percent to 15 percent cumulatively. The RBI also imposed new measures on August 14th to restrict capital outflows. These included reducing the limit on the amounts residents could invest abroad or repatriate for various reasons, including for purchasing property abroad.

India being an oil-importing country, demand for foreign exchange from companies that import oil can add significantly to the overall demand for foreign currency and thus affect the level and volatility of the exchange rate. The RBI opened a separate swap window for three public sector oil marketing companies on August 28, 2013, in order to exclude their demand from the private foreign exchange market and reduce its volatility.¹¹

There were then few additional policy actions in the second half of August, when the exchange rate depreciated most rapidly. This was a period of transition at the RBI, during which Governor Dr Subbarao was to retire on September 4, 2013, and a new governor had to be inducted. On August 6, 2013, the government announced that on September 4 Raghuram Rajan would take charge as the new governor of the RBI, and in the interim he would join the RBI as an Officer on Special Duty. Little policy communication or guidance was provided by the RBI during this interregnum, over which the exchange rate depreciated by nearly 10 percent.

On September 4, 2013, after formally taking office as governor, Rajan issued a statement and held a press conference expressing confidence in the economy and highlighting its comfortable reserve position. He announced

11. None of these policy measures were novel in the Indian context, having been implemented at different instances in the past, e.g., the import duties on gold were prevalent until the early 1990s; deposits from the Indian diaspora were attracted in a similar fashion twice in the past, in 1998 and in 2000; a separate swap window was made available to the oil importing companies in 2008 to reduce the volatility in the foreign exchange market after the collapse of the Lehman brothers.

new measures to attract capital through deposits targeted at nonresident Indians and partially relaxed the restrictions on outward investment introduced previously. Another measure that possibly helped boost the availability of foreign exchange and calm the financial markets around this time was the extension of an existing swap line with Japan, which was increased from \$15 billion to \$50 billion. The extension of the swap line was negotiated between the Government of India and the Government of Japan and signed by their respective central banks.

We analyze the impact of these policy announcements on financial markets using event-study regressions. These compare the values of the exchange rate and financial market variables in a short window after the policy announcement (we report results for a five day post announcement window, but also considered shorter windows of two or three days which yielded similar results) with those prior to the announcement. For the control period, we consider two options, first, the entire tapering period from May 22 until the day of the policy announcement, and second, a shorter control period of one week prior to the announcement. Further, we report results from the specifications in which we use this shorter control period of a week.

The regression specification is given in Equation 2, in which Y is either log exchange rate, log stock market index, portfolio debt flows, or portfolio equity flows (portfolio flows are in millions of US\$). For some policy announcements, we also look at the impact on the turnover in the foreign exchange market.

 $Y_{t} = \text{constant} + \mu \text{ Bond Yield in the US}_{t} + \alpha \text{ Tapering Talk Dummy}_{t} + \beta \text{ Dummy for a week prior to Policy Announcement}_{t} + \gamma \text{ Dummy for Policy Announcement}_{t} + \varepsilon_{t}$ (2)

The regressors include US bond yields to account for global liquidity conditions and three separate dummies, one each for the tapering period (from May 23, 2013 until a week before the policy announcement was made), for the week prior to the policy announcement, and for the week since the policy announcement. We estimate these regressions using data from January 1, 2013, up to the date the policy dummy takes a value of 1, dropping subsequent observations.¹²

12. We acknowledge the limitations in being able to establish causality using these regressions, due to the difficulty in establishing the counterfactual and in controlling for all the relevant factors that may affect the financial markets.

4.1. Increase in the Interest Rate (July 15)

To assess the impact of increase in interest rates on July 15, we construct the tapering dummy to take a value of 1 from May 23 to July 7, the dummy for the week prior to the announcement takes a value of 1 from July 8 to July 14, and the dummy for increase in the interest rate takes a value 1 for five consecutive days from July 15 on which the financial markets were open.

The results in Table 6 show that the rate of currency depreciation, equity prices, and debt flows did not change significantly following the increase in interest rates. It would appear, then, that this initial policy response was ineffectual.

Comparing the increase in interest rates in the other Fragile Five countries (Figure 5), we can see that, except for South Africa, the other countries increased interest rates as well. Brazil started raising rates in May and continued doing so through the end of the year; the increase between May and September totaled 150 basis points. Indonesia first raised rates in July but continued raising them through September; the increase during May–September summed up to 100 basis points. India was different from the other countries in that it raised the interest rate by a larger amount all in one go.¹³ Decisiveness might be thought to signal commitment (this, presumably, is what the Indian authorities had in mind). Alternatively, a large increase in rates all at once may be perceived as a sign of panic, especially if taken against the backdrop of weak fundamentals. Eichengreen and Rose (2003) suggest that sharp increases in rates designed to defend a specific level of asset prices (e.g., a specific exchange rate) may be counterproductive when nothing is done at the same time to address underlying weaknesses.

4.2. Foreign Exchange Market Intervention

The decline in reserves amounted to some \$13 billion between the end of May and end of September, i.e., about 5 percent of the initial stock. Intervention was relatively large from June 17 to July 7, when reserves fell by \$3 billion a week. Comparing the extent of intervention in the Fragile Five countries, we see that India and Indonesia intervened the most, and that their intervention was concentrated in June and July.

Not knowing the exact timing of this intervention, we are unable to run event-study regressions. Moreover, since the pressure to intervene was

13. One question of interest is whether a large one time increase is more effective, perhaps for signaling reasons, than several small increases spaced out over months.

	•			
	(1)	(2)	(4)	(2)
	Log exchange rate	Log stock market index	Portfolio debt, \$mn	Portfolio equity, \$mn
US bond yield	0.06 * * *	-0.00	-183.96*	9.27
	[7.55]	[0.25]	[1.74]	[0.08]
Dummy for tapering May 22–July 7 ($lpha$)	0.04 ***	-0.01	-233.09***	-189.89***
-	[9.46]	[0.56]	[4.32]	[3.20]
Dummy for a week prior to July 15, i.e.	0.05 * * *	0.00	-4.91	-376.24 * * *
from July 8–July 14 (ß)				
	[5.99]	[0.15]	[0.05]	[3.19]
Dummy for a week from July 15 (dummy=1	0.05 * * *	0.02	-21.38	-167.71
for 5 working days from July 15) (γ)				
	[6.28]	[1.34]	[0.21]	[1.52]
Results for hypothesis	accept Ho: $\gamma \geq \beta$,	accept Ho: $\gamma \leq \beta$,	accept Ho: $\gamma \leq \beta$,	accept Ho: $\gamma \leq \beta$,
comparing γ and eta^{*}	reject Ha: $\gamma < \beta$	reject Ha: $\gamma > \beta$	reject Ha: $\gamma > \beta$	reject Ha: $\gamma > \beta$
Constant	3.87***	8.69***	399.78**	137.50
	[240.80]	[264.27]	[2.00]	[0.63]
Observations	135	138	133	133
R-squared	0.89	0.03	0.40	0.25
Adj. R-squared	0.88	0.004	0.39	0.23
Source: Haver Analytics.				

TABLE 6. Effect of the Increase in the Marginal Standing Facility Rate

Note: Data used in the regressions runs from January 1, 2013–July 22, 2013. *, **, *** indicates that the coefficient is significantly different from zero at 10, 5, and 1% levels of significance, t statistics are in parentheses. # the null hypothesis in each regression is that the policy announcement did not stabilize the market, and the alternative hypothesis is that it stabilized it; 1% level of significance is used to test the hypotheses, unless otherwise indicated.



FIGURE 5. Changes in Policy Interest Rates by Fragile Five

Source: Haver.

larger when there was larger depreciation of the currency, one is likely to see a positive correlation between decline in reserves and exchange rate depreciation.

Figure 6, where we plot the weekly change in reserves and the percentage change in the nominal exchange rate, confirms this. As predicted, we observe a positive correlation in Panel A (significant at the 1 percent level), i.e., a large decline in reserves was associated with more exchange rate depreciation. In Panel B, we correlate percentage changes in the exchange rate and reserves, where the latter is lagged by a week. The correlation between the lagged values of decline in reserves and exchange rate depreciation is indistinguishable from zero.¹⁴

For one specific intervention announcement, however, we can do better. This is the foreign exchange swap window provided for oil importers. Oil adds up to \$10 billion a month to India's import bill. The demand for foreign exchange thus affects the level and volatility of the exchange rate (as per some estimates, the demand for foreign exchange from these companies is about \$400 million a day). With this in mind, the RBI opened a separate swap window for three public sector oil companies on August 28, 2013, so as to remove their demand from the foreign exchange market. The measure can be thought of as analogous to foreign exchange market intervention,

^{14.} Similar charts for Turkey and Brazil, two other countries for which we have the weekly data on reserves, showed a similar relationship between the decline in reserves and exchange rate depreciation.

FIGURE 6. Weekly Decline in Reserves (billion \$) and % Change in Nominal Exchange Rate in India during May 23-End September, 2013



A: Contemporaneous correlation

B: Reserve declines lagged by a week



Source: Haver.

where rather than intervening when the demand for foreign exchange in general increases, the RBI automatically intervenes to meet the demand from the oil companies.

Why this particular form of foreign exchange market intervention should be preferable is not entirely clear. It is not obvious whether, with a daily turnover of about \$50 billion in the onshore foreign exchange market, and presumably an equally large offshore market, the amount made available through the special swap window translated into a significant reduction in the demand for foreign exchange.

While some commentators reacted positively to this announcement, we find little evidence of a favorable impact on turnover in the onshore foreign exchange market, the exchange rate or equity markets in the week following. If anything, exchange rate depreciation accelerated after this policy was announced (Table 7).

4.3. Restrictions on Capital Outflows

On August 14, 2013, the RBI announced restrictions on capital outflows from Indian corporates and individuals. It lowered the limit on Overseas Direct Investment under the automatic route (i.e., the outflows which do not require prior approval of the RBI) from 400 percent to 100 percent of the net worth of the Indian firms, reduced the limit on remittances by resident individuals (which were permitted under the so-called Liberalized Remittances Scheme) from \$200,000 to \$75,000, and discontinued remittances for acquisition of immovable property outside India. Table 8 looks at outward remittances by residents subject to these restrictions. The amounts remitted were small, of the order of \$100 million a month. There was no surge in remittances during the period of tapering talk. Outflows were just \$92 million in June and \$110 million in July 2013. Hence there does not seem to be an apparent justification for this restriction.

Outflows once underway can be difficult to stem with these kinds of restrictions, since incentives for evasion are strong. Table 9 confirms this. Here the dummy for the tapering period prior to the restrictions takes a value of 1 from May 22 to August 6, the dummy for the week prior to policy takes a value of 1 from August 7 to August 13, while the dummy for the policy announcements takes a value of 1 for five consecutive days from August 14. The results indicate that in the five days from the time when this announcement was made, exchange rate depreciation and the decline in stock market index were accentuated, while equity flows declined.

Commentary in the international financial press reflected the fears that these controls evoked (*The Economist*, August 16, 2013, ".... India's

	(1)	(2)	(3)	(4)	(5)
			Log forex market		
	Log exchange rate	Log stock market index	turnover	Portfolio debt, \$mn	Portfolio equity, \$mn
US bond yield	0.09 * * *	-0.03 * *	-0.22***	113.02	-23.32
	[13.15]	[2.35]	[2.87]	[1.38]	[0.29]
Dummy for tapering May 22-	0.04 * * *	0.01	0.02	-281.76***	-179.39***
August 20 (α)	[8.00]	[0.69]	[0.36]	[5.20]	[3.40]
Dummy for a week prior to	0.09 * * *	-0.06***	0.13	-177.07	-288.62**
August 28, i.e. from	[9.70]	[3.25]	[1.20]	[1.53]	[2.56]
August 21–August 27 (β)					
Dummy for a week from August	0.13***	-0.06***	0.15	-228.67**	-171.92
28 (dummy = 1 for 5 working	[14.27]	[3.11]	[1.47]	[2.11]	[1.62]
days from August 28) (γ)					
Results for hypothesis	accept Ho: $\gamma \geq \beta$,	accept Ho: $\gamma \leq \beta$,	accept Ho: $\gamma \geq \beta$,	accept Ho: $\gamma \leq \beta$,	accept Ho: $\gamma \leq \beta$,
comparing γ and $eta^{{\scriptscriptstyle \#}}$	reject Ha: $\gamma < \beta$	reject Ha: $\gamma > \beta$	reject Ha: $\gamma < \beta$	reject Ha: $\gamma > \beta$	reject Ha: $\gamma > \beta$
Constant	3.83 ***	8.74***	11.33***	-158.07	198.73
	[298.29]	[342.55]	[76.54]	[1.02]	[1.32]
Observations	165	168	164	162	162
R-squared	0.944	0.357	0.135	0.281	0.271
Adj. R-squared	0.943	0.341	0.113	0.263	0.252
Source: Haver. Noto: Data used in the regressions r	uns from January 1–2013.	- hilv 22 2013 * ** *** ind	licates that the coefficient i	e significantly different from	zero at 10 5 and 1 norcent

Effect of the Separate Swap Window for Oil Importing Companies on Financial Markets TABLE 7. Note: data used in the regressions runs from January 1, 2013-July 22, 2013. The molicates that the coefficient is significantly offreent from January 1, 2013-July 22, 2013. The molicates that the policy announcement did not succeed in stabilizing the market, and the alternative hypothesis is that it succeeded; 1 percent level of significance is used to test the hypotheses, unless otherwise indicated.

	Avg. of 2012	Avg. Jan- April 2013	May 2013	June 2013	July 2013	Aug 2013	Sep 2013	Oct 2013	Nov 2013	Dec 2013
Total	95.2	129.3	115.3	92.1	109.9	75.8	72.2	67.6	59.4	75.2
Deposits abroad	1.9	3.6	2.2	1.3	2.9	3.2	1.3	1.3	1.2	1.9
Purchase of Property	2	10.3	7.2	8.6	20.6	ę	3.8	1.3	0.3	0.5
Investment in equity/debt	19.5	29.4	13.3	12.5	16.2	14.9	9.8	10.2	2.9	11.2
Gift	20.2	30.3	28.8	22.5	24.8	17.3	15.9	17.8	9.8	19.7
Donations	0.4	0.2	0.2	0.1	0.3	0.2	0.1	0.3	I	0.2
Travel	3.7	3.8	4.3	1.1	-	0.7	-	-	0.2	0.8
Maintenance of relatives	17.6	23.8	23.3	9.3	13.8	8.8	9.4	9.5	34.5	9.4
Medical treatment	0.4	0.4	0.6	0.2	0.4	0.1	0.4	0.2	0.2	0.3
Studies abroad	10.1	11.4	16.9	7.1	15.5	16.5	14.5	11.9	5.1	18.1
Others	16.5	16.5	18.5	29.4	14.5	11.1	16.2	13.9	5.2	13

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	(1)	(2)	(3)	(4)	(2)
		Log stock market	Log forex market	Portfolio debt,	Portfolio equity,
	Log exchange rate	index	turnover	\$mn	\$mn
US bond yield	0.08***	-0.00	-0.21**	84.99	-22.13
	[11.10]	[0.14]	[2.40]	[0.95]	[0.24]
Dummy for tapering May 22–August 6 ($lpha$)	0.04***	-0.00	0.01	-269.33***	-181.64***
• •	[9.26]	[0.33]	[0.26]	[4.89]	[3.28]
Dummy for a week prior to August 14, i.e.	0.06***	-0.05 * *	-0.06	-331.38***	-129.77
from August 7-August 13 (β)	[7.51]	[3.13]	[0.57]	[3.21]	[1.25]
Dummy for a week from August 14	0.07***	-0.07***	0.03	-86.70	-228.04*
(dummy = 1 for 5 working days from	[7.98]	[3.93]	[0.31]	[0.75]	[1.97]
August 14) (γ)					
Results for hypothesis	Accept Ho: $\gamma \geq \beta$,	Accept Ho: $\gamma \leq \beta$,	Accept Ho: $\gamma \geq \beta$,	reject Ho: $\gamma \leq \beta$,	Accept Ho: $\gamma \leq \beta$,
comparing γ and $\beta^{\#}$	reject Ha: $\gamma < \beta$	reject Ha: $\gamma > \beta$	reject Ha: $\gamma < \beta$	accept Ha: $\gamma > \beta$,	reject Ha: $\gamma > \beta$
				0% C 18	
Constant	3.85***	8.68***	11.29***	-105.41	196.49
	[293.81]	[323.85]	[69.52]	[0.62]	[1.15]
Observations	156	159	155	154	154
R-squared	0.93	0.25	0.15	0.31	0.25
Adj. R-squared	0.93	0.23	0.12	0.29	0.23
Source: Haver.					

Restrictions on Overseas Direct Investment TABLE 9. Note: Data used in the regressions runs from January 1, 2013-4, ugust 21, 2013. *, **, *** indicates that the coefficient is significantly different from zero at 10, 5, and 1 percent levels of significance, t statistics are in parentheses. # the null hypothesis in each regression is that the policy announcement did not succeed in stabilizing the market, and the alternative hypothesis is that it succeeded; 1 percent level of significance is used to test the hypotheses, unless otherwise indicated. authorities have planted a seed of doubt: might India 'do a Malaysia' if things get a lot worse? Malaysia famously stopped foreign investors from taking their money out of the country during a crisis in 1998..."; and *Financial Times*, August 15, 2013, "... the measure smacks more of desperation than of sound policy"). It is perhaps revealing that none of the other members of the Fragile Five responded to the tapering talk by restricting outflows. India's experience suggests that they were wise.

4.4. Import Duty on Gold (June 5, August 13, and September 18)

Rising gold imports being partly responsible for the deteriorating current account balance, import duties on gold were raised from 6 percent to 8 percent on June 5 and further to 10 percent on August 13. On September 18, the duty on the imports of gold jewelry was then raised to 15 percent. Some other quantitative restrictions, such as prohibiting the import of gold coins, and a 20/80 rule requiring that 20 percent of the gold imports be made available to exporters while 80 percent could be used domestically, were introduced as well.

The results in Table 10 for the first duty increase on June 5 show that these duties had little positive effect. The rate of exchange rate depreciation increased in the five-day window following the imposition of the duty, compared to the week before or the tapering period prior to that. The stock market declined, and portfolio inflows were smaller. These increases in import duties were ineffective because, rather than dealing with the causes of financial weaknesses, they only addressed the symptoms. Insofar as higher duties on gold imports were equivalent to tighter restraints on capital outflows, they appeared to have an analogous (unfavorable) impact on financial markets.

The increase in the duty on gold imports had other unintended effects as well. Even as they curtailed the import of gold (Figure 7), higher gold prices also dented exports of gold jewelry. The press reported frequent complaints from exporters about the increase in the price of gold bullion following the increase in duty. Moreover, a large difference between the domestic and international price of gold created incentives for smuggling. The World Gold Council estimated that nearly 200 tons of gold was smuggled into India following the increase in duty (see Reuters, July 10, 2014). This is a reminder of the situation in India until the early 1990s, when due to high import duties on gold, as well as an artificially appreciated exchange rate, smuggling of gold was rampant and also contributed to a thriving parallel market for foreign exchange to convert proceeds from smuggled

	(1)	(6)	187	(4)
		<u>/-</u>		
	Log exchange rate	Log stock market index	Portfolio debt, \$mn	Portfolio equity, \$mn
US bond yield	-0.01	0.08***	-265.42*	337.23**
	[0.70]	[3.40]	[1.72]	[2.11]
Dummy for tapering May 22–May 28($lpha$)	0.03***	0.01	-154.11*	-145.16
	[5.41]	[0.76]	[1.77]	[1.60]
Dummy for a week prior to June 5, i.e. from	0.04***	0.00	-231.18***	-143.40
May 29–June 4 (β)	[8.58]	[0.06]	[2.76]	[1.65]
Dummy for a week from June 5 (dummy=	0.06***	-0.02*	-335.04 * *	-245.87***
1 for 5 working days from June 5) (γ)	[11.99]	[1.76]	[3.93]	[2.77]
Results for hypothesis	Accept Ho: $\gamma \geq \beta$,	Accept Ho: $\gamma \leq \beta$,	Accept Ho: $\gamma \leq \beta$,	Accept Ho: $\gamma \leq \beta$,
comparing γ and $\beta^{\#}$	reject Ha: $\gamma < \beta$	reject Ha: $\gamma > \beta$	reject Ha: $\gamma > \beta$	reject Ha: $\gamma > \beta$
Constant	4.01***	8.53***	552.79*	-478.55
	[243.27]	[186.14]	[1.91]	[1.59]
Observations	107	110	106	106
R-squared	0.727	0.146	0.332	0.088
Adj. R-squared	0.717	0.113	0.305	0.0516
Source: Haver.				

Increase in the Import Duty on Gold (on June 5) and the Effects on Exchange Rate and Financial Markets TABLE 10. Note: Data used in the regressions runs from January 1, 2013–June 10, 2013. *, **, *** indicates that the coefficient is significantly different from zero at 10, 5, and 1% levels of significance, t statistics are in parentheses. # the null hypothesis in each regression is that the policy announcement did not succeed in stabilizing the market, and the alternative hypothesis is that it succeeded; 1% level of significance is used to test the hypotheses, unless otherwise indicated.



FIGURE 7. Duties on Gold Imports Helped Restrain the (reported) Import of Gold

Source: Reserve Bank of India.

gold into rupees at a premium. As a part of the reforms of the early 1990s, import duties on gold were abolished and the exchange rate was devalued and eventually floated, bringing an end to smuggling as well as the parallel market for the exchange rate. All these are reasons not to rely too heavily on measures such as import duties and certainly not for too long.

4.5. Communication and Guidance

As noted, there was little additional guidance from the government or the central bank in August, even as the exchange rate appeared to go into free fall (the exchange rate depreciated by nearly 10 percent from August 15 to September 4). On September 4, the new RBI governor issued a statement expressing confidence in the economy and highlighting its comfortable reserve position. He announced new measures to attract capital through deposits targeted at the Indian diaspora, and relaxed some of the restrictions on outward investment which had been tightened earlier.¹⁵ While we cannot separate out the effect on the markets of each of these different announcements, we can assess their combined effect. Table 11 shows that the exchange rate and stock market improved markedly within five days of the announcements on September 4.

15. The RBI offered a swap facility to the banks to swap their exchange rate risk, the banks could buy this exchange rate risk coverage at a cost of 300 basis points and they in turn offered about 4 percent or 5 percent interest rate on dollar deposits to the diaspora. The total cost of these deposits thus works out to about 7.5 percent.

	(1)	(2)	(3)	(4)
	Log exchange rate	Log stock market index	Portfolio debt, \$ mn	Portfolio equity, \$ mn
US bond yield	0.11***	-0.05***	144.73*	-50.25
	[14.42]	[4.00]	[1.86]	[0.66]
Dummy for tapering May 22–August 27 ($lpha$)	0.03***	0.01	-293.92***	-170.32***
-	[5.67]	[1.53]	[2.50]	[3.27]
Dummy for a week prior to Sep 4, i.e. from	0.11***	-0.04*	-257.59**	-147.36
Aug 28-Sep 3 (B)	[10.97]	[1.94]	[2.43]	[1.43]
Dummy for a week from Sep 4	0.07***	0.02	-193.87*	75.12
(dummy = 1 for 5 working days from Sep 4) (γ)	[6.20]	[1.25]	[1.70]	[0.68]
<i>p</i> value for hypothesis	Reject Ho: $\gamma = \beta$	Reject Ho: $\gamma = \beta$	reject Ho: $\gamma = \beta$	reject Ho: $\gamma = \beta$
γ = β , against the alternative hypothesis	Accept Ha: $\gamma < \beta$	Accept Ha: $\gamma > \beta$	accept Ha: $\gamma > \beta$	accept Ha: $\gamma > \beta$
Constant	3.79***	8.78* **	-217.64	249.32*
	[269.90]	[345.87]	[1.48]	[1.74]
Number of observations	170	173	167	167
R-squared				
Adjusted R-squared	0.93	0.26	0.253	0.248
Source: Haver.		;=; ;; ;;=;***********************	the second s	olorio 110 E ord 110 lorio

Policy Announcements, Statement, and Press Conference on September 4, 2013 TABLE 11.

of significance, t statistics are in parentheses. # the null hypothesis in each regression is that the policy announcement did not succeed in stabilizing the market, and the alternative indicates that the coefficient is significantly different from zero at 10, 5, and 1% levels hypothesis is that it succeeded; 1% level of significance is used to test the hypotheses, unless otherwise notes. Note: Data used in the regressions runs from January 1, 2013–Sep 11, 2013. *, **, *

4.6. Summary

In sum, many elements of the policy response were ineffective or counterproductive. The very sharp increase in policy interest rates, taken without adequate explanation and not accompanied by steps to address the underlying weaknesses of the economy, did not reassure. Efforts to restrict capital outflows and discourage gold imports undermined confidence and encouraged evasion. The much-talked-about foreign exchange window for stateowned oil importers does not appear to have been effective. Better, in our view, would have been measured increases in interest rates and measured intervention in the foreign exchange market, supplemented by a clear communication strategy describing what other steps were being taken to address the underlying economic and financial weaknesses that had rendered the Indian economy vulnerable.

5. The Medium-term Policy Framework

Once a country is experiencing the impact of global rebalancing, there are no easy choices. Better is to put in place a medium-term policy framework that limits vulnerabilities, avoiding that crisis in the first place while maximizing the policy space to respond to shocks. While maintaining a sound fiscal balance, sustainable current account deficit, and environment conducive to investment is, for obvious reasons, integral to such a framework, there are in addition some other less obvious elements. These include managing capital flows so as to encourage relatively stable longer term flows while discouraging volatile short-term flows, avoiding excessive appreciation of the exchange rate through interventions using reserves and macroprudential policy, holding a larger stock of reserves, where feasible signing swap lines with other central banks, and preparing the banks and corporates to handle greater exchange rate volatility.

5.1. Level of Reserves

Average reserve holdings in emerging markets increased sharply in the last four decades, from about 5 percent of GDP in the 1980s to 25 percent in 2010s (see Ghosh et al. 2012). Emerging markets hold reserves for a variety of reasons: mercantilist, as insurance against shocks to their current and capital accounts; as an indicator of external solvency, and as ammunition with which to stabilize the exchange rate. While in the 1980s and 1990s countries held reserves mainly to defend the level of their exchange rate and to insure against shocks to the current account, insuring against shocks to the capital account has become a more important motivation in the last two decades (Ghosh et al. 2012).

There are several popular metrics for the adequacy of reserves. There is the well-known Greenspan–Guidotti rule that an emerging market should hold reserves equivalent to a year of short-term liabilities. Rules based on import requirements consider reserves equivalent to about 3–6 months of imports to be adequate. Yet another metric defines the adequate level of reserves with respect to the supply of broad money and considers reserves equivalent to 20 percent of M2 to be sufficient to guard against shocks to the capital account. The IMF combines the aforementioned in a risk weighted composite index to assess the reserve adequacy of its member countries.

Although India's reserves appear adequate on most of these metrics, examining the level of reserves more closely, one can observe two distinct eras since 2000 (Figure 8).¹⁶ The first lasted from 2000 to 2008, when reserves increased from \$40 billion to \$305 billion. Reserves then declined to \$245 billion by end 2008, due to the withdrawals of capital after the collapse of Lehman Brothers. In the second era, reserves were rebuilt to some

FIGURE 8. The Stock of External Reserves in India has Remained Stable since 2009 (\$ billion)



Source: Reserve Bank of India.

Note: Total reserves include net foreign assets, SDR, and gold.

16. India's reserve level has been considered adequate in the IMF's assessment of the Indian economy. The IMF is however currently revising its reserves metrics and is likely to revise upwards the desirable level of reserves for oil importing countries such as India, who need to hold a larger reserve buffer to meet the cost of importing oil, the demand for which is inelastic and the import bill often volatile due to the volatility of oil prices.

\$300 billion during 2009–11, but only to the level last seen before the collapse of the Lehman Brothers, at which level they then remained broadly stable. There were no attempts to increase the reserves coverage further during this period. As a result, with the growth of the economy and external liabilities, the effective reserve coverage in India declined from 2008 (Figure 9), implying heightened vulnerability to current account or capital account shocks and a narrower room to intervene in the foreign exchange market.

The use of reserves to curb exchange rate volatility also differs across these two periods. There seems to have been a reluctance to use reserves since 2008 to limit exchange rate volatility, a reluctance reflected in

FIGURE 9. Effective Coverage Provided by Foreign Reserves has Declined A: In terms of external debt







(Figure 9 Contd)



(Figure 9 Contd)





Source: Citi Bank Research. Total external debt includes: long-term debt (multilateral, bilateral, IMF, trade credit, ECB, NRI and FC above one year maturity and rupee debt) and short-term debt (NRI and FC deposits up to one year maturity, bills and other instruments and other trade related debts).

smaller monthly percentage changes in reserves but increased volatility of the exchange rate between 2009 and 2012 (Figure 10). This increase in volatility is not confined just to the period immediately after the collapse of Lehman or that during the tapering talk, but extends through the entire

FIGURE 10. Changes in Reserves and Volatility in Exchange Rate Since 2000





Source: Haver, Bloomberg.

Note: Averages are calculated for January 2000–September 2008 and April 2009–Decemebr 2013. These averages are significantly different from each other at 1% level of significance.

B: While the volatility in exchange rates (monthly standard deviation) has increased since 2009



Source: Haver, Bloomberg.

Note: Averages are calculated for January 2000–September 2008 and April 2009–Decemebr 2013. These averages are significantly different from each other at 1% level of significance.

(Figure 10 Contd)

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(Figure 10 Contd)





Source: Haver, Bloomberg.

period since 2009.¹⁷ This hints at more passive reserve management as a factor in increased volatility of the exchange rate.

Reserves are typically invested in liquid treasury bills of the countries which issue hard currencies and generate returns lower than the domestic assets. Available estimates suggest that these costs are smaller than sometimes believed. Some researchers argue that the estimates of the cost of holding reserves should take in to account not just the interest rate differential, but also the valuation gains that accrue on reserves. Friedman (1953) suggested that if the central banks purchase dollars when the exchange rate is overvalued and sell them when it is undervalued, valuation changes may offset and even outweigh the interest rate differential. Similarly, Flood and Marion (2002) suggested that once the capital gains arising from exchange

17. One might argue that the increased volatility of the exchange rate is a global phenomenon, and afflicted all emerging markets post-2008. We calculated similar measures of volatility for all Fragile Five countries, but observed that besides India no other country experienced a similar increase in volatility. There is empirical evidence to support the idea that high levels of exchange rate volatility can distort investment decisions and affect long-term growth, especially in countries with low levels of financial development (see Serven 2003; Aghion Aghion, Philippe Bacchetta, Ranciere and Rogoff 2009).

rate changes are taken into account, the opportunity cost of holding reserves is likely to be small.

World Bank (2013) estimates the cost of central bank intervention in the foreign exchange market for several emerging countries. These estimates suggest that the cost of intervention is small across countries and indeed negative for some countries. The report estimates a net gain to India from intervention in its foreign exchange market between 2005 and 2012 to be about 1 percent of its 2012 GDP.

The actual cost of intervention is likely to be even smaller than the one which accounts for the interest rate differential and the valuation effects (see Levy and Yeyati 2008), because larger reserve holdings may lower the cost of issuing sovereign or even private debt. The World Bank suggests that if the central banks still deem the cost of holding reserves to be high, they may want to consider holding a proportion of their reserves in higher yield assets, than the lower yield treasury bills, as some central banks have indeed started doing. The report reminds that, since the central banks hold reserves for a variety of reasons, the entire cost cannot be attributed to any one objective, such as to smooth exchange rate movements.

5.2. Swap Lines as a Substitute for Reserves? But Swap Line with Whom?

Since there are costs as well as benefits to holding reserves and there is no consensus on what constitutes an optimal level, bilateral swap lines with other central banks, regional swap lines such as under the Chiang Mai initiative (CMI) or Brazil, Russia, India, China and South Africa (BRICS) Contingent Reserve Arrangement (CRA), or multilateral lines such as the liquidity arrangements with the IMF may present attractive alternatives.

Eichengreen (2014) argues that, given the reluctance of the US Congress to authorize increased funding for the IMF, the Fed should contemplate extending swap lines to a larger number of emerging economies. Mohan and Kapur (2014) suggest that since monetary policies of the advanced economies have important spillovers for emerging markets, the latter ought to be offered swap facilities to limit this impact. Sheng (2014) emphasizes the need for the emerging markets to rely on swap lines, but he points out that the swap lines with the US Fed are available only selectively, and the emerging markets in general do not figure in these. Hence he suggests that the emerging markets should consider a diverse set of arrangements, including signing swap arrangements with China, which has emerged as a large regional as well as global player in offering these swap lines, and pursuing regional arrangements such as the CMI or the CRA being planned by the BRICS.

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The most recent initiative along these lines is the BRICS's CRA, negotiated in summer 2014, under which the member countries committed \$100 billion of reserves to the arrangement. India's share is \$18 billion, and it can withdraw twice that much from the arrangement. Just to put the size of this withdrawal facility in perspective, note that the net amount (above its own commitment to the pool) that India can withdraw is less than half the size of its current swap line with Japan and barely 5 percent of reserves. Revealingly, negotiation of an IMF program is a precondition for drawing funds from the BRICS's CRA above the first 30 percent, just as in the CMI. The unencumbered 30 percent appears to be a rather modest amount.

The question about this arrangement is whether it will actually operate or would meet the same fate as the CMI. Participants of the CMI have been reluctant to put actual cash on the barrelhead, since they are reluctant to impose policy conditions of the sort that will maximize the likelihood of them being paid back (conditionality among neighbors being politically delicate).¹⁸ There may similarly be a reluctance to provide net resources under the CRA. While any member country can request access to the swap line up to its limit, but that request must be acceded to by the providing parties. And whether they will accede is yet to be seen.

Rajan (2014) suggests that since the IMF possesses the expertise to operate such lines, is free of political obligations to explain to the domestic stakeholders if a credit risk emerges in these arrangements, and has the capacity to bear such risks if they arise, swap arrangements should be channeled through it. Rajan also suggests that the IMF could act as a facilitator, helping countries identify the counterparts who would be amenable to signing the bilateral or regional swap arrangements, and if needed, mediating negotiation of these swap lines. He also proposes modifications to the IMF's existing liquidity line so as to reduce the stigma of accessing the facility and ensure its wider use by the member countries.

The countries with which India might be able to sign bilateral swap lines would perhaps be its large trading partners or the countries where foreign investment to India originates, in other words the countries which have a stake in the stability of its currency and economy. Such swap lines would be considered credible if signed with countries that are not considered to be in the same asset class as India by global investors, and thus are not likely to be affected in a similar manner by a rebalancing of global portfolios or global

^{18.} The \$100 billion of reserves are not going into a common pool. Rather, each country will continue to hold its own reserves; the commitment to provide dollars against local currency is only on paper.

financial conditions. Based on these considerations, some countries that India could explore bilateral swap lines with include the USA, UK, Japan, the Republic of Korea, and the countries from which India imports its oil.¹⁹

Is a swap line with the USA viable for India? Apparently the USA is very selective in offering these lines. In October 2008, the Federal Reserve Board agreed to offer liquidity swap lines to four large emerging markets, Mexico, Brazil, Singapore, and Korea. These were for \$30 billion each (similar in amount to the lines offered to Canada, Sweden, and Australia). The transcripts of Federal Open Market Committee (FOMC) meetings on October 23–24, 2008, suggest that these lines were offered not just because the countries in question faced liquidity risk, but also because they were considered of systemic importance to the USA, given their financial linkages with the US economy.²⁰ Fed officials worried that if these countries faced liquidity problems, these could spill over to the US financial institutions, given the large presence of the US financial institutions in these countries. The FOMC was also emphatic that since all of these countries held substantial reserves, a large part in US treasury bonds, swap arrangements with them carried little credit risk.

Even then, the swap arrangements offered to emerging markets were less generous than those offered to the developed countries and entailed additional safeguards. Emerging markets could draw only with the prior authorization of the Fed, with individual drawings each time limited to \$5 billion; central banks were required to publicly announce when they drew on their lines and to provide details of the allocation of dollar liquidity they thus obtained. And though the Fed converted the dollar swap lines put in place during the global financial crisis with the Bank of Canada, Bank of England, European Central Bank, Bank of Japan, and Swiss National Bank into longer arrangements in October 2013, the swaps with emerging markets were allowed to expire after six months.²¹

19. While it is difficult to anticipate what amount of additional swap lines would provide the required buffer to India in addition to its existing \$300 plus billion of reserves, but perhaps something of the order of \$100 billion of unconditional line would be adequate.

20. Some of these contentions are confirmed by Aizenman et al. (2010) in their empirical work conducted before these minutes were published. They established that the swap lines were offered selectively by the Fed to the countries with which the USA had substantial trade and financial linkages. The few emerging markets it offered the lines to were the ones in which the US banks had exposure; hence the USA inherently had a stake in their financial stability. Apparently India does not enjoy this advantage with the USA.

21. The amounts of swap lines with developed economies were larger, adding upto \$333 billion, compared to \$120 billion offered to the emerging markets. Sheng compares the arrangements signed between the Fed and these emerging markets with the swap offers that

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There was an extensive discussion in the committee on whether any other emerging markets would be considered for swap arrangements if they approached the Fed. It acknowledged and discussed whether by selecting a small group of countries for the swap arrangements the Fed was exposing the rest of the countries, which were not offered similar arrangements, to negative market reactions. The committee decided that the swap lines would not be extended to any other emerging country, which would instead be directed to utilize a new IMF facility, which was to be announced in conjunction with the Fed's swap line the following day. Prasad (2014) and Steil (2014) note that in 2008 the Fed rebuffed requests for swaps from Chile, the Dominican Republic, Indonesia, and Peru, and in 2012 it spurned a request from India. The swap arrangements that most emerging markets could access were with larger, more developed Asian economies such as China, Japan, and Korea, rather than with the USA, European Union, or other advanced economies (Figure 11).²²

This leads us to conclude that India should not expect to rely on arrangements with the USA, alone or even in part, in the event of future difficulties and should seek other alternatives.

India's only existing swap line, other than the CRA, is with Japan, as noted above. This was originally signed in 2008 for \$3 billion, but was raised to \$15 billion in December 2011, and again to \$50 billion on September 6, 2013.²³ Around the time when Japan extended its swap line with India, it also signed swap lines with Indonesia and the Philippines, and in addition was committed to swap lines to other countries in ASEAN as a part of the CMI. Given the extent of Japan's existing commitments, there may be limits to how much further the existing India–Japan swap line can be expanded.

One multilateral option that India can consider is a precautionary facility with the IMF. As is well known, these precautionary lines of credit have been used very sparingly by the IMF members (only Mexico, Poland, and Colombia have applied). Apparently, approaching the IMF for a precautionary line of credit conveys an adverse signal to market participants.²⁴

the People's Bank of China signed with about a score of developing countries most of which export commodities to China. The latter added up to over US\$426 billion, implying that the China offered a more viable alternative to developing countries than the Fed.

^{22.} We have presented a selective list of swap lines that the Bank of China signed with other countries.

^{23.} Our understanding is that under this agreement after the first \$15bn, India can draw the rest \$35 bn only after it has negotiated an IMF program.

^{24.} A similar sentiment was recorded in the minutes of the Fed's meetings held on October 28–29, 2008, where it was noted (by Nathan Sheets), that "[t]hese top-tier EMEs that we are recommending for swap lines are very reluctant to return to the IMF. Given the strength of



FIGURE 11. Selective Recent Currency Swap Lines Offered by the Larger Asian Economies

Notes:

Sep.6, 2013: India and Japan signed \$50bn currency swap agreement. Source: RBI.

Oct.7, 2013: Indonesia and China signed \$16bn currency swap agreement. Source: Bloomberg.

Oct.12, 2013: Indonesia and Korea signed \$10bn currency swap agreement. Source: WSJ.

Dec.14, 2013: Indonesia and Japan signed \$22.7bn currency swap agreement. Source: Bank of Indonesia.

Mar.26, 2013: Brazil and China signed \$30bn currency swap agreement. Source: BBC.

Dec.16, 2013: Philippines and Japan signed \$12bn currency swap agreement. Source: WSJ.

Oct.13, 2013: UAE and Korea signed \$5.4bn currency swap agreement. Source:globaltimes.com

Oct.20, 2013: Malaysia and Korea signed \$4.7bn currency swap agreement. Source: Koreaherald.com

Sep.9, 2013: Hungary and China sign \$1.62bn currency swap line. Source:centralbanking.com

Sep.13, 2013: Albania and China sign \$0.33bn currency swap line. Source: Reuters.

Apr.2, 2014: Albania and China sign \$0.34bn currency swap line. Source: Reuters.

Some bilateral currency swap lines are excluded from figures such as China-UK (\$32.6bn), China-ECB (\$57.2bn), and Korea-Australia (\$7.4bn).

Indian policy makers appear to be strongly convinced by this argument. It would be worth the investment to understand how countries like Mexico have managed to apply without suffering such stigma effects.

We conclude that there do not seem to be many leads for India to extend the swap lines for larger amounts or to sign new lines with advanced economies. While India could continue exploring these further with advanced economies as well as with oil-exporting countries, it seems, just like the rest of the emerging world, it would continue to be on its own in handling the spillovers of monetary policy in advanced economies. A similar view has been aired by the IMF (2013), whereby,

their policies, they no longer view themselves as clients..."; and subsequently (Eric Rosengren) "[g]oing to the IMF will attach a fair amount of stigma [to the country] ¹/₄ the spillover benefits to other countries will be negative, not positive, because of that stigma."

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Reserves remain a critical liquidity buffer for most countries. They are generally associated with lower crisis risk (*crisis prevention*) as well as space for authorities to respond to shocks (*crisis mitigation*). While other instruments, such as official credit lines and bilateral swap lines, are also external buffers, for most countries they principally act as a complement to their official reserves.²⁵

5.3. Managing Capital Flows

Capital flows to emerging markets are volatile. However recently Bluedorn, Duttagupta, Guajardo, and Topalova (2013) noted that private capital flows are typically volatile for all countries, across all points in time, and for all types of capital flows (bank flows, portfolio debt and equity flows, etc.). They recommended using macroeconomic and macroprudential measures to buttress economic and financial resilience to such volatility.

In a similar view, in its *Global Financial Stability Report*, published in April 2014, the IMF acknowledged that "the reduction in US monetary accommodation could have important spillovers for advanced and emerging market economies alike as portfolios adjust and risks are repriced." The Find noted that the increased participation of foreign investors in domestic bond markets has increased the volatility of capital flows to emerging markets. Even as the financial markets have deepened and become more globalized, new asset classes have developed, and the role of bond funds—especially local currency bond funds, open-ended funds with easy redemption options, and funds investing only opportunistically in emerging markets—has increased. These global portfolio investors and bond flows are sensitive to global financial conditions. The Fund's recommendation, of particular relevance to India, is to monitor and limit the size of foreign investors in local bond markets, even as the attempts are needed to increase the participation of local investors in the bond markets.

India actively monitors and manages its capital flows. It has retained quantitative restrictions on several categories of capital inflows including on portfolio equity and debt flows. Total outstanding investment by foreign investors in government and corporate bonds are subject to different ceilings, while portfolio equity flows are subject to limits on such investment in each firm and in different sectors. India has also retained certain restrictions on capital outflows, but these apply mostly to residents. These restrictions limit the amounts that individuals can withdraw from the country each year, e.g., firms may invest abroad only up to a certain multiple of their net worth.

^{25.} The IMF however cautions, rightly so, that the reserves cannot substitute for sound fundamentals and a good policy framework.

The amounts that Indian firms can borrow abroad are also monitored and, in some instances, are subject to RBI approval; and there are limits on the interest rates at which the firms can borrow abroad.

Capital flows to India consist of FDI flows, portfolio debt, and equity flows, borrowing abroad by Indian firms (called external commercial borrowings) and bank deposits by the Indian diaspora (often known as non-resident Indian deposits or NRI deposits). While FDI inflows and external commercial borrowings to India have been relatively stable, as has been the experience of other emerging markets, portfolio flows, and especially debt flows, into India have been more volatile (Table 12).²⁶ This, in our view, provides some justification for the current approach of encouraging the first set of flows relative to the second.

Gordon and Gupta (2004) analyzed trends in NRI deposits and their determinants, and established that these deposits respond positively to the differential between the interest rates on NRI deposits and what could be obtained on competing assets in other countries.²⁷ Even though other factors affect these deposits as well, the impact of the interest rate differential outweighs that of other factors. The RBI has been repeatedly able to attract sizable amounts through special deposit schemes targeted at the nonresident population. A precedent was in 1998, when to augment its reserves (following the international sanctions on India in the aftermath of nuclear tests), RBI issued the Resurgent India Bond—targeted at the NRI community, at an interest rate of 7.75 percent on US dollar deposits and raised \$4.2 billion within days.

26. One potential source of vulnerability with the external commercial borrowing is the exchange rate risk that the corporates assume, exposing them to negative balance sheet effects if the exchange rate depreciates. Thus for such borrowings hedging of foreign exchange risk is important, especially for the firms which do not derive their earnings from exports.

27. NRI deposit flows to India gained momentum in the 1980s once the RBI introduced NRI deposit schemes to tap flows from the Indian diaspora abroad. It made deposits fully repatriable, offered attractive interest rates, and assumed the exchange rate risk on foreign currency-denominated accounts. However, these schemes proved to be vulnerable during the 1991 balance of payments crisis, when the outflows of deposits compounded the pressure on the external accounts. Subsequently the composition of deposits was shifted toward rupee denominated accounts; the repatriable component was reduced; and the exchange risk on foreign currency deposits was shifted to the banks. In the subsequent one decade NRI deposit inflows continued to be substantial, although their relative importance in the external accounts declined with remittances and services exports gaining pace. The authorities responded to a robust external position by linking the interest rates on these deposits; by giving the banks flexibility to set interest rates on rupee deposits; and by making all new deposits fully repatriable. These measures resulted in the interest rates on NRI deposits declining sharply, and moderating the inflows.

TABLE 12. Differe	nt Kinds of	Net Inflows	in Capital	Account (ii	n billion \$)					
		Monthly Avg.								
	Monthly	Jan-April								
	Avg. 2012	2013	May 2013	Jun 2013	Jul 2013	Aug 2013	Sep 2013	Oct 2013	Nov 2013	Dec 2013
FDI	2.02	2.46	1.99	1.8	2.17	1.92	4.64	1.83	2.24	1.71
External commercial	2.52	3.01	2.49	1.95	3.71	2.31	3.35	1.93	2.18	4.56
borrowings (Corporate)										
Portfolio equity	2.03	2.78	3.77	-1.76	-0.99	-0.95	1.99	2.93	1.13	2.53
Portfolio debt	0.57	0.78	0.52	-5.37	-2.11	-1.38	-1.26	-2.10	-0.78	0.86
NRI deposits	1.39	1.05	1.64	2.51	1.17	1.56	5.42	5.28	15.14	1.02
Source: BBI Haver Bloomberg										

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Source: RBI, Haver, Bloomberg.

It offered a second scheme in 2000, the Indian Millennium Deposit, and was able to raise \$5.5 billion at an interest rate of 8¹/₂ percent. A similar phenomenon was observed during the tapering talk episode. By providing certain incentives to the banks, the RBI managed to attract a large amount of NRI deposits through banks—net deposit mobilization was of the order of \$30 billion between September and December 2013. The success implies that marketing bonds or deposits to the Indian diaspora as a crisis mitigation strategy could be deployed in the future as well.

6. Conclusion

Starting in May 2013, expectations that the Federal Reserve would begin reducing the pace of its securities purchases had a large adverse impact on emerging markets. India was among those hit hardest. Between May 22, 2013, and the end of August 2013, the rupee depreciated by 18 percent, and stock prices, foreign reserves, and portfolio flows all declined. The reaction was sufficiently pronounced for the press to warn that India might be heading toward a financial crisis.

Why India? Because it had received large capital flows in prior years and had large and liquid financial markets that were a convenient target for investors seeking to rebalance away from emerging markets. An additional factor was that macroeconomic conditions had weakened noticeably in prior years, rendering the economy vulnerable to capital outflows and exchange rate depreciation and narrowing policy space. The deterioration in fundamentals was intertwined with the sizable amounts of capital that India imported during the period of zero interest rates and quantitative easing in the USA and other advanced economies. Rebalancing by global investors when the Fed began to talk of tapering highlighted these vulnerabilities.

The authorities adopted several measures in response, intervening in the foreign exchange market, hiking interest rates, raising the import duty on gold, introducing measures to encourage capital flows from the Indian diaspora, easing demand pressure in foreign exchange markets by opening a separate swap window for oil importing companies, and extending a swap line with the Bank of Japan. The Reserve Bank also sought to restrict capital outflows from Indian residents and companies.

Many elements of the policy response were ineffective or counterproductive. The very sharp increase in policy interest rates, taken without adequate explanation and not accompanied by steps to address the underlying weaknesses of the economy, did not reassure the markets. Efforts to
restrict capital outflows and discourage gold imports undermined confidence and encouraged evasion. The foreign exchange window for state-owned oil importers does not appear to have had much effect. Better would have been measured increases in interest rates and measured intervention in the foreign exchange market, supplemented by a clear communication strategy describing what other steps were being taken to address the underlying economic and financial weaknesses that had rendered the Indian economy vulnerable.

These results highlight that once a country is affected by an external shock leading to a rebalancing of global portfolios, there are no easy choices. Better is to put in place a medium-term policy framework that limits vulnerabilities, maximizing policy space for responding to such shocks. Maintaining a sound fiscal balance, sustainable current account deficit, and environment conducive to investment are, for obvious reasons, integral to such a framework. In addition there are some less obvious elements. These include managing capital flows so as to encourage relatively stable longer term flows while discouraging volatile short-term flows, avoiding excessive appreciation of the exchange rate through interventions using reserves and macroprudential policy, holding a larger stock of reserves, and preparing banks and the corporates to handle greater exchange rate volatility. India's experience also suggests abstaining from introducing new constraints on capital outflows in the midst of a crisis, since these can aggravate the loss of confidence. Finally, those who implement a medium-term framework and emergency crisis-management measures need to adopt a clear communication strategy so as to interact smoothly and transparently with market participants.

The week starting on	Weekly % change in exchange rate	Weekly change in reserves, \$ mn	Date of policy	Policy announcement
20 May	1.38	94		
27 May	1.55	-3,057		
3 Jun	0.99	1617	June 5	Government raised the duty on import of gold to 8% from 6%.
10 Jun	0.81	963		
17 Jun	3.02	-2,656		
27 Jun	0.21	-3,155		
1 Jul	1.43	-3,175		
8 Jul	-1.01	33		

APPENDIX I. Policy Announcements, Exchange Rate Depreciation and Reserve Changes during the Tapering Talk in India

(Appendix I Contd)

The week	Weekly % change in	Weekly change in		
starting	exchange	reserves,	Date of	
on	rate	\$ mn	policy	Policy announcement
15 Jul	-0.47	-999	July 15	RBI raised its marginal standing facility rate by 200 basis points to 10.25% to "restore stability to the foreign exchange market"; used open market operations to suck liquidity; required banks to maintain a minimum daily CRR balance of 99% of average fortnightly requirement.
22 Jul	-0.52	914	July 22 July 23	20% of gold imports to be made available to exporters Revised Cap LAF 0.5% of individual bank's NDTL; daily average CRR increased from 70% to 99% of the requirement
29 Jul	3.48	-2,155		
5 Aug	-0.38	1,453		Stricter maintenance of CRR; curtailed access to LAF by banks; OMO of ₹22,000 each week
12 Aug	1.33	212	August 13	Indian government hiked the import duty on gold to 10%
		4 979	August 14	Limit on overseas direct investment under automatic route reduced from 400% of the net worth of the Indian party to 100%. Reduced the limit on remittances by resident individuals under the Liberalized Remittances Scheme from \$200,000 to \$75,000; abolished its use for acquisition of immovable property outside India.
19 Aug 26 Aug	2.73	-1,078	August 20	PPI anonad a faray awan window to most the daily
20 Aug	3.71	-3,001	August 20	dollar requirements of three public sector oil marketing companies
4 Sep	-0.7	-656	September 4	Limit on overseas direct investments, through external commercial borrowings, reinstated to 400% of net worth.
				Offered a swap window to the banks to swap the fresh FCNR (B) dollar funds, mobilized for a minimum tenor of three years; at a fixed rate of 3.5% per annum. The overseas borrowing limit of 50% of the unimpaired Tier I capital raised to 100%; the borrowings mobilized under this provision could be swapped with the RBI at the option of the bank at a concessional rate of 100 basis points below the ongoing swap rate prevailing in the market; the schemes to remain open till Nov. 30, 2013. New governor, Rajan, issued a statement outlining priorities and reiterating trust in the health of the economy; laid out the blueprint of further financial sector reforms.

(Appendix I Contd)

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The	Weekly %	Weekly		
Week	cnange in	cnange in		
starting	exchange	reserves,	Date of	
on	rate	\$ mn	policy	Policy announcement
9 Sep	-2.68	500		
16 Sep	-1.92	1975	September 18	Government increased the import duty on gold jewelry to 15%
23 Sep	0.35	-1296	September 20	RBI increased the policy rate by 25 bps to 7.5%
			October 7	RBI lowered the MSF rate by 50 bps to 9.0 and announced additional liquidity measures in the form of term repos of 7-day and 14-day tenor for the amount equivalent to 0.25% of banking system NDTL through variable rate auctions every Friday beginning October 11, 2013.
			October 29 November 11 November 20	RBI lifted its policy repo rate by 25 bps to 7.75% RBI receives US\$17.5 billion under Forex Swap Window RBI receives US\$22.7 billion under Forex Swap Window

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Source: RBI, Haver, and authors' calculations.

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Comments and Discussion

Shankar Acharya

Indian Council for Research on International Economic Relations

Thank you Chair and thanks to the organisers for inviting me. Many thanks Poonam for a very nice presentation and a good paper too. I found the paper informative and interesting. It was particularly interesting for me to have the comparisons, both with respect of India within the context of the "fragile five," as well as with the whole set of emerging countries, done in a professional way. I think this is very important for an Indian audience because we tend to be somewhat inward looking and anything that makes us look a bit more at our neighbours or other countries to calibrate and benchmark our own experience is a very good thing.

Let me say to begin with that I agree with most of your conclusions that you presented in the last 3 or 4 slides (as presented in the conference). However, I am a little less persuaded by some of the analysis which leads to those conclusions.

Why was India impacted so severely? Frankly, I found the standard presentation with charts and sentences much more persuasive, than your econometric work. But that may be a comment on me and not on you. There is just one point which I keep repeating with apparently very little impact (see Acharya, 2012). You say somewhere that the fiscal stimulus of 2009 was one of the causes of India going downhill on the macro front. I just want to remind you and others that it was not 2009, it was 2008 and it was not fiscal "stimulus," it was unprecedented fiscal profligacy that was carried out from a year ahead of the national elections in spring 2009. This included: the follow through on the Sixth Pay Commission's government wage increase recommendations; the huge subsidies for oil, fertilizers, and food because of rising commodity prices and failure to undertake necessary adjustments in administered prices; the farm loan waivers announced in the 2008 budget; the ramping up of the national rural employment guarantee programme and some other things, which took the budgeted Central government fiscal deficit for fiscal 2008–09 (three quarters of which are in calendar 2008) from 2.5 percent of GDP to over 8 percent of GDP if one includes off-budget items like various kinds of bonds to petroleum and fertilizer companies.

This was, by a very large margin, the biggest overshooting of a budget target that Government of India has ever indulged in since its existence. It is also important to appreciate that the nature of the massive expenditure increases were not stimulus, (suggesting a possibility of withdrawal). Rather most of the expenditure hikes (government wage increases, subsidies, etc.) were of a kind which were politically difficult to scale back. Thus the "stimulus" stubbornly persisted for the next five years.

Let me move on to the policy response part. In your typology, let us start with the interest rate increases which occurred in mid-July 2013 and which you say did not seem to have much effect. I agree that in the short run they didn't seem to have much effect in restoring external balance. In fact they might even have had the opposite effect of inducing a sense of panic in the financial markets. I think the interesting question or counterfactual here is: would it have made any difference if instead of having a 200 basis point, sharp increase in the *de facto*, short-term policy rates, this order of increase had been spread out over 2 or 3 months, as in some other countries. The question may be worth exploring.

On gold imports, first let me just correct you on one point, the customs duty on gold never went as high as 15 percent. There was a 15 percent rate that refered to gold jewellery, not to gold. The gold duty peaked at 10 percent during the period. I doubt this makes a big difference to your analysis but it is important to get some of these basic facts right. More broadly, to the surprise of many, the quantitative restrictions on gold imports during these several months, were quite successful in the short run in bringing down imports of gold. This, in turn, was a very important part of the compression of the 4.8 percent of GDP current account deficit in 2012–13 to below 2 percent in 2013–14. Commentators and analysts from mainstream, Anglo-Saxon traditions tend to focus on price variables but I think we should also bear in mind that sometimes non-price policy levers do serve useful purposes. Here, I refer you to the so called "80–20 scheme" which was put into place for gold jewellery makers and various other restrictions. Clearly, in a crisis, policy-makers have to be quite eclectic about choice of instruments.

On swap facilities, I agree that those to the petroleum companies were not that important in this context. The really significant measures were the swap facilities offered by the RBI in August 2013 to non resident depositors in foreign currency non-resident accounts (FCNR). Although effective in the short run in attracting capital inflows, one should not underestimate their large quasi-fiscal costs in the form of *de facto* exchange rate guarantees. At that time anybody in the market place knew that if you were a high net worth individual living abroad, you could borrow money at low interest, invest in these FCNR deposits with high leverage and make returns of 18–20 percent. The inflows came in, but at high cost.

The other thing which helped (and which is missing in your paper) in solving the short-run mismatch between a high current account deficit and declining capital inflows was the notable modulation of "taper talk." If you go back to the September 12 minutes of the Federal Reserve Open Market Committee and look at those, they are very soothing. They talk about a continuation of low interest rate regimes etc. In your "event analysis", September 12 happens to fall outside the chosen "window." But I suggest that window needs to be extended.

So, my stylized summary of the successful external liquidity crisismanagement in the short run would give priority to three factors: (a) the new FCNR swap facilities; (b) the restrictive policies on gold imports, especially the non-price ones; and (c) the Fed's softening of its taper talk stance. That is why the second half of the financial year looks much calmer according to all the financial market indicators in India.

As for the medium-term policy framework, I broadly agree with your summary recommendations. But since Indian policymakers often find it politically difficult to get the medium-term policies right, the real question is what guidance does the paper offer for handling a crisis of confidence when it occurs in the short run? I agree with the advice not to get into the difficult, near-crisis situations and that is what we keep telling our political masters all the time (from both within and outside government). But it does not seem to work! My own final thought is that in these, short-run crisis situations what works is highly *sui generis* and you have to feel your way as you make up an action plan. Basically, you need intelligent, flexible, and empowered policymakers at that time. And lots of luck!

Kenneth Kletzer

University of California, Santa Cruz

This is a particularly interesting paper and a pleasure to read. The consequences of the reportage of Ben Bernanke's May 22, 2013, speech on the emerging market economies provides an opportunity to analyze the vulnerability of these economies to capital flow reversals and the efficacy of policy responses. This news allows the authors to do an event study of the capital market responses across emerging markets. In their prior paper, Eichengreen and Gupta (2014) investigate how macroeconomic conditions and country-specific financial market characteristics influenced the impact of the tapering talk on exchange rate depreciation, stock market indices, and international reserves. That analysis provides a nice motivation for taking the event study further to ask how India's policy responses performed. This paper takes advantage of multiple policy announcements, specific to India, in addition to the global news shock from the Federal Reserve. I especially like this paper because the event sharply focuses on policy responses to an adverse capital market surprise.

The paper begins by observing that the effects of the tapering talk on depreciation of the rupee and central bank reserves were particularly pronounced in relation to the rest of the emerging market economies, although this distinction is shared by the rest of the Fragile Five. Figure 2 displays evidence for the primary conclusion of the cross-country analysis by Eichengreen and Gupta that countries with larger and more liquid capital markets suffered larger exchange rate depreciations in the months following the Bernanke speech. As expected, countries that received proportionately larger capital inflows following the US financial crisis suffered larger taper-ing talk effects. Similarly, a larger capital market as proxied by the ratio of stock market capitalization to GDP and higher market turnover ratios are positively correlated with nominal exchange rate depreciation. However, the rate of depreciation is also positively correlated with the total size of the stock of portfolio liabilities in 2012. This size effect figures prominently in the earlier paper.

How should we think about the observation that "large and liquid" markets are more vulnerable? The empirical results reported in Table 5 show that absolute size matters. As explained by the authors, these effects are robust to using alternative definitions of capital market size from the reported cumulative private external financing to just GDP. Clearly, more financially open emerging markets should experience more volatile capital flows and are more vulnerable to external monetary policy shocks. Accordingly, pressure on exchange rates, both nominal and real, should be related to market liquidity and the relative size of a country's financial sector. News indicating future monetary tightening by the Federal Reserve should have effects on nominal exchange rates, central bank reserves, and stock market valuations in proportion to the magnitude of the stock of external financing or other measures of financial market size as a share of GDP, controlling for market liquidity, and capital account restrictions. Table 5, along with Figure 2, shows that portfolio adjustment induced by the tapering talk concentrated on larger markets, given domestic market liquidity and relative size.

Both papers explain this, indicating that global investors rebalanced portfolios more easily and conveniently by targeting large markets. The conclusion is that having a large and liquid capital market raises vulnerability more than proportionally. That implies that one big market would be less vulnerable than many small markets in sum. Standard theories suggest that investors should move funds out of all emerging markets in proportion to their portfolio holdings conditioning on restrictions on or the costs of fund retrieval: that is, why should outflows as a proportion to GDP rise with GDP? Liquidity should matter for both inflows and outflows from individual emerging markets. Investment positions should reflect relative market liquidity, so that outflows ought to be roughly proportionate to external exposures. Increasing returns to portfolio rebalancing by market could explain the importance of market size in the tapering talk episode. Another, probably better, explanation for the finding is that market liquidity is being proxied by sheer size.

The primary lesson from the cross-country comparisons is that macroeconomic fundamentals mattered for the capital market response to the tapering talk. India was particularly vulnerable. Over the three-year period 2010–2012, India realized exceptional capital inflows and real exchange rate appreciation. The current account deficit and government deficit rose substantially after 2008. Simultaneously, the ratio of central bank reserves to money fell. By comparison to the full sample of emerging markets, India stands out with respect to inflation, public sector deficits, and public debt. These are all identifiable reasons that India was more susceptible to the announcement. A large and volatile capital inflow accompanied by real exchange rate appreciation made India a target for global portfolio adjustment. The large reserve decreases and nominal exchange rate depreciation reflect India's macroeconomic exposure and limited policy space to respond to prospective monetary tightening by the Federal Reserve. The paper does a very nice and succinct job of showing this.

I now turn to the core of the paper. The event study of the policy responses to the tapering talk shock allows an assessment of how effective policy invention measures were. As we can read, several of policy responses are readily identified by an announcement of a single policy action. The analysis of these makes complete sense, and I have no criticisms of the approach or execution. Instead, I want to emphasize some of the results and implications. The RBI raised the Marginal Standing Facility rate on July 15, 2013 at once. The event analysis reported in Table 6 shows that this had no effect on the dependent variables: the nominal exchange rate, stock market index, portfolio debt inflows, and portfolio equity inflows. The null hypothesis that the interest rate increase did not reduce exchange rate depreciation or capital outflows is accepted. This is certainly not a favorable finding for

using monetary policy as an emergency measure against an external shock. Other policy interventions include the foreign exchange swap window for oil importers, capital outflow restrictions, and gold import duty increases. The announcement of each of these did not affect the rate of exchange rate depreciation. The positive finding regarding policy interventions by the RBI is that the communication and guidance effort undertaken on September 4, 2013, did have significant stabilizing effects.

In addition to showing that the RBI's overnight lending rate increase did not reduce exchange rate depreciation, the authors show that RBI reserve sales and the rate of depreciation are positively correlated contemporaneously and with reserve sales lagged. Exchange intervention was not just ineffective; declining reserves appear to have contributed to diminishing market confidence. I agree with the interpretation made by the authors that short-term measures in a crisis environment did not work and with their conclusion that policy makers need to pay attention to avoiding exposure to potential external disturbances beforehand.

In the wake of the global financial crisis, the IMF suggested that capital controls could be a policy tool to contain financial contagion and manage evolving crises. The analysis of India's experience in the summer of 2013 provided by Basu, Eichengreen, and Gupta may offer some insights on this. The tightening of controls on overseas direct investment by the RBI on August 14 did not alleviate pressure on the exchange rate or on other measures of capital market pressure. I think this is a useful data point that ought to give pause to enthusiasm for keeping in place the apparatus of capital controls may have contributed to the apparent immunity of the Indian economy to contagion after the collapse of Lehman Brothers. Their argument is that having a framework in position allows authorities to raise capital account restrictions quickly in response to an unfolding crisis. That is, even though it's always open, keeping the gate in place allows us to close it if needed.

One problem with this argument is that the evidence in favor of concluding that India's capital controls helped to insulate India from the global financial crisis is that it lacks proper evidence. The empirical findings in this paper show that tightening existing capital controls did not help mitigate the effects of an external capital market disturbance. This paper takes a clean econometric look at adjusting in-place capital controls to mitigate exchange depreciation and gets a statistically significant negative answer. This event study ought to caution policy makers that keeping the apparatus of capital controls at the ready may not be useful. Given the measured failure of mitigation measures to significantly stem (or, even, not exacerbate) the fall of the rupee in the summer of 2013, the authors rightly turn attention to reforming the medium-term policy framework. The authors show that the RBI appears to have switched its international reserve policy regime in 2008 so as to systematically allow greater exchange rate volatility and lower reserve volatility. It is worthwhile noting that over the same period, the relationship between the volatility of central bank reserves and nominal exchange rate depreciation is about the same as for both Brazil and Turkey, two other members of the Fragile Five, as for India.

The rules of thumb for reserve holding have been import coverage (old rule) and short-term debt coverage (new rule). By both of these, India's reserves were comfortably high as the rupee depreciated from June to September of 2013. Further, a glance at Figure 7 shows that reserves increased sharply as the housing market cooled in the USA and EU, then fell in the crisis and recovered a bit as capital inflows rose. These observations suggest to me that the RBI did not avail itself very much of its capacity to use reserves in the tapering talk episode. I wonder why not. A major issue, raised in this paper, is that the RBI did not make very extensive use of its reserves to resist real appreciation during 2010-12. Instead, it was restocking reserves from September 2008 on. An alternative and better choice of policy may have been to put reserves to use resisting real appreciation so as to protect against the consequences of eventual monetary tightening by the USA with an appreciated real exchange rate. A lesson from the effects of US monetary policy in the recession and its subsequent tapering is that central bank reserves should play an insurance role by mitigating real appreciation and rapid capital inflows, and not just be accumulated for use against rapid nominal depreciation in a crisis. I think the authors are right in arguing that a stock of reserves can be expended to avoid crises before they start. The proper role for precautionary reserves may be for use against potentially destabilizing real exchange appreciation, rather than held back to use against a destabilizing nominal depreciation.

The authors also explore the possibility of expanding international reserve swap lines. Broadening swap line participation makes tremendous sense for more efficient reserve accumulation and hoarding, as well as promoting policy coordination. Perhaps, more progress will come in time. A more immediate agenda for India could be to focus on managing capital inflows. The reversals in the capital account that followed the tapering talk were concentrated in portfolio flows which are much more volatile than foreign direct investment flows. Among portfolio, debt flows suffered larger and more persistent reversals. As observed by the authors, managing portfolio flows should probably include policy reforms in the regulation of intermediaries (such as, adopting cyclical capital adequacy requirements). Maintaining a more stable macroeconomic environment and adequate policy space to avoid and manage external shocks also means using policy to reduce the volatility of short-term capital inflows and to lean against real appreciation to reduce the magnitude of capital account reversals. Managing deposits from nonresident Indians by adjusting yields so as to moderate inflows and outflows, as well as extending the maturity of inflows, is a policy opportunity for India that most other emerging markets do not have.

This is a really helpful and timely analysis. The paper makes a notable contribution by demonstrating how the tapering event reveals the efficacy of policy interventions used to address a capital account disturbance and stem an episode of rapid nominal depreciation. The authors' analysis of shortterm policy interventions and thoughts on medium-term policy framework are important and extremely useful. Policy makers would be well advised to give these their attention.

General Discussion

Indira Rajaraman agreed that in the medium-term, we have to mainstream gold by going back to the prior duty structure. But she also supported Acharya in that it was actually the non-duty interventions to de-facilitate gold imports that were in the end more effective. There is nothing better for an exporter of gold to India than to have a major commercial bank with all its assurance of integrity be the counterpart. The removal of public sector banks as conduits for gold imports, rather than the duty hikes, was the main reason for the sharp decline in gold imports.

The second point she made was on Shankar Acharya's comment about 2008–09, where she agreed that 2008–09 was a preelection year, sops made in the budget, and so on. But the contribution of the second set of two quarters in hiking the fiscal deficit over what was in place for 2007–08 was far more on account of what happened in quarters 3 and 4 after the global crisis when the fiscal stimulus kicked in than what happened in quarters 1 and 2 which was pre-stimulus.

Vijay Joshi said was that the paper would benefit by looking at financial balances. The current account deficit is the sum of public sector deficit and the private sector deficit. It is right the fiscal deficit went up, but not only did the fiscal deficit go up, but also the current account deficit worsened despite the fact that private investment fell. Household financial savings also fell, which was the critical element in the current account deficit. He also emphasized the role of inflation in all this. It led to an appreciation of the real exchange rate and to the decline in household savings. If we look at the financial balances what comes out strongly is the importance of the decline in household savings as the determining factor in what happens to the current account deficit.

He also commented on the policy conclusions. Management of the capital account presumably by means of capital controls etc., as an important policy instrument. In supporting that there needs to be a discussion of what India's capital controls currently are. Quite a lot of people claim that, there are few capital controls now and that they are no longer an instrument of policy. The validity of this claim needs to be discussed. The paper implies that they can be an instrument of policy. If so, it has to say what has been happening to capital controls.

Ajay Chhibber said that the paper highlights that fact that India has drifted into a mostly open capital account. So, the question is when did this happen. Was there some series of decisions that were made that got us there or did we just drift into this situation? And did the RBI really not understand what it was dealing with, that it did not have a good framework for open economy macroeconomics, did not understand the fact that all this money would come in, that the exchange rate would be appreciating and that this passive policy that was followed was really a conscious policy?

The second was linked to what Shankar Acharya said, as the paper rightly showed, the interest rate increase did not work because the big risk was FX volatility and that once this swap arrangement was put in place which took away the exchange rate risk, then of course we were able to attract the NRI and other deposits. But regarding the costs was that premium then necessary once we took away the foreign exchange risk? The third question was whether the persistence of inflation in any way linked to the macro stance that we have. Fourth, if we did not worry enough about the fact that the exchange rate was appreciating then, are we in a similar danger today? The Reserve Bank is buying reserves quite aggressively but at the same time we have seen a year of inflation and the rupee is still around 60, so what is the appropriate real exchange rate today. Should we be more aggressive in buying FX?

Govinda Rao referred to the paper's proposition that the rationale for a fiscal stimulus in 2009 was the global financial crisis. He thought that it was the stimulus first and then global financial crisis came later. But, in the fiscal deficit, which increased from the budgeted 2.5 percent to 8.5 percent,

almost 2 percent increase was on account of the oil price increase. We had three fiscal expansion measures—the debt waiver, pay commission award, and expansion of National Employment Guarantee Act from 200 districts to 600 districts. But a much more severe shock materialized in July 2008 when crude oil prices touched \$147 a barrel and then remained at an elevated level thereafter. Although there was a semblance of recovery thereafter, the inability of the policymakers to correct for the high oil prices has continued and it became a major problem, which impacted both the fiscal deficit and the current account deficit. There was a transmission from the real sector to the financial sector through this channel as well.

Abhijit Banerjee suggested a dissonance between basic macro theory and the real macroeconomics that gets done and said that this paper was an example. The fact that India had very bad macro fundamentals was known for a long time before this tightening was mooted. What was it, then, that made India and all these countries so vulnerable suddenly at that point. Somehow the level and the change are not necessarily obviously directly correlated. The paper states it as obvious that these things should align. But, the opposite could also have been true. India had such bad macro-fundamentals and everything that could have happened would have already happened precisely because we knew that the macro-fundamentals are bad. Therefore, any further changes would have a small effect on the economy because people who were all still holding Indian assets were people who were hedged against it. He questioned the link between bad macro-fundamentals and the claim that tightening would have a bigger effect on those economies.

Mihir Desai referred to the issue of large financial markets and how it was framed in the paper, which claims that large financial markets give the potential for more rebalancing to happen from those economies. He thought, to the contrary that large financial markets make a country more susceptible to the real exchange rate appreciations which underlie some of these problems.

He suggested that, for the event study, it would be useful to control for what other emerging markets were doing during those periods. The paper controls for the US bond yield but the premise of the paper in many ways is that we can learn from these other fragile five. So, he thought in the event study would control for, e.g., stock market data, emerging market returns ex-India so that we would then have a better sense of what is actually happening idiosyncratically as a result of the policy in India.

Rajnish Mehra questioned the entire premise that the tightening actually caused any of the effects that the paper indicates. He said that quantitative easing was a reshuffle of the asset side of the balance sheets of banks. It took away some bonds from there and credited it with reserves at the Fed. So, it was a pure financial transaction. Had banks taken those excess reserves and lent them out, particularly to investors in emerging markets, then it would make sense. However, for all the QE the money multiplier actually collapsed in the USA. The marginal dollar actually is sitting in the excess reserves at the Fed. On the Fed's balance sheets, excess reserves by the banks have gone up hugely. So, he did not see the linkage between the Fed's tightening and demand for dollars going up in the USA, causing investors to liquidate in emerging markets. He disagreed with the paper's premise that this causation took place.

Sudipto Mundle said that the paper argues that economies should have a macroeconomic framework so that prevents crisis. Nobody can disagree with that but the fact is that countries do still get into a crisis so we have to address the question more seriously of what actually helped us get out of it at least in the short term.

He asked question was about the swap facility created for the oil companies. The paper shows that if anything it may have had a negative effect. At the time when this was done there was a big recognition at least in the press that it was that action along with some other announcements that the new Governor made that began to stabilize conditions. So, why did the authors think that it did not really matter?

Surjit Bhalla thought that the paper was perilously close to concluding causation from correlation. First, the paper commented that our macro fundamentals were very bad. So, the first counterfactual question to be asked was: Would this readjustment in the exchange rate have happened anyway? In other words, if there was no tapering, what would have happened? It may not have happened at that precise time and that is where there is no question that the tapering announcement had in effect in terms of acceleration or whatever the fundamental trends were. But after that, we need to answer that question.

Second, he said that the paper did not look at the other tapering incidents, which would have been a fantastic control to look at whether the tapering had an effect subsequently. Third, he would have liked in a cross-section study to look what the deviations were, not in a study of each country from its means etc. Inflation in India was the highest ever recorded in Indian history except for a few years after the oil crisis of 1973. We had inflation in India of 12–13 percent going on for three to four years that would immediately tell us that, all other things being equal, we would have a depreciation of the exchange rate. That happened. Therefore, if we do a cross-section study which takes into account own countries' fundamentals relative to their trend,

we would find that that explains what the changes are rather than any tapering announcement whether in 2013 or subsequently.

Ashok Lahiri commented on the current account deterioration that we saw. He said that it was again related to the fiscal problem. If we look at public savings, if current account is a difference between savings and investment, then it is the public savings that has actually gone down quite remarkably. Coming back to the tapering, his question was: Did the RBI do anything which it would not do again if there was another crisis? Prevention is better than cure, but if we get into a crisis what the Central Bank can do is to increase interest rates, which it did, tinker with capital controls, and borrow more. He pointed out that Indian foreign exchange reserves had gone up and so had the external debt. This was basically borrowing to bolster reserves, along with import controls. Were the authors suggesting that the next time there is a crisis, do not increase interest rates, do not borrow more and bolster reserves, or do not try to control gold imports. What, then, should be done differently?

Seema Sangeeta expressed curiosity about the diaspora deposit policy: Whether the success of that policy was confined to India or was there any evidence of this working in the other fragile five economies or other emerging markets or developing countries.

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Enhancing Nutrition Security via India's National Food Security Act: Using an Axe Instead of a Scalpel?[§]

ABSTRACT In September 2013, India passed a historic National Food Security Act (NFSA). This paper examines the potential impact of the two central pillars of this act—expansion of the Public Distribution System (PDS) and strengthening of the Integrated Child Development Schemes (ICDS)—on child nutrition. Using new data from the India Human Development Survey of 2011–12, this paper shows that access to subsidized grains via PDS is not related to improved child nutrition, and while ICDS seems to be related to lower child undernutrition, it has a limited reach in spite of the universalization of the program. The paper suggests that a tiered strategy in dealing with child undernutrition that starts with the identification of undernourished children and districts and follows through with different strategies for dealing with severe, acute malnutrition, followed by a focus on moderate malnutrition, could be more effective than the existing focus on cereal distribution rooted in the NFSA.

Keywords: *Malnutrition, Child health, Food Security, Public Distribution System* (PDS), Integrated Child Development Scheme (ICDS)

JEL Classification: 112, 115, 138, 015

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1. Introduction

ational Food Security Act (NFSA) passed in September 2013 is one of the largest safety net programs in the world. This Act legislates the availability of 5 kg of cereals per person per month at prices ranging from ₹1 to ₹3 per kg to about 67 percent of India's population. It also contains provisions for nutritional supplementation for young children as well as pregnant and lactating mothers via the Integrated Child Development Scheme (ICDS) and through maternity benefit of ₹10,000 for all new mothers.¹ The maternity benefits are not yet implemented due to a court challenge but the other two programs involve expansion/restructuring of currently existing programs. The financial cost of this extremely ambitious program is difficult to estimate but some estimates peg it at ₹44,000–₹76,000 crore (Mishra 2013) above and beyond the costs already being incurred for various food security programs.

This act has emerged in response to a strong advocacy following the observation that economic growth has not kept pace with reduction in hunger and malnutrition in India. In 2013, India ranked 63rd out of 120 in the Global Hunger Index. This index is based on proportion of people who do not get sufficient calories, proportion of children who are underweight, and mortality rate for children under five (von Grebmer et al. 2013). Much of this low ranking is driven by very high proportion of underweight children in India. National Family Health Survey (NFHS) of 2005–06 shows that 43 percent of children under five are underweight compared to WHO global standards and 48 percent are too short for their age (have moderate to severe stunting).

Research on the consequences of undernutrition notes substantial economic costs associated with poor learning outcomes and productivity (Spears 2012, 2013). By some estimates, the economic burden of malnutrition is expected to be between 0.8 percent and 2.5 percent of the GDP (Crosby et al. 2013). One can easily quibble about the size of these estimates but these eye-catching numbers have given considerable impetus to the advocacy for reducing malnutrition and placed it at the forefront of the national political agenda. For example, the election manifesto of the Bharatiya Janata Party prioritizes a focus on undernutrition in a mission mode.

While a nutrition advocacy has fueled the demand for NFSA, whether the NFSA will meet the nutritional needs of the nation remains far from clear.

^{1.} For the text of the Act, see http://indiacode.nic.in/acts-in-pdf/202013.pdf (accessed April 30,2015).

In order to assess its potential implications, we must address the following questions:

- 1. What are the determinants of undernutrition in India and does NFSA appropriately target them?
- 2. How successful are the two mechanisms at the core of NFSA—PDS and ICDS—in targeting undernutrition? Are there any unanticipated effects?
- 3. What is the likelihood that the massive expansion of programs envisioned by NFSA can be carried out within the present administrative framework?
- 4. Should we be looking at any other policy options?

2. Current Status of Undernutrition in India

Given the policy activism surrounding food and hunger, it is surprising that India has so little recent data on nutritional status. Generally, malnutrition is measured by collecting data on height and weight for children and adults. Based on these, anthropometric indices are calculated reflecting standardized scores for weight-for-age or height-for-age comparing the index individual with a reference standard.² For adults the body-mass-index is usually used. Children with weight-for-age index of that is two standard deviations or more below the median of the reference population are generally considered underweight, while those below three standard deviations are considered severely underweight. Similarly, children with height-for-age of below two standard deviations are considered stunted and those below three standard deviations are considered severely stunted.

2.1. Sources of Nutrition Data in India

Getting national data on child anthropometry is quite difficult because not only does it involve measuring children, it also involves collecting accurate data on their age since children grow rapidly and a few months' difference

2. Whether use of global standards is appropriate in India is subject to considerable debate, see Panagariya (2013) and articles in response to this including Deaton et al. (2013) and Desai and Thorat (2013). Since a fourth of the WHO sample from which these standards were derived consists of Indian children, and these standards have been officially adopted by Indian Academy of Pediatrics as well as over 150 countries worldwide, we do not focus on this debate in this paper.

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in age could make a large impact on their placement on the growth chart. We have three major sources of data on nutrition:

- NFHS of about 100,000 women conducted in 1992–93, 1998–99, and 2005–06 are the most frequently used sources of nutrition data. This survey was organized by the International Institute of Population Sciences which also conducted the District Level Health Survey (DLHS-II) of 2002–04 of about 200,000 households. DLHS-IV of 2011–12 was carried out for only selected states but offers the latest data on undernutrition with large samples.
- Periodic surveys conducted by National Nutrition Monitoring Board (NNMB) covering anthropometric outcomes and dietary intake for rural areas of 10 states in 1975–79, 1988–90, 1996–97, and 2011–12. The sample size for these surveys is about 24,000 households. NNMB also carries several other special purpose surveys including those in tribal areas.
- 3. Some of the special surveys with anthropometric data include the HUNGaMA survey of 2011–12 in rural areas of 100 poorest districts of seven states carried out by the Nandi Foundation for over 100,000 children and India Human Development Surveys (IHDS) (2004–05 and 2011–12) of about 42,000 households.

Sadly, none of the large nationally representative surveys are recent. But Figure 1 based on NFHS, NNMB, and IHDS surveys paints a picture of modest decline in proportion of children underweight during an era when poverty dropped sharply. The HUNGaMA survey suggests a sharper decline when compared the DLHS-II survey for the same districts using the same reference standards (from 53 percent children being underweight in DLHS of 2002–04 to 42 percent underweight in HUNGaMA survey of 2011–12 but these comparisons are somewhat difficult due to different survey design and focus on 100 poorest districts.

No other national data are currently available. The Annual Health Survey (still being processed) collects anthropometric data for nine focus states in north-central India, while the DLHS-IV collects data in the rest of the India and fact sheets form DLHS-IV for selected states are just being put in the public domain.

2.2. State of Undernutrition in India

The IHDS of 2011–12 on which most of the discussion in this paper is based, is the only source of national data on anthropometry as well as dietary

FIGURE 1. Decline in Percentage of Children under Five being Underweight Has Not Kept Pace with Poverty Decline



Source: NFHS-III report, NNMB report, authors' calculation IHDS.

intake/expenditure and utilization of large public programs like ICDS and PDS. Thus, it is important to evaluate the quality of this survey before drawing any conclusions from it.

Table 1 compares the point estimates of underweight for children under five from various other surveys with the IHDS-II results. These results appear to be more or less in line with each other and point to about 37 percent of the children being underweight in India circa 2011–12. Figure 1 plots fertility decline from various surveys over the past 20 years, along with the decline in poverty. This figure suggests a continuation of the prior trend of a relatively slow decline in underweight children of less than 1 percentage point per year, a stark contrast to the rapid decline in poverty.

We do not focus on children's height-for-age in this paper because collection of height data is far more error prone than collection of weight data, particularly for children under one who must be measured lying down.³ However, all multivariate analyses presented in this paper are repeated with stunting (height-for-age being less than two SD below reference median) and show similar results.

3. Underweight rates for IHDS-I are similar to NFHS, stunting rates are considerably higher suggesting greater measurement error in height than in weight. Our personal observations in the field support this.

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IHDS-II Sample	IHDS-II (2011–12)	HUNGaMA (2010–11) Rural–100 poorest districts in 7 Central States	NNMB Rural–10 large states (South + WB + Orissa + UP)	DLHS4
Nationwide				
Rural	40%			
Urban	29%			
All	37%			
Rural—HUNGaMA states	43%	42%		
Rural NNMB states	41%		43%	
States				
Maharashtra	39.1			38.7
Himachal Pradesh	26.6			28.5
Karnataka	32.6			29.7
Punjab	21.4			25.5
West Bengal	32.1			37.4

TABLE 1. Point Estimates of Underweight Circa 2010 for IHDS-II in Comparison with NNMB, HUNGaMA, and DLHS-IV

Source: (a) Published reports of HUNGaMA, NNMB and DLHS-IV Fact Sheets. (b) IHDS-II authors' calculations.

3. Determinants of Undernutrition

Since 1990s, research on undernutrition has been guided by the framework proposed by UNICEF (United Nations Children's Fund 1990). A modified version of this framework from the Lancet series on undernutrition is reproduced below in Figure 2 (Black et al. 2008).

While this framework identifies disease and diet as two proximate causes of undernutrition, it has done a disservice to the field by not distinguishing between different components of diet—specifically, caloric intake and dietary composition. Although dietary diversity and micronutrient deficiency is well recognized as a source of undernutrition, much of the attention in the policy arena remains directed to caloric deficiency resulting in advocacy for eradicating hunger (Sheeran 2008) and has provided justification for the NFSA. Further, we review evidence for three major sets of determinants for child undernutrition.

3.1. Disease Climate and Undernutrition

Prevalence of gastrointestinal diseases has been long recognized as a key determinant of poor nutritional outcomes (see India Policy Forum paper by Spears 2013). While the pathways are diverse, several deserve particular



FIGURE 2. Modified UNICEF Framework on Undernutrition

attention. Increased prevalence of diarrhea is associated with loss of appetite and inadequate dietary intake; it is also associated with increased loss of water and electrolytes leading to direct loss of nutrients as well as decreased absorption of nutrients (Dangour, Watson, Cumming, Boisson, Che, Velleman, Cavill, Allen and Uauy 2013).

Studies linking water, sanitation, and hygiene (WASH) to diarrheal prevalence seem to find a generally positive relationship between improvements

Source: Black et al. (2008).

in WASH and disease prevalence (Clasen Thomas et al. 2006; Clasen Thomas et al. 2010; Ejemot-Nwadiaro Regina et al. 2008) and WASH and nutritional outcomes (Dangour et al. 2013). Hookworm infection from the soil contaminated with feces affects small intestine and is associated with iron deficiency and appetite loss. This evidence is somewhat tentative and direct effects are relatively small,⁴ but improving disease climate offers an interesting opportunity for multiplicative effect of other socioeconomic interventions.

Past research in India has documented a large role of geography in shaping disease prevalence, mortality, and access to health care (Deolalikar 2005; Desai et al. 2010). However, with declining disease prevalence, the role of geography is receding and that of food intake is likely to increase.

As disease prevalence declines, the role of food intake becomes more important (Desai and Thorat 2013). As Table 2 based on NFHS documents, over time the differences between the rich and the poor on nutritional outcomes have grown, documenting rising role of household incomes in shaping nutritional outcomes.

3.2. Food Intake and Undernutrition

When UNICEF began its campaign for child survival and development in early 1980s, it began with the poorest and most marginalized children at its center. This led to the famous GOBI (Growth monitoring, oral rehydration, breastfeeding, and immunization) framework that has influenced the discourse around health and undernutrition over the past three decades. Hunger or caloric deficiency has been the center of this discussion. As research on famines, war, and other emergency situations documents, crises situations frequently lead to a vast proportion of individuals, particularly children, being malnourished (von Grebmer et al. 2013). This would lead us to assume that in stable economies as incomes grow, poverty will be vanquished and along with it undernutrition.

However, although income growth leads to decline in poverty, its impact on undernutrition tends to far smaller. Ruel and Alderman (2013, p. 538) note that, "Country fixed-effects regressions show that a 10 percent increase in gross domestic production (GDP) per person predicts a 5.9 percent (95 percent CI $4 \cdot 1-7 \cdot 6$) reduction in stunting and an 11 percent ($8 \cdot 6-13 \cdot 4$) decrease in the World Bank's poverty measure of individuals living on

^{4.} But a randomized experiment in toilet construction in Maharashtra shows a relatively large effect on nutrition; see Hammer and Spears (2013).

TABLE 2	. Change	s in Proporti	on Stunted a	and Underwei	ight between	1992–93 ar	nd 2005-06	by Wealth Qu	intile	
	1st qu	uintile	2nd qı	vintile	3rd qu	intile	4th qu	uintile	Top qu	intile
Age	1992-93	2005-06	1992-93	2005-06	1992-93	2005-06	1992-93	2005-06	1992-93	2005-06
					Proportion {	Stunted (%)				
< 12	32	24	28	22	25	19	22	14	15	10
13-23	65	65	64	56	59	54	52	46	38	28
24–35	71	59	69	53	62	41	57	34	40	18
36-48	75	62	74	54	72	50	63	41	45	24
All Ages	60	53	59	47	55	42	48	34	35	21
					Proportion Un	derweight (%)				
< 12	39	35	36	30	32	22	25	17	18	11
13-23	73	74	73	62	70	57	57	47	42	31
24–35	70	70	72	64	68	52	59	46	42	30
36-48	99	65	67	56	63	52	54	44	40	29
All Ages	62	61	61	54	58	46	49	39	35	26

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Source: Desai and Thorat (2013).

\$1.25 per person, per day." The same review also observes that the relationship for India is even weaker than that observed globally.

Declining caloric consumption in India adds to this puzzle. Although incomes have risen sharply in India, per capita caloric consumption has steadily fallen from 2,150 calories per person per day in 1993–94 to 2,020 in 2009–10 in rural areas and from 2,071 to 1,946 in urban areas (National Sample Survey Organisation 2012). Similar decline is observed in the data collected by the National Nutrition Monitoring Bureau (National Nutrition Monitoring Bureau 2012). This decline in caloric consumption has added urgency to the advocacy for reducing hunger in India.

However, it seems somewhat implausible that as incomes grow and poverty declines, hunger levels rise instead of declining. While rising inequality or higher health care, transportation and other expenditures could account for this, one would expect that food consumption is at the core of the household expenditure strategy and would receive priority. Are there any other explanations for this observed trend? Measurement errors in the National Sample Survey (NSS) survey could account for this, particularly since converting data collected in kilograms and rupees to calories requires substantial approximation. This has become a bigger problem over time since more and more information for consumption expenditure seems to be provided in rupees rather than in quantities, increasing errors in conversion. However, there may also be a deeper issue. Disaggregated analysis seems to show that much of the decline in caloric consumption has taken place in higher income strata (Deaton and Drèze 2009) and may well be associated with a decline in energy-intensive work. Moreover, over time household structure has also changed resulting in changes in caloric needs. NSS results for 2009-10 have adjusted the caloric intake for energy needs of different age groups and the results, presented in Figure 3a and 3b, suggest an increase in caloric intake in urban areas between 2004-05 and 2009-10 for all income groups, but a decline in caloric intake for households at higher consumption levels in rural areas. Without doing this adjustment for age/activity level, bottom 20 percent of the households seem unable to meet FAO revised norms for 1,800 calories per day, with the adjustment, all consumption classes seem to meet these norms on average (National Sample Survey Organisation 2012). Given the growth of non-farm work in rural India, decline in energy needs among the rural rich seems a plausible explanation.



FIGURE 3A. Calories Intake per Adult Equivalent, Rural

Source: National Sample Survey Report 513, 2012.

FIGURE 3B. Calories Intake per Adult Equivalent, Urban



Source: National Sample Survey Report 513, 2012.

3.3. Food Composition and Undernutrition

As economies grow and starvation levels recede, we would expect to see caloric intake increase. However, composition of food continues to remain a bottleneck for improved nutritional status. A large number of studies have documented the importance of micronutrients like iron, vitamin A, zinc, and calcium in shaping maternal health, child birth weight, and child undernutrition (Bhutta et al. 2013; Black et al. 2013). This issue is particularly relevant in India since studies have documented high prevalence of anemia in Indian mothers and children that seems persistent in spite of economic growth.

NFHS of 2005–06 records 56 percent of the women as being anemic up from 52 percent in 1998–99. A similar increase in anemia is observed among children with about 78 percent being at least mildly anemic (hemoglobin level of <10 g/dl) in 2005–06 compared to 74 percent in 1998–99.

This increase in anemia among Indian population is puzzling given the increase in incomes. Food diversity including consumption of milk, vegetables, fruits, and pulses is important to a balanced diet and micronutrient intake. Analysis of NFHS-III data shows that children who received diets that consisted of at least four food groups had far lower likelihood of being underweight or stunted than those that did not (Menon et al. 2015).⁵ However, NFHS-III notes that only 49 percent of the women consume milk daily while that number is even smaller for fruits, only 13 percent.

What is more curious is the fact that dietary diversity has steadily declined in India (Gaiha, et al. 2013). Gaiha and colleagues use NSS data to show increasing concentration for food expenditure across various food groups using a concentration index similar to Herfindahl that takes into account distribution of expenditure across various food groups. Dietary surveys by National Institute of Nutrition also document a decline in availability of calcium and iron along with protein and energy in the states they have surveyed since 1975 (National Nutrition Monitoring Bureau 2012).

4. National Food Security Act and Undernutrition

This brief review has examined the determinants of undernutrition and their trends in India. How do we expect NFSA to address these three components? Although NFSA provides a nod to the need for improved water and sanitation systems, policies directed towards stimulating agriculture and providing maternity benefits of ₹10,000 to each pregnant woman, food distribution through the Public Distribution System (PDS) and Integrated Child Development Services (ICDS) are the two pillars of this legislation. This is not surprising given its origin, the Right to Food case filed by the People's Union of Civil Liberties in 2001 and a series of Supreme Court orders directing universalization of ICDS as well as provision of food to the poor.

^{5.} Note, however, that some cross-national analyses have failed to find this to be a statistically significant relationship Jones, Mbuya, Ickes, Heidkamp, Smith, Chasekwa, Menon, Zongrone and Stoltzfus (2014).

The NFSA emerged as a part of the common minimum program of the UPA Government in 2004 and was finally passed as legislation in September 2013. However, given its focus on alleviating hunger and ensuring food distribution, its potential for addressing India's nutritional challenges remains unknown. In this paper, we examine the potential of PDS and ICDS for improving nutritional outcomes of children under age five.

While in principal, both programs should improve nutritional outcomes, empirical studies fail to show a conclusive relationships. Literature on effectiveness of PDS in improving nutrition is not unanimous in its findings. With some exceptions (Kochar 2005), studies that focus on caloric intake find that PDS is effective in increasing caloric intake (Himanshu and Sen 2013; Kaul Forthcoming); in contrast, studies that actually focus on nutritional outcomes show little impact of going from universal PDS to targeted PDS on anthropometric outcomes (Tarozzi 2005). The literature on ICDS is also ambiguous. Some of the earlier studies failed to find a strong relationship between availability of ICDS program and nutritional outcomes (Deolalikar 2005; Lokshin et al. 2005), while more recent studies show that presence of Anganwadi centers (AWCs) through which ICDS operates improve children's nutritional outcomes, although often for selected groups of children (Jain 2013; Kandpal 2011). This suggests that these relationships should be empirically examined and not simply assumed.

5. India Human Development Survey (IHDS)

Results presented in this paper are based on the analysis of IHDS-II of 2011–12. The IHDS is carried out jointly by the University of Maryland and National Council of Applied Economic Research and is the only nationwide survey to collect data on income, consumption, and nutrition. This is a survey of over 40,000 households. It began in 2004–05 with a sample of 41,554 households and about 83 percent of these households were resurveyed in 2011–12. The IHDS-II sample consists of 42,154 households of which 34,621 households were also surveyed in 2004–05; 5,397 households have separated from the original household (also included in the sample) and live in the sample village or urban area; and, 2,134 households were added to refresh the urban sample where there were greater losses due to non-recontact. The recontact rate is over 90 percent in rural areas and about 72 percent in urban areas. The quality of IHDS-I data is considered to be generally quite high with its results being comparable to Census, NFHS, and NSS, and ASER

survey on variables like poverty rate, school enrollment, and learning outcomes (Desai et al. 2010). Analysis of IHDS-II shows similar concurrence between IHDS-II data and other data sources. The comparison of IHDS-II anthropometric data with other surveys is presented in Table 1.

The IHDS sample is spread over all states and union territories with the exception of Andaman Nicobar and Lakshadweep and covers both urban and rural areas covering 1420 villages and 1042 urban blocks. The IHDS-II contains interviews of a respondent knowledgeable about household income, expenditure, and employment (typically the head of the household), up to two ever-married women ages 15–49, and a youth aged 15–18.

IHDS-II also includes anthropometric measurements for household members including those for 10,715 children for whom both complete date of birth and weight measurements are available. Using these two pieces of information, we have constructed weight-for-age standardized scores for children 0–60 months of age using WHO growth reference standards and STATA's Zanthro routine. Descriptive statistics for moderate and severe underweight for children are presented in Table 3 and show expected correlation between household education and income and child underweight. Children from households that participate in the two programs we are interested in—PDS and ICDS—show higher undernutrition rates, but that is partly due to selectivity into these programs by lower income families. A point to which we return when discussing multivariate analyses.

IHDS-II collected data on both incomes and expenditure. Expenditure data were collected using the short module of about 50 items used by the NSS's Employment/Unemployment survey. While this does not contain the full range of items collected by the consumption expenditure survey of NSS, it is sufficient for our analysis since we focus on consumption of major commodities and food groups. Comparison of quantities consumed per capita from detailed NSS data and IHDS shows fairly similar pattern. For example, cereal consumption per capita in NSS 68th round is 9.4 kg per month in urban areas and 11. 4 kg in rural areas; corresponding figures for IHDS are 9.8 kg and 11.5 kg.

Our focus is on the quantity of cereals, pulses, and milk consumed by PDS and non-PDS households along with whether their consumption included fruits, vegetables, oil/fat, and sweeteners. We also construct an index of dietary variety which is a sum of the number of food groups consumed including cereals, other grains, such as ragi and jowar, pulses, fruits and nuts, vegetables, and milk.

Where quantities consumed are available (e.g., for grains, pulses, and milk), the quantity consumed per household member is adjusted for

	We	ight-for-age
	(Moderate < 2 SD)	(Severe underweight < 3 SD)
All India	37.4	15.8
States		
J&K, HP, UK	27.6	7.9
Pun, Har, Del	26.3	8.7
UP, Bih, Jhar	40.8	18.5
Raj, Chh, MP	40.9	15.4
North-East, Assam, WB	34.7	18.1
Guj, Maha, Goa	39.1	14.9
AP, Kar, Ker, TN	32.4	13.1
Sector		
Rural	40.1	17.7
Urban	29.0	10.2
Highest HH Education		
Illiterate	46.5	22.9
1–4 std	39.9	19.0
5–9 std	40.6	16.7
10–11 std	35.4	13.3
12th and graduate	34.1	13.4
Postgraduate	24.1	10.2
Caste/Religion		
Forward caste Hindus	26.7	11.7
OBC	38.0	14.7
Dalit	41.6	17.9
Adivasi	49.2	23.4
Muslim	36.0	16.3
Christian, Sikh	23.3	8.8
Income group		
Below 25,000	43.5	18.3
25,001-50,000	43.6	20.3
50,001-75,000	41.6	17.9
75,001–100,000	36.1	13.5
100,001-200,000	31.1	12.2
200,001-300,000	26.6	11.6
300,001-400,000	22.7	8.0
400,001–500,000	22.2	4.8
500,001 and above	16.2	7.2
No. of Adult Equivalent		
1	0.0	0.0
2	19.1	16.8
4	38.3	15.3
8	37.1	16.6
8+	35.3	13.7
Any toilet in the HH		
Yes	29.9	11.6
No	43.1	19.1

TABLE 3. Percentage of Children Underweight by Location and Household Characteristics

(Table 3 Contd)

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(Table	3	Contd)
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	We	ight-for-age
-	(Moderate < 2 SD)	(Severe underweight < 3 SD)
Piped water in HH		
Yes	32.5	11.8
No	39.9	17.9
Sex		
Male	37.3	16.5
Female	37.5	15.1
Child age category		
< 12 months	33.3	16.5
13–24 months	38.9	17.9
25–36 months	36.6	14.0
37–48 months	38.2	15.6
49–60 months	40.6	15.0
Type of PDS card		
APL/No card	35.1	14.6
BPL	40.1	17.7
Antyodaya	46.6	19.0
Purchase from PDS shop by card type		
No PDS Use	35.8	15.0
APL use	32.8	14.3
BPL use	40.2	17.7
Antyodaya use	48.8	19.3
ICDS education particip.		
Yes	39.9	14.7
No	37.0	16.1
ICDS food receipt		
Yes	40.7	15.3
No	35.9	16.2
Sample—children ages 0–60 months	10,521	

Source: Authors' calculations.

Note: SD = standard deviations.

age/gender composition of household members using a scale used by the NSS (Appendix I). This analysis was repeated with a simple equivalence scale with a child under five counting as half an adult, the conclusions did not change.

6. Propensity Score Matching

In this paper, we undertake three analyses:

1. Do households who access subsidized cereals from PDS shops have a different food basket than those who do not use subsidized cereals?

- 2. Are children from households that use cereals from PDS shops less likely to be undernourished?
- 3. Are children who use ICDS services less likely to be malnourished than comparable children who do not use ICDS services?

Since the use of PDS and ICDS is concentrated in lower socioeconomic strata of the society, we employ propensity score matching to compare households and children that are as similar to each other as possible. Propensity score analysis (; Heckman and Navarro-Lozano 2004; Rosenbaum and Rubin 1983) is frequently used in the context of nonrandom treatment assignments in observational studies. The propensity score is expressed as:

$$e(\mathbf{X}_i) = pr(\mathbf{Z}_i=1 \mid \mathbf{X}_i = \mathbf{X}_i)$$

where the propensity score for subject i (i = 1... N) is the conditional probability of being assigned to treatment Zi = 1 versus control Zi = 0 given a vector xi of observed covariates.

Conceptually, estimating treatment effect in a quasi-experimental situation is relatively simple involving predicting participation in a treatment using a set of covariates and then matching two respondents with similar propensity scores, one from the treatment group and one from the control group. However, results tend to be sensitive to the quality of matching. In order to maximize the quality of the match, we have used nearest neighbor matching within calipers and following (Austin 2011), set calipers to 0.2 standard deviations of the predicted logit. Since our matching procedure does not allow a comparison case to match with more than one treatment case, it also reduces the number of treated observations that have a valid match, an issue of potential concern. We examine both of these potential sources of bias in a later section.

In this analysis, we match households with each other using the following variables: state of residence, urban/rural residence, highest education level obtained by an adult above 21 in the household, household income and a squared term for income, number of adult equivalents in the households, number of married women in the household as a proxy for household structure as well as time availability, caste/religion categories (forward caste, OBC, Scheduled Caste, Scheduled Tribe, Muslim, other religions), whether household has any toilet and whether it has indoor piped water. For child underweight analyses, we add child and mother characteristics including child's gender, age, a dummy variable for infants, and number of children borne by the mother.

6.1. Quality of Matching

Table 4 provides an illustrative example of the quality of matching in this analysis. The left-hand side panel shows sample distribution before matching and the right-hand side shows it after matching. For example, before matching 21 percent of the PDS users came from urban areas while 35 percent of the non-PDS sample was urban. After matching this proportion was 24 percent for both. T-test examines the differences in these means. As Table 4 shows, matching substantially reduces the bias on each independent variable. Where statistically significant bias remains for an individual covariate, it is very small in size.

Appendix II contains kernel density plots for the log odds of propensity score for the treatment and comparison sample for each of the four analyses, PDS use at household level, PDS use at child level, and ICDS use at child level. The graphs suggest that matched treatment and comparison cases are very similar on predicted propensity scores. While this close matching eliminates the bias, efficiency of this matching process remains open to question. Our matching technique includes nearest neighbor matching within calipers without replacement. That is, a comparison case will only match a treatment case if predicted propensity score for both falls within a narrow caliper and one comparison case will match one and only one treatment case. For each of the four analyses about 6–28 percent of the sample of treated cases did not match with an appropriate comparison case and the results are based on the remainder. Comparison of unmatched and matched treatment cases for any given dependent variable provides some estimate of differences between these two sets of cases.

As a robustness check, we also carry out household level fixed-effects analysis to see if holding all unobserved household characteristics constant and controlling for variables that vary over time—namely, income and household composition—supports our conclusions based on propensity score matching. While household fixed effects analyses are feasible for food consumption, they are not feasible for nutritional outcomes since households with young children at one point in time may not have young children at the time of the second survey. But fixed effects analyses for food intake provide some robustness check by validating the observations from propensity score matching. Results from these robustness checks and comparison of changes in nutritional outcomes with changes in PDS intake from other data sources such as DLHS-IV are presented in Appendix III.

TABLE 4. Distribu	tion of Ma	tched and Un	matched H	ouseholds-	-Before an	d After Pro	pensity Scor	e Matching	_	
		With	out adjustme	ent			Wi	th adjustment		
	W	ean		t-tı	st	Ŵ	ean		t-te	st
Variable	PDS Use	No PDS use	% bias	t	p > t	PDS use	No PDS use	% bias	t	p > t
States										
J&K, HP, UK	omitted									
Pun, Har, Del	0.059	0.133	-25.3	-23.65	0	0.080	0.075	1.8	1.44	0.149
UP, Bih, Jhar	0.114	0.166	-15.0	-14.42	0	0.145	0.145	0.1	0.04	0.969
Raj, Chh, MP	0.161	0.175	-3.6	-3.54	0	0.194	0.191	0.8	0.55	0.583
NER, Ass, WB	0.155	0.150	1.4	1.41	0	0.180	0.174	1.8	1.26	0.208
Guj, Maha, Goa	0.085	0.156	-21.8	-20.67	0	0.116	0.112	1.0	0.79	0.431
AP, Kar, Ker, TN	0.372	0.153	51.4	52.77	0	0.215	0.235	-4.7	-3.52	0.000
Sector										
Rural	omitted									
Urban	0.219	0.382	-36.3	-34.80	0	0.239	0.242	-0.5	-0.38	0.704
Highest HH education										
Illiterate	omitted									
1–4 std	0.082	0.047	14.2	14.49	0	0.076	0.076	0.3	0.18	0.858
5–9 std	0.363	0.294	14.7	14.52	0	0.378	0.381	-0.7	-0.47	0.635
10-11 std	0.135	0.150	-4.4	-4.27	0	0.138	0.139	-0.2	0.16	0.875
12th and some college	0.099	0.154	-16.6	-15.84	0	0.113	0.112	0.3	0.21	0.830
Graduate	0.069	0.229	-46.0	-42.40	0	0.081	0.081	0.0	0.02	0.980
									11)	able 4 Contd)
		With	out adjustm	ent			Μ.	ith adjustmen.	nt	
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	W	ean		t-te	st	W	lean		t-t	est
Variable	PDS Use	No PDS use	% bias	t	p > t	PDS use	No PDS use	% bias	t	p > t
Caste/Religion										
Forward caste Hindus	omitted									
OBC	0.355	0.330	5.4	5.31	0	0.353	0.361	-1.6	-1.17	0.241
Dalit	0.276	0.175	24.3	24.45	0	0.260	0.258	0.5	0.32	0.745
Adivasi	0.129	0.063	22.4	23.06	0	0.114	0.109	1.5	1.01	0.312
Muslim	0.113	0.128	-4.5	4.38	0	0.123	0.131	-2.4	-1.73	0.084
Christian, Sikh	0.012	0.037	-16.4	-15.02	0	0.016	0.015	0.2	0.22	0.827
Income group										
Below 25,000	omitted									
25,000-50,000	omitted									
50,001–75,000	0.258	0.167	22.3	22.46	0	0.246	0.231	3.8	2.68	0.007
75,001–100,000	0.207	0.149	15.2	15.25	0	0.206	0.190	4.3	3.04	0.002
100,001-200,000	0.125	0.110	4.6	4.51	0	0.127	0.120	2.2	1.59	0.113
200,001-300,000	0.177	0.231	-13.6	-13.12	0	0.190	0.195	-1.2	-0.88	0.381
300,001–400,000	0.035	0.102	-26.7	-24.60	0	0.041	0.052	-4.1	-3.57	0.000
400,001-500,000	0.010	0.047	-22.7	-20.43	0	0.012	0.017	-2.7	-2.78	0.005
500,001 and above	0.004	0.028	-18.7	-16.69	0	0.006	0.006	-0.1	-0.09	0.928
No. of adult equivalent	3.861	3.898	-2.0	-1.96	0	3.895	3.905	-0.5	-0.39	0.697
No. of married females	1.150	1.230	-11.4	-11.11	0	1.167	1.170	-0.4	-0.30	0.761
Any toilet in the HH	0.407	0.629	-45.7	-45.01	0	0.450	0.453	-0.6	-0.41	0.683
Piped water in HH	0.471	0.488	-3.5	-3.39	0.001	0.423	0.428	-1.0	-0.78	0.435

7. Public Distribution System and Food Consumption

Although a very weak form of PDS existed in India during the second world war, it emerged in the form we now see in 1960s (Kumar 2010) following increased availability of grains via US Government's foreign assistance program known as PL-480 as well as the institution of price support program to stabilize agricultural prices. A large network of PDS shops, also known as Fair Price Shops, was established: local traders were enrolled as owners, and households were issued a PDS card with monthly per capita entitlements of food staples.

The PDS has changed both qualitatively and quantitatively since the 1970s. At first, the PDS was confined to urban areas and regions with food deficits. The main emphasis was on price stabilization. Private trade was considered "exploitative," and the PDS was considered a countervailing power to private trade. Since the early 1980s, the welfare role of the PDS has gained importance. Nevertheless, the PDS was widely criticized for its failure to reach those living below the poverty line for whom the program was intended. Although rural areas were covered in many states in the 1980s, the PDS had an urban bias and large regional inequalities in its operation. An effort was made, therefore, to streamline the PDS by introducing the Targeted PDS (TPDS) in June 1997 (Kumar 2010).

At present, households have access to three types of cards: Above Poverty Line (APL) cards which allow households to buy from the PDS shops at close to market price; Below Poverty Line (BPL) cards which allow for subsidized purchase of rice, wheat, sugar, and kerosene at subsidized prices up to an allocation level fixed by state governments; and Antyodaya Anna Yojana (AAY) cards given to the poorest of the poor which provide a much higher level of subsidy. While this is a centrally sponsored scheme, it is administered by state governments, which are free to add other items to the list and to reduce prices or to increase quantities.

7.1. Who Uses PDS?

The TPDS scheme has been severely criticized for its inability to identify the poor and for widespread leakages (Dreze and Khera 2010). Its operation has been less effective in poorly governed states than in more efficient states, resulting in low off-take rates. For example, in 2004–05 only 31 percent of the BPL or AAY card holders purchased rice at PDS shop; the corresponding figure was 35 percent for wheat. However, the program has undergone considerable changes between 2005 and 2011 with proportion of PDS users rising sharply along with a decline in targeting errors (Himanshu and Sen 2013). IHDS I and II show an interesting pattern of change. First, exclusion of very poor households from access to BPL/AAY cards has declined, although some the nonpoor still own BPL/AAY cards. Second, proportion of card holders who buy wheat, rice, or other cereals from fair price shop in the month prior to the survey has increased substantially. Increasing food prices may be at least partially responsible for this.

Table 5 shows descriptive statistics for households with access to various types of cards as well those who purchased food (not counting sugar and kerosene) from fair price shops. The results show some interesting patterns. The PDS has expanded rapidly in the South with state government funds; thus, 57 percent of the Southern households have a BPL card compared to only 30 percent in the central plains, although poverty is far more prevalent in the central states than in South. Beginning from a program that had a marked urban bias, PDS is now increasingly a rural program. Scheduled Castes and Tribes are far more likely to get BPL and AAY cards than others, partly because of the higher rates of poverty among these groups and partly because of identification criteria used at the local levels.

Almost all BPL and AAY card holders seem to purchase food grains from the PDS shops. This is a marked contrast to 2004–05 in IHDS-I where offtake of often quite limited (Desai et al. 2010). About 15 percent of the APL households also purchase food from PDS shops although the price they pay is very close to the market price.

7.2. Role of PDS in Shaping Food Consumption

In analyzing the role of PDS in shaping food consumption of the households, we combine APL households with non-users. Since our focus is to understand the role of price subsidies on food consumption, it makes sense to exclude APL card holders who must pay near market prices from the treatment sample (but they are included in the comparison group). We also combine BPL and AAY card holders for these analyses given the small number of AAY card holders in our sample, only about 5 percent.

Table 6 shows means for a variety of measures of food consumption for PDS and non-PDS samples, before and after matching. The results from the matched samples show that regardless of PDS use most households consume cereals, pulses, oil/fat, and vegetables in the month prior to the interview. Since these are such staples of Indian diet, everyone consumes at least some

		Card type			Use c	if card	
•	APL/No card	BPL	Antyodaya	No use/No card	APL and use	BPL and use	Antyodaya and use
All India	58.6	36.3	5.6	47.7	15.0	32.6	5.1
States							
J&K, HP, UK	68.5	25.1	6.6	28.1	43.1	22.8	6.0
Pun, Har, Del	73.4	18.7	8.2	78.6	3.2	11.7	6.7
UP, Bih, Jhar	62.2	30.1	8.2	64.4	3.5	25.2	7.4
Raj, Chh, MP	60.5	31.1	8.8	58.4	6.8	27.1	8.1
NER, Ass, WB	59.8	36.1	4.8	43.3	20.3	32.5	4.4
Guj, Maha, Goa	72.0	25.4	2.8	60.5	16.2	20.9	2.4
AP, Kar, Ker, TN	40.4	57.5	2.9	16.0	25.7	56.2	2.8
Sector							
Rural	52.9	40.8	7.0	44.3	13.1	36.8	6.4
Urban	71.8	25.9	2.5	55.5	19.6	22.9	2.1
Highest HH education							
Illiterate	41.0	49.7	10.1	37.7	8.0	45.7	9.3
1-4 std	47.8	45.0	7.9	37.6	13.8	41.7	7.5
5–9 std	54.6	39.6	6.4	43.5	15.4	35.6	6.0
10-11 std	61.7	35.1	3.6	47.6	17.8	32.0	2.9
12th and some college	68.6	28.2	3.6	55.2	17.7	24.2	3.1
Graduate	81.1	17.9	1.2	65.8	18.7	14.8	0.8
Caste/Religion							
Forward Cast Hindu	76.1	21.6	2.5	63.0	16.3	18.7	2.0
OBC	56.9	38.2	5.3	45.7	15.1	34.7	4.7
Dalit	46.9	45.1	9.1	38.9	12.6	41.1	8.5

TABLE 5. Distribution of Card Type and PDS Purchase

(Table 5 Contd)

APL/No card BPL Antyodaya No use/No card APL and use BPL and use BPL and use BPL and use Ant and use BPL and use BPL and use Ant and use BPL and use Ant and use BPL and use BPL and use BPL and use Ant and use Ant and use BPL and use BPL and use Ant and use Ant and use Ant and use Ant and use BPL and use BPL and use Ant and use <th< th=""><th></th><th></th><th>Card type</th><th></th><th></th><th>Use u</th><th>of card</th><th></th></th<>			Card type			Use u	of card	
Adivasi43.149.18.139.79.543.4Muslim63.033.04.48.139.79.543.4Direntian, Sikh80.418.01.954.029.815.0Christian, Sikh80.418.01.954.029.815.0Dirone80.043.78.941.011.139.2Below 25,00049.344.17.242.711.140.055,001-55,00055.739.45.643.510.711.140.050,001-105,00055.739.45.643.510.711.140.050,001-105,00055.739.45.643.510.711.140.050,001-105,00055.739.45.643.510.711.140.050,001-100,00055.739.45.643.510.711.238.275,001-500,00085.613.51.072.711.430.2500,001-500,00085.613.51.072.711.430.2500,001-500,00085.637.46.743.316.65.3500,001-500,00085.637.46.743.316.65.3500,001-500,00086.637.46.743.317.49.5500,001-500,00086.837.46.743.317.49.5500,001-500,00086.837.46.743.317.434.26161<		APL/No card	BPL	Antyodaya	No use/No card	APL and use	BPL and use	Antyodaya and use
Muslim 63.0 33.0 4.4 48.8 18.1 29.4 Christian, Sikh 80.4 18.0 1.9 54.0 29.8 15.0 Income group 80.4 18.0 1.9 54.0 29.8 15.0 Beinw 25,000 48.0 43.7 8.9 41.0 11.7 39.2 25,001–75,000 52.1 41.9 7.2 42.0 11.1 40.0 50,001–75,000 55.7 39.4 5.6 43.5 10.7 11.1 40.0 75,000 55.7 39.4 5.6 43.5 10.7 14.2 38.2 75,000 55.7 39.4 5.6 43.5 10.7 11.1 40.0 75,000 55.7 39.4 5.6 43.5 10.4 11.1 40.0 75,000 55.7 39.4 5.6 43.5 10.4 15.1 30.2 700,001-500,000 85.1 37.4 5.6 47.8 16.4	Adivasi	43.1	49.1	8.1	39.7	9.5	43.4	7.7
	Muslim	63.0	33.0	4.4	48.8	18.1	29.4	4.0
Income group 41.0 11.7 39.2 39.2 39.2 39.2 39.2 39.2 39.2 39.2 39.2 39.2 39.2 39.2 39.2 39.2 39.2 39.2 50.001 50.000 55.010 55.010 55.0100 55.1 41.1 72.2 42.2 11.1 40.0 39.2 75.001 50.000 55.1 39.4 5.6 43.3 50.9 10.2 30.2 <td>Christian, Sikh</td> <td>80.4</td> <td>18.0</td> <td>1.9</td> <td>54.0</td> <td>29.8</td> <td>15.0</td> <td>1.4</td>	Christian, Sikh	80.4	18.0	1.9	54.0	29.8	15.0	1.4
Below 25,000 48.0 43.7 8.9 41.0 11.7 39.2 $5,001-75,000$ 52.1 44.1 7.2 42.7 11.1 40.0 $5,001-75,000$ 55.7 39.4 5.6 42.7 11.1 40.0 $7,001-100,000$ 55.7 39.4 5.6 43.5 16.4 35.8 $7,001-100,000$ 55.7 39.4 5.6 43.5 16.4 35.8 $7,001-200,000$ 57.1 39.4 5.6 32.2 50.9 19.8 27.0 $200,001-300,000$ 80.0 13.5 1.0 72.7 17.4 9.5 $300,001-400,000$ 85.6 13.5 1.0 72.7 17.4 9.5 $300,001-500,000$ 80.2 9.3 10.7 72.7 17.4 9.5 $300,001-500,000$ 85.6 13.5 10.9 79.9 14.6 53.4 $00,01-500,000$ 82.7 1	Income group							
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Below 25,000	48.0	43.7	8.9	41.0	11.7	39.2	8.5
	25,001-50,000	49.3	44.1	7.2	42.7	11.1	40.0	6.7
75,001-100,00055.739.45.643.516.435.8100,001-200,00067.329.93.250.919.827.0200,001-300,00085.613.51.763.420.415.1300,001-400,00085.613.51.072.717.49.5300,001-400,00086.61.072.717.49.5500,001-500,00090.29.20.773.719.06.9500,001 and above90.29.20.773.719.06.9500,001 and above90.88.40.979.914.65.360,001 and above90.88.40.979.914.65.3700,001 and above90.88.138.214.65.37147.544.58.138.214.65.37338.247.816.731.834.2857.236.86.749.117.334.2857.236.86.749.112.732.7857.236.86.749.112.732.7857.238.45.156.410.827.7916.633.15.156.410.827.7857.238.86.749.112.732.791036.436.436.436.436.540.4177944.547.816.7 </td <td>50,001-75,000</td> <td>52.1</td> <td>41.9</td> <td>6.7</td> <td>42.0</td> <td>14.2</td> <td>38.2</td> <td>6.2</td>	50,001-75,000	52.1	41.9	6.7	42.0	14.2	38.2	6.2
	75,001–100,000	55.7	39.4	5.6	43.5	16.4	35.8	4.9
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	100,001–200,000	67.3	29.9	3.2	50.9	19.8	27.0	2.6
300,001-400,000 85.6 13.5 1.0 72.7 17.4 9.5 400,001-500,000 90.2 9.2 0.7 73.7 19.0 6.9 400,001-500,000 90.2 9.2 0.7 73.7 19.0 6.9 500,001 and above 90.8 8.4 0.9 79.9 14.6 5.3 No. of Adult Equivalent 47.5 44.5 8.1 38.2 14.3 6.9 1 47.5 44.5 8.1 38.2 14.3 40.4 2 56.8 37.4 6.2 43.1 17.3 34.2 2 56.8 37.4 6.2 43.1 17.3 34.2 8 57.2 36.8 6.7 49.1 12.7 32.7 8+ 61.6 34.8 5.1 56.4 10.8 29.4 Any toilet in the HH 12.7 32.1 10.5 25.3 10.5 40.1 Yes No 48.3 44.3 <td>200,001-300,000</td> <td>80.0</td> <td>18.5</td> <td>1.7</td> <td>63.4</td> <td>20.4</td> <td>15.1</td> <td>1.3</td>	200,001-300,000	80.0	18.5	1.7	63.4	20.4	15.1	1.3
400,001-500,000 90.2 9.2 0.7 73.7 19.0 6.9 500,001 and above 90.8 8.4 0.9 79.9 14.6 5.3 No. of Adult Equivalent 47.5 44.5 8.1 38.2 14.3 40.4 1 47.5 44.5 8.1 38.2 14.3 40.4 2 56.8 37.4 6.2 43.1 17.3 34.2 2 56.8 37.4 6.2 43.1 17.3 34.2 3 5 51.2 36.8 6.7 49.1 12.7 32.7 8 57.2 36.8 6.7 49.1 12.7 32.7 34.2 8 51.1 56.4 10.8 5.1 56.4 10.8 29.4 Any toilet in the HH 51.2 34.8 5.1 56.4 10.8 29.4 8 51.2 38.2 42.5 10.8 29.4 32.7 32.7 8 51 56.4 10.8 51.7 19.5 25.3 40.1	300,001-400,000	85.6	13.5	1.0	72.7	17.4	9.5	0.5
500,001 and above 90.8 8.4 0.9 79.9 14.6 5.3 No. of Adult Equivalent 47.5 44.5 8.1 38.2 14.3 40.4 1 47.5 44.5 8.1 38.2 14.3 40.4 2 56.8 37.4 6.2 43.1 17.3 34.2 2 56.8 37.4 6.2 43.1 17.3 34.2 3 5 56.8 37.4 6.2 43.1 17.3 34.2 4 60.8 35.1 4.5 47.8 16.7 31.8 8 57.2 36.8 6.7 49.1 12.7 32.7 8 51.1 56.4 10.8 29.4 32.7 Any toilet in the HH 51.1 56.4 10.8 29.4 Yes 61.6 34.3 8.2 42.5 10.5 40.1 Yes No 48.3 44.3 8.2 42.5 10.5 40	400,001-500,000	90.2	9.2	0.7	73.7	19.0	6.9	0.5
No. of Adult Equivalent 47.5 44.5 8.1 38.2 14.3 40.4 1 47.5 44.5 8.1 38.2 14.3 40.4 2 56.8 37.4 6.2 43.1 17.3 34.2 4 60.8 35.1 4.5 47.8 16.7 31.8 8 57.2 36.8 6.7 49.1 12.7 32.7 8 57.2 36.8 6.7 49.1 12.7 32.7 8 51.6 34.8 5.1 56.4 10.8 29.4 Any toilet in the HH 12.7 28.4 3.1 52.7 19.5 25.3 8 61.6 34.3 8.2 42.5 10.8 29.4 90 48.3 44.3 8.2 42.5 10.5 40.1 91 10.6 36.4 3.6 44.8 19.0 33.2 10.6 57.2 28.4 3.1 50.5 40.1 10.6 57.2 36.4 3.6 44.8 19.0 33.2	500,001 and above	90.8	8.4	0.9	79.9	14.6	5.3	0.3
1 47.5 44.5 8.1 38.2 14.3 40.4 2 56.8 37.4 6.2 43.1 17.3 34.2 4 60.8 35.1 4.5 47.8 16.7 31.8 8 57.2 36.8 6.7 49.1 12.7 32.7 8 57.2 36.8 6.7 49.1 12.7 32.7 8 57.2 36.8 6.7 49.1 12.7 32.7 8 51.6 34.8 5.1 56.4 10.8 29.4 Any toilet in the HH 7 28.4 3.1 55.1 56.4 10.8 Yes 68.7 28.4 3.1 52.7 19.5 25.3 No 48.3 44.3 8.2 42.5 10.5 40.1 Yes 60.4 36.4 3.6 42.5 10.5 40.1 Yes 60.4 36.4 3.6 44.8 19.0 33.2 No 57.2 36.2 7.2 49.9 12.0 33.2	No. of Adult Equivalent							
2 56.8 37.4 6.2 43.1 17.3 34.2 4 60.8 35.1 4.5 47.8 16.7 31.8 8 57.2 36.8 6.7 49.1 12.7 32.7 8 57.2 36.8 6.7 49.1 12.7 32.7 8 57.2 36.8 6.7 49.1 12.7 32.7 8 51.6 34.8 5.1 56.4 10.8 29.4 Any toilet in the HH 5.1 56.4 10.8 29.4 Yes 68.7 28.4 3.1 52.7 19.5 25.3 No 48.3 44.3 8.2 42.5 10.5 40.1 Yes 60.4 36.4 3.6 44.8 19.0 33.2 No 57.2 36.2 7.2 49.9 12.0 33.2		47.5	44.5	8.1	38.2	14.3	40.4	7.2
4 60.8 35.1 4.5 47.8 16.7 31.8 8 57.2 36.8 6.7 49.1 12.7 32.7 8 + 57.2 36.8 6.7 49.1 12.7 32.7 8 + 51.6 34.8 5.1 56.4 10.8 29.4 Any toilet in the HH 5.1 56.4 10.8 29.4 Yes 68.7 28.4 3.1 52.7 19.5 25.3 No 48.3 44.3 8.2 42.5 10.5 40.1 Piped water in HH 57.2 36.4 3.6 44.8 19.0 33.2 No 57.2 36.4 3.6 44.8 19.0 33.2	2	56.8	37.4	6.2	43.1	17.3	34.2	5.8
8 57.2 36.8 6.7 49.1 12.7 32.7 8+ 61.6 34.8 5.1 56.4 10.8 29.4 Any tollet in the HH 61.6 34.8 5.1 56.4 10.8 29.4 Yes 68.7 28.4 3.1 52.7 19.5 25.3 No 48.3 44.3 8.2 42.5 10.5 40.1 Piped water in HH 52.7 19.6 33.2 40.1 Yes 60.4 36.4 3.6 44.8 33.2 No 57.2 36.2 7.2 49.9 12.0 33.2	4	60.8	35.1	4.5	47.8	16.7	31.8	4.0
8+ 61.6 34.8 5.1 56.4 10.8 29.4 Any tollet in the HH 61.6 34.8 5.1 56.4 10.8 29.4 Any tollet in the HH 68.7 28.4 3.1 52.7 19.5 25.3 Yes 68.7 28.4 3.1 52.7 19.5 25.3 Piped water in HH 60.4 36.4 3.6 44.8 3.6 3.1 53.2 33.2 Ves 60.4 36.2 7.2 49.9 12.0 33.2 No 57.2 36.2 7.2 49.9 12.0 32.1	8	57.2	36.8	6.7	49.1	12.7	32.7	6.1
Any toilet in the HH Yes 68.7 28.4 3.1 52.7 19.5 25.3 No 48.3 44.3 8.2 42.5 10.5 40.1 Piped water in HH 60.4 36.4 3.6 44.8 19.0 33.2 Yes 60.4 36.2 7.2 49.9 12.0 32.1 No 57.2 36.2 7.2 49.9 12.0 32.1	8+	61.6	34.8	5.1	56.4	10.8	29.4	4.8
Yes 68.7 28.4 3.1 52.7 19.5 25.3 No 48.3 44.3 8.2 42.5 10.5 40.1 Piped water in HH 60.4 36.4 3.6 44.8 3.6 33.2 Ves 60.4 36.2 7.2 49.9 12.0 32.1	Any toilet in the HH							
No 48.3 44.3 8.2 42.5 10.5 40.1 Piped water in HH 60.4 36.4 3.6 44.8 33.2 Ves 60.4 36.4 3.6 44.8 19.0 33.2 No 57.2 36.2 7.2 49.9 12.0 32.1	Yes	68.7	28.4	3.1	52.7	19.5	25.3	2.7
Piped water in HH Yes 60.4 36.4 3.6 44.8 19.0 33.2 No 57.2 36.2 7.2 49.9 12.0 32.1	No	48.3	44.3	8.2	42.5	10.5	40.1	7.5
Yes 60.4 36.4 3.6 44.8 19.0 33.2 No 57.2 36.2 7.2 49.9 12.0 32.1	Piped water in HH							
No 57.2 36.2 7.2 49.9 12.0 32.1	Yes	60.4	36.4	3.6	44.8	19.0	33.2	3.3
	No	57.2	36.2	7.2	49.9	12.0	32.1	6.5

(Table 5 Contd)

	PDS users	Non-users	Difference	<i>S.E.</i>	T-stat
Any cereal					
, Unmatched	0.996	0.994	0.002	0.001	2.86
Matched	0.996	0.991	0.006	0.001	5.05
Any other food grain					
Unmatched	0.322	0.274	0.048	0.005	10.38
Matched	0.279	0.273	0.006	0.006	1.00
Any pulses					
Unmatched	0.981	0.986	-0.005	0.001	-4.18
Matched	0.978	0.984	-0.006	0.002	-2.98
Any oil/ghee					
Unmatched	0.996	0.992	0.004	0.001	5.19
Matched	0.997	0.992	0.005	0.001	4.83
Any vegetables					
Unmatched	0.993	0.986	0.006	0.001	5.86
Matched	0.992	0.986	0.006	0.001	4.16
Any fruits					
Unmatched	0.670	0.743	-0.074	0.005	-16.14
Matched	0.636	0.677	-0.041	0.006	-6.38
Any meat					
Unmatched	0.737	0.590	0.147	0.005	30.44
Matched	0.686	0.679	0.008	0.006	1.19
Any sweetener					
Unmatched	0.984	0.981	0.003	0.001	1.95
Matched	0.982	0.970	0.012	0.002	5.72
Any eaas					
Unmatched	0.550	0.453	0.097	0.005	19.07
Matched	0.482	0.496	-0.013	0.007	-1.94
Any milk					
, Unmatched	0.816	0.893	-0.077	0.003	-22.36
Matched	0.805	0.820	-0.014	0.005	-2.74
Quantity cereal (Kg/adult)	equiv)				
Unmatched	15.356	13.865	1.491	0.071	20.90
Matched	15.432	14.610	0.822	0.102	8.08
Quantity milk (ltr/adult eq	uiv)				
Unmatched	2.830	5.958	-3.128	0.077	-40.73
Matched	3.223	4.009	-0.786	0.087	-9.08
Quantity pulses (kg/adult o	equiv)				
Unmatched	0.232	0.259	-0.027	0.008	-3.47
Matched	0.213	0.241	-0.028	0.009	-3.13
Quantity sugar (kg/adult e	quiv)				
Unmatched	1.149	1.469	-0.321	0.011	-27.94
Matched	1.225	1.265	-0.041	0.015	-2.79
Food/nonfood ratio					
Unmatched	0.518	0.485	0.034	0.002	20.68
Matched	0.520	0.523	-0.003	0.002	-1.26
Variety – No. of food grou	ps				
Unmatched	9.312	9.176	0.135	0.015	8.85
Matched	9.079	9.130	-0.051	0.021	-2.45
Unmatched households	14,924	27,217			
Matched households	10,909	10,909			

TABLE 6. Food Intake Comparisons for Unmatched and Matched PDS Users and Non-Users from Propensity Score Matching

Source: Authors' calculations.

of each item. However, when it comes to milk and fruits, the PDS sample is a little less likely to consume both of these items. Our index of dietary variety which is a sum of the number of food groups consumed including cereals, other grains like ragi and jowar, pulses, fruits and nuts, vegetables, and milk is 5.69 for PDS users and 5.71 for non-users. While this is a very small difference, given the number of staples everyone consumes (e.g., cereals, oil, and vegetables), this small difference really taps into consumption of fruits and milk and has an impact on nutritional outcome, mediating some of the adverse relationship between PDS use and nutrition.

When we examine quantities consumed, we find that PDS users are substantially more likely to consume cereals. On an adult equivalent level, PDS users consume 20 kg cereals per month compared to 18 kg for non-users. In contrast, PDS users only consume 4.3 l of milk per adult equivalent compared to 5.3 for non-users.

This suggests that PDS users seem to skew their consumption towards items they are able to purchase cheaply, namely cereals, while reducing consumption of other items like fruits and milk. It is difficult to figure out how to interpret this observation. If Indian undernutrition is due to caloric deficiency, higher consumption of calorie dense foods like cereals could be a good way of addressing undernutrition. In that case, by making cereals cheaper, the policy is doing exactly what it is supposed to do. In contrast, if caloric insufficiency is not the bottleneck and if cheaper cereals lead people to switch away from milk and fruits and thereby reduce dietary diversity, it could potentially have a negative impact on nutritional outcomes. This is an issue to which we turn in the next section.

8. Public Distribution System and Child Nutrition

In this section, we examine underweight statistics for households that purchased grains from PDS shops in the month prior to the survey and those that did not, following the matching strategy used above. Here our sample consists of over 10,000 children ages 0–60 months for whom we have data on weight as well as a valid date of birth.

We present results for three outcome variables, standardized score on weight-for-age, whether the child's weight-for-age is two standard deviation or more below the median of WHO reference population (moderate to severe undernutrition) and, whether it is 3 or more standard deviations below median (severe undernutrition). The results presented in Table 7 indicate that children from PDS-using households have a slightly lower z score and are more likely to be underweight than non-PDS using households. However, these differences are not statistically significant. Since PDS use is concentrated in low-income households, it is not surprising that the differences between unmatched samples are very large. But even when we match the samples on a variety of variables such as income, caste, residence, and household composition, PDS sample appears not to benefit from PDS usage and is more or less on par with non-PDS households on anthropometric outcomes.

This could simply be due to poor quality of matching or sensitivity of different matching techniques; we found that different model specifications changed the size and significance of this difference. However, we did not find that any change in specification reversed the sign and make PDS users *less* malnourished than comparable non-users.

It seems counterintuitive that a policy designed to increase foods security would not lead to improvement in nutritional outcomes and may mildly be associated with poorer outcomes. Do we have any reason to believe that PDS could make the undernutrition problem worse than it is? As we note above, reduction in dietary diversity seems to accompany PDS use, skewing consumption towards cereals rather than fruits and milk.

These results imply that if food subsidy for cereals is the only weapon in our arsenal, it is unlikely to reduce child undernutrition. If a significant proportion of Indian population suffered from starvation, the response to increased cereal consumption would be far greater. However, starvation has been declining in India, making dietary diversity a greater challenge than simple caloric intake.

	PDS users	Non-users	Difference	S.E.	T-stat
Z score for weight-for-age					
Unmatched	-1.621	-1.385	-0.236	0.033	-7.24
Matched	-1.594	-1.527	-0.067	0.042	-1.62
Moderate underweight ($<$ 2 SD)					
Unmatched	0.402	0.334	0.068	0.010	6.71
Matched	0.394	0.374	0.020	0.013	1.48
Severe underweight (<3 SD)					
Unmatched	0.164	0.126	0.038	0.007	5.22
Matched	0.156	0.146	0.010	0.010	1.05
Unmatched children 0–60 months	3,157	7,364			
Matched children	2,607	2,607			

TABLE 7. Comparison of Weight-for-age and Underweight for PDS Users and Non-users

Source: Authors' calculations.

9. ICDS and Child Undernutrition

The second pillar of NFSA, ICDS, was set up in 1975. Early in its history, this program was geared towards children under five from BPL households. However, following an order of the Supreme Court, it has now been universalized. It operates community-based AWCs operated by an Anganwadi worker, who is now supposed to receive help from a helper. ICDS program is supposed to provide the following services:

- 1. Supplementary nutrition to children below six, pregnant and lactating mothers, and adolescent girls
- 2. Immunization to children under six and pregnant women
- 3. Health checkup to children under six and pregnant and lactating mothers
- 4. Referral to children under six, pregnant and lactating mothers
- 5. Health and nutrition education to women ages 15–45 and adolescent girls.

As on January 31, 2013, 13,31,076 AWCs are operational across 35 States/ UTs, covering 93 million beneficiaries under supplementary nutrition and 35 million three to six years children under pre-school component were operational, at least on paper (Saxena 2014).

On paper this program has tremendous potential for redressing maternal and child undernutrition. However, its evaluations present mixed evidence. Several studies using data from 1990s have found little impact of the presence of AWC on child nutritional outcomes (Deolalikar 2005; Lokshin et al. 2005). In contrast, studies using more recent data (i.e. circa 2005) have found statistically significant but small positive effect of presence of AWC's (Kandpal 2011) and of daily supplementary feeding (Jain 2013) on child nutrition. Since most evaluations rely on data from NFHS of 1998–99 and 2005–06, few evaluations have been undertaken since the program was universalized.

Table 8 shows distribution of ICDS usage by household and child characteristics for the two major components, use of ICDS education program (typically, targeted at children 3 and above) and supplementary food distribution program. Children attending educational program at the ICDS centers (Anganwadis) also receive meals. For these analyses, we restrict our sample to youngest children born in the prior five years since ICDS data in our survey are only collected for the last birth.

	ICDS education benefits	ICDS food benefits
All India	20.3	39.0
States		
J&K, HP, UK	19.0	41.0
Pun, Har, Del	10.0	21.2
UP, Bih, Jhar	10.4	21.8
Raj, Chh, MP	15.8	43.0
NER, Ass, WB	27.7	63.1
Guj, Maha, Goa	33.5	51.1
AP, Kar, Ker, TN	34.9	48.2
Sector		
Rural	21.6	42.9
Urban	16.6	26.9
Highest HH education		
Illiterate	19.0	34.3
1–4 std	23.1	46.4
5–9 std	21.2	44.8
10–11 std	25.5	42.7
12th and graduate	17.6	31.5
Postgraduate	16.1	28.7
Caste/religion		
Forward caste Hindus	19.0	32.0
OBC	18.8	36.1
Dalit	20.1	42.3
Adivasi	32.6	61.0
Muslim	19.9	37.6
Christian, Sikh	13.6	25.4
Income aroup		
Below 25,000	23.5	45.8
25.001-50.000	23.1	42.9
50.001-75.000	19.5	41.2
75.001-100.000	20.4	38.2
100.001-200.000	18.8	34.3
200.001-300.000	15.6	29.6
300.001-400.000	18.7	34.7
400.001-500.000	16.6	22.8
500.001 and above	9.0	24.8
No. of adult equivalent		
1	0.0	0.0
2	8.0	30.1
4	22.4	40.9
8	18.4	37.4
8+	21.3	37.9
Any toilet in the HH	2110	0710
Yes	21.3	42.2
No	19.2	34.9
Pined water in HH	1012	0.10
Yes	18.4	38.3
No	23.9	40.2

TABLE 8. Use of ICDS Services for Youngest Child under Five

(Table 8 Contd)

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	ICDS education benefits	ICDS food benefits
Sex		
Male	21.0	38.8
Female	19.6	39.2
Child age category		
< 12 months	9.3	31.1
13–24 months	16.7	40.9
25–36 months	24.5	40.4
37–48 months	30.0	44.2
49–60 months	33.2	43.8

(Tadie & Lonta)	(Table	81	Contd)	
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Source: Authors' calculations.

Table 9 shows results from propensity score matching for children who received pre-school education (and hot meals) with those who did not. Table 10 performs similar analysis for the use of supplementary nutrition program. The results show that both of these interventions are associated with higher weight-for-age and lower underweight for participants. These differences are statistically significant in one-tail test at 0.05 level in some of the regressions. Participation in pre-school program is associated with lower probability of being underweight in matched samples; participation in food supplementation program improves the z score of weight-for-height and reduces moderate underweight but not severe underweight.

Before matching, the sample children who do not receive pre-school or food supplementation are more likely to have lower z score and higher

	ICDS educational program users	Non-users	Difference	S.E.	T-stat
Z score for weight-for-age					
Unmatched	-1.558	-1.397	-0.161	0.044	-3.70
Matched	-1.527	-1.601	0.074	0.057	1.31
Moderate underweight (< 2 SD)					
Unmatched	0.385	0.341	0.044	0.013	3.31
Matched	0.376	0.398	-0.022	0.018	-1.23
Severe underweight ($<$ 3 SD)					
Unmatched	0.147	0.138	0.009	0.010	0.98
Matched	0.147	0.171	-0.024	0.013	-1.84
Unmatched children 0–60 months	1,631	6,233			
Matched children	1,514	1,514			

TABLE 9. Comparison of Weight-for-Age and Underweight for ICDS Educational Service Users and Non-Users

Source: Authors' calculations.

	ICDS food supplement				
	users	Non-users	Difference	<i>S.E.</i>	T-stat
Z score for weight-for-age					
Unmatched	-1.564	-1.347	-0.218	0.036	-6.01
Matched	-1.510	-1.425	-0.085	0.047	-1.81
Moderate underweight (< 2 SD)					
Unmatched	0.388	0.326	0.062	0.011	5.66
Matched	0.376	0.352	0.024	0.014	1.72
Severe underweight ($<$ 3 SD)					
Unmatched	0.145	0.136	0.009	0.008	1.10
Matched	0.144	0.152	-0.007	0.010	-0.71
Unmatched children 0–60 months	3,078	4,788			
Matched children	2,295	2,295			

TABLE 10. Comparison of Weight-for-Age and Underweight for ICDS Supplemental Food Service Users and Non-Users

Source: Authors' calculations.

proportion are underweight. But in the matched sample, the pre-school education group has higher z score and lower likelihood of being underweight. This difference is greatest for severe underweight (<3 SD) making it statistically significant. Since some of the most disadvantaged cases in the ICDS sample were not matched by an appropriate control (as seen by improved weight for the matched treatment sample vis-à-vis unmatched treatment sample), this may play a role but this selection bias is less important than the fact that matched non-users are substantially different from unmatched non-users.

Although these two components ICDS seem to be useful in reducing the prevalence of severe undernutrition, their reach remains limited. Only 20 percent of all children under five and 30 percent of children between three and five years of age avail of it. This observation is in keeping with the process evaluations of ICDS program which appear to range from cautiously optimistic to negative (Agnihotri 2014, Saxena 2014, and The Planning Commission 2011). Part of this ambivalence lies in the fact that Anganwadis function well in some states and not in others. Use of ICDS services has grown substantially between 2004–05 and 2011–12. The IHDS-I found only 22 percent of the women took any advantage of ICDS services for their last birth; this proportion has grown to 54 percent after universalization. However, when we look at the details of the services provided, they seem to be quite limited. For the last child born (within the prior five years) among IHDS respondents, respondent report availing of ICDS services with the following frequency:

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- 1. Percent of mothers who received any services (56 percent)
- Percent of children who received any immunization from/via ICDS workers (47 percent)
- 3. Percent children who received any health check from Anganwadi (28 percent)
- 4. Percent children who receive any growth monitoring (38 percent)
- 5. Percent children who receive pre-school education (21 percent)
- 6. Percent children who receive take home food rations (39 percent ever, 14 percent in prior month)

Nutrition services—take home food ration and pre-school programs that provide hot meals—seem to have a particularly poor reach. This mismatch between program objectives and service coverage may be due to a variety of reasons. First, the Anganwadi worker faces tremendous demands on her time. A survey of Anganwadi workers notes that they spend as much time in record keeping and maintaining a register as they do in delivering pre-school education (The Planning Commission 2011), moreover they are responsible for helping out in a variety of other government programs that also place demands on their time (e.g., carry out Socioeconomic Census). Second, funds and supplies are sporadically received in some states. Spot surveys of Anganwadis by NCAER on behalf of the Planning Commission note delays in receipt of funds to purchase take home rations, mismatch between funds and prevailing local prices, lack of utensils, absence of helpers (The Planning Commission 2011), and a host of other management and process-related challenges that limit effective functioning of ICDS programs.

10. The NFSA: An Axe or a Scalpel

The results presented previously suggest two things: (a) Access to PDS in the five years prior to the IHDS-II survey does not seem to be associated with better nutritional outcomes for children; and (b) Access to educational programs and associated meals for pre-school children is associated with somewhat lower undernutrition, although the reach of these programs is far from universal.

These are sobering observations since PDS and ICDS form the backbone of NFSA. ICDS is already supposed to be universal and NFSA adds specific details regarding its scope and functioning but does not demand major overhaul. The coverage of PDS is expanded substantially and is expected to cover at least 67 percent of the population. Research on targeting shows that past efforts at targeting PDS and other programs have been rife with errors of inclusion and exclusion (Dreze and Khera 2010, Sahu and Mahamallik 2011) and hence, expansion of the target population may do a better job of catching the excluded poor. A number of studies have noted the importance of PDS in reducing poverty by effectively increasing consumption expenditure (Dreze and Khera 2013, Himanshu and Sen 2013). Both of these are plausible arguments in favor of expansion of the target population, or even universalization of benefits. However persuasive these arguments are, they may not be a solution to nutrition challenge given the relationship between a cereal-focused PDS system and decrease in dietary diversity we have observed previously.

What about transforming foods subsidies into cash transfers? NFSA allows for this possibility and this is something that has gained considerable currency following some of the Latin American experiments. A recent experiment with unconditional cash transfers by SEWA and UNICEF suggests substantial nutritional improvements for households receiving cash transfers (Sewa Bharat 2013); another study by SEWA also notes a great preference on the part of households for receiving cash rather than in-kind benefits (Sewa Bharat 2009). Unfortunately, these studies do not present data on changes in household consumption basket for the same households following cash transfers. Without conducting more research into changes in household consumption basket with income growth, we remain cautious about this potential solution, particularly since income elasticity for decline in malnutrition is only about 0.5 (Haddad et al. 2003).

There are a number of reasons for the modest correlation between income growth and nutritional improvements. First, as we discussed previously, caloric availability at a household level may not be the primary bottleneck at the present level of economic development in India. Indeed, a large number of children suffering from undernourishment live in households where adults have sufficient calories available to them (National Nutrition Monitoring Bureau 2012). Second, improvement in nutrition requires reduction in diseases and studies show that a substantial proportion of positive impact of income on nutrition actually comes from improvement in infrastructure (Alderman 2005); however, infrastructure access depends on both household income and supply of services such as water and sewage connections (Desai et al. 2010). Consequently, higher income does not always translate into better nutrition.

Increasing pessimism about nutritional consequences of both conditional and unconditional cash transfer programs gives us food for thought. Conditional cash transfer programs have been implemented in many parts of the world but most of the empirical evidence comes from Latin America. These programs assumed that transfers given to women will lead to greater investments in child-related consumption and thereby reduce undernutrition. Unconditional cash transfers are more popular outside of Latin America. However, a recent review notes that both conditional and unconditional transfers have only a modest impact on undernutrition. Ruel and Alderman (2013, p. 542) note that, "A forest plot analysis of 15 programs, combining conditional cash transfers and unconditional cash transfers, shows an average effect of 0.04 in height-for-age z score, an effect size that is neither statistically significant nor biologically meaningful; similarly, no significant effect was identified for conditional cash transfers only."

11. Outcome Focused Nutrition Strategy

Advocacy for food security in India has focused on the process of ensuring hunger elimination. Given the inadequacy of this approach as discussed earlier, what are the alternatives that we should consider? In Figure 4, we describe a tiered approach to this issue that focuses on improvement in nutritional status as the ultimate outcome.

11.1. Focus on Pregnant Mothers and Young Children

While undernutrition is a problem that afflicts the whole population, it is far easier to tackle in vitro and before age two than at a later stage (Alderman 2012). Thus, focusing on pregnant women and young children is the first step towards developing an effective nutrition strategy.

11.2. Identify the Undernourished

Undernutrition is a stealth enemy, particularly during childhood. Parents often do not realize that their children are undernourished until they suffer from severe malnutrition. Thus identifying children and populations at risk is of utmost importance. Moreover, without accurate statistics on undernutrition, it is impossible to detect whether our strategies to combat undernutrition are working or not.

We need data at three levels:

1. At national and state levels, we need statistics on undernutrition—height-for-age and weight-for-age as well as hemoglobin



FIGURE 4. A Tiered Approach to Reducing Undernutrition

Source: Authors' creation.

levels—coupled with information on program utilization and income to examine the effectiveness of our public policies. This must be done by a credible agency and with a strong government buy-in to be useful in policy design and evaluation. An NFHS-III like survey with some additional information in program utilization for about 120,000 children would provide good national and state level estimates. Government must make a commitment to ensure that this survey is conducted every two years. Burdening this survey with requirements to provide district level estimates may not be wise.

- 2. Collection of nutrition data at a district level to allow us to develop district-specific strategy for combating undernutrition and strategically prioritizing programs based on levels of undernutrition. Instead of engaging in a separate data collection, it would be possible to aggregate data in Step 3, to provide district level estimates.
- 3 Identifying individual children as being undernourished and degree of malnutrition so that the parents can be alerted and appropriate services can be provided. Like Polio days, setting aside two National Nutrition Days per year when every child below five is weighed and measured could be a way to empower parents with the required

information and to provide data for district-level planning. Linking these data to child's (or parents') Aadhar number can help organize a database when children's growth can be carefully monitored information can be provided to parents. A focus on awareness campaign that helps parents identify undernutrition in their children and strategies to address them could be extremely fruitful.

Evaluations of ICDS note that although the ICDS program is supposed to carry out growth monitoring, few Anganwadi workers have appropriate charts or training in undertaking this effort. A national campaign where children suffering from undernutrition can be identified and tracked into appropriate remedial programs will be very useful. It will be easy to set up a system for weighing and measuring at central locations like panchayat bhawan and railway stations and if coupled with a small computer and printer, it will be feasible to provide parents with printout of their children's height and weight in relation to other children of the same age. While this will not be a representative sample, it will be useful for identifying districts as high, moderate or low malnutrition districts. These nutrition days could also be used to provide treatments like vitamin A supplementation, deworming, etc. However, we should refrain from overburdening them because a review of child health days by UNICEF notes that these days could be effective provided the number of interventions did not exceed five (UNICEF 2011).

11.3. Address Severe Acute Malnutrition Immediately

Children who are three or more standard deviation below the reference median on height-for-age or weight-for-age are defined as suffering from severe acute malnutrition (SAM). International standards suggest that treatment in an inpatient facility should be considered for these children; however, since nearly a fifth of the Indian children are classified in this category, the consensus statement by Indian Academy of Pediatricians suggests hospitalization for children under six months and home-based therapy with either locally prepared foods or ready to use therapeutic foods (RUTF) for older children (Dalwai et al. 2013).

RUTF is energy dense, micronutrient-enhanced pastes used in therapeutic feeding. These soft foods are a homogenous mix of lipid rich foods, typically made out of peanuts, oil, sugar, milk powder and vitamin, and mineral supplements. Since they are energy dense and do not require addition of

water, they have a long shelf life and can be safely used. While RUTF have been strongly recommended by international organizations like WHO and UNICEF they have been highly controversial in India. UNICEF's program in Madhya Pradesh that used commercial RUTF preparations was under severe attack by the Right to Food Campaign for promoting commercial interests in spite of its success in reducing mortality and increasing weight for a significant proportion of the participants. Over time, emergence of locally made RUTF has calmed these troubled waters as has cautious endorsement by the Indian Academy of Pediatrics (Dalwai et al. 2013). Concerns with poor nutritional content of hot meals like khichri prepared in Anganwadi also suggests a need to look for alternatives. Our results suggest that Anganwadi pre-school education programs which generally serve hot cooked meals may also be associated with lower SAM, albeit the effect is relatively small. This suggests that developing clear guidelines for treating SAM is a priority for developing a workable nutrition policy.

11.4. Address Proximate Determinants of Moderate Malnutrition

Moderate undernutrition—children between 2 and 3 standard deviations below the reference median—form the bulk of the undernourished children in India. A number of current strategies are of relevance to this population. The ICDS program includes many of these on paper including food supplementation in ICDS centers, take home rations, Vitamin A, and Iron supplements.

However, the Anganwadi worker rarely has time to pay attention to things like provision of deworming and iron supplement tablets. Thus, restricting the program to ensure accountability and implementation of existing strategies could yield rich benefits. In particular, deworming to treat hookworm infection and provision of iron supplements should be done for all children regardless of whether they attend other Anganwadi programs. While few studies document the prevalence of hookworm infection in India, a trial carried out in New Delhi slums documents 69 percent children in pre-school programs suffered from anemia and 30 percent had worm infestation. Simultaneous treatment of worms and iron supplement improved weightfor-age z scores by 0.31, a large and significant impact (Bobonis et al. 2006).

As we discussed previously, lack of dietary diversity and faulty infant and young child feeding practices are also implicated in increased prevalence of undernutrition (Menon et al. 2015). Providing parents with information about their children's nutrition status through national nutrition days proposed above could be an important tool in directing parental attention to this issue. Moreover, micronutrient deficiencies can also be handled through food fortification.

Finally, improving nutrition of pregnant mothers as well as reducing anemia during pregnancy could help reduce low birthweight among babies (Bhutta et al. 2013). NFHS-III shows that 32 percent of the pregnant women suffered from moderate to severe anemia (International Institute for Population Sciences and Macro International 2007). Only 23 percent women took iron folic acid supplement for at least 90 days during their last pregnancy and only 4 percent took any treatment for worms. Since iron deficiency is associated with hookworm infection, it is difficult to eliminate anemia without treating intestinal parasites. Several other interventions for pregnant mothers are increasingly being recommended such as multiple micronutrient supplements (Bhutta et al. 2013) but their efficacy is not yet fully understood and more research is needed in this area. These are some of the topics that deserve attention as we begin to think about restructuring the ICDS program to make it more effective.

11.5. Create Enabling Conditions for Balanced Diet and Disease Control

As we move past the immediate concerns, creating an environment in which nutritional improvements become rooted requires attention to creating enabling conditions for balanced diet and disease control. While access to food through the PDS will play a role in increasing caloric availability, increasing access to fruits, vegetables, and milk is even more important in creating a balanced diet. Agricultural price stabilization in India has involved rapidly increasing procurement prices for wheat and rice but little attention has been directed towards increasing production of diverse food crops. Improving dietary diversity may require increased production, storage and marketing systems, and taming food price inflation.

While the national attention has been directed towards reducing open defecation, very little attention has been directed towards whether the sanitation programs build toilets that are actually sanitary and are associated with decreased disease prevalence. Most of the toilets constructed under Nirmal Bharat Abhiyan are single pit toilets and we know little about their construction quality and whether they are properly installed. Research on water treatment programs and health outcomes shows that in spite of treatment at the source, considerable contamination takes place as water moves from the treatment plant to the distribution points as well as within the household (Clasen Thomas et al. 2006). Thus, along with campaigns to increase acceptability of toilets, it is also important to study the effectiveness of the types of the toilets that are being constructed.

The previous discussion of policies to reduce undernutrition has focused on supplementary feeding of energy dense foods for severe malnutrition and increased dietary diversity for moderate malnutrition. Neither of these involve the central component of NFSA—provision of practically free cereals to 67 percent of the Indian population via PDS. We do not dispute that the new and expanded PDS will provide income supplementation to a large proportion of Indian households via food subsidies as argued by Himanshu and Sen (2013). However, this may not be effective in eliminating undernutrition. In contrast, if ICDS can be restructured and its governance structure can be improved, it could be an effective weapon against undernutrition.

APPENDICES

Completed years	Male	Female
< 1	0.43	0.43
1–3	0.54	0.54
4–6	0.72	0.72
7–9	0.87	0.87
10–12	1.03	0.93
13–15	0.97	0.80
16–19	1.02	0.75
20-39	1.00	1.71
40-49	0.95	0.68
50–59	0.90	0.64
60–69	0.80	0.51
70+	0,70	0.50

APPENDIX I. Conversion Factor for Adult Equivalence Scale

Source: National Sample Survey Report 513 2012, p. 13.

APPENDIX II. Distribution of Propensity Scores for Matched Sample Units



Kernel Density-Table7



(Appendix II Contd)

(Appendix II Contd)



Distribution of Prop. Scores for Matched Sample Children

Kernel Density-Table 9



Source: Authors' calculations.

Appendix III. Absence of Relationship between PDS and Nutrition: Real or a Statistical Artifact?

	% Ho	useholds	using PDS		% Ch	ildren underw	eight	
			Percentage			Percentage		
	NSS	NSS	point	IHDS-I	IHDS-II	point	NFHS-3	DLHS-4
	2004-	2011-	improvement	(2004–	(2011–	decline in	(2005–	(2012-
	05	12	in PDS use	05)	12)	underweight	06)	13)
Gujarat	25.5	22.7	-2.8	49.9	37.5	12.4	44.6	
Delhi	5.7	12.3	6.6	48.5	31.9	16.6	26.1	
Maharashtra	22.1	33.1	11.0	38.2	39.1	-0.9	37.0	38.7
Haryana	4.3	16.2	11.9	29.6	28.5	1.0	39.6	36.2
Karnataka	50	63.1	13.1	34.7	32.6	2.2	37.6	29.7
Tamil Nadu	72.7	87.1	14.4	32.5	29.7	2.9	29.8	32.5
Rajasthan	10.2	25.4	15.2	33.5	34.4	-0.9	39.9	
Madhya Pradesh	20.8	36.6	15.8	50.9	49.5	1.4	60.0	
Andhra Pradesh	58.5	76.1	17.6	33.4	40.1	-6.7	32.5	28.1
Punjab	0.5	19.8	19.3	20.1	21.4	-1.3	24.9	25.2
Uttar Pradesh	5.7	25.4	19.7	45.0	39.6	5.4	42.4	
Jharkhand	5.5	29.6	24.1	48.8	51.5	-2.7	56.5	
West Bengal	13.2	44.6	31.4	47.5	32.1	15.4	38.7	37.4
Chhattisgarh	24.2	57.5	33.3	27.6	38.7	-11.1	47.1	
Himachal	51.6	89.5	37.9	28.4	26.6	1.8	36.5	28.5
Pradesh								
Jammu &	39.5	79.6	40.1	10.9	18.2	-7.3	25.6	
Kashmir								
Bihar	1.9	42.7	40.8	54.8	41.4	13.4	55.9	
Kerala	39.7	81.9	42.2	24.5	23.2	1.2	22.9	20.9
Assam	8.4	52.7	44.3	50.3	46.6	3.7	36.4	
Orissa	18.6	63.3	44.7	44.0	39.3	4.8	40.7	
Uttarakhand	21.0	69.0	48.0	45.6	32.8	12.8	38.0	
All India	22.4	44.5	22.1	41.9	37.4	4.5	42.5	

TABLE A3.1.	Percentage of Children Under Age Five Years Classified as
Malnourished Accor	ding to Indices of Nutritional Status: Height-for-Age and
Weight·for·Age, by S	State

Source: NFHS and DLHS-IV data from published reports; NSS PDS use data from Himanshu and Sen (2013), IHDS underweight, authors' calculations.

Note: IHDS state samples are very small and hence results should be treated with great caution. IHDS 1 sample for underweight is only 5.630 children ages 0–5 and IHDS 2 sample is 10555.

Readers may be rightly concerned that the observed lack of improvement in nutrition in families who use the PDS and those who do not may be due to unobserved factors since PDS users are poorer than non-users. While we do our best to match households with and without access to PDS, our matching procedures could be imperfect. Underlying this uneasiness is a fundamental puzzle; if undernutrition is due to hunger, how can access to subsidized cereals fail to reduce it?

However, judging by the historical experience of Indian states, this is precisely what seems to be happening. Growth in PDS usage seems to be unrelated to the decline in undernutrition. As NSS data document, the use of PDS expanded dramatically between 2004–05 and 2011–12 (Himanshu and Sen 2013), however, decline in undernutrition has been far more modest. Although nationwide undernutrition data from recent surveys are not yet available, Appendix Table 1 based on DLHS of 2012–13 and NFHS-III of 2005–06 for selected states shows that there is little relationship between growth of PDS use and decline in underweight. Underweight rate has hardly budged in Kerala and Tamil Nadu in spite of a massive expansion of PDS, while that in Karnataka has declined substantially in spite of a more modest improvement in PDS coverage. Beginning from nearly identical levels of undernutrition in 2005–06 and in spite of similar expansion in PDS use, Himachal Pradesh experienced substantial decline in underweight while West Bengal did not.

IHDS surveys provide national information but do not have very large samples at a state level. Nonetheless, IHDS results also do not show a great deal of relationship between state-level expansion of PDS coverage and decline in underweight. Nationally, PDS use with BPL/Antyodaya prices grew from 21 percent to 37 percent between the two waves while percent underweight declined only from 22 percent to 37 percent.

What can explain this lack of concordance? As this paper argues, access to PDS has a direct impact on availability of cereals but does not have a substantial positive impact on consumption of other food groups. Households do not seem to invest money saved in cereal purchase to improve their consumption of other micro-nutrient rich foods. In this Appendix, we present data on changes in food intake using a fixed effects regression using panel data from 2004–05 to 2011–12. This analysis holds unobserved household characteristics constant and controls for time varying factors such as PDS use, survey period, income, squared term for income, and household size.

The results in Appendix Table 3.2 shows that within this fixed-effects framework, PDS use with BPL/AAY card is associated with greater amount of cereal consumption—by about 840 grams/month per adult—but it does not substantially affect consumption of other items. Part of it may be because savings from consumption of subsidized cereals appear to be invested in other expenditures, possibly important expenditures like schooling and medical care but away from food. Holding constant income and household size, the share of food in total expenditure is lower by about two percentage points

Dependent Variable	Coefficient	<i>S.E.</i>	T-Statistic
Cereals per adult equiv (kg/mo)	0.841	0.080	10.48
Milk per adult equiv (Itr/mo)	-0.012	0.077	-0.15
Pulses per adult equiv (kg/mo)	0.030	0.023	1.3
Sugar/jaggery per adult equiv (kg/mo)	0.043	0.014	2.98
Share of food in total consumption	-0.025	0.002	-11.95

T A B L E A 3.2. Results from Household Level Fixed Effects Regressions for IHDS-I and IHDS-II Household Consumption Expenditure

Source: Authors' calculations.

Note: Household level fixed effects regression for households surveyed in both rounds of the IHDS survey (N = 34643 in IHDS-I).

in PDS using households. It is important to note that food patterns and habits are slow to change and here we are comparing households with themselves at two points in time so should not expect to see very large effects.

But these two observations, changes and lack thereof in state-level undernutrition rates during an era of PDS expansion and household level changes reflected in cereal consumption with PDS use, suggest that we should be cautious about our expectation that increased cereal supply via PDS expansion would lead to substantial decline in undernutrition.

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Comments and Discussion

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Let me begin with two things. First, it is a great data. This is evident in the type of questions that the authors have put up in the beginning of the paper which suggest that those questions can be answered. This, in turn, means this dataset is rich and that, in itself, is of great service to everyone. Second, the study suggests some immediate policy directions and the paper then digs deeper into these issues. In particular, they try to connect the PDS with nutrition outcomes and opens up a discussion on cash transfers versus PDS. Having experimented with my colleagues on substituting cash for BPL cards, the discussion in the paper, on this subject, is of obvious interest to me (see Gangopadhyay et al. 2014).

An important finding at the end of this study, and something that corroborates what other researchers presented in an earlier NCAER conference on nutrition, is that there does not seem to be any direct correlation between income and nutrition. So, in some sense the lack of nutrition was not only restricted to poor households or not restricted in any systematic way to poor households. So, when we are talking about policy on nutrition: Is PDS the one to focus on?

The logic of the presentation in the paper seems to suggest that awareness campaigns and extension services could be very important for an effective nutrition policy. This cannot be a simple policy declaration but needs reaching out to individual households. The ICDS thus becomes the effective tool on which to focus.

The paper mentions three factors that may determine the levels of nutrition in a child—food intake, food diversity, and general health (morbidity due to lack of hygiene). The paper matches households who use the PDS with those that do not. Among other things, they use availability of toilets and piped drinking water (as proxies for hygiene) to match households and find that there is no statistically significant difference in the mean nutrition levels (as measured by underweight statistics) of those that use PDS and those that do not. However, they also find that the food diversity of non-PDS users is more than that of PDS users.

Given that much of PDS-use depends on the quality of service (timing of available supplies) this part could have been refined a bit by checking whether, or not, all those who use PDS exhaust their full quotas. In other words, are the nutritional outcomes different for those using their quotas versus those that are not. If PDS does help in nourishing children, one would expect some negative impact if households are unable to get their full quota or the desired supply. This becomes especially important to do because the authors do state that some BPL card holders do not use the ration shops.

A conclusion that I draw from the paper is that the PDS may be a very costly way (given the leakages and the costs of the Food Corporation of India) to be used as an instrument for tackling child malnutrition. One has to reach out more to households, may be through a greater focus on ICDS.

Rinku Murgai

The World Bank

This paper focuses on the impacts of the PDS and ICDS programs on food consumption and child nutrition. Given the high levels of malnutrition in India (debates on measurement notwithstanding) and the amount of public resources devoted to these programs, the paper addresses important questions. By using the 2011–12 round of the India Human Development Survey, the authors bring new data to bear on these issues.

In summary, the paper examines the impact of PDS on the types of foods that households consume, focusing in particular on cereal consumption. It also assesses the impact of the programs on child nutrition. Taken at face value, the results show that PDS increases cereal and vegetable consumption, but reduces milk and sugar consumption. It decreases the diversity of food consumed in the household. By some measures—moderately undernourished, underweight households—child nutrition worsens. ICDS is found to reduce the incidence of severe malnutrition (underweight), suggesting that ICDS may hold promise. The sizes of the impacts are pretty small and PDS is having unintended negative effects and should be scaled down. Especially, the PDS results are provocative enough that it would be good to think little harder about the methodology before we go much further with them.

On methods, the first comment is on what we mean by PDS use because the empirical approach compares households that used PDS shops in the month preceding the survey and compares those to a matched sample of households that did not use PDS shops in the same time period. The validity and interpretation of PDS use as a measure of program access depends on the underlying model of why PDS would matter. For example, if the existence of a PDS shop reduces the risk in access to grains, the appropriate indicator would be availability of a functioning shop as opposed to PDS use. Alternatively, the correct measure may be having a ration card if it in fact were the case that the only households that did draw from PDS shops were those that actually had a card. I do not know what the data say on that and it would be interesting to see more data on it. So, I think a little bit more on exploring what the right measure of PDS use is would be helpful.

Second, I would like to see more information on the matching procedure to find comparison samples for the programs. The matched sample is a very small sub-sample of PDS users which is worrisome. More generally, it would be useful to present results from the participation regression. Drawing on recent literature, that regression is missing potentially key variables such as birth order of the child, access to PDS shop, etc.

Third, my main question on the method is why the IHDS panel is not being used. The panel will allow corrections for selection on unobservables, and may also permit better understanding of impacts by examining entry or exit from the programs. Overall, much more can be done with the data itself to improve on both the Propensity Score Matching, carrying out robustness checks, and perhaps more credible ways of assessing impacts.

Moving from the results to policy is tricky as evaluations such as these only provide indications of whether or not a scheme works, if impacts are small/zero, we do not know whether it is because of design or implementation issues. To move towards policy, it is important to try to disentangle the two. Examining differences between states in program implementation and impacts may provide a fruitful line of enquiry.

It is important also to think about program design. NSS data show that for the vast majority of households, PDS transfers are infra-marginal. Therefore, the transfers should have an income effect but no substitution effect. Given this, impacts on dietary changes are hard to explain. There may well be some intra-household dynamics at play—e.g., women are more likely to have control over food allocation decisions if the transfers are in kind versus in income—that could explain the dietary impacts. But the evidence is slim, and such or other mechanisms need to be better understood to make a convincing case that the PDS has nutrition impacts.

Finally, in considering policy implications—the second half of this paper—it is useful to weigh the impacts of PDS and ICDS relative to other determinants. For instance, according to recent research poor sanitation is an overwhelmingly important factor explaining differences in child heights between African and Indian kids. What should policy focus on? What are the trade-offs?

General Discussion

Abhijit Banerjee said that while Sonalde Desai was careful not to insist on causality, the results would be read as causal. So, it is very important to be quite careful in emphasizing the caveats. There is a dataset on malnutrition which was generated from106 districts—the Hungama dataset, by the Nandi Foundation, from which a correlation between there being a PDS shop in a village and the malnutrition rates shows up. Whether that is saying something about causality or about placement of the shops is debatable but it suggests that these shops are placed exactly for very good policy reasons in the places where they are more needed. This is a good reason to use a panel for this kind of analysis. More generally, it reinforces that suspicion that that the PDS is infra-marginal so it should not have any substitution effect. Virtually all studies show that income effects for milk are positive. He did not think that income effects could explain the findings, which could be the emerging from cross-sectional variations across households who accessed PDS.

Karthik Muralidharan thought that the cross-section defeats the purpose of a panel. What should be done is matching on the first round, identify comparable households, and then looking for changes over time either because there was change in access to PDS, the PDS shop opened up nearby or because there is change in access to a card. The initial sample did not have young children and that is why there are matching limitations later but even then, with a demographic pool of young households with women in peak fertility years, in this period of six or seven years should show a difference in fertility between the treatment and control samples. He reiterated that the negative correlation in the cross section was a big concern.

He also reinforced the point that evidence shows PDS grains being intra-marginal, which rules out a substitution effect explaining the findings. Beyond this, he felt that the cross section could be used to differentiate between households in terms of the various constraints they faced and how these influenced their use of PDS. This differentiation, he thought would help to determine whether PDS supplemented access to nutrition.

TN Srinivasan raised concerns that the connection between access to PDS and the nutrition measure, which is the weight-for-age, was tenuous. The PDS is largely for the purchase of cereals and the mechanism that links the purchase of grain to ultimate the weight for age of children within the household is not represented in any way in the econometrics. He was not sure that the exercise suggested by Karthik Muralidharan could be carried out with this dataset.

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He further questioned the nutrition measure itself. Weight-for-age was the consequence of past nutritional intake and may not be amenable to significant change through an intervention like improved PDS access. His final point was related to intra-household allocation of food. There is no way of directly policy intervening at the intra-household decisions if the intra-household allocation is distorted away from children to adults the weight-for-age of children is going to lead to a distorted conclusion.

Dilip Mookherjee reinforced the point that the effects of sanitation and disease can be studied from this dataset and this should be done. That seems to be an important policy question, rather than food or nutrient intake.

Rohini Somanathan suggested that states that have really expanded the PDS are also ones in which milk consumption is very low, which might explain the counterintuitive finding of the study. She also said that a schemeby-scheme approach could be leading to the wrong conclusions, because it did not measure the entire nutrient intake of the child. What is really needed is to physically measure everything that the child eats and relate this to what schemes are on the ground and seeing whether it makes a difference at the right point in time to their height and weight. One of the nice things about a panel is that by matching households over earlier rounds, the anthropometrics and the food intake can be linked. Then, we might be able to see, e.g., whether they have a mid-day meal or not and impute some benefit to it.

She raised two issues relating on general equilibrium effects. One is competition: households that are not accessing PDS may be getting the same food items cheaper because there is competition from the PDS, which could lead to an underestimation of the effect of the PDS presence. The other thing, related to the point made earlier is all these other schemes coming into the village and their impact.

Sheela Bajaj emphasized that the quality of food, whether distributed through PDS or the Anganwadi scheme, or the mid-day meal, was a very important factor in providing nutritional security to the people who consume it. If this could be brought into the analysis, it could give useful insights for policy.

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The Evolution of Gender Gaps in India[§]

ABSTRACT We examine the evolution of gender gaps in India between 1983 and 2010 in education, occupation choices, and wages. We find that the gaps have shrunk quite sharply between men and women in most indicators. Our examination of the wage gaps shows that gaps have declined across most percentiles of income groups including the 90th percentile. While convergence in measured attributes like education accounts for most of the decline in the gap in other income groups, the decline in the gender wage gap of the 90th percentile is unexplained with measured attributes predicting that the gap should have widened. The gaps have narrowed most sharply for the youngest cohorts in the workforce suggesting that measured gaps will decline even more sharply over the next two decades.

Keywords: Gender Gaps, Convergence, Labor

JEL Classification: J6, R2

1. Introduction

One of the biggest challenges that any country faces is in putting its productive resources to work. This process involves both inducing these resources to be offered for profitable employment and then matching them to their best use. The challenge is perhaps easiest to see in the context of putting a country's labor force to work. Consider the case of women in India. In 1983, barely 31 percent of Indian women in the working age group of 16–64 years chose to participate in the labor force. By 2005, this

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number had risen, but barely, to 40 percent. The corresponding numbers for men were around 94 percent. Of the women who did choose to participate in the workforce, how well were they prepared to embrace the challenges of finding work and contributing productively to their jobs? Amongst the Indian workforce that is illiterate, around one-third was women, both in 1983 and in 2005. At the other extreme, in 1983 barely 11 percent of workers with middle school or higher education were women. This number rose to 22 percent by 2005. On the employment side, in 1983 only 10 percent of white collar jobs in India were performed by women. This rose by a bare 5 percentage points to 15 percent in 2005.

To summarize, a large share of working age Indian women choose not to participate in the labor market. When they do, they find themselves very poorly trained with most of them having very little education. Consequently, most women workers end up working in low skill and low return agrarian jobs while the higher skill white collar jobs are typically performed by men. Starting with the basic premise that there are no innate differences between the genders in ability, these statistics tell a rather disheartening overall story of the allocation of talent in the country. They suggest large scale underutilization of productive resources along with misallocation of labor inputs across occupations that potentially have serious productivity consequences for the country.

While the statistics cited above are disappointing, the period since 1983 has also seen sharp declines in the gender wage gap. The median male wage was 90 percent above the median female wage in 1983. By 2010, this premium had declined to about 50 percent. To put these numbers in perspective, in the US the median gender wage premium declined from 55 percent to 18 percent between 1979 and 2011 (see Kolesnikova and Liu 2011).¹ In China on the other hand, the gender gap has been reported to be rising over the past two decades. National surveys in China report that the average male-to-female wage mark-up has risen from 28 percent to 49 percent in urban areas and from 27 percent to 79 percent in rural areas between 1990 and 2010. The Indian performance is thus quite encouraging when expressed in this relative context.

In this paper, we examine the factors underlying the sharp decline in the gender wage gap. Did the gender wage gap fall across all income groups? Did it decline due to a decline in the gender gaps in the proximate determinants of wages such as education attainment rates and occupation choices

^{1.} The OECD average for the median wage premium of full-time male workers over their female counterparts in 2009 was 23 percent. There is a lot of variation though with the male premium varying from 35 percent in Austria and the Czech Republic to just around 5 percent in Italy.

of the workforce? We examine this using household level survey data from successive rounds of the National Sample Survey (NSS) from 1983 to 2010. The period since 1983 is a particularly interesting phase in India since it has been characterized by sharp macroeconomic changes. Whether such sharp macroeconomic changes have also coincided with better harnessing and allocation of talent in the country is a question of independent interest.

Our primary finding is that there has been broad-based and significant decreases in gender gaps across a number of indicators. Both education attainment rates and occupation choices of men and women have been broadly converging since 1983. Moreover, a large part of the decline in the gender wage gap is accounted for by convergence in these attributes of wages. We also find that the gender wage gap has declined across most of the income distribution. However, while for the 10th and 50th percentiles of the wage distribution, the decline in the gender wage gap was accounted for by convergence in measured attributes (primarily education), the gender wage convergence in the 90th percentile of the wage distribution was mostly due to unmeasured factors. Strikingly, changes in the measured attributes of this group tended to widen the gender wage gap. This effect is particularly strong in urban India which could reflect reductions in gender discrimination in urban areas though this requires more detailed investigation.

Our results on gender gaps suggest a general pattern of declining socioeconomic gaps across a number of different groups in India over the past three decades. In Hnatkovska, Lahiri, and Paul (2012) and Hnatkovska, Lahiri, and Paul (2013), we have shown that gaps between scheduled castes and tribes and the rest have narrowed sharply since 1983 along a number of different indicators. Similarly, in Hnatkovska and Lahiri (2012) we have found an even sharper narrowing of socioeconomic gaps between rural and urban workers between 1983 and 2010. Taken together, our results suggest that the period since 1983 which has been marked by rapid economic transformation and growth in India has also been a period that has seen disadvantaged groups sharply reducing their large historical socioeconomic disparities relative to others.

We should note that inequality in society can be measured as withingroup inequality or between-group inequality. Our approach in this paper as well as in Hnatkovska, Lahiri, and Paul (2012); Hnatkovska and Lahiri (2012); and Hnatkovska, Lahiri, and Paul (2013) focuses on between-group inequality. Our finding of declining inequality between groups in these papers is not inconsistent with findings of widening within-group inequality in India during some subperiods since 1983. It is plausible that there is more inequality within and less inequality across groups. More generally, the results suggest that greater work is required to determine the overall
pattern of inequality in India during the last 30 years of market-oriented reforms and growth take-off in India.

This paper is related to some existing literature on the gender difference in labor market outcomes in India. Tilak (1980) used survey data from East Godavari district of Andhra Pradesh analyzed the difference in return to education across gender in India. The paper provides evidence that gender wage gap is relatively less for higher education groups. Using survey data from the Lucknow district of Uttar Pradesh, Kingdon (1998) found that women face significantly lower economic rates of returns to education than men. Kingdon and Unni (2001) found that women face high level of wage discrimination in the Indian labor market using 1987–88 NSS data on Tamil Nadu and Madhya Pradesh. However, education contributes little to this wage disadvantage of women.

A key limitation of these studies is that they are concentrated in specific districts or states and do not produce national level estimates. Using national level "Employment and Unemployment" surveys of the NSS for the years 1983 and 1993, Duraisamy (2002) found that the returns to female post-primary education are higher than that for men in 1983 and also in 1993–94. A study by Bhaumik and Chakrabarty (2008) using 1987 and 1999 rounds of the NSSO employment–unemployment survey found that the gender wage gap narrowed considerably between years 1987 and 1999. The narrowing of the earnings gap was attributed largely to a rapid increase in the returns to the labor market experience of women. Using nationally representative data from India Human Development Survey (IHDS) 2005, Agrawal (2013) found that the wage differential between males and females can largely be attributed to discrimination in the labor market. Differences in endowments play a more prominent role in explaining wage difference between social groups.

Most of the papers in the gender gap literature in Indian context focused on average gap in male–female wages. Khanna (2012) analyzed whether male–female wage gap differs for different wage levels. Using data from the 2009–10 employment–unemployment schedule of the NSS, this paper shows that male–female wage gap is higher at the lower end of the wage distribution.

It is important to recognize at the outset that the focus of this paper is on the evolution of gender gaps amongst full-time workers in the workforce. This has two important consequences. First, the evolution of gender gaps amongst part-time workers is outside the ambit of the paper. While part-time workers are an important component of the workforce, the measurement issues surrounding this category are too serious to tackle within the confines of this paper. Second, the paper is silent about the trends in the labor force participation decisions of women. This is a very important issue, not just for India but for all economies. Indeed, there is a significant amount of work in this area focusing on the USA and other industrial economies that has found evidence of a U-shaped pattern in the evolution of female labor-force participation rates with participation initially declining with development and rising later on in the development process. India too has seen a decline in the labor force participation rates (LFP) of women over the last 10 years. Whether or not this is part of the same syndrome that one has observed elsewhere in the West or is it due to some other India-specific factor which is something that deserves a paper on its own right. In this paper, we confine ourselves to summarizing some of this literature in a separate subsection.

The next section presents our results on education and occupation attainment rates and gender gaps in those indicators. Section 4 describes the evolution of gender wage gaps and their decomposition into measured and unmeasured attributes. In the last section conclusion has been given.

2. Empirical Regularities

Our data comes from successive quinquennial rounds of the NSS from 1983 to 2009–10. Specifically, we use rounds 38, 43, 50, 55, 61, and 66 of the employment and unemployment surveys of the NSS. Given our interest in labor market characteristics and outcomes, we restrict the sample to working age adults in the age-group 16–64 who belong to households with a male head of household, who are working full-time, and for whom we have information on their education and occupation choices.² While the overall NSS quinquennial surveys typically sample around 100,000 households (equivalently, around 460,000 individuals on average), our sample restriction reduces the sample to around 160,000 on average. Table 1 gives the demographic characteristics of the workforce. Clearly, men and women differ very marginally along these demographic characteristics.

Our primary interest lies in examining the evolution of gender gaps in India since 1983 along three dimensions: education, occupation, and wages. Given that education and occupation choices are two fundamental ingredients in wage outcomes, we start with a closer examination of patterns on these two indicators. Before proceeding we would like to address a potential

^{2.} We leave out female-led households from the analysis since these households are likely to be a typical in the generally patriarchal Indian family setup.

			Males					Females		
				Sample					Sample	
	Age	SCST	Married	share	Rural	Age	SCST	Married	share	Rural
1983	35.55	0.25	0.79	0.79	0.75	33.69	0.36	0.85	0.21	0.86
1987–88	35.82	0.26	0.8	0.79	0.77	33.82	0.35	0.87	0.21	0.87
1993–94	36.11	0.27	0.8	0.79	0.75	34.62	0.35	0.86	0.21	0.86
1999–2000	36.27	0.28	0.8	0.76	0.74	35.22	0.38	0.88	0.24	0.86
2004-05	36.63	0.27	0.8	0.78	0.73	35.91	0.35	0.86	0.22	0.84
2009–10	37.68	0.28	0.81	0.81	0.71	36.71	0.36	0.86	0.19	0.81
Source: Comp	iled by authors.									

Statistics
Summary
Sample
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Notes: I nis table reports summary statistics for the sample. The statistics are reported at the individual level.

concern regarding our sample selection. Given that we are going to analyze outcomes of those in the labor force, one might have legitimate concerns that our findings may be affected by changes in the gender composition of the labor force. This could occur if there were a differential changes in the proportion of women working full-time relative to men, in the LFP of women relative to men or in the relative employment rates of women during the sample period. Figure 1 shows the ratio of male to female rates in labor force participation, employment, full-time workers, and part-time workers. The key point to note is that there are no clear trends in any of these ratios which suggests that our finding are unlikely to be driven by gender-based differential changes in the participation rates.



FIGURE 1. Gender Gaps: Labor Market Participations Rates

Source: Compiled by authors.

The characteristics of the workforce in terms of their labor force participation choices and outcomes may differ across the genders along a number of other margins. One key factor of interest is potential differences between rural and urban workers. With a large majority of workers still living in rural India, it is important to document any differences in labor force behavior between these two sectors. Table 2 describes the gender differences in the labor force characteristics of workers broken down by rural and urban workers. The key variables we report are LFP, proportion of workers working full time (FULL), proportion working part-time (PART), proportion self-employed (SELF), and proportion unemployed (UNMP).

			-							
					Panel a: Rural					
			Male					Female		
Round	LFP	FULL	PART	SELF	UNMP	LFP	FULL	PART	SELF	UNEMP
1983	0.9365	0.9578	0.0422	0.6131	0.0354	0.3567	0.8557	0.1443	0.6001	0.0438
1987-88	0.9417	0.966	0.034	0.5844	0.0396	0.3449	0.8965	0.1035	0.5692	0.0412
1993–94	0.9512	0.9665	0.0335	0.5836	0.0291	0.4188	0.8246	0.1754	0.614	0.0298
1999–2000	0.9439	0.9626	0.0374	0.5561	0.0365	0.4163	0.8323	0.1677	0.5927	0.0351
2004-05	0.9528	0.9567	0.0433	0.5873	0.0354	0.4557	0.7912	0.2088	0.6661	0.0398
2009–10	0.9511	0.97	0.03	0.5361	0.0297	0.3477	0.8127	0.1873	0.5849	0.0357
					Panel b: Urban					
			Male					Female		
Round	LFP	FULL	PART	SELF	UNMP	LFP	FULL	PART	SELF	UNEMP
1983	0.9352	0.977	0.023	0.3941	0.06	0.1819	0.8933	0.1067	0.412	0.0808
1987–88	0.9345	0.9834	0.0166	0.4026	0.0614	0.1877	0.9162	0.0838	0.4213	0.0984
1993–94	0.9366	0.9858	0.0142	0.4074	0.0467	0.2173	0.8634	0.1366	0.4515	0.0901
1999–2000	0.9275	0.984	0.016	0.4015	0.0518	0.1981	0.8745	0.1255	0.4453	0.0781
2004-05	0.931	0.9808	0.0192	0.4396	0.0475	0.2383	0.8561	0.1439	0.4957	0.092
2009-10	0.9279	0.9876	0.0124	0.4085	0.0302	0.198	0.8804	0.1196	0.4217	0.079
Source: Compi	led by authors.									

TABLE 2. Labor Market Characteristics by Gender: Rural and Urban Workers

Notes: This table reports the labor force characteristics of men and women separately for rural and urban workers. LFP indicates Labor Force Participation rates, FULL is proportion of workers working full-time, PART are proportions of part-time workers, SELF indicate proportion of self-employment and UNEMP denotes the unemployment rate. The numbers in the table show that the patterns are similar for rural and urban workers on most measures. The two key features worth noting are: (a) in both rural and urban areas women are more likely to be working part-time relative to their male counterparts and (b) LFP are higher for rural women relative to urban women. In terms of our focus on full-time workers in the analysis below, the key point that we would like to emphasize is that the composition of full-time and part-time workers has not changed much across gender lines during the sample period.

2.1. Education Attainment

Education attainments of sampled individuals in the NSS survey are reported as categories: Illiterate, Primary, Secondary, etc. While we use the category level information for our analysis further in the text, we also generated statistics on years of education by converting the categories into years of education. This conversion allows us to represent the trends in a more parsimonious manner. The details of the mapping from education categories to years of education are given in the appendix.

Table 3 reports the average years of education of the male and female workforce in India across all the rounds. While the average worker had just three years of education in 1983, the disparity between men and women workers was even more dramatic with men having on average around

	Ave	rage years of educa	tion	Relative
	Overall	Male	Female	educational gap
1983	2.99	3.54	0.93	3.83***
	(0.01)	(0.01)	(0.02)	(0.08)
1987-88	3.19	3.75	1.15	3.25***
	(0.01)	(0.01)	(0.02)	(0.06)
1993-94	3.82	4.42	1.55	2.86***
	(0.01)	(0.02)	(0.02)	(0.04)
1999-2000	4.32	5.05	2	2.53***
	(0.02)	(0.02)	(0.03)	(0.04)
2004-05	4.82	5.44	2.64	2.06***
	(0.02)	(0.02)	(0.03)	(0.02)
2009-10	5.71	6.21	3.59	1.73***
	(0.03)	(0.03)	(0.06)	(0.03)

TABLE 3.	Education Ga	ps: Years of	f Schooling
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Source: Compiled by authors.

Notes: This table presents the average years of education for the overall sample and separately for males and females; as well as the gap in the years of education. The reported statistics are obtained for each NSS survey round which is shown in the first column. Standard errors are in parenthesis. * p < 0.1, ** p < 0.05, *** p < 0.01.

3.5 years of education while women had less than a year's schooling! The relative gap in years of education between men and women of the Indian workforce was almost 4. By 2010, the situation had improved, albeit slightly. The relative gap had declined to about 1.7 with men having on average about 6.2 years of schooling while women had 3.6 years. There clearly has been some decline in the education gender gap.

The evidence on years of education does not reveal where and how the catch-up in education levels has been occurring. Did the decline in the gender gap in years of education happen primarily due to women moving out of illiteracy or due to more women moving past middle and secondary school? This question is important since the addition of a year of education is likely to have very different effects depending on what kind of education is that extra year acquiring. We collect the education levels reported in the NSS survey into five categories: illiterate (Edu1), some education (Edu2), primary (Edu3), middle (Edu4), and secondary and above (Edu5). The last category collects all categories from secondary and above. Given the relatively limited representation of workers in some of the higher education categories at the college and beyond, this allows a relatively even distribution of individuals across categories.

Panel (a) of Figure 2 shows the distribution of men by education category on the left and the corresponding distribution of women. The figure illustrates the direness of the education situation in India. In 1983, 70 percent of male workers had primary or below education levels while the corresponding number for women workers was 90 percent! The period since then has witnessed improvements in these with the proportion of men with primary or lower education level declining to 40 percent by 2010 while for women it fell to around 60 percent. At the other end of the education spectrum, in 1983 around 15 percent of men and 5 percent of women workers had secondary or higher education levels. By 2010, the share of this category had risen to 40 percent for men and 25 percent for women.

Panel (b) of Figure 2 looks at the change in the share of women in each education category over time. The figure makes clear that women have been increasing their share in every education category except for Edu1 (illiterate) where the share has stayed unchanged. The fastest rise in the share of women occurred in education categories 2, 3, and 4 (some education, primary, and middle school). Overall, the figure suggests that the education catch-up has been fairly uniform across categories.

Are the measured narrowing of the gender education gaps as suggested by the data on years of education as well as categories of education



FIGURE 2. Distribution of Workforce across Education Categories

(a) Distribution of workforce across edu (Overall)

(b) Share of women in educational categories



Source: Compiled by authors.

Notes: Panel (a) of this figure presents the education distribution of each gender into the different education categories. Panel (b) shows the share of women in all workers in each category.

statistically significant? We examine this by estimating an ordered probit regression of education attainment (measured by education category) on a constant and a female dummy. We do this for each sample round. Table 4 gives the marginal effect of the female dummy in each round, the changes in the marginal effect across specified rounds as well as the statistical significance of the estimates. Corroborating the visual impressions in Figures 1 and 2, the estimates indicate that being female significantly increased the probability of being illiterate and significantly reduced the probability of being in all other education categories in 1983. Over the subsequent 27 years, this over-representation of females amongst illiterate workers and under-representation in other categories declined for all categories except for the secondary and above category. Moreover, the changes over time were statistically significant.³

In summary, our review of the education attainment levels of men and women in the Indian labor force suggests that gender gaps in education have declined significantly over the past three decades though the absolute levels of education in the country remain unacceptably low. Additionally, while more women are joining the labor force with secondary school or higher education, they have been not done this fast enough to consistently raise their share of secondary and above educated workers. This partly also be reflecting the fact that secondary educated women in India are still not joining the labor force at high enough rates.

2.2. Occupation Choices

Our next indicator of interest is the occupational choice of the workforce. Specifically, we want to examine differences in the occupational choices between men and women workers in the workforce and how those differences have evolved over time. We use the three-digit occupation classification reported in NSS and aggregate them into three broad occupational categories—Occ1:*white-collar* occupations like administrators, executives, managers, professionals, technical, and clerical workers; Occ2: *blue-collar* occupations such as sales workers, service workers and production workers; and Occ3: *agrarian* occupations which collects farmers, fishermen, loggers, hunters, etc.

3. We should note that the marginal effect of the female dummy measures its effect on the absolute gap between the probability of that category between the genders. Hence, this is different from the relative gap numbers reported in Figure 2 which reports trends in the relative gap in the probabilities. This explains the difference in our results for the convergence patterns in Edu5 category in Figure 2 and Table 4.

		Pá	nel a. Marginal effu	ects of female dum	шy		Panel b.	Changes
	1983	1987-88	1993-94	1999–2000	2004-05	2009-10	1983-2005	1983-2010
Edu 1	0.3760***	0.3641 * * *	0.3582***	0.3460***	0.3011 * * *	0.2482***	-0.0749***	-0.1278***
	(0.003)	(0.03)	(0.0035)	(0.0036)	(0.004)	(0.0062)	(0.05)	(0.0069)
Edu 2	-0.0607***	-0.0531 * * *	-0.0367***	-0.0180***	0.0008*	0.0165***	0.0615***	0.0772***
	(0.001)	(0.000)	(0.008)	(9000.0)	(0.0005)	(9000.0)	(0.0011)	(0.0012)
Edu 3	-0.0971***	-0.0879***	-0.0648***	-0.0460***	-0.0335***	-0.0099 * * *	0.0636***	0.0872***
	(0.0012)	(0.0011)	(0.001)	(0.000)	(0.000)	(0.000)	(0.0015)	(0.0015)
Edu 4	-0.0935 * * *	-0.0851 * * *	-0.0884 * * *	-0.0883***	-0.0790***	-0.0555***	0.0145***	0.038***
	(0.0011)	(0.001)	(0.0011)	(0.0012)	(0.0013)	(0.0018)	(0.0017)	(0.0021)
Edu 5	-0.1247***	-0.1380***	-0.1683***	-0.1937***	-0.1895***	-0.1992***	-0.0648***	-0.0745***
	(0.0011)	(0.0011)	(0.0014)	(0.0018)	(0.0021)	(0.004)	(0.0024)	(0.0041)
Z	164979	182384	163126	173309	176968	133926		
Source: Co	impiled by authors.							
Notes: Pa.	nel (a) reports the ma	rginal effects of the	e female dummy in ar	n ordered probit regr	ession of education o	categories 1 to 5 on a	a constant and a fen	nale dummy for each

Marginal Effect of Female Dummy on Education Categories TABLE 4.

survey round. Panel (b) of the table reports the change in the marginal effects over stated periods and over the entire sample period. N refers to the number of observations. Standard errors are in parenthesis. * p-value < 0.10, ** p-value < 0.05, *** p-value < 0.01.

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Figure 3 shows the key features of the occupation distribution patterns of the workforce broken down by gender. Panel (a) shows the distribution of the male workforce across the three occupation categories and the corresponding distribution of female members of the workforce. The two graphs in panel (a) clearly show a robust pattern of occupational churning in the entire labor force: workers of both genders have been switching out of agrarian occupations. The share of agriculture in male full-time employment declined from around 50 percent in 1983 to 30 percent in 2010. Correspondingly, the share of agriculture in female full-time employment also fell, albeit more tepidly, from 70 to 55 percent during the same period. The share of blue-collar employment for males rose from around 40 to 50 percent while that of white-collar employment rose from 10 to around 20 percent. Women, by contrast, saw blue-collar employment's share in their total employment in 2010 rise slightly above its 1983 level of just under 25 percent. White collar employment of women however rose sharply from 5 to just under 20 percent between 1983 and 2010.

Panel (b) of Figure 3 shows the share of women in total full-time employment in each occupation. Note that this is in contrast to Panel (a) which showed the share of each occupation in total full-time female employment. The most visible change in the share of women is in Occ1 which is whitecollar employment where women's share has increased from 10 to 15 percent between 1983 and 2010. The share of women in total employment in the other two occupations has not changed much during this period.

The trends documented above suggest that women have been changing occupations during this period. Has this resulted in a decline in the gender disparities in the occupation distribution of the labor force? We answer this question by running a multinomial logit regression of occupational choice on a constant and a female dummy for each round. We then compute changes in the effect of the female dummy across the rounds. Table 5 shows the results. In a confirmation of the visual suggestion previously, in 1983 being female significantly increased the probability of being employed in agriculture while significantly reducing the probability of employment in blue and white collar jobs (Occ2 and Occ1, respectively). While this basic pattern has not changed between 1983 and 2010, the negative marginal effect of the female dummy on the probability of white-collar employment declined significantly during this period indicating that there was statistically significant reduction in the under-representation of women in these occupations during this period. The other two broad occupation categories however, showed a worsening of the initial disparity of representation with the over-representation of women in agricultural employment and under-representation in blue-collar occupations marginally worsening between 1983 and 2010.



FIGURE 3. Distribution of Workforce across Occupation Categories

(a) Distribution of workforce across Occ (Overall)

(b) Share of women in occupational categories



Source: Compiled by authors.

Notes: Panel (a) of this Figure presents the occupation distribution of each gender into the different occupation categories. Panel (b) shows the share of women in each category.

		Pai	nel a. Marginal effe	cts of female dumn	у		Panel b. (hanges
	1983	1987-88	1993-94	1999–2000	2004-05	2009-10	1983-2005	1983-2010
Occ1	-0.0564***	-0.0488***	-0.0407***	-0.0512***	-0.0370***	-0.0394***	0.0194***	0.017***
	(0.0016)	(0.0015)	(0.002)	(0.0022)	(0.0024)	(0.004)	(0.0029)	(0.0043)
Occ2	-0.1172***	-0.1155***	-0.1481***	-0.1756***	-0.1670***	-0.1592***	-0.0498***	-0.042***
	(0.0031)	(0.0031)	(0.0031)	(0.0034)	(0.0037)	(0.0055)	(0.0048)	(0.0063)
Occ3	0.1736***	0.1644***	0.1888***	0.2268***	0.2040***	0.1986***	0.0304***	0.025***
	(0.0033)	(0.0033)	(0.0035)	(0.0037)	(0.0041)	(0.0064)	(0.0053)	(0.0072)
z	164979	182384	163126	173309	176968	133926		
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Source: Compiled by authors. Note: Panel (a) of the table presents the marginal effects of the female dummy from a multinomial probit regression of occupation choices on a constant and a female dummy for each survey round. Panel (b) reports the change in the marginal effects of the rural dummy over the relevant time periods. Agrarian jobs is the reference group in the regressions. N refers to the number of observations. Standard errors are in parenthesis. * p-value < 0.01, ** p-value < 0.05, *** p-value < 0.01. In summary, our review of the trends in the disparity between the genders in their occupation distribution suggests a mixed picture. On the positive side, women have been moving out of agricultural jobs into blue- and whitecollar jobs thereby behaving like their male counterparts in the workforce. However, in terms of the share of women in the different occupations, only white-collar jobs have seen a significant expansion of the share of women while the under-representation in blue-collar jobs and over-representation in agrarian jobs has increased. This latter effect suggests to us that women have been moving out of agricultural jobs and into blue-collar jobs at a slower rate than their male counterparts.

3. Wage Outcomes and Gender Differences

We now turn our attention to the third indicator of interest—gender gaps in wages. In terms of background, it is worth reiterating that the two key determinants of wages of individual workers are their education levels and the occupations that they choose. In the previous section, we have shown that gender gaps in education have tended to narrow for all but the highest education groups. This trend is likely to be a force toward raising the relative wage of women. We have also shown that women's share of employment has only increased in white-collar occupations. In as much as women are getting disproportionately more represented in agricultural and blue-collar jobs, one might expect this force to lower the relative wage of women if these occupations pay relatively lower wages. Clearly, there are offsetting underlying forces here.

The NSS only reports wages from activities undertaken by an individual over the previous week (relative to the survey week). Household members can undertake more than one activity in the reference week. For each activity we know the "weekly" occupation code, number of days spent working in that activity, and wage received from it. We identify the main activity for the individual as the one in which he spent maximum number of days in a week. If there are more than one activities with equal days worked, we consider the one with paid employment (wage is not zero or missing). Workers sometimes change the occupation due to seasonality or for other reasons. To minimize the effect of transitory occupations, we only consider wages for which the weekly occupation code coincides with usual occupation (one year reference). We calculate the daily wage by dividing total wage paid in that activity over the past week by days spent in that activity. Figure 4 shows the evolution of the gender wage gaps since 1983. Panel (a) shows the mean and median wage gaps across the rounds, while Panel (b) shows the wage gap across all percentiles for three different years: 1983, 2004–05, and 2009–10. Two points are worth noting from the figure. First, the gender wage gap has shrunk secularly since 1983 for all groups except the very richest groups. In other words, the decline in the gender wage gap has been broad-based and inclusive. Second, there has been a very sharp decrease in the gender wage gap between 2004–05 and 2009–10. Uncovering the reasons behind this phenomenon is interesting in its own right.

Are the measured decreases in the wage gap statistically significant? We test this by running regressions of the log wage on a constant, a female dummy, and controls for age and age squared (to control for potential lifecycle differences between men and women related to their labor supply choices). We run the regression for different quantiles as well as for the mean.⁴ Table 6 shows the results. The regression results show that the decline in the wage gaps were significant for all income groups except the 90th percentile for whom there was no significant change in the wage gap between 1983 and 2010. Moreover, they also a statistically significant decrease in the wage gap between 2004–05 and 2009–10.

So, what is driving the wage convergence between the genders? Specifically, how much of the decrease in the gender wage gap is due to convergence in measured attributes of workers? To understand the timeseries evolution of the gender wage gaps, we use the Oaxaca-Blinder decomposition technique to decompose the observed changes in the mean and quantile wage gaps between 1983 and 2010 into explained and unexplained components as well as to quantify the contribution of the key individual covariates. We employ ordinary least-squares (OLS) regressions for the decompositions at the 10th, 50th, and 90th quantiles.⁵ Our explanatory variables are demographic characteristics such as individual's age, age squared, caste, and geographic region of residence. Additionally, we control for the education level of the individual by including dummies for education categories.⁶

4. We use the RIF regressions developed by Firpo, Fortin, and Lemieux (2009) to estimate the effect of the female dummy for different points of the wage distribution.

5. The inter-temporal decomposition at the mean is in the spirit of Smith and Welch (1989). All decompositions are performed using a pooled model across men and women as the reference model. Following Fortin (2006), we allow for a group membership indicator in the pooled regressions. We also used 1983 round as the benchmark sample.

6. We do not include occupation amongst the explanatory variables since it is likely to be endogenous to wages.

FIGURE 4. Gender Wage Gaps Since 1983



(a) Relative wage gap

(b) Log ratio of male to female wages



Source: Compiled by authors.

Notes: Panel (a) of this figure presents the relative male to female wage for full-time workers. Panel (b) shows the log ratio of male to female wages for each percentile.

		Panel A	l: Female dummy coet	fficient		Panel B: I	Changes
	1983	1993-94	1999-2000	2004-05	2009-10	1983-05	1983-10
10th Perc	-0.8851***	-0.6020***	-0.4727***	-0.7737***	-0.6035***	0.1114***	0.2816***
	(0.0193)	(0.0157)	(0.0129)	(0.0199)	(0.0277)	(0.0277)	(0.0338)
50th Perc	-0.6872***	-0.6064***	-0.6115***	-0.5164***	-0.3690***	0.1708***	0.3182***
	(0.0097)	(0.0089)	(0.009)	(0.0086)	(0.0112)	(0.013)	(0.0148)
90th Perc	-0.3543***	-0.3506* **	-0.4141***	-0.4073***	-0.3841***	-0.0530***	-0.0298
	(0.01)	(0.0132)	(0.0184)	(0.0235)	(0.0354)	(0.0255)	(0.0368)
Mean	-0.6604***	-0.5641***	-0.5810***	-0.5777***	-0.4622***	0.0827***	0.1982***
	(0.0083)	(0.0095)	(0.0095)	(0.01)	(0.0139)	(0.013)	(0.0162)
z	63981	63364	67322	64359	57339		
Source: Compil	ed by authors.		- - -				
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Notes: Panel (a) of this table reports the coefficient on the female dummy in a regression of log wages on a constant, a female dummy and controls for age (age and age squared). Panel (b) reports changes in the coefficient across the relevant rounds. N refers to the number of observations. Standard errors are in parenthesis. * p-value < 0.10, ** p-value < 0.05, *** p-value < 0.01.

The results of the Oaxaca-Blinder decomposition exercise are reported in Table 7. The table shows that all of the gender wage convergence for the median and around 75 percent of it for the mean can be accounted for by measured covariates. For the 10th percentile measured covariates explain around 50 percent of the observed convergence. Encouragingly, convergence in education was a key contributor to the observed wage convergence for all these groups.⁷ The convergence at the 90th percentile between 1983 and 2010 however cannot be explained by measured covariates. In fact, the observables covariates of wages predict that the gender wage gap should have actually widened rather than narrowed The source of the wage convergence at the 90th percentile is thus a puzzle as it is almost entirely unexplained.

	Measured gap	Explained	Unexplained	Explained by education
		Change (1983	to 2009–10)	
10th Perc	-0.1220***	-0.0638***	-0.0582**	-0.0241***
	(0.0267)	(0.0097)	(0.0273)	(0.0078)
50th Perc	-0.2102***	-0.2452***	0.0349	-0.1378***
	(0.0287)	(0.0143)	(0.0257)	(0.0099)
90th Perc	-0.1665***	0.1484***	-0.3148***	0.0455*
	(0.0569)	(0.0352)	(0.0544)	(0.0259)
Mean	-0.2157***	-0.1512***	-0.0645***	-0.0891***
	(0.0169)	(0.0105)	(0.0158)	(0.0083)

TABLE 7. Decomposition of the Changes in the Wage Gap

Source: Compiled by authors.

Note: This table presents the change in the rural-urban wage gap between 1983 and 2009–10 and its decomposition into explained and unexplained components using the RIF regression approach of Firpo, Fortin, and Lemieux (2009) for the 10th, 50th and 90th quantiles and using OLS for the mean. The table also reports the contribution of education to the explained gap (column iv). Bootstrapped standard errors are in parenthesis. * p-value < 0.10, ** p-value < 0.05, *** p-value < 0.01.

To gain greater perspective on the underlying forces driving the contraction in the gender wage gap, Panel (a) of Figure 5 shows the gender wage gaps by education category. Examining Panel (a) it is clear that the dispersion in the wage gap by education category has declined perceptibly since 1983. Moreover, gender wage gaps have declined sharply for groups with some education (edu2), primary education (edu3), and those with middle

7. As we show below, adding occupation choices to the list of explanatory variables does not significantly raise the share of the explained component in the observed wage convergence. This is not unusual. Blau and Kahn (2007) report that over 40 percent of the gender wage gap in the USA remains unexplained even after accounting for a rich set of explanatory variables including education, race, occupation, industry, union status, experience, etc.





(b) Relative wage gap by occupation



Source: Compiled by authors.

Notes: Panel (a) of this figure presents the relative male to female median wage gap by education category, while Panel (b) shows the median wage gap between men and women in different occupations.

school education (edu4) while increasing slightly for illiterates and those with secondary and above education. Since women have been increasing their representation in education categories 2, 3, and 4 while reducing their relative representation in categories 1 and 5, the behavior of the wage gaps by education category in Panel (a) of Figure 5 suggests why education accounts for a large part of the observed gender wage convergence.

Panel (b) of Figure 5 gives the median wage gaps by occupation category. The median wage gaps were the highest in blue-collar jobs (Occ2) and used to be the lowest in white collar jobs (occ1) in 1983. By 2010, the wage gaps in these two occupations had converged while the wage gap in agrarian jobs remained relatively unchanged. Recall from Table 5 that between 1983 and 2010 women reduced their under-representation in white-collar occupations. At the same time their over-representation in agrarian jobs rose and the under-representation in blue-collar occupations worsened.

The effect of occupation choices on the wage gap is thus ambiguous. On the one hand, the movement of women towards white-collar occupations that had lower average wage gaps would have tended to lower the wage gap. The increased under-representation in blue-collar jobs, typically characterized by high gender wage gaps, would also tend to lower the overall wage gap as would the decline in the wage gap over time in that occupation. However, the increase in the wage gap in white-collar occupation over time would have had the opposite effect of widening the wage gap.

In summary, our results on wage outcomes of the workforce indicate that the gender wage gap has narrowed significantly across all percentiles except the very top of the income distribution. Most of this convergence was due to convergence in measured covariates of wages. Additionally, there has been a very sharp convergence in male and female wages between 2004-05 and 2009-10. While the reasons behind this require more careful examination, our preliminary examination of the issue suggests that a narrowing of the gender gap in education was a key contributing factor. It is tempting to attribute the convergence to factors such as the National Rural Employment Guarantee Program (NREGA) which guarantees 100 days work in the offseason to every rural household. However, we do not believe that our results are driven by NREGA for a couple of reasons. First, as Figure 4 illustrates clearly, the convergent trends pre-date the introduction of NREGA (which was only introduced in 2006). Second, the convergent patterns characterize both rural and urban areas whereas NREGA only applied to rural areas. Clearly, some factors that were common to both rural and urban areas are likely to have been at play rather than a rural India specific program like NREGA.

4. The Young

The trends we have documented above do suggest significant narrowing in gender gaps across multiple categories. However, a key reason for examining these trends is to also anticipate what one might expect to see over the next couple of decades in terms of gender disparities. While forecasting such trends are very difficult, one measure which usually provides windows into future trends would be the trends in the gender gaps of the young workers.

To probe this more closely, Figure 6 shows that the primary force driving the catch-up in education is the increasing education levels of younger cohorts. Thus, in 1983 the relative gender gap in years of education between men and women workers aged 16–22 was three. By comparison, in 2005, the education gap was 1.4 for the 17–23 year old cohorts who were born between 1982 and 1988. Clearly the gap is lower for younger birth cohorts.

We take a closer look at the gaps amongst younger workers by concentrating on the characteristics of 16–25 year olds in each survey round. We start with education. Figure 7 reports the years of education of the 16–25 year olds in every survey round broken down by females and males and by rural and urban. As can be seen from the figure, young workers in the 16–25 age group have been increasing their years of education in both rural and urban India. Moreover, in both areas the gap between men and women has narrowed sharply. Perhaps, most impressively, in 2010, women workers in urban areas had more years of education on average than their male counterparts. Even in rural India, in 2010 the gap was just above one year for this group. These trends suggest that over the next two decades, the gender gap in education should become very small. These trends would get even stronger as more and more educated women begin participating in the labor force.



FIGURE 6. Education Gaps in Years by Birth Cohorts

Source: Compiled by authors.

FIGURE 7. Gap in Years of Education: 16-25 Year Olds

(a) Years of education of age-group 16-25 (Rural)



(b) Years of education of age-group 16-25 (Urban)



Source: Compiled by authors.

Note: Panel (a) of this figure presents the years of education of female workers in the 16–25 age cohort across the six survey rounds. Panel (b) shows the corresponding figures for male workers aged 16–25.

How have the 16–25 year olds been behaving in terms of their occupation choices? Are there significant differences between the genders on this dimension? Figure 8 shows the occupation choices of women (Panel a) and men (Panel b). The patterns are very similar for the two. The share

FIGURE 8. Occupational Distribution of 16-25 Year Olds



(a) Occupational distribution of age-group 16-25 (Males)

(b) Occupational distribution of age-group 16-25 (Females)



Source: Compiled by authors.

Notes: Panel (a) of this figure presents the occupation distribution of female workers in the 16-25 age cohort across the six survey rounds. Panel (b) shows the corresponding figures for urban male workers aged 16-25.

of agricultural occupation has declined, while the share of the other two occupations has risen for both men and women between 1983 and 2010. In terms of comparisons of the occupation distribution, by 2010, the share of the female workforce in the 16–25 age group that was engaged in white-collar jobs was marginally higher than the corresponding proportion for male workforce in the 16–25 age-group. On the other hand, while women in this age group have been switching out of agriculture into blue-collar occupations, their male counterparts in the same age group have been doing so at a faster rate. Consequently, even in 2010 almost 60 percent of young female workers were engaged in agrarian jobs while blue-collar jobs accounted for only 30 percent of their employment. The corresponding numbers for young male workers on the other hand were 50 percent and 40 percent, respectively. The key though is that the gaps have narrowed much faster for these younger workers as compared to their older counterparts.

The rapidly shrinking gender gaps amongst younger workers suggests to us that going forward gender gaps are likely to narrow even faster as more and more of the older cohorts drop out of the labor force and more younger cohorts with similar education and occupation choices replace them in the workforce.

5. Female Labor Force Participation

A number of existing studies found that a U-shaped relationship exists between female labor force participation and economic development (Fatima and Sultana 2009; Goldin 1995; Kottis 1990; Mammen and Paxson 2000). They argue that in low-income societies, women work on family farms or enterprises and thus female labor force participation is high. As society gets richer there is higher focus on industrialization. Thus, blue collar jobs become more important and woman's participation in the labor market falls accordingly. This can be explained by income effect arising from rising family income, incompatibility of factory work with child care and social stigma associated with working outside home. With further economic development, female labor force participation increases once again due to the expansion of higher education among females and the emergence of a white-collar jobs. The stigmas associated with jobs disappear overtime and at such advanced stages of development, the substitution effect on account of higher female wages dominates the income effect. Empirical support for the U-hypothesis is primarily based on crosscountry analysis (Cagatay and Ozler 1995; Mammen and Paxson 2000). Panel analyses, on the other hand, have produced mixed results. While Luci (2009) and Tam (2011) have argued that the U-shaped LFP hypothesis has support within countries over time, Gaddis and Klasen (2014) found that the evidence of a U-shaped relationship is weak and extremely sensitive to underlying data.

In the Indian context, there is mixed evidence on the U-shaped relationship. On the one hand, Olsen and Mehta (2006) found that a U-shaped relationship exists between female employment and educational status. Using 1999–2000 NSS data, they found that women with low education as well as those with university degrees more likely to work than middle educated women. Using panel data between 1983–2010 from the NSS, Lahoti and Swaminathan (2013) however did not find a significant relationship between level of economic development and woman's participation rates in the labor force. Female labor participation rates tend to also vary between rural and urban areas and across sub-rounds of the NSS data, as shown by Bardhan (1984).

As the discussion above makes clear, female labor force participation is a complicated subject that requires a separate paper on its own. We hope to return to this issue in future work.

6. Conclusion

Allocating talent is one of the major challenges for any country. It is an even bigger issue in rapidly developing economies with their changing economic structure. In this paper, we have examined one aspect of this talent allocation process by examining the evolution of gender gaps in India since 1983. The absolute differences between males and females in the Indian labor force are huge in a number of different indicators including education attainment rates, LFP, occupation choices, as well as wages. However, the gaps have narrowed along all these indicators in the last 27 years. Most encouragingly, the majority of the wage convergence is accounted for by measured covariates of wages, particularly education.

We believe that our results here, in conjunction with our previous work in Hnatkovska, Lahiri, and Paul (2012); Hnatkovska, Lahiri, and Paul (2013); and Hnatkovska and Lahiri (2012) on scheduled castes and tribes and rural– urban disparities, suggest that the past three decades have been a period of a sharp narrowing of historical inequalities between different segments of the Indian workforce. Given that these gaps have narrowed most sharply for the youngest cohorts in the workforce particularly for education, we believe that labor market disparities between these groups will shrink even more rapidly over the next couple of decades.

Our study has ignored three key areas that can shed greater light on the evolution of gender gaps. First, our study has focused on aggregate Indiawide trends. Given the huge variation in policies and outcomes across states in India since 1983, on profitable approach would be to exploit the cross-state differences to better identify the causal channels at work. This is a research approach that we hope to take in the future. Second, as we mentioned earlier, a fascinating topic that we have no addressed at all are trends in female LFP in India. This has first-order implications for gender disparities but comes with a host of data and conceptual issues that render a full-scale examination of it difficult in this paper.

Third, the past 30 years have also seen a sharp increase in measured productivity (both total factor productivity and labor productivity) in India. How much of this productivity increase can be attributed to better allocation of skills and talent by the labor market? Our previous work in Hnatkovska and Lahiri (2011) and Hnatkovska and Lahiri (2012) on caste gaps and rural–urban gaps suggest that aggregate productivity changes may have been crucial in driving the declining wage gaps across these groups. However, that work took the productivity changes as exogenous to labor market allocations. Depending on how much of a productivity effect there is from improved labor allocations, this may or may not be a good allocation. We intend to address these questions in future work.

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Comments and Discussion

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I think the findings are generally plausible. Most of my comments are small and on details.

- The paper talks about workers, but NSS data are actually on time disposition, in terms of person-days in the reference period, and distinguish between "usual status,""weekly status,"and "current daily status" (the estimates for participation in labor force, unemployment, etc. are usually different for these different statuses). It'll be useful to spell this out for the labor market characteristics discussed in the paper and if there are significant differences for the different statuses.
- 2. Why are workers in female-headed households left out?
- 3. There are many studies on female labor force participation rates, some using the NSS data. This paper should be linked to that literature. One would also like to have an analysis of LFP for rural and urban workers in terms of different expenditure groups, castes, manual or nonmanual jobs, etc. Female LFP in rural areas also varies significantly across seasons (NSS sub-rounds). Even if the female labor force participation issue is not handled in the paper some ideas on its possible link with the pattern of wage gap may be called for (e.g., if the pattern were U-shaped what implication does it have for the pattern of wage gap?)
- 4. Similarly, the analysis of the narrowing of gender education gaps could be controlled for expenditure group, caste, area of residence, etc.
- I would suggest that in the occupational classification the "agrarian" occupation be subdivided into "self-employed" and "wage-employed" or cultivators and agricultural laborers, as these are large distinct categories.
- 6. Since a large number of women work only part-time, the Figure 3 for occupational categories may be done for part-time work (or subsidiary occupation categories) as well.
- 7. For the marginal effect of female dummy in Table 3 should be shown after controlling for household expenditure, caste, area, etc. Sometime

a woman's occupational choice (or whether she'll enter the labor force at all) may also depend on the employment or underemployment status of the males in the household.

- 8. Under-representation of women in blue-collar occupations may be related to education, and particularly to lack of opportunities for women in acquiring vocational skills and training. This may also be the reason why the median wage gaps were highest in bluecollar jobs.
- 9. The factors behind withdrawal of women from the labor force at an intermediate level of income and education (bringing about an S-shaped labor supply curve) observed in different parts of India may be associated with the under-representation of women in bluecollar job.
- 10. It makes sense to compare the wage rates of men and women, or of any two kinds of workers when the tasks are actually comparable. Changes in gaps of average wage rates for broad occupational categories may hide a lot of technological and demographic changes and may not reflect changes in gaps in task-specific wage rates.
- 11. One would like to know if the equality in male–female wage rates in NREGA had any effect at all on decrease in the gender wage gap. Even though the sharpest decrease may be in urban white-collar jobs and the decrease started prior to the onset of NREGA, it is worth checking if in the rural sector, controlling for education, NREGA has any effect on the wage gap for manual workers.
- 12. In the Oxaca-Blinder decomposition exercise in Table 7 the explanatory variables may also include availability of NREGA work, proximity to cities, indicators of general connectivity, etc.
- 13. Since there is plenty of evidence of a sharp regional pattern of gender disparity-related indicators (more in north and west India compared to south and east India), it may be interesting to break down the data by states.

Dilip Mookherjee

Boston University

This paper contains some good news about the evolution of the Indian economy over the past three decades: gender gaps in the labor market have narrowed significantly, contrary to perceptions of rising inequality in general, and to the experience of the Chinese economy over a comparable period. Authors' earlier work has shown a similar shrinking of caste gaps as well. Specifically, gender wage gaps for full time workers have fallen, particularly in the middle and bottom of the wage distribution. This can mostly be accounted for by falling gender gaps in education, and shifts in occupation structure away from manual to non-manual work (where wage gaps are narrower).

The authors suggest these facts reflect a better utilization of the economy's workforce, possibly contributing to the growth process. This argument is not fleshed out in any detail. They indicate toward the end of the paper that establishing the direction of causality needs further research. Implicitly, the main question of interest is therefore what the facts imply for progress in equity and fairness, and for India's performance on the dimension of gender empowerment (one of the UN Millenium development goals).

While they are careful not to interpret the facts in such broad terms, their results naturally invite a discussion along these lines. So let me venture forth in this direction, and state a number of qualifications that I would add to interpreting the facts as indicating substantial progress in reducing gender-based inequality.

First, the facts pertain only to convergence in wages and education. But other dimensions also matter. The authors discuss gender gaps in labor force participation, where progress has been less marked. Women's participation rates have risen only slightly, from 31 percent to 40 percent over this period. Moreover, since 2005, women's participation has fallen, consistent with the general tendency for a U-shaped pattern of women's participation with economic development. Moreover, the paper does not address gender gaps in health and nutrition or the problem of "missing women," where improvements have been less marked or altogether absent.

Second, there are qualifications owing to statistical problems. The paper focuses only on full-time workers. One expects a large part of the female workforce to be employed part-time. The data however shows less than 20 percent of rural working women were part-time workers, and less than 12 percent in urban areas. This seems to me suspiciously low, and poses questions about the way the NSS defines participation particularly for the part-time work. The authors argue the data shows no noticeable differences in trends of part-time work for men and women. Table 2 in the paper however shows the part-time rate for rural women rose from 14 percent in 1983 to 21 percent in 2005 and 19 percent in 2010, whereas for men it remained stationary around 4 percent in 1983 till 2005 and fell to 3 percent in 2010. There is also the problem of controlling for endogenous selection between full-time, part-time work and not working at all. For instance, those women

not experiencing the same relative wage gains may have dropped out or switched to part-time work, imparting an upward bias to the estimated convergence.

Third, there was a sharp increase in the wage gap in white collar occupations, and a less marked increase in the highest education category (see Figure 5)—contrary to the general tendency for wage gaps to narrow in other occupations and education categories.

Fourth, there are still many unobserved factors unaccounted for, so it is premature to make any inferences concerning trends in gender discrimination on the labor market. Factors not controlled for include experience, location, quality of human capital, intensity of labor supply, job assignments, and investment in skills. This is particularly true at the top end of the wage distribution, where education, occupation, and age fail to explain much of the observed narrowing. Indeed, controlling for age alone seems to make a considerable difference; while the raw data shows reduction in wage gaps at the 90th percentile, this disappears in Table 6 (Panel b, 1983-2010). Table 7 shows that observed attributes predict a 15 percent increase in the gap at the 90th percentile, as against an observed fall of 17 percent. Hence, unobserved factors accounted for a significant narrowing of the wage gap at the top. One can only speculate whether this reflects reduced discrimination-in an increasingly knowledge-based economy, one expects the relative importance of brains to brawn to rise, and accordingly gender gaps in wages to narrow. Set against this, the rising wage gap in white collar occupations represents a puzzle.

Finally, it is worth noting that substantial progress still remains to be made on the dimensions that have been documented in the paper. Wage and education gaps still remain large, there is yet a long way to go. Nevertheless, these qualifications aside, it is good to hear of substantial progress from truly abysmal disparities three decades ago.

General Discussion

T.N. Srinivasan felt that the authors need not have confined themselves to NSS quinquennial-round data from 1983 but could have also used the annual rounds, which have enough sample size at the national and major-state levels. Second, he also noted that Bardhan's suggestion that NSS definitions of usual status and daily status could both be used for measuring participation was not right: daily status was in person days, not persons, as the other definitions, and so not useable for the purposes of the paper unless we went into

time allocation details. He was also concerned that the wage information that the paper was using was most likely coming from the regular wage and salary category, which is less than 20 percent of the labor force, so it was not clear how to interpret that information from a relatively small portion of the total workforce. Third, he felt, like Bardhan, that female labor force participation is a joint, household level decision and may not be captured by individual, female, dummy-based analysis as done in the paper but may need household-level variables. Finally, regional analysis is very important. For example, in thinking of the demographic dividend, states with poorer education levels (and other concomitants of productivity) are likely to have a higher proportion of the young (due to higher fertility) in the emerging workforce, and so the dividend may not be so easily realized in such states. But this one could not tell without looking at the regional detail.

Mihir Desai pointed to the dramatic changes reported in the paper during 2004–05 and 2009–10, with a big drop in female labor force participation and major wage gains coming disproportionately in those five years. Was this due to NREGA, the rapid economic growth in at least the first half of that period, or something simply in the data that was leading to these distinctive results? This was an important question because the period is recent and the effect just in these five years so dramatic. Similarly, it would be useful to elaborate on the anomalous results on higher education not having an impact for females and second, for the 90th percentile, the measured values being very different from what one would expect.

Devesh Kapur asked if the paper had done its analysis by religion and within and cross castes, and if so, whether the gaps were occurring differentially across religions and castes or was it uniform across religions and castes. Second, as the male–female gaps decline, are these related as cause or consequence with fertility decisions? Finally, the share of services in GDP grew substantially relative to manufacturing during this period. Since manufacturing is a sector dominated by the male workforce and services may not be, is the increase in services contributing to the increase in female labor force participation and the decline in wage gap?

Rinku Murgai pointed out that, in looking at the 2011–12 NSS round, rural female labor force participation had again seen a sharp drop, whereas many people had thought that the decline between 2004–05 and 2009–10 was an anomaly, perhaps because 2009–10 was the worst drought year in four decades. Was this a measurement issue or could it be related to urbanization? Work that she was doing suggested that this may be closely related to details of the NSS sampling frame—areas that are now urban are still being classified as rural, and the "rural" decline is really a consequence of

rapid urbanization. But the really important question then needs to be recast as to why women in urban areas do not work. There has always been a big gap between rural and urban female labor force participation in cross section data, and it is important to understand why.

Subir Gokarn echoed comments by Mookherjee and Kapur on manufacturing versus services and posed the question of what might have happened had India followed the traditional manufacturing route to development. Would we have had greater disparity but at higher average wages, which from a welfare perspective may have been a better outcome? Are the feelgood aspects of the results in the paper about greater equality, but at lower wages, then not so worthwhile compared to the counterfactual of what might have happened if manufacturing had grown more in relative terms? This may be important from a policy perspective. Gokarn further noted that public sector employment peaked in about 1998, roughly half way into the period the paper considers, and then has fell continuously thereafter. Assuming that public sector employment is less wage discriminatory by gender, the decline in the share of public sector employment would suggest results that would go in the other direction from the paper's results. It would be useful to shed light on this.

Sonalde Desai felt that the authors may actually be understating the case because they rely on NSS data. Using NCAER's IHDS data (2004–05 to 2011–12), which collects information on multiple jobs (so that in a year people could be working on more than one job), suggests that there is a sharp decline in participation in agriculture for both men and women who were solely in agriculture. For men, it went down from 50 percent to 35 percent, so a lot of nonagricultural work, and for women, from 83 to 66 percent. So this suggests that there has been a major transition in rural labor markets that is not being captured by NSS data. That also suggests that the participation equation would be really worth modeling between agricultural and nonagricultural, nonhousehold work, and with different datasets one might actually get even more positive results.

Shekhar Shah asked the question whether the increase in female labor participation reported in the paper is happening fast enough relative to the aging of India's predominantly young population that it will overcome the drag effects of the extremely low female participation rates that India has started its demographic transition with.

Rohini Somanathan (Chair) asked whether the narrowing of the wage gap suggested in the paper has brought us closer to equal work for equal pay. What can the paper do to get at that? Can the paper model the participation decision as Dilip Mookherjee had suggested? She thought there were also a number of other things that could be done with the NSS data to answer questions like this. She thought that the paper could look at the NSS data by detailed organized sectors and see if their growth has led to more equal pay for equal work: How the wage gap was behaving in these sectors as opposed to others. Finally, when looking at the distributions, suppose there was some inherent discrimination, then as more women start participating, then you would expect the highest ability women to come into the top earning categories. Conditional on being in the top wage categories, women's ability would be higher than men's ability. And so, when one sees these different percentiles behaving differently, we would have a set of predictions for why they would do so because of the underlying discrimination, perhaps even an explanation for why education seems to narrow wage gaps rather than widen them.

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Are Publicly Financed Health Insurance Schemes Working in India?[§]

ABSTRACT Since 2003, various government-sponsored health insurance schemes have been implemented in India to offer financial protection against catastrophic health shocks to the poor. Several state governments took the initiative to roll out their own state-financed health insurance schemes and these were followed by the national government, rolling out the largest of such schemes, the Rashtriya Swasthya Bima Yojna (RSBY) in 2008. These schemes provide fully subsidized cover for a limited package of secondary and tertiary inpatient care, targeting the population below poverty line. This paper analyzes the impact of these state-sponsored health insurance schemes through a literature review and some illustrative empirical work. We find limited impact of these government-sponsored health insurance schemes and provide rationales for this. We also discuss the policy implications of these findings.

Keywords: Publicly Financed Health Insurance Schemes, Health Reforms, Health Financing, RSBY

JEL Classification: 118, G22, H43

1. Introduction

hat will India's healthcare system look like in the next two decades? Depending on policies undertaken over the next few years, we could end up spending 18 percent of our gross domestic product (GDP) on health, like the US, or 4 percent, like Singapore (or somewhere in between), while achieving the same outcomes. Most agree that we need

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a strong primary care system that is publicly funded and focuses on preventive and public health measures. Beyond this fundamental agreement, there are divergent views on financing methods to adopt. Our current system is largely out-of-pocket (OOP) payments, with tax breaks provided for health insurance. Between 2003 and 2010, several state governments in south India adopted publicly funded insurance models for secondary and tertiary care for the poor. The national government followed with the Rashtriya Swasthya Bima Yojana (RSBY) in 2008. Toward the end of the term, the United Progressive Alliance (UPA) government's favored instrument was a single-payer Universal Health Coverage (UHC), free care at all levels to everybody, mainly through entitlements backed by government funding and purchasing of health services.

Insurance is widely recognized as a poor model for healthcare financing because it suffers from severe information asymmetries. In a voluntary insurance market, there is an adverse selection problem, which means that people who buy insurance on average are more likely to be sicker than the rest of the population. This makes the pool of insured riskier than the average population, thereby making pricing and functioning of insurance market difficult. Most developed countries such as the US have, therefore, made health insurance mandatory to overcome this problem. The other big tension that arises due to information asymmetry is moral hazard. Neither patients nor physicians have the incentives to control costs and therefore overuse. This makes the insurance system unsustainable, leading to massive cost inflation. The example here is the US, which spends 18 percent of its GDP on healthcare, close to double of what most developed countries spend.

UHC proponents recognize these shortcomings and point to developed countries that adopted tax-funded, pay-as-you go single-payer systems that depend on governments to pay healthcare costs for citizens. While most of these countries have well-run public systems, they are currently facing a crisis of sustainability. As their population ages and there are fewer young people to pay into the system, there are more elderly who need care. On the contrary, India's poor record of governance and managing healthcare systems inspires little confidence in its ability to successfully pull off a universal healthcare system with the government as the single payer. Even if we were to attempt this, while a large majority of population is young and thus relatively healthy, with dropping fertility rates, we must look to the future and prepare for a time when our demographics will not be favorable.

To offer financial protection against catastrophic health shocks to the poor, various government-sponsored health insurance schemes have been implemented in India since 2003. Several state governments took the initiative to roll out their own state-financed health insurance schemes and these were followed by the national government, rolling out the largest of such schemes, the Rashtriya Swasthya Bima Yojna (RSBY) in 2008. These schemes provide fully subsidized cover for a limited package of secondary and tertiary inpatient care, targeting the population below poverty line (BPL). This paper analyzes the impact of these state-sponsored health insurance schemes.

The Government of India is now reviewing options for health financing reforms and these recent experiments with publicly financed health insurance schemes (PFHIS) are being debated by policymakers. The intention of this paper is to inform and contribute to this policy debate, with a literature review and analysis of the impact of these insurance programs. We use nationwide sample survey data on household consumption expenditure from the National Sample Survey Organisation (NSSO) to study their effect on impoverishment, catastrophic headcount, and poverty gap index.

Although government-funded health insurance schemes existed earlier, this latest push that started in early 2000s is seen as a new form of government resource allocation to healthcare in India. Almost all public financing of healthcare in India was directed toward government-owned and government-operated health service delivery system. This new surge of health insurance schemes is, therefore, being seen as paradigm shift in the way public resources are allocated for healthcare in India. Nearly, all these schemes target the BPL population, but their intent is to reach universal coverage eventually. The BPL lists, however, vary across schemes. The state schemes use a more extensive BPL list and in Andhra Pradesh, e.g., the Aarogyasri covers nearly 80 percent of the population, whereas the central government scheme, the RSBY, uses the BPL set by the Planning Commission of the Government of India.

2. Understanding the Context for Publicly Financed Health Insurance in India

India has traditionally been spending low on healthcare and stands significantly below the global average as well as other comparable countries. India's performance in improving health outcomes is also below most of its neighbors (World Bank 2010), whether in reductions in maternal mortality, adult mortality, or the prevalence of communicable diseases. Infant mortality rates have improved in the last 10 years, but not at the same rates as in Bangladesh and Nepal (Deolalikar et al. 2008). Healthcare in low- and middle-income countries is often paid for OOP by the people. It is well known that high OOP expenditure for health brings financial burden on families and it also influences the health-seeking behavior with delayed treatments. In recent years, several countries have expanded the coverage of national insurance programs with the aim to improve access to healthcare services and reduce the OOP expenditures. Some countries, such as Thailand and Colombia, underwent reforms more than a decade ago, and research has found improvements in the financial protection. The long-term success of state-financed health insurance schemes, however, would depend on their integration in to the broader health delivery system and the financial system in a country.

Most countries are far from UHC and reforms are currently underway to improve the coverage. In India, there has been a new wave of government-financed health insurance schemes since 2003, starting with the Universal Health Insurance Scheme (UHIS) and Yeshasvini in Karnataka. Despite its name, the UHIS had poor enrollment and only covered 3.7 million lives in 2009–10, and Yeshasvini in Karnataka was also a limited scheme that only covered members of rural cooperative societies in the state.

Major experimentation with publicly financed health insurance programs in India started from 2007 with the launch of Aarogyasri in Andhra Pradesh and the subsequent introduction of RSBY across the country in 2008. Despite the large number of such schemes being rolled out, the private burden of healthcare spending remains significant, as India still has a much higher OOP expenditure in comparison with most other low-income and middle-income countries (Table 1). Health financing reforms must, therefore, be a high priority on the policy agenda of the new government.

Countries with national health insurance programs	Out-of-pocket expenditure as % of total health expenditure
Ghana	27
Indonesia	38
India	61
Kenya	43
Mali	53
Nigeria	59
Philippines	54
Rwanda	22
Vietnam	58

TABLE 1. Share in Healthcare Spending in 2010

Source: See http://apps.who.int/nha/database/DataExplorerRegime.aspx for the most recent updates.

Note: The World Development Indicators, The World Bank Data sources: World Health Organization National Health Account database.

The role of private health insurance system in India also remained small until early 2000s. Only 2 percent of total hospitalization expenditure in India was covered through private health insurance. By 2008–09, with introduction of third party administrators and a massive expansion of networked hospitals, private health insurance covered 10 percent of all hospitalization expenditure in India (La Forgia and Nagpal 2012). Many publicly financed health insurance schemes (PFHIS) tapped into this network to improve access and treatment for beneficiaries.

The coverage of overall health insurance in India increased from around 6 percent to 25 percent of the population in three years, between 2007 and 2010. The Employees State Insurance Scheme (ESIS) was the largest program in 2007. Government-sponsored health insurance programs for BPL people were then introduced and have accounted for the major increase in insurance coverage of the population (Table 2).

	Publicly funded			
Year	insurance schemes	Private insurance	ESIS	Total
2004-05	2.12	10.91	32.9	45.9
2009–10	191.7	553	50.1	296.8

TABLE 2. Health Insurance Coverage in India (millions)

Sources: 1. Estimated by author based on IRDA reports, 2.Yeshasvini, and 3. La Forgia and Nagpal, 2012.

The fundamental aim of the new PFHIS is to provide financial protection from catastrophic health shocks, but these are specifically focused only on inpatient care. The central government scheme, the RSBY, puts emphasis on secondary care, while all state schemes are focused on tertiary care. There are also significant variations across these schemes in the nature of coverage. Most schemes have an annual cap per household that ranges from ₹30, 000 (RSBY) to ₹150,000 (Aarogyasri in Andhra Pradesh).

The new programs can be divided in two categories as schemes initiated by state governments and schemes initiated by the central government. The Aarogyasri Health Insurance program, launched in 2007 by the state government of Andhra Pradesh, was introduced as a response to the many farmer suicides and the understanding that one of the main reasons for these was indebtedness caused by healthcare expenditure. The Chief Minister's Relief Fund had, every year, financially supported thousands of people requiring hospitalization and the Chief Minister decided to create a formal scheme to address this issue. The Aarogyasri Health Insurance scheme now covers 938 procedures for an amount up to ₹200,000 per family per year for tertiary care services and some secondary care procedures.

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Karnataka and Tamil Nadu adopted similar programs in 2009, and the governments of Kerala and Maharashtra have also introduced similar coverage using state funding. We refer to these schemes as PFHIS. In 2008, the Ministry of Labor and Employment developed RSBY that was rolled out in 18 states of India. The RSBY represents the second category of insurance programs which is at the national level. The central aim of the RSBY is to reduce healthcare expenditure and improve access to care with a focus on the poorest households. Recently, the RSBY has been expanded to cover all rickshaw drivers, rag pickers, sanitation workers, auto-rickshaw and taxi drivers, and mine workers. It was decided that the scheme should provide cashless secondary care treatment, as more people require secondary care than tertiary care. The coverage is up to ₹30,000 per year per family. An overview of the main insurance programs launched by the central and state governments is provided in Table 3.

Despite the rapid expansion of the PFHIS in India, their utilization is significantly lower than private voluntary insurance in India. RSBY and Yeshasvini cover secondary and tertiary inpatient care, similar to most private voluntary health insurance schemes in India, but their frequency of utilization at 25 and 22 admissions, respectively, per 1000 beneficiaries per year is a fraction of 64 admissions per 1000 beneficiaries per year, for private insurance.

3. Are the PFHIS Working? A Literature Review

Given the rapid expansion of health insurance schemes by the national and state governments in India, it is important to analyze their impact on financial risk protection and health outcomes. The need for evaluation is also crucial as the Government of India is reviewing options for health financing reforms. The aim of our study is to review the existing literature and to inform this debate by complementing these findings with some empirical analysis of health insurance schemes over time that might lead to specific policy recommendations for health financing reforms in India.

The PFHIS are designed as demand-side financing by focusing on the split between service provisions and financing, where the financing is left to the state, healthcare service is provided by both private and public institutions. Such demand-side financing is based on the philosophy of "money follows the patients" approach, as was outlined by Hsiao (2007). In financially underdeveloped economies with poor health infrastructure, information asymmetries are exacerbated by lack of facilitating institutions such as

		Yeshasvini Cooperative			
	Rashtriya Swasthya	Farmers Healthcare	Rajiv Aarogyasri Health	Chief Minister Kalaignar's	Vajpayee Arogyashri
	Bima Yojna	Scheme	Insurance Scheme	Insurance Scheme	Scheme
Starting year	2008	2003	2007	2009	2009
Geography	18 states	Karnataka	Andhra Pradesh	Tamil Nadu	Karnataka, 6 districts
Benefit package	Mainly secondary care	Tertiary care	Mainly tertiary care	Tertiary care	Tertiary care
Families covered (millions)	22.7	3 (individuals)	20.4	13.4	1.43
Amount covered	₹30,000	₹200,000	150,000 + 50,000	₹100,000 over four years	150,000 + 50,000
Premium	₹440-750 per family	₹144	₹299-439 per family	₹469	₹300 per family
Frequency of	1-42 hospitalisations per	21.76 hospitalisations	4.56 hospitalisations per	5 hospitalisations per 1,000	0.53 hospitalisations
hospitalisation	1,000 beneficiaries (diff	per 1,000 beneficiaries	1,000 beneficiaries	beneficiaries	per 1,000 beneficiaries
	by state)				
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Source: La Forgia and Nagpal, 2012 and Ministry of Labor, RSBY, Government of India.

health management information system (MIS) or credit bureaus. Together these lead to severe market failures and cost escalations in health insurance.

There are several studies on the impact of the new health insurance schemes on financial risk protection in India. Most careful studies (Bergkvist et al. 2014; Fan et al. 2011; Selvaraj and Karan 2012) have indicated that the share of healthcare expenditure of households has declined marginally since the PFHIS were introduced. This decline, however, is largely due to significant fall in outpatient expenditure. Table 4 below shows the disaggregated data for household healthcare expenditure in India from NSSO 2009–10. As the data indicates, most healthcare expenditure is for outpatient care and mainly to cover the cost of drugs. The recently introduced PFHIS, however, predominantly focus on tertiary and secondary healthcare services. This is a critical point of dissonance between the recent health financing reforms and the source of true health burden on average Indian households.

The RSBY covers a limited package of secondary care hospitalization, and the state health insurance schemes overwhelmingly focus on high-end tertiary care expenses. These interventions are designed to tackle low-frequency but high-value hospitalization expenses that often result in catastrophic health expenditure and impoverishment of poor households. Borrowing from informal sources for health expenses is often cited as a leading cause of impoverishment in low-income communities. These PFHIS are essentially targeting such episodes to provide financial protection against health shocks.

An excellent review of early experiences of RSBY rollout is available in Palacios et al. (2011) and in a study by Nandi et al. (2013), which discusses the socioeconomic and institutional determinants of participation in RSBY. The success of RSBY in achieving high enrolment rates is impressive, in comparison to much lower enrolment rates typically seen in other developing countries. There are, however, enormous variations in the enrolment of RSBY across districts in India and this is shown using official enrolment data in a useful map of India by Nandi et al. (2013). They analyze the data on RSBY enrolment, socioeconomic data from the District Level Household Survey 2007-08, and additional state-level information on fiscal health, political affiliation, and quality of governance. They find inequities in participation, and in particular, districts with socially backward communities (scheduled castes and scheduled tribes) experience lower participation and enrolment rates. These results reveal the weak nature of the pro-poor targeting mechanism of RSBY. Their results from multivariate probit and ordinary least squares (OLS) analyses suggest that political and institutional factors are among the strongest

		Non-insti	itutional			Institu	ıtional	
	Per capita 6 in 30 d	expenditure ays (₹)	% of househ expenditure	olds incurring e in 30 days	Per capita e in 30 di	xpenditure ays (₹)	% of househ expenditure	olds incurring in 30 days
ltem	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
Medicine	32.27	48.36	66.8	63.4	8.32	13.69	12.4	13.7
X-ray, pathological tests	1.95	3.78	4	4.9	1.9	4.12	7.9	6
Doctor's fee	4.26	8.94	26.1	31.6	2.27	5.8	8.7	10.4
Hospital charges	I	ı	I	ı	3.62	9.97	7.4	9.4
Other medical expenses	-	1.62	ı	ı	1.31	2.79	5.7	5.8
Medical Total	39.49	62.69	68	64.6	17.42	36.37	12.9	14.4
Country Notice Country	Organization	0000						

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Source: National Sample Survey Organization, 2009–10.

determinants explaining the variation in participation and enrolment in RSBY. In particular, districts in state governments that are politically affiliated with the opposition or neutral parties at the Centre are more likely to participate in RSBY and have higher levels of enrolment. Districts in states with a lower quality of governance, a pre-existing state-level health insurance scheme, or with a lower level of fiscal deficit as compared to GDP are significantly less likely to participate or have lower enrolment rates. Among socioeconomic factors, they find some evidence of weak or imprecise targeting. Districts with a higher share of socioeconomically backward castes are less likely to participate, and their enrolment rates are also lower.

Moving beyond enrolment, if we look at the utilization rate of PFHIS, we note that it is significantly lower than the utilization rate in the private health insurance market. On average, for every 1000 beneficiaries enrolled, utilization rate is 64 admissions per year in private voluntary health insurance products but only 25 admission per year for RSBY and 22 admissions per year for Yeshasvini in Karnataka. Figure 2 from Palacios et al. (2011) shows the utilization rates for RSBY across 78 districts for male and female beneficiaries. They show that 22 districts have less than 1 percent utilization rates, and there are only 15 districts that have utilization rate above 5 percent. These point to a serious problem with the implementation of RSBY even amongst districts where the scheme has been rolled out.



FIGURE 1. Utilization for RSBY

Source: Palacios, Das, and Sun (2011).

Note: Seventy-eight districts sorted by male utilization rate. Female utilization rates shown by dots.

An IFMR study (Jain 2011) put together data for hospitalization ratio for 229 districts that completed one year of RSBY. In Figure 2, it is shown that the overall hospitalization ratio is 2.4 percent with large variations across states, where Assam has 0.1 percent hospitalization ratio and Kerala has 5.1 percent. Hospitalization ratio looks at the percentage of covered beneficiaries who filed at least one insurance claim in the year. While the early utilization ratios increase in most states. On average, the hospitalization ratio for RSBY rose from 4 percent in the first year to 6.3 percent in second year, once again with great variations across states. Nine districts (out of 47 that completed two years of RSBY) have hospitalization ratio of 10 percent by the second year of RSBY, with the highest utilization from UP, Gujarat, and Kerala.

Empirical evidence shows that PFHIS have been unable to meet their main objective to provide financial protection against health shocks (Wagstaff 2009). These demand-side financing models of health finance reforms are critically dependent on identifying the right target groups. These PFHIS target the BPL population but evidence from Andhra Pradesh shows that more than 80 percent of the population is enrolled under Aarogyasri



FIGURE 2. Hospitalization Ratio across States (At least one claim/total beneficiaries covered)

Source: N. Jain, 2011.

scheme. Mistargeting is a serious problem with these PFHIS. Surprisingly, a study by Bergkvist et al. (2014) found significant negative excess growth in expenditure on inpatient care for nonpoor population. Another study by Fan et al. (2011) found a significant reduction in OOP expenditure but no difference in catastrophic expenditure. The studies of the catastrophic healthcare expenditure have used different thresholds ranging from 10 to 25 percent of total expenditure. Selvaraj and Karan (2012) concluded that there has not been any significant impact on financial protection of households and dismissed the reform initiatives of PFHIS.

Another point of dissonance between the design of the PFHIS and the actual healthcare burden for average Indian households is that while these schemes are targeted toward high-value, low-frequency inpatient episodes, the evidence on catastrophic payments and impoverishment is that only 2.3 percent and 3.1 percent of rural and urban population, respectively, are hospitalized at a point in time. The population that accesses outpatient health services at a point in time is 8.8 percent and 9.9 percent for rural and urban areas, respectively. And in terms of expenditure share, the outpatient department (OPD) expenses dominate the total health spending for average Indian household, as shown in Table 4.

The analysis carried out in most studies, including ours, use data from the consumption survey of NSSO. The limitation of this data prohibits us from including two important measures that make us believe that the results are underestimated. Firstly, the new health financing reforms in India were developed to reduce the indebtedness with families taking loans to finance healthcare and ending up in a debt trap of interest payments in consecutive periods. The evaluations of the reforms have, to date, not considered the changes in indebtedness and the means of financing healthcare.

Secondly, there is evidence of how financial protection influence healthseeking behavior; people without protection are less likely to seek care. An assessment of financial protection must, therefore, consider changes in use of healthcare services (Moreno-Serra et al. 2011). The impact on use of services has only been assessed for one insurance program and major increase in inpatient care was found (Bergkvist et al. 2014; Rao et al. 2014). No evaluation of the recent health financing reforms in India has considered the impact on expenditure taking the change in access to care into consideration.

Yet another limitation of these evaluations is that they do not take into consideration changes in the likelihood of being hospitalized for free care. A major objective of the insurance schemes is that no expenditure is incurred on inpatient care while being hospitalized. Unfortunately, it is not captured in any of the evaluations that are based on NSSO expenditure data analysis, thereby reinforcing that the impacts are underestimated.

4. Some New Analysis of PFHIS Using NSSO Data

Selvaraj and Karan (2012) used the "reported" date of coverage to identify the treated districts and have 247 districts in their sample. We refine the analysis by only considering districts where the schemes actually existed and have significantly fewer districts in our sample. The data on actual dates of scheme implementation were collected by filing Right to Information (RTI) with the government. We further extend the analysis by restricting the sample to those districts where the schemes existed for at least a year, to see if utilization improved with time. It is important to see the long-term trends within the context of rising hospitalization ratio over time. As Jain (2011) notes, average hospitalization ratio for RSBY rose from 4 percent in the first year to 6.3 percent in the second year, and this increase is noted in 36 out of the 47 districts that completed two years of RSBY. Nine districts have hospitalization ratio of 10 percent by the second year of RSBY, with the highest utilization of 25 percent.

The insurance schemes were rolled out gradually in different months of the years 2007 through 2009, so we have 1–3 years lag period to capture the impact of the PFHIS. The implementation of RSBY began across districts in India from April 1, 2008, and we have the actual dates of implementation of the scheme for each district. We further divide the districts into two samples (i) where the scheme was implemented before July 2010 (end of NSSO survey) and (ii) where the scheme was implemented before July 2009 (beginning of NSSO survey). We ended up with 194 districts in sample 1 and 118 in sample 2, both of which are significantly smaller than Selvaraj and Karan's treatment sample of 247. These are outlined in Table 5.

We find that despite the modest beginning, there are some gains in outcome from these schemes over time. This could be due to supply side factors, such as improved implementation, or demand side factors, such as awareness of the scheme and financial literacy amongst users. To test this, we run the analysis by varying the treatment group to only include districts that have schemes actually running and districts that have the schemes running for at least a year. The basic motivation is to understand if outcomes are changing with time. We do the analysis for various outcomes of interest such as average impoverishment, catastrophic healthcare expenditure, and poverty

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State	Total Districts 2004–05	Total districts 2009–10	RSBY districts: If policy started before Jul 10	RSBY districts: If policy started before Jul 09	Districts under State schemes 2007–10
Andhra Pradesh	23	23	_	_	23
Arunachal Pradesh	13	16			_
Assam	23	27	-	_	-
Bihar	37	38	4		_
Chhattisgarh	16	16	7	5	_
Delhi	7	7	7	7	_
Goa	2	2			-
Gujarat	25	25	10	10	-
Haryana	19	20	21	21	-
Himachal Pradesh	12	12	2	2	-
Jammu and Kashmir	10	11	-	_	-
Jharkhand	18	22	6		-
Karnataka	27	27	-	-	22
Kerala	14	14	14	14	-
Madhya Pradesh	45	45	-	-	-
Maharashtra	34	34	5		-
Manipur	9	9	-	-	-
Meghalaya	7	7	1		-
Mizoram	8	8	-	-	-
Nagaland	8	11	3	3	-
Orissa	30	30	2	-	-
Punjab	17	18	16	14	-
Rajasthan	32	32	-	-	-
Sikkim	4	4	-	-	-
Tamil Nadu	30	31	-	-	31
Tripura	4	4			-
Uttar Pradesh	70	70	29	15	-
Uttarakhand	13	15	2	2	-
West Bengal	18	19	5	2	-
Union Territories	10	12	1	-	-
Total	585	609	135	95	76

TABLE 5. District Coverage of Treatment Samples

Source: Based on date of actual implementation of the respective schemes, RSBY, Ministry of Labour, Government of India.

gap change, in response to publicly provided health insurance schemes in India.

Given the nature of our data, we are unable to identify the exact pathways of improved outcomes over time. Therefore, we extend our discussion to incorporate some of the possible explanations for our results from the recent literature on PFHIS in India. In particular, we discuss the role of information, awareness, and financial literacy (Das and Leino 2011; Rai and Ravi 2011) in improving utilization of health insurance products amongst microfinance clients who belong to similar socioeconomic strata that these government-sponsored schemes target.

The NSSO surveys collect detailed information on various categories of household expenditure on monthly or annual recall period. OOP spending on health is covered under both recall periods: Monthly for outpatient expenditure and annual for hospitalization. For calculating total OOP expenditure, we combine the monthly recall period for outpatient expenditure with the (scaled to monthly) annual expenditure on hospitalization. The poverty lines that we make use to calculate both impoverishment and the poverty gap index are defined by the Planning Commission of India and are state specific, thus implicitly taking into account price differences across states.

As all previous literature in this area, we use difference-in-differences methodology to study the impact of PFHIS on likelihood of impoverishment, catastrophic health expenditure, and the poverty gap index. Two of these measures look at the household expenditure relative to an externally defined benchmark. Impoverishment is defined as the monthly per capita consumption expenditure of the household falling below a specified poverty line while the poverty gap index measures the average distance from the poverty line. The specified poverty line that we use is at the state level because there are significant variations in the poverty line across states. We consider these outcome variables independently and also net of total OOP health expenditure, hospitalization expenditure, outpatient expenditure, and expenditure on drugs. The other outcome variable that we analyze, namely catastrophic health expenditure, attempts to measure the extent of the impact of health spending relative to the household's own aggregate consumption expenditure. The ratio of the household's health-related expenditure to aggregate expenditure is compared against a predefined threshold to determine if it is "catastrophic."

Table 6A shows that there has been a reduction in impoverishment due to health expenditure for hospitalization, outpatient care and drugs in the treatment as well as the control groups. Impoverished households are defined as those that consume less than their state-specific poverty line. OOP impoverishment occurs if the household's consumption net of its health expenditure falls below the state poverty line. Table 6B presents the changes in the average catastrophic headcount with a threshold of 40 percent of nonfood expenditure. In other words, this is the probability of having health expenditure account for 40 percent or more of the total nonfood expenditure of the household. The numbers indicate that this probability has been broadly going up for both treatments and the control group, over time. The result indicates similar findings as estimated by Selvaraj and Karan (2012) where the means of number of households incurring catastrophic expenditure as a result of hospitalization has increased while the means of number of households with catastrophic expenditure for outpatient care and drugs has decreased. Table 6C presents the changes in poverty gap index over time and between the treatment and control districts in India. These are consistent with the changes in impoverishment over time and across the two samples.

Similar to all previous literature in this area, we recognize that the implementation of the PHFIS was not random and that there might be significant selection concerns in picking the early adopters from the later ones. We also recognize that treatment groups include state health insurance schemes that might have strong "state effects." The economic growth, e.g., has been relatively higher in the treatment group in comparison to the control districts. We, therefore, refine these average effects further by conducting a regression analysis including state-fixed effects and control vector of household covariates commonly used in the literature. Some of the control variables have been described in Table 7.

The results of the regression analysis using state-fixed effects are presented in tables 8A through 8C for the overall sample of districts with PFHIS. The results in Table 8A indicate that for the overall sample of treatment districts, PFHIS had no effects on impoverishment. So, the publicly funded health insurance schemes did not provide the financial protection against healthcare shocks, as was intended. This has been the broad result that other recent researches have highlighted, advocating dismissal of these schemes for their apparent uselessness.

To explore long-term impacts of PFHIS, we limit our focus to only those districts that had a PFHIS running for at least a year and the results are shown in Table 9A. The coefficients on the interaction term are all negative and strongly significant. This indicates that over a longer period of time, the PFHIS are reducing the incidence of impoverishment due to various forms of health shocks including OOP, hospitalization, outpatient, and expenses on drugs.

Similar results emerge when we study the impact of PFHIS on the probability of households spending more than 40 percent of their total nonfood expenditure on various healthcare expenses. Table 8B suggests that the PFHIS are leading to greater catastrophic headcount in the population. It is disturbing that the long-term impact (Table 9B) broadly mimics the results

	Оиег	rall Impoverishm.	ent	00	P Impoverishme	nt		Hospitalisation	
	Pre	Past	Diff.	Pre	Post	Diff.	Pre	Post	Diff.
Overall sample									
Treatment	0.281	0.207	-0.074	0.321	0.24	-0.081	0.287	0.213	-0.074
	-0.003	-0.004	-0.005	-0.003	-0.004	-0.005	-0.003	-0.004	-0.005
Control	0.357	0.276	-0.081	0.401	0.312	-0.089	0.362	0.283	-0.079
	-0.003	-0.004	-0.005	-0.003	-0.004	-0.005	-0.003	-0.004	-0.005
Diff.	-0.076	-0.069	0.007	-0.08	-0.072	0.008	-0.075	-0.07	0.005
	-0.004	-0.006	-0.007	-0.004	-0.006	-0.007	-0.004	-0.006	-0.007
Long-term Sample									
Treatment	0.273	0.169	-0.104	0.306	0.193	-0.113	0.277	0.173	-0.104
	-0.004	-0.005	-0.007	-0.004	-0.006	-0.007	-0.004	-0.005	-0.007
Control	0.335	0.266	-0.069	0.38	0.303	-0.077	0.342	0.273	-0.069
	-0.002	-0.003	-0.004	-0.002	-0.003	-0.004	-0.002	-0.003	-0.004
Diff.	-0.062	-0.097	-0.035	-0.074	-0.11	-0.036	-0.065	-0.1	-0.035
	-0.005	-0.006	-0.008	-0.005	-0.007	-0.008	-0.005	-0.006	-0.008

TABLE 6A. Means of Outcome: Impoverishment

(Table 6A Contd)

		Outpatient			Drugs	
I	Pre	Post	Diff.	Pre	Past	Diff.
Overall sample						
Treatment	0.313	0.232	-0.081	0.309	0.229	-0.08
	-0.003	-0.004	-0.005	-0.003	-0.004	-0.005
Control	0.394	0.304	-0.09	0.392	0.304	-0.088
	-0.003	-0.004	-0.005	-0.003	-0.004	-0.005
Diff.	-0.081	-0.072	0.009	-0.083	-0.075	0.008
	-0.004	-0.006	-0.007	-0.004	-0.006	-0.007
Long-term Sample						
Treatment	0.299	0.188	-0.111	0.293	0.184	-0.109
	-0.004	-0.006	-0.007	-0.004	-0.006	-0.007
Control	0.373	0.295	-0.078	0.371	0.294	-0.077
	-0.002	-0.003	-0.004	-0.002	-0.003	-0.004
Diff.	-0.074	-0.107	-0.033	-0.078	-0.11	-0.032
	-0.005	-0.006	-0.008	-0.005	-0.006	-0.008
Source: Authors' calculat Note: Immoverished house	ions. Ablde are defined as th	edt ssel emusuos odw. ese	n thair state snorific nov	artv line	ment occurs if the house	old's consumntion not of

Note: Impoverished households are defined as those who consume less than their state-specific poverty line. UUP impoverishment occurs if the household's consumption net of its health expenditure falls below the poverty line. Clustered standard errors are in parentheses.

(Table 6A Contd)

		00P		Ħ	nspitalisation	4		Outpatient			Drugs	
	Pre	Post	Diff.	Pre	Post	Diff.	Pre	Post	Diff.	Pre	Post	Diff.
Overall sample	а											
Treatment	0.0466	0.0448	-0.0018	0.0104	0.0117	0.0013	0.0397	0.0309	-0.0089	0.0179	0.0167	-0.0012
	-0.0013	-0.0018	-0.0022	-0.0006	-0.0009	-0.0011	-0.0012	-0.0016	-0.002	-0.0008	-0.0011	-0.0014
Control	0.0453	0.036	-0.0093	0.0085	0.0094	0.0009	0.0439	0.0254	-0.0185	0.0231	0.0151	-0.008
	-0.0013	-0.0017	-0.0021	-0.0005	-0.0008	-0.001	-0.0013	-0.0015	-0.002	-0.0009	-0.0012	-0.0015
Diff.	0.0013	0.0088	0.0075	0.0019	0.0022	0.0003	-0.0042	0.0054	0.0096	-0.0052	0.0016	0.0068
	-0.0018	-0.0025	-0.0031	-0.0008	-0.0012	-0.0014	-0.0018	-0.0022	-0.0028	-0.0012	-0.0016	-0.002
Long-term Sai	mple											
Treatment	0.0389	0.0367	-0.0022	0.0087	0.0093	0.0006	0.0332	0.0282	-0.005	0.011	0.0095	-0.0015
	-0.0018	-0.0026	-0.0032	-0.0008	-0.0013	-0.0015	-0.0017	-0.0025	-0.003	-0.001	-0.0013	-0.0016
Control	0.0479	0.0411	-0.0067	0.0096	0.0108	0.0012	0.0444	0.0279	-0.0165	0.0234	0.0176	-0.0058
	-0.001	-0.0014	-0.0018	-0.0005	-0.0007	-0.0008	-0.001	-0.0012	-0.0016	-0.0007	-0.001	-0.0012
Diff.	-0.009	-0.0044	0.0046	-0.0009	-0.0015	-0.0006	-0.0112	0.0003	0.0115	-0.0124	-0.0082	0.0042
	-0.0021	-0.003	-0.0037	-0.0009	-0.0014	-0.0017	-0.002	-0.0027	-0.0034	-0.0012	-0.0016	-0.002

Means of Outcomes, Catastrophic Headcount Threshold-40% of Non-food Expenditure TABLE 6B.

Source: Authors' calculations. Note: Clustered standard errors are in parentheses.

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Poverty Gap Index

	7	Dverall PG			00P PGI		θH	spitalisati	uo		Dutpatient			Drugs	
	Pre	Post	Diff.	Pre	Post	Diff.	Pre	Post	Diff.	Pre	Post	Diff.	Pre	Post	Diff.
Overall sar	nple														
Treatment	0.059	0.04	-0.019	0.07	0.048	-0.022	0.061	0.042	-0.019	0.068	0.046	-0.022	0.067	0.046	-0.021
	-0.0009	-0.001	-0.0013	-0.0009	-0.001	-0.0014	-0.0009	-0.001	-0.0013	-0.0009	-0.001	-0.0014	-0.0009	-0.001	-0.001
Control	0.079	0.056	-0.023	0.091	0.066	-0.025	0.08	0.058	-0.022	0.089	0.064	-0.025	0.089	0.063	-0.026
	-0.0008	-0.0011	-0.0013	-0.0009	-0.0011	-0.0014	-0.0008	-0.0011	-0.0014	-0.0009	-0.0011	-0.0014	-0.0009	-0.0011	-0.0014
Diff.	-0.02	-0.016	0.004	-0.021	-0.018	0.003	-0.019	-0.016	0.003	-0.021	-0.018	0.003	-0.022	-0.017	0.005
	-0.001	-0.001	-0.002	-0.001	-0.002	-0.002	-0.001	-0.001	-0.002	-0.001	-0.002	-0.002	-0.001	-0.002	-0.002
Long-term	Sample														
Treatment	0.058	0.032	-0.026	0.065	0.038	-0.027	0.059	0.033	-0.026	0.064	0.037	-0.027	0.062	0.036	-0.026
	-0.0014	-0.0013	-0.0019	-0.0014	-0.0014	-0.002	-0.0014	-0.0013	-0.0019	-0.0014	-0.0014	-0.0019	-0.0014	-0.0013	-0.0019
Control	0.073	0.053	-0.02	0.086	0.063	-0.023	0.075	0.055	-0.02	0.084	0.061	-0.023	0.083	0.061	-0.022
	-0.0007	-0.0008	-0.0011	-0.0007	-0.0009	-0.0012	-0.0007	-0.0009	-0.0011	-0.0007	-0.0009	-0.0012	-0.0007	-0.0009	-0.0011
Diff.	-0.015	-0.021	-0.006	-0.021	-0.025	-0.004	-0.016	-0.022	-0.006	-0.02	-0.024	-0.004	-0.021	-0.025	-0.004
	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002	-0.002
Source: A	uthors' calc.	ulations.													

Note: Clustered standard errors are in parentheses.

	Treatment 1: All districts with PFHIS		Treatment 2: All early adopter districts (long-term)		Control districts	
	Before	After	Before	After	Before	After
Variable						
% of rural households	68.4	65.4	67.9	62.9	76	72.6
Mean household composition						
% aged 0–4 years	7.8	6.6	6.8	5.8	9.3	7.9
% aged above 60 years	9.7	10.2	10.3	10.7	8.5	9.1
% female	48.7	48.1	50	49.4	47.3	47.2

TABLE 7. Descriptive Statistics of Other Control Variables

Source: NSSO data.

Notes: T is treatment, C is control; Treatment 1 includes all those districts where publicly financed health insurance schemes (PFHIS) were launched before December 2010; Treatment 2 includes all those districts where PFHIS were launched before December 2009, therefore existed for at least two years before end-line survey.

of the overall sample. This implies that while catastrophic headcount goes up immediately on introduction of PFHIS, they tend to stay up even after a year or so.

These broad findings are supported by previous studies where introduction of insurance for tertiary care services brought about an increased utilization of the tertiary care services covered by insurance, as well as outpatient services that are not covered. The introduction of insurance can, therefore, increase the expenditure on outpatient services there (Wagstaff, 2009). It may appear strange that there is a significant increase in catastrophic expenditure for outpatient care and drugs, but the results show a significant decrease in impoverishment as a result of the same. One explanation for this can be that people have a higher income and are not as close to the poverty line as earlier but that a relative increase in drug and outpatient expenditure, as compared to the nonfood expenditure, is high enough to result in an increase in catastrophic expenditure.

Tables 8C and 9C present the changes in poverty gap index caused by the introduction of the PFHIS in the short run and over a one year period, respectively. Once again, the broad short-term and long-term results are in the same directions as for the other outcomes of interest. In the short-term, PFHIS seem to have raised the intensity of poverty as captured by the poverty gap index. The long-term effect suggests that overall poverty gap has been reduced due to PFHIS and the disaggregated analysis shows that this is particularly the case for poverty gap arising due to hospitalization expenses.

	Overall	Impoverish-	Impoverish-	Impoverish-	Impoverish-
	impoverish-	ment net of	ment net of	ment net of	ment net of
	ment	OOP	hospitalisation	outpatient	drugs
Treatment*Post	0.0082	0.0089	0.0063	0.0107	0.0094
	-0.0065	-0.0067	-0.0065	-0.0067	-0.0067
Treatment	0.0203***	0.0242***	0.0222***	0.0224***	0.0204***
	-0.0057	-0.0059	-0.0057	-0.0058	-0.0058
Post	-0.0724***	-0.0795***	-0.0708***	-0.0810***	-0.0791***
	-0.0047	-0.0048	-0.0047	-0.0047	-0.0047
Constant	-0.0380***	-0.0383***	-0.0417***	-0.0366***	-0.0356***
	-0.0082	-0.009	-0.0082	-0.0089	-0.009
Control	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes
Observations	225499	225499	225499	225499	225499
R ²	0.101	0.111	0.103	0.109	0.109

TABLE 8A. Impoverishment Effects in Overall Sample

Source: Authors' calculations.

Note: Clustered standard errors in parentheses * p < 0.10, ** p < 0.05, *** p < 0.01.

	Due to OOP	Due to hospitalization	Due to outpatient	Due to drugs
Treatment*Post	0.0075**	0.0004	0.0096***	0.0069***
	-0.003	-0.0014	-0.0028	-0.002
Treatment	-0.0032	0.0006	-0.0069***	-0.0035*
	-0.0027	-0.0012	-0.0025	-0.0019
Post	-0.0084***	0.0011	-0.0179***	-0.0077***
	-0.0021	-0.001	-0.0019	-0.0015
Constant	-0.0110**	0.0001	-0.0120***	-0.0097***
	-0.0048	-0.0035	-0.0028	-0.002
Control	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
Observations	225499	225499	225499	225499
<i>R</i> ²	0.018	0.003	0.02	0.014

TABLE 8B. Catastrophic Headcount, Overall sample—Threshold 40% of Non-food Expenditure

Source: Authors' calculations.

Note: Clustered standard errors in parentheses * p < 0.10, ** p < 0.05, *** p < 0.01.

5. Discussion and Policy Implications

The existing literature finds very limited short-term impacts of PFHIS on financial protection of households in India (and for certain outcomes, they seem to make matters worse). Our analysis corroborates these short-run results. When we extend the analysis, we find that over time, some small but

	Poverty gap	PGI net	PGI net of	PGI net of	PGI net of
	index	of OOP	hospitalization	outpatient	drugs
Treatment*Post	0.0037**	0.0047**	0.0036 ^{**}	0.0049***	0.0048**
	-0.0018	-0.0019	-0.0018	-0.0019	-0.0019
Treatment	0.0044***	0.0049***	0.0049***	0.0043**	0.0044***
Post	-0.0208***	-0.0233***	-0.0205***	-0.0234***	-0.0231***
	-0.0013	-0.0014	-0.0013	-0.0014	-0.0014
Constant	-0.0098***	-0.0135***	-0.0108***	-0.0124***	-0.0122***
	-0.0019	-0.0021	-0.002	-0.0021	-0.0021
Control	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes
Observations	222525	222525	222525	222525	222525
R ²	0.082	0.093	0.083	0.091	0.091

TABLE 8C. Poverty Gap Index, Overall Sample

Source: Authors' calculations.

Note: Clustered standard errors in parentheses* p < 0.10, ** p < 0.05, *** p < 0.01.

	(1)	(2)	(3) Impoverish-	(4)	(5)
	Overall	Impoverish-	ment net	Impoverish-	Impoverish-
	impoverish-	ment net of	of hospital-	ment net of	ment net of
	ment	OOP	ization	outpatient	drugs
Treatment*Post	-0.0308***	-0.0316***	-0.0313***	-0.0293***	-0.0275***
	-0.0077	-0.008	-0.0077	-0.0079	-0.0079
Treatment	0.1590***	0.1709***	0.1635***	0.1681***	0.1587***
	-0.0089	-0.0097	-0.009	-0.0096	-0.0097
Post	-0.0619***	-0.0684***	-0.0610***	-0.0695***	-0.0686***
	-0.0038	-0.0039	-0.0038	-0.0038	-0.0038
Constant	-0.0436***	-0.0442***	-0.0469***	-0.0427***	-0.0411***
	-0.008	-0.0089	-0.0081	-0.0087	-0.0089
Control	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes
Observations	225499	225499	225499	225499	225499
R ²	0.101	0.11	0.102	0.109	0.109

TABLE 9A. Impoverishment, Long-term Sample

Source: Authors' calculations.

Note: Clustered standard errors in parentheses * p < 0.10, ** p < 0.05, *** p < 0.01.

significant improvements were gained due to PFHIS. In this section, we discuss these broad results by exploring potential factors that can explain low impact of PFHIS in India. Some of these factors have been highlighted in the literature and can form the basis for future policy experimentation in health financing reforms in India.

	(1)	(2)	(3)	(4)
		Due to	Due to	
	Due to OOP	hospitalization	outpatient	Due to drugs
Treatment*Post	0.0048	-0.0006	0.0120***	0.0045**
	-0.0036	-0.0017	-0.0033	-0.002
Treatment	0.0217***	0.0066*	0.0130***	0.0024
	-0.005	-0.0037	-0.0029	-0.0017
Post	-0.0060***	0.0014*	-0.0161***	-0.0055***
	-0.0017	-0.0008	-0.0016	-0.0012
Constant	-0.0123***	-0.0001	-0.0130***	-0.0109***
	-0.0048	-0.0035	-0.0027	-0.002
Control	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes
Observations	225499	225499	225499	225499
<i>R</i> ²	0.017	0.003	0.02	0.014

TABLE 9B. Catastrophic Headcount, Long-term Sample-Threshold 40% of Non-food Expenditure

Source: Authors' calculations.

Note: Clustered standard errors in parentheses * p < 0.10, ** p < 0.05, *** p < 0.01.

	(1)	(2)	(3)	(4)	(5)
	Poverty gap	PGI net	PGI net of	PGI net of	PGI net of
	index	of OOP	hospitalization	outpatient	drugs
Treatment*Post	-0.0047**	-0.0035	-0.0047**	-0.0035	-0.0032
	-0.0021	-0.0022	-0.0021	-0.0022	-0.0022
Treatment	-0.0109***	-0.0156***	-0.0114***	-0.0149***	-0.0155***
	-0.0015	-0.0016	-0.0015	-0.0016	-0.0016
Post	-0.0177***	-0.0201***	-0.0176***	-0.0201***	-0.0198***
	-0.0011	-0.0011	-0.0011	-0.0011	-0.0011
Constant	0.0326***	0.0369***	0.0330***	0.0363***	0.0359***
	-0.0013	-0.0014	-0.0013	-0.0014	-0.0014
Control	Yes	Yes	Yes	Yes	Yes
Observations	222525	222525	222525	222525	222525
R ²	0.053	0.064	0.055	0.061	0.062

TABLE 9C. Poverty Gap Index, Long-term Sample

Source: Authors' calculations.

Note: Clustered standard errors in parentheses * p < 0.10, ** p < 0.05, *** p < 0.01.

A recent randomized controlled trial by Mahal et al. (2013), in *The Lancet*, found that people with an insurance card that permitted cashless visits to the community health workers (CHWs) had different outcomes compared with people who visited the CHWs without insurance (paying a modest $\overline{12}$ per visit). Households assigned to the treatment group in the study had a substantially higher number of visits to the covered provider

and more referrals to the doctor and to hospitals. More significantly, they also found that the insurance-only group spent fewer days in a hospital bed and spent less OOP on hospitalization expenses. Their interpretation is that the insurance product incentivized more frequent visits to the CHWs, leading to earlier identification of illnesses and more timely referrals to a hospital where the patient could get treated at an earlier stage and hence at a lower cost. The important implication of this finding is that insurers, as well as government agencies deploying hospitalization insurance schemes, can benefit if inpatient insurance was bundled with outpatient insurance, as it could improve financial viability. This suggestion is particularly relevant for policymakers in India, where the focus of private and public insurance products has overwhelmingly been on inpatient cover. This finding is particularly relevant for PFHIS that are solely focused on inpatient care.

Given the narrow focus on inpatient financial support from PFHIS, there are serious escalations, given the lack of incentives to cut costs from both health seekers and healthcare providers. Insurance has proved to be a poor model for healthcare, famously leading to the extremely expensive and distortionary US healthcare system, which holds important lessons for healthcare financing reforms in India.

Rai and Ravi (2011) have explored the usage of health insurance scheme by microfinance clients that comprise men and women. The context of this study is relevant for our findings because microfinance clients are mostly around the poverty line and have very similar healthcare concerns and general expenditure patterns as the intended beneficiaries of these large PFHIS in India. This study looks at the probability of filing health insurance claims by people who are compulsorily covered by a health insurance program. The findings suggest that the claims to coverage for microfinance clients are significantly lower in comparison to overall private health insurance sector. This is despite the fact that morbidity rates are quite high in the target population. This is the case for PFHIS as well. Moreover, the single biggest determinant of a family filing insurance claim was literacy level of the women household member. This is also a proxy for minimum skill and awareness level that is required for filing health insurance claims. Just as in the microfinance context, our results also suggest that adverse selection concerns that are present in developed insurance markets are less of a concern in these markets because the results show significantly lower utilization in the short-term.

Insurance is a sophisticated financial instrument that requires some degree of skill and literacy. Improvement in the impacts over a longer term implies that greater awareness and access to information could promote higher utilization of the PFHIS which is necessary for the success of these schemes. For example, fixing enrolment/targeting mechanisms with an eventual aim of universalization of such PFHIS; establishing a robust data gathering and use process with repeat impact evaluations and close monitoring through a strong health management information system; and establishing an autonomous institution to govern, monitor, coordinate, and set policies and guidelines for all PFHIS in India, giving operational autonomy to individual states.

Another recent study by Das and Leino (2011) discusses the impact of RSBY on financial risk protection of households using an experimental information and education campaign and household survey carried out in the first year of the program in Delhi. Their findings suggest that, first, the experimental information campaign (EIC) had no impact on enrolment, but households that were part of the household survey sample and therefore received information closer to the enrolment period were 60 percent more likely to enroll. Second, they show that there is little evidence that the insurance company selectively enrolled healthier households. Instead, hospital claims were lower for households that received the EIC and for households that received both the survey and the EIC, suggesting that the marginal household enrolled was in fact healthier. The program is bound to have limited immediate impact if healthier households are targeted rather than those that are more likely to use the PFHIS.

As policy recommendations (some of these have also been included in La Forgia and Nagpal 2012), therefore, we suggest extending coverage of PFHIS beyond the current secondary and tertiary care, since a significantly larger share of the household expenditure is borne on outpatient and drugs in India. These could include standard ambulatory package that is linked to publicly provided primary care. This is currently not included in any PFHIS in India, but given the nature of household expenditure, extending coverage to include ambulatory care would have direct impact on utilization and poverty outcomes: a contributory package for nonpoor (non-BPL households) who are termed as "vulnerable" to health shocks. This could be a form of co-payment and would reduce moral hazard problems and fraudulent filing of claims. It is important to include a standard package of maternity care, which is common cause for financial catastrophe for poor households. Extending coverage for this would have immediate effect on utilization and subsequently impoverishment of households.

The common experience of health insurance markets in low-income countries can be explained as a coordination problem between scale and quality of the health insurance product. To provide high-quality product, it is important to attain a certain scale. Take up, however, is low primarily due to poor quality of product. So, it is a bad equilibrium that can be difficult to get out of unless some external shock is applied to the system. This external shock is usually in the form of government investment in healthcare infrastructure that can lower the cost of delivery and hence improve the quality of the health insurance products. This would lead to higher take up and utilization. Some practical implementation concerns that arise could be overcome by investing in technology and robust health MIS.

Given the experience of PFHIS, it might even be the opportune time to propose a different paradigm for health financing in India in the form of medical savings accounts (MSAs). It definitely deserves policy experimentation, given its theoretical strengths as a financial instrument for healthcare. These are individual savings accounts that can be used only for spending on medical care of the individual or his/her immediate family. Deposits into these accounts can be similarly structured as Provident Fund, which is a defined contribution receiving tax breaks. This can only be allowed to use for medical payments or as a voluntary contribution receiving deferred tax breaks if used for medical purposes. MSAs enlist healthcare consumers in keeping costs low and avoid the issues of both consumer moral hazard and adverse selection. They also mitigate the problem of borrowing across generations that arise when a larger part of the population is older since everyone saves for their healthcare costs when they are younger. With a largely young population, MSAs could be an important opportunity for India, as these would incentivize saving for future healthcare costs. These mobilized funds would help create the health infrastructure needed to deliver the future costs.

Singapore is one country that adopted MSAs in 1984, and it presents a significant success story. Its healthcare outcomes are comparable to developed countries, while its spending is significantly lower. Following its success, China too adopted MSAs for urban areas in 2010. China's experience is recent so we cannot draw long-term lessons, but its size and complexity must serve as an example for India, since we are often quick to dismiss Singapore as "too small" to compare with. MSAs are no panacea of course. In Singapore itself, MSAs are complemented by high deductible insurance (after a large amount has already been paid from the MSA) and a government fund to pay for the poor. India too has serious concerns of equity in access to healthcare, particularly for those who would find it impossible to make defined benefit contributions. This can be overcome by designing a system of government-supported MSA for poor and vulnerable segment of the society, for whom MSAs will help overcome problems of adverse selection and moral hazard keeping costs low. Overall MSAs present an attractive alternative for financing healthcare. With a young population and a healthcare system still in flux, India has a unique opportunity to experiment with.

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Comments and Discussion

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This is an interesting paper on an important topic. The background to the analysis, as discussed in the paper, is that there has been a massive expansion of health insurance in India. We now have substantial public funding of this health insurance, but the new policies also introduce the possibility of private provision of healthcare. So, the poor, rather than having to go to low-cost, low-quality public facilities, can go to private providers and have their costs covered by the new insurance schemes. The insurance is itself provided by private companies in some cases, so this is a significant policy innovation in terms of mixing public and private provisions. This new mix feeds into a broader set of issues of efficiency and equity in academic and policy debates about the provision of healthcare and health insurance.

Healthcare provision is a very emotive topic. The Selvaraj and Karan (2012) work that is referred to in the Ravi–Bergkvist paper, and which provides some of the basis for the paper under discussion, reached the conclusion that these publicly funded health insurance schemes do not work. If you read the Selvaraj–Karan paper, what they really seem to be objecting to is involving the private sector at all, their concerns being that the private sector will cherry-pick, and that there are administrative and other costs associated with private sector involvement. So, what they argue for is basically government-provided, taxpayer-funded universal healthcare. The broader literature on this topic gives one a sense that there is a great deal of complexity in terms of implementation and coverage for different groups, with various effects on supply and demand, cherry-picking of patients and other complications. So, this is a very complicated topic and this paper is important as part of an analytical literature that needs to expand rapidly, in order to provide a firmer basis for policymaking.

Before going into my comments, I will summarize the paper. The analysis uses NSS household data for two years 2004–05 and 2009–10. The paper employs a standard difference-in-differences methodology, exploiting the difference in changes in outcome variables between districts with the treatment, that is, some version of PFHIS, and districts without such schemes, which are the control group. The paper examines multiple outcome variables,

such as impoverishment and hospitalization, to get a sense of what the different possible impacts are, of access to these PFHIS. The main result is in comparison to the Selvaraj and Karan paper, and the Ravi–Bergkvist analysis suggests that allowing for the length of time of operation of these PFHIS leads to a finding that the impacts are more positive than the previous paper had found.

I first provide some specific comments on the details of the analysis and then go into some general comments. Very specifically, the details of the econometric techniques could have been made more explicit, e.g., there is no discussion of possible heteroskedasticity in the error terms¹ or of possible checks for endogeneity or selection bias, and the discussion of the control variables is also very brief and uninformative. The major point to be made is that the regression controls seem to be quite weak. The regressions use district-level variables as controls but they seem to capture very little of the possible exogenous district-level variation and they certainly do not capture household-level variation. The latter point is important because the analysis is performed with household-level data, but is not done in a way that adequately captures the household-level variation. The district-level heterogeneity is very important and needs to be taken into account better than is done in the paper. Even though the set of districts is smaller than in Selvaraj-Karan paper, with the shrinking criterion designed to ensure that the members of the treatment group properly satisfy that designation, there is an enormous amount of heterogeneity even in the smaller treatment: I will illustrate that later in these comments. One very obvious point with respect to this heterogeneity is that the authors should have checked whether their results are robust in excluding the Andhra Pradesh scheme from the regressions. This is a state scheme rather than the national-level RSBY. The paper acknowledges that "One likely explanation for why the effect of PFHIS is stronger over a long-term is because this sample includes Aarogyashri of Andhra Pradesh," and goes on to discuss the specific differences in the implementation of the Andhra Pradesh scheme. In fact, the paper by Rao et al. (2014) compares the Andhra Pradesh state-level scheme with Maharashtra that has RSBY, and finds that there is a large difference in terms of the impacts: The Andhra Pradesh scheme does a lot better, presumably because the parameters of the scheme as well as its implementation are very different. It is worth noting that although the regressions include state-fixed effects,

1. In my initial comments, I had asked whether the standard errors were clustered, and the revised version clarifies that they are.

these merely allow constant terms to differ across states, and do not allow for possible differences in impact across states, measuring those would require including interaction terms of the state-fixed effects with other variables.

Turning to more general comments, a concern I have is that the paper describes the impacts of PFHIS from the difference-in-difference regressions, but then states that we really do not know what the mechanisms are. The discussion then relies totally on completely different studies to guess the mechanisms and make policy recommendations. It would have been much better to try use the available data to directly address the issue of the mechanisms through which the PFHIS leads to the estimated impacts. This also goes back to my earlier point about looking at the controls more carefully and the need for addressing the district-level heterogeneity in characteristics and in policy implementation. I think there is quite a gap between the evidence and the policy recommendations. For the India Policy Forum, one is obliged to have some observations on policy, but one has to be more careful in terms of going from empirical analysis to policy recommendations if the analysis has significant gaps, as is my view. In this regard, the addition of a discussion of MSAs to the revised conclusion of the paper is even more speculative and unsatisfactory; it has no connection at all to the empirical analysis of the paper.

I also think that there is a considerable literature that is not referenced and could have been useful for this paper, if it were serious about empirical analysis and policy conclusions. For example, there is an excellent collection of studies (Palacios et al. or PDS 2011), which has a great deal of institutional detail, including discussion of some of the problems of implementation. I will give some illustrations later in these comments. This also is a very useful paper by Nandi et al. (2013), which does a very nice job of looking at the determinants of enrolment. Presumably, all the data that they use are publicly available and would have enabled a much more detailed analysis. For example, Figure 2 in Nandi et al. (2013, p. 5) shows that among districts that had RSBY, enrolment rates varied from as little as 20 percent to over 80 percent. That is a large difference, which presumably is present among the districts in the treatment group, without being accounted for in the regression analysis.

Another example of data that should matter but is not taken account of in the paper's empirical analysis is the utilization rate, which varied dramatically across districts (Figure 3, Robert Palacios, in Palacios et al. 2011, Chapter 1, p. 20). Some of this difference could be reflecting the fact that health conditions are different across states, reflecting other exogenous factors, but it also could be because the schemes are being implemented very differently in different states. The analysis of the paper has nothing to say about these issues. There are yet more examples, which reinforce the point of available data that is neglected in the paper. The conversion ratios of BPL families enrolled (Nishant Jain, in Palacios et al. 2011, Chapter 2, p. 49) display large difference in conversion ratios across states, going from as little as 11 percent to over 80 percent. Similarly, hospitalization ratios (as opposed to the hospitalization expenditure used as an outcome variable in the paper) are very different across the states: The rate in Kerala is 10 times that in Himachal Pradesh (Nishant Jain, in Palacios et al. 2011, Chapter 2, p. 55). I do not think this is because people in Himachal Pradesh are healthier than those in Kerala, something else is going on. There are also data at the village level, e.g., on enrollment rates (Figure 1, Changqing Sun, in Palacios et al. 2011, Chapter 4, p. 94). So intra-district heterogeneity could have been incorporated in the controls for regressions with household-level data.

To conclude, there is a large amount of rich data available that could have been exploited much more fully. The paper is a useful specific contribution and the topic is extremely important. However, the policy conclusions are premature, and much more empirical analysis needs to be done. Again, I want to reiterate that providing affording health insurance is an important social goal, the question is really how we are going to do it in terms of the public–private mix as well as the details of implementation.

General Discussion

T.N. Srinivasan (Chair) said he had similar concerns as Abhijit about the districts chosen for control and treatment and asked if there would be a selection problem that might affect the inferences drawn by the paper. Second, by catastrophic, we commonly understand events that would destroy the earning capacity of the household for a very long time. The temporary slipping into and out of poverty that is used in the paper, he felt, does not capture this notion of catastrophic risk in the context of insurance. Finally, Srinivasan noted that the paper uses the phrase "long-term" interchangeably with programs that have been in place for a somewhat "longer" time. These notions are not the same, and it was not clear whether the paper could make inferences about the long-term consequences or implications of PFHIS from the data it was looking at.

Ashok Lahiri said that he was surprised that the Philippines had a lower ratio of OOP expenditure to total health expenditure than India: Manila, e.g., has no public hospitals to speak of. He was unclear why the paper was recommending that health insurance covers primary and preventive health care, since health insurance really is intended for catastrophic risk, which would typically require hospitalization and inpatient care.

Rohini Somanathan asked how one is to judge whether a utilization rate is high or low without a contrafactual and without knowing how many people actually get sick. Rohini was also worried about sample size if the take up is really low. This was a 2 percent NSS Sample and with only some 0.5–2 percent take up of the schemes, the number of observations would be really small.

Rajnish Mehra said that in insurance, there is lot of idiosyncratic risk at the level of individual but if you aggregate across the entire population, then by the law of large numbers, idiosyncratic risk does not remain that important and one can price group insurance at a much cheaper rate. He suggested a framework that first looked at individuals smoothing out lifetime consumption and what reduction in consumption they would be willing to bear as an insurance premium and then to do this at the aggregate level where the answer would be quite different because of the pooling of risk and the premium would be much smaller.

Vijay Joshi asked who fixed insurance prices and caps because one issue that the paper did not address was the cost escalation observed in insurance schemes globally. Joshi felt that the suggestion the health insurance covers primary case needed a lot of thought because it was not clear what would prevent the patient and the doctor getting together and bankrupting the scheme by abusing the system for primary care costs, which would be easy to do since treatment would all be outpatient.

Sandeep Sukhtankar suggested that it would be valuable to separate the RSBY from the other state schemes. Two of the three states considered by the paper had almost no within state variation, so it was hard to see how we could have state-fixed effects. The second suggestion was to cluster the standard errors by district, which should be fairly straightforward to do if it was not being done.

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Corruption in India: Bridging Research Evidence and Policy Options[§]

ABSTRACT Corruption has become an increasingly salient issue in India today, spawning enormous interest from the media as well as a large amount of academic research. Yet, there is a sizeable gap between what has captured the media's attention, the policy options under discussion, and the actual evidence base drawn from empirical research on corruption. We attempt to bridge this gap by directly addressing the particular challenges that corruption in India poses. Academic evidence supports the popular perception that corruption is widespread and endemic. However, we find that the costs of day-to-day corruption are just as large, if not larger, than those of the "scams" that dominate headlines. Further, we find that there is very little evidence to support the idea that greater transparency, information, and community-based efforts have a significant impact on reducing corruption on their own. This is also true for some technological interventions, although those interventions-like direct benefit transfers-that bypass middlemen and corrupt officials have a much greater scope for success, as do interventions that transfer bargaining power to citizens and beneficiaries. We find much to commend in the sensible and wide-ranging legislative agenda to combat corruption, including the Right to Service and Public Procurement bills. However, what is most important for combating corruption is not the law on paper but the implementation of the law; the binding constraint, as always, is the government's desire and ability to punish corrupt officials and politicians.

Keywords: Corruption, India, Transparency, Public Sector, Political Financing, Public Sector Recruitment, Electoral Reform

JEL Classification: D4, D73, H10, H40, H83, K42, O10

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1. Introduction

Orruption in India is a topic that seems to never fall out of fashion. From as far back as Kautilya's *Arthashastra* in the 4th century BC to the 2G telecommunications spectrum scam in the contemporary period, corruption is widely perceived to be an endemic phenomenon in the Indian subcontinent.

Yet, by any measure, the salience of corruption in the public policy discourse in India has ratcheted up in recent years. This is, in part, a reflection of a series of high-profile "scams" that plagued the recently departed United Progressive Alliance (UPA) government. In 2011, India saw a groundswell of popular protest in which thousands of citizens joined in anticorruption demonstrations after a series of scandals implicated ruling politicians and their cronies in billions of dollars of graft—from the Commonwealth Games to 2G scandals, and from "Coalgate" to Adarsh Housing Society. This simmering discontent later gave rise to a new political party—the Aam Aadmi Party (AAP)—that burst onto the political scene with a pledge to clean up government.

While the AAP's popularity has largely been limited to Delhi and its surrounding areas, the recent anticorruption mood in India arguably helped propel the Bharatiya Janata Party's (BJP) Narendra Modi and his National Democratic Alliance (NDA) government into power in the 2014 general election. Indeed, Modi consistently invoked his fight against corruption on the campaign trail, telling huge crowds that the Congress Party-led UPA government stood for the "ABCD of corruption," listing numerous scams in which the party and family members of the Nehru–Gandhi dynasty were implicated: "A for Adarsh, B for Bofors, C for Commonwealth Games, and D for *Damad Ka Karobaar* ('son-in-law's business,' a reference to corruption allegations against Robert Vadra, the son-in-law of Congress president Sonia Gandhi)."

A post-election analysis conducted by the Centre for the Study of Developing Societies (CSDS) suggests that anticorruption sentiment was a key contributor to the BJP's winning an outright majority in parliament, the first time any party has done so in three decades (and the first time in history such a feat was accomplished by a party other than the Congress). According to CSDS' 2014 National Election Study, only concerns over inflation and lack of economic development were more important than corruption in determining voters' choices in the election.

In this paper, we try to bridge the gap between evidence and policy when it comes to understanding the causes and consequences of corruption in India and formulating solutions to address its spread. This gap exists for several reasons.

For starters, corruption is by its very nature difficult to objectively measure. Most corrupt transactions transpire out of public view and the parties involved have incentives to keep it that way. What emerges from media reporting is, by definition, ex post and often sensationalist in nature. For example, the media focuses on "scams" that involve billions of rupees worth of malfeasance; yet our calculations suggest that the costs of day-today corruption are at least of the same order of magnitude, if not higher. We compiled an inventory of the biggest public corruption scandals uncovered after the year 2000,¹ finding that the amounts involved sum up to hundreds of billions of dollars (the mean scam "value" was ₹36,000 crore, and the median ₹12,000 crore; see Table 1).² Eye-popping as these numbers are, the costs of day-to-day corruption are comparable: e.g., Muralidharan et al. (2014b) calculate the annual costs of teacher absence to be in the range of ₹8,100–9,300 crore; Transparency International and CMS (2005) estimate the costs of bribes paid annually for accessing various government services across India to be ₹21,000 crore. Hence, attention-grabbing one-off scandals may deflect attention from corruption that is just as costly, but is harder to find and measure.

Second, while the existing social science literature has established some theories of corruption, these have produced markedly divergent predictions about both the causes and consequences of corruption. In particular, existing theory is ambiguous about whether corruption is bad for the economy. An old literature suggests that corruption "greases the wheels" of the economy by providing incentives for bureaucrats to work harder, and also by allowing firms and individuals to get around costly and inefficient red-tape and regulations (Huntington 1968, Leff 1964). Another strand of thought predicts that corruption may have no efficiency effects, only redistributive ones; e.g., if the most efficient firm is the one that can pay the highest bribes to

1. While there is no precise formula for determining what constitutes a big scandal, we began by scanning lists of "corruption scams" compiled by news outlets (*India Today, Outlook, NitiCentral, Yahoo, DNA*) over the past several years. We then created a shortlist so that only scams that featured on multiple lists were included. For some number of scams, it was difficult to find the level of detail we wanted, so we excluded these. Table 1 summarizes the 28 scandals we examine.

2. Not all of these amounts involve losses to the government and, moreover, these amounts must be viewed with caution, since the media tends to inflate and focus on the largest numbers. Indeed, the "costs" written up in the media conflate the value of bribes that changed hands, pure theft or embezzlement from the government of various sorts, cheating the exchequer out of the appropriate value of assets, as well as private losses in which one party simply cons the other.

TABLE 1. Major Corruption Scandals	in India in the	21st Cen	tury			
Name	Date	Years	Sector	State	Cost (ECrore)	Cost type
Taj Heritage Corridor Scam	2002-03	2	Construction	Uttar Pradesh	175	Embezzlement
Uttar Pradesh NRHM Scam	2005-11	7	Construction	Uttar Pradesh	10,000	Embezzlement
Tatra Trucks Scam	1997–11	15	Defense	N/A	750	Bribes
Agusta Westland Chopper Deal Scam	2010-13	4	Defense	N/A	450	Bribes
Calcutta Stock Market Scam	2001	-	Financial	West Bengal	120	Private fraud
Telgi Stamp Scam	2003-13	1	Financial	Maharashtra, others	43,000	Private fraud
IPO Demat Scam	2003-05	ო	Financial	N/A	146	Private fraud
Saradha Group Chit Fund Scam	2006-13	œ	Financial	West Bengal, others	20,000	Private fraud
Sahara India Pariwar - Investor Fraud Case	2008-10	ო	Financial	Uttar Pradesh	24,000	Private fraud
Kerala Solar Panel Scam	2010-13	4	Financial	Kerala	7	Private fraud
Rice Export Scam	2008-09	2	Food grains	N/A	2,500	Value loss to govt.
Uttar Pradesh Food Grain Scam	2002-10	6	Food grains	Uttar Pradesh	35,000	Embezzlement
Gegong Apang Public Distribution System Scam	1995-04	10	Food grains	Arunachal Pradesh	1,000	Embezzlement
Antrix Devas/ISRO Spectrum Allocation Scam	2005–11	7	T	N/A	2,00,000	Value loss to govt.
2G Spectrum Scam	2008	-	Ц	N/A	56,000	Value loss to govt.
Satyam Computer Services Scandal	2009	-	T	N/A	14,162	Private fraud
Karnataka Wakf Board Scam	1954–11	58	Land	Karnataka	2,00,000	Value loss to govt.
Maharastra Adarsh Housing Society Scam	2003-10	œ	Land	Maharastra	163	Value loss to govt.

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Andhra Pradesh Land Scam	2006-12	7	Land	Andhra Pradesh	1784	Value loss to govt.
Voida Corporation Farm Land Scandal	2009-11	ო	Land	Uttar Pradesh	5,000	Value loss to govt.
Aaharashtra Irrigation Scam	1999-09	11	Land	Maharashtra	35,000	Embezzlement
Ddisha Mine Scam	2000-10	11	Mining	Odisha	50,000	Value loss to govt.
Coalgate	2004-12	6	Mining	N/A	1,86,000	Value loss to govt.
Bellary Mining Scandal	2005-11	7	Mining	Karnataka,	21,000	Value loss to govt.
				Andhra Pradesh		
Iharkhand Mining Scam	2006-09	4	Mining	Jharkhand	3,400	Value loss to govt.
Boa Mining Scam	2009-11	2	Mining	Goa	35,000	Value loss to govt.
Cash for Votes Scandal	2008	-	Political	N/A	50	Bribes
CWG Scam	2010	-	Procurement	N/A	70,000	Embezzlement
Source: Authors' compilation from various media sources	Full details nrovided	in Annen	diy A in naner on fire	t author's website http://www	dartmouth ed	ul ~ sandin/Sukhtankar.

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officials in order to obtain contracts or licenses from the government, then there is no efficiency consequence, just a transfer from the government to the corrupt official (Lui 1985).

On the other hand, there are a number of theoretical reasons why corruption might negatively affect efficiency and economic and political development. Continuing the example above, the secrecy inherent in corruption might mean that firms connected to the bureaucrat, which might not necessarily be the most efficient ones, obtain contracts or licenses (Shleifer and Vishny 1993). Meanwhile, not all rules and regulations are inefficient, and in cases where individual willingness or ability to pay diverges from what is considered socially good, corruption will not be optimal (Banerjee 1997). For example, being able to drive a car is a reasonable requirement for obtaining a driver's license, and bribing to get around this rule might reduce social welfare. Further, bribery might increase bureaucrats' incentives to create inefficient red-tape in the first place (Banerjee 1997).

Third, the industrial organization of corruption may also matter. Suppose a firm needs multiple clearances to set up a project. If a number of decentralized corrupt agents act as independent monopolists, they will charge bribes that are "too high" and create an inefficient entry barrier (Shleifer and Vishny 1993). Additionally, corruption that involves straight theft might distort optimal public finance (Niehaus and Sukhtankar 2013b). Finally, the presence of widespread corruption in the economy might incentivize rentseeking rather than productive activities (Murphy et al. 1991).

Fortunately, one recent bright spot from the research community is the development of a burgeoning empirical literature on corruption in India that tests many of these theoretical predictions. These studies have produced a vast amount of knowledge about both the political economy of corruption as well as the relative effectiveness of various solutions in addressing this scourge.

However, much of this scholarly work has not filtered down into the policy domain. While there are several excellent recent reviews of research on corruption drawing on a wide array of settings (Banerjee et al. 2012, Olken and Pande 2012, Pande 2007), corruption in India poses particular challenges that these surveys do not explicitly address. For example, India's archaic campaign finance laws result in candidates turning to illicit means to raise funds for elections (Kapur and Vaishnav 2015; Sukhtankar 2012). Moreover, electoral accountability mechanisms proven to check corruption in other contexts (Ferraz and Finan 2011) fail in India where criminal and corrupt politicians thrive in spite of these measures (Aidt et al. 2013, Banerjee and Pande 2009, Vaishnav 2012). Furthermore, many

such reviews do not produce explicit recommendations for formulating better public policy.

These various misalignments have created a great deal of confusion. Despite the increasing salience of corruption in India and the heated political rhetoric the subject arouses, there is a large gap between what has captured the media's attention, the policy options under discussion, and the actual evidence base from empirical research on corruption. To give one example, the conventional wisdom holds that corruption in politics or in public works programs is often the result of information asymmetries. Yet, multiple studies actually show that information provision is largely ineffective in producing better governance outcomes, at least in isolation (Banerjee, Banerji, Duflo, Glennerster, and Khemani 2010a; Niehaus and Sukhtankar 2013b; Ravallion, van de Walle, Dutta, and Murgai 2013).

The objective of this paper is to make a modest contribution toward a more optimal alignment. To begin with, we define corruption using the most common academic definition: "the misuse of public office for private gain" (Bardhan 1997). Note that this immediately narrows our focus to the public sector, to include both bureaucrats and politicians. Our choice of definition does not imply that we are leaving out the private sector or private individuals, usually the source of bribes that represents the "private gain" of the bribe receivers; it simply means we are ignoring purely private fraud, e.g., a case of a private firm paying off another private firm to get an unfair advantage in a private transaction between them.³ Given the paucity of research in this area and the difficulty in conceptualizing every type of private sector malfeasance, we focus on public sector corruption.

Having defined corruption in this manner, we divide the remainder of the paper into four main parts. In Section 2, we provide a stylized classification of the causes of corruption in India. We identify four underlying drivers: two "deep" causes (lack of enforcement capacity, regulatory complexity) and two "proximate" causes (inadequate regulation of political finance, shortcomings in public sector recruitment and postings).⁴

In Section 3, we pivot from a discussion of corruption's underlying drivers to presenting a rubric for classifying corrupt acts. Specifically, we organize corruption into three general categories based on the actions of public officials: facilitative, collusive, and extractive corruption. Using

3. However, some of the scams that we identify in Table 1 involve financial sector fraud with only private actors.

4. Technically speaking, the issues of political finance and discretionary transfers and postings are both drivers of corruption, as well as corrupt outcomes in and of themselves. In the latter regard, they are manifestations of collusive and/or extractive corruption.

this simple framework, we then draw on research from both economics and political science to describe the magnitudes, causes, and consequences of each of these types of corruption.

Section 4 discusses broad strategies for combating corruption, describes major recent anticorruption legislation either passed or under discussion, and explores academic evidence that evaluates the effectiveness of both broad strategies and particular legislation in combating corruption. In Section 5, we discuss India's unique political economy of reform and what, if anything, India can learn from the historical record. In Section 6, we conclude with some parting lessons.

It is important to note that our focus is on academic research that has rigorously evaluated causal relationships with the best quality data and information possible. Given the vastness of the literature on corruption in India, we were compelled to narrow our parameters in this way. Furthermore, with an eye towards distilling the major takeaways of this literature and extracting the core policy prescriptions that emerge, we have generally tried to avoid discussions of empirical methodology. In so doing, we follow a template similar to that pursued by Muralidharan (2013) in his review of education in India.

2. Causes of Corruption

In this section, we briefly review the major causes of corruption in India. Given the complexity and breadth of an issue such as corruption, it is impossible to fully account for all of the underlying drivers that create incentives for corrupt behavior. Rather than attempting to construct such an unwieldy inventory, we focus instead on stylized drivers of corruption.

India's per capita Gross Domestic Product (GDP) in 2015 places it among the ranks of the world's lower middle-income countries. Given the inverted-U shaped relationship between corruption and per capita GDP across countries, it seems intuitive that corruption in India might pose a particular challenge. In the poorest countries, corruption is limited because there is, frankly, not much to steal; in the most undeveloped economies, there is little need to delegate the types of discretionary tasks that lend themselves to bribery. On the opposite end of the spectrum, the rich, advanced industrialized countries have developed robust legal frameworks and institutional and enforcement mechanisms necessary to deter and combat corruption. As Laffont (2006) points out, one is likely to find the greatest corruption in those countries standing at the unfortunate juncture of a heavily regulated economy that does not yet boast adequate enforcement capacity.

We refer to these two factors—lack of enforcement capacity and regulatory complexity—as "deep" causes, insofar as they reflect the key institutional parameters that define India's corruption environment. The remaining two drivers— inadequate regulation of political finance and shortcomings in public sector recruitment and postings—are more "proximate" in nature. By proximate, we do not mean to imply that they can be easily addressed in the short-term, but rather that they are well-defined pathologies spawned by larger infirmities plaguing India's institutional moorings. Based on the literature, we believe these four drivers set the stage for the vast majority of corrupt acts taking place in India in recent years.

2.1. Regulatory Complexity

In light of India's experience of colonial exploitation and the realities of its abject poverty, and in concert with prevailing ideological trends of the era, India's first Prime Minister, Jawaharlal Nehru, launched India down a path of state-led development. Upon Nehru's death, his daughter Indira Gandhi doubled down on this state-led model, triggering the onerous system of state controls later dubbed the "License Raj." With the "pro-business" reforms of the 1980s and the "pro-market" reforms of the early 1990s, the role of the state in India's economy appreciably diminished (Rodrik and Subramanian 2005). However, more than two decades after enacting liberal economic reforms that loosened controls on private business and deepened India's economic integration with the rest of the world, many vestiges of the License Raj persist and help facilitate significant rent-seeking activity.

First, India remains an intensely difficult place for firms to do business. According to the 2015 World Bank Doing Business indicators, India ranks 142 out of 189 countries. Its standing compares unfavorably to its South Asian peers, as well as other "lower middle income" economies, and even within the universe of BRICS nations. For instance, according to the World Bank survey, the act of obtaining a single construction permit in India involves 27 discrete procedures, takes 162 days, and costs 46 percent of the total outlay to a construction firm of building a warehouse.

Second, lucrative sectors of the economy remain largely untouched by economic reforms, allowing the state to exercise a heavy hand through its regulatory authorities as well as the market power of public sector undertakings. As Reserve Bank of India Governor Raghuram Rajan has noted, the state in India continues to dominate the "commanding heights," such as oil and gas, mining, and heavy industry (Rajan 2012). The possibilities of quid pro quos are especially high in these areas, as the allocation of rights over natural resources has been poorly defined historically and virtually all but ignored by successive economic reforms.

Two facts result from this state of affairs. First, the regulatory intensity of the state with respect to private business activity not only minimizes the role for market forces, but also facilitates a natural quid pro quo whereby the state provides licenses, permissions, clearances, etc. in exchange for side payments. This is why India reliably rates poorly on most perception-based indicators of corruption and bribery.

Second, corruption is most intense in those sectors where the regulatory footprint of the state is the greatest. Consider, for instance, the sectoral breakdown of our inventory of scams listed in Table 1. The clustering of scams within certain sectors is quite instructive; the mining and land sectors are most commonly represented, accounting for 35 percent of the total (10 of 28). This category includes scams such as the now infamous "Coalgate" scandal, in which the Comptroller and Auditor General of India (CAG) accused the Union Government of allocating almost 200 coal blocks without a competitive bidding process between 2004 and 2009. The CAG alleged that private firms paid far less than what they would have had the licenses been auctioned. Many of these firms were owned by, or closely linked with, sitting politicians, implying that political criteria were used to allocate licenses.

As argued above, this interaction of regulatory intensity and corruption is in line with our priors, as these areas represent obvious sources of rents in the economic sense of the word—they are sectors of the economy where the regulatory intensity of the state is immense and the opportunities for bribes or kickbacks are legion. The values involved are also generally high in these sectors, given their centrality to the broader economy.

2.2. Lack of Enforcement and Implementation Capacity

While regulatory complexity allows wide scope for rent-seeking and extraction, the capacity to combat misdemeanor and enforce rules and regulations is seriously limited. The government agencies in charge of administration and law and order are overburdened, inadequately staffed, and often poorly equipped. Thus implementing complex rules and policies, as well as catching and punishing rule-breakers, is a massive challenge.

Given the discussion on the cumbersome role of the state in the previous section, it is somewhat counterintuitive that India has the smallest number of government employees as a ratio of its population among any of the Group of 20 (G-20) nations, with only 146 public sector employees per 10,000 residents (Figure 1). Compared to China (537), the USA and Germany (both about 730), or Russia (1534), this number is remarkably low. Even this low number is likely an overestimate of administrative capacity, given that it includes employment in the state-owned Indian Railways, one of the largest employers in the world. Furthermore, the overall strength of the public sector has declined since 2001, although this partially reflects a divestment from public sector enterprises and a move to greater contract employment, rather than a reduction in administrative capacity per se (Figure 2).

Nevertheless, what the relatively small number of public employees means for a country India's size is that the administrative service has an enormous burden placed on it to not only implement the plethora of schemes and regulations in place but also to enforce them. For example, the chief administrative officer of the most relevant administrative unit for implementing public programs in India—the district collector—is also the official in charge of law and order in a district, which has on average 2 million inhabitants. While these officers are selected from the cream of the crop of the Indian Administrative Service (IAS), given the enormous burden placed on their shoulders, the decks are stacked against them from the beginning.



FIGURE 1. Public Sector Employment in G-20 Countries

Sources: International Labor Organization; Saudi Arabia Ministry of Economy and Planning; China National Bureau of Statistics; World Bank.



FIGURE 2. Public Employment in India from 1971–2001 (millions)

Source: Economic Survey of India (various years).

Compounding the administrative burden they face, officers regularly face political interference. Although rules were designed to prevent meddling, Krishnan and Somanathan (forthcoming, p. 11) write that, "the power to punish arbitrarily has been acquired (and used to telling effect) by the political executive ... through misuse of the power of transfer." Frequent transfers, or the very threat of transfers, make officers' jobs even harder, as they only have "short tenures in each post, which greatly diminishes effectiveness."

The state of public administration is not helped by the fact that many government jobs are left unfilled, possibly due to political jockeying (see Section 2.4 below). The problem of unfilled job vacancies is particularly severe for the police and courts, the pillars of the enforcement arm of the government. To begin with, the number of police and judicial officials as a proportion of the population is very low. By our rough estimate, India has approximately 16.5 judges per one million residents, which compares unfavorably to around 101 judges for a comparable population in the USA. In addition, India has the lowest rate of police officers per capita—122.5 per 100,000 people—of any G-20 member state. Yet even with this low base, a quarter of police vacancies across the country are unfilled. For certain states, the vacancy rate is alarming: Uttar Pradesh, which faces serious law and order difficulties, has nearly 60 percent of its police posts unfilled (Table 2).

State	Sanctioned	Actual	Vacancy Rate (%)
Andhra Pradesh	107730	89787	16.66
Arunachal Pradesh	5322	4548	14.54
Assam	30979	19870	35.86
Bihar	78641	62803	20.14
Chhattisgarh	54499	32259	40.81
Goa	5330	4722	11.41
Gujarat	75267	54921	27.03
Haryana	48569	39059	19.58
Himachal Pradesh	10833	9864	8.94
Jammu & Kashmir	51860	47755	7.92
Jharkhand	55771	42073	24.56
Karnataka	82358	68584	16.72
Kerala	40185	37995	5.45
Madhya Pradesh	76518	62281	18.61
Maharashtra	191197	182832	4.38
Manipur	18636	12219	34.43
Meghalaya	7490	5948	20.59
Mizoram	4321	3377	21.85
Nagaland	6013	5637	6.25
Odisha	35047	30850	11.98
Punjab	59201	59969	-1.30
Rajasthan	88881	69689	21.59
Sikkim	2381	1906	19.95
Tamil Nadu	99541	87581	12.02
Tripura	12898	10441	19.05
Uttar Pradesh	331984	133261	59.86
Uttarakhand	17074	16643	2.52
West Bengal	101560	72083	29.02
A&N Islands	3741	3453	7.70
Chandigarh	5794	5414	6.56
D&N Haveli	354	287	18.93
Daman & Diu	422	370	12.32
Delhi	72686	67686	6.88
Lakshadweep	606	384	36.63
Puducherry	2423	2433	-0.41
Total (All)	1786112	1348984	24.47

 TABLE 2.
 Police Vacany Rates across Indian States, 2013

Source: National Crime Records Bureau, Crime in India, 2013.

The judiciary faces the same dilemma: almost 30 percent of seats on High Courts across the nation are vacant, in addition to 22 percent of seats in district and subordinate courts. Only the Supreme Court seems to be relatively free of this malaise, as the corresponding rate there is only 6.5 percent (Figure 3).

One of the main consequences of these judicial vacancies is that it takes an inordinately long time to resolve cases. This fact should come as no



FIGURE 3. Unfilled Vacancies in Judicial System

Source: Supreme Court of India, Court News (various years).

Note: Measured at 12/31/2013 for Supreme and High Courts, 9/30/2013 for District/Subordinate.

surprise to anyone in India, but the figures do not make for enjoyable reading. As of 2011, approximately 24 percent of court cases had been pending for at least five years, while 9 percent had been pending for more than 10 years (Law Commission of India 2014). At the start of 2014, there were a total of 31.4 million cases pending across all courts in India (Figure 4). While the situation is slowly improving—for all courts the number of outstanding cases on January 1, 2013 was higher than the end of year figures—the sheer level of backlog induces despair.

We discuss initiatives to tackle these administrative and judicial issues in the final section. But as of now, we merely stipulate the fact that India's capacity to enforce rules and regulations in virtually every domain is severely wanting.

2.3. Inadequate Regulation of Political Finance

Turning now to proximate drivers of corruption, India's approach to political finance is emblematic of these larger weaknesses of enforcement and regulation. What makes this failing puzzling is that it stands in sharp contrast to the actual planning and execution of elections, which are ably handled by the independent Election Commission of India (ECI), one of the most autonomous election agencies in the world. At the heart of this puzzle sits the aforementioned overbearing role of the state in the economy. As a recent analysis of India's political finance regime concludes, "Until the Indian state retreats from major sectors of the economy and gives way to market



FIGURE 4. Outstanding Cases in Indian Courts, 2013

Source: Supreme Court of India, Court News (various years).

forces, politicians and business will have reason to perpetuate a system of trading policy and regulatory favors for monetary payments and campaign 'donations'" (Sridharan and Vaishnav, forthcoming).

Buttressing this system of favor trading are shortcomings in the underlying legal and regulatory powers of the ECI to adequately regulate political finance. For instance, corporations and parties are only legally required to publicly disclose political contributions in excess of ₹20,000. This rule allows contributors to package unlimited political contributions just below this threshold value completely free of disclosure. Indeed, in 2014 the Association for Democratic Reforms (ADR) reported that 75 percent of the income of India's six major parties comes from undocumented sources (ADR 2014).

On the expenditure side, candidates face strict limits on spending once elections have been announced, but election authorities struggle to properly verify their reported expenditure since a substantial portion typically occurs "in the black." Even though the ECI has devoted greater resources to addressing this problem, it faces several challenges. Under existing statute, the ECI lacks clear powers to take follow-up action in the event a candidate files false or misleading declarations. An even bigger problem lies with a loophole in the law that allows candidates to keep secret party and supporter expenditures on behalf of their campaigns that are spent propagating the party program rather than endorsing the specific candidate in question (Sridharan and Vaishnav, forthcoming). In theory, if parties were transparent in their finances, some triangulation would be possible. Unfortunately, party finances are highly opaque. Parties are required to submit audited accounts to the ECI, but there is no requirement that the auditor needs to be an independent, third-party entity, which creates incentives for parties to cook the books. The ECI recently issued guidelines to parties to strengthen the reporting of their finances, but without additional legal authorities, the ECI has no credible sanctioning mechanism.

In light of these infirmities, the regulation of political finance in India is in dire shape and, hence, susceptible to corruption. Of the themes highlighted in this paper, political finance is arguably in greatest need of further research and exploration. Commentators across the political spectrum have recognized its centrality in corruption dynamics in the country. For instance, Mehta (2002) has noted: "The reform, regulation and overhaul of the means by which political parties and candidates finance elections is arguably the single most important institutional challenge facing Indian democracy." *The Economist* (2014) summarized the issue in the context of the recently completed 2014 general election more poetically: "picture the elections as a dark sea of liquid assets, mostly undocumented cash (and a lot of liquor too), overspilling the dykes that were meant to keep it in check."

The opacity of political finance, however, presents an obvious obstacle to careful empirical work. Hence, there is space for creative "forensic" approaches.⁵ One such study is Sukhtankar (2012). The author finds evidence of electoral cycles in input prices paid for sugarcane among politically controlled mills in Maharashtra. Specifically, he finds that cane prices paid to farmers by politically controlled mills falls in election years. Sukhtankar claims that sharp drops in cane prices represent mill funds siphoned off to finance political contributions. Interestingly, the funds are paid back after elections to farmers (with interest, so to speak) conditional on the respective political mill chairman (or his party) winning office.

5. For instance, Gingerich (2014) takes advantage of a police investigation in Brazil into an illicit campaign spending scheme which took place in the run-up to the elections in the Brazilian state of Minas Gerais in 1998. Based on police reports, which contain detailed bank transactions listing the names of those who received under-the-table election funds, he is able to analyze the allocation of payments to local vote brokers and estimate their effect on election outcomes. Mironov and Zhuravskaya (2014) aim to measure illicit payments by firms to politicians in Russia. The authors find that firms involved in government procurement substantially increase "tunneling" (defined as transfers by legitimate firms to fly-by-night firms established with the purpose of taking cash out of companies) around regional elections. These illicit flows exhibit a political business cycle, in contrast with firms not involved in public procurement. Sukhtankar's paper captures an important truth characterizing India's electoral dynamics: the costs of elections have grown so immensely in recent years that politicians face incentives to recoup some of the financial "investments" made during the campaign by using their political positions to extract rents. Indeed, political office is widely perceived to be a highly lucrative proposition in India. Unfortunately, quantifying just how "lucrative" elected office can be is not an easy task. However, some scholars have attempted to estimate the financial returns to office, drawing on new data drawn from affidavits candidates submit at the time of their nomination which detail, among other parameters, their financial assets and liabilities. Analyzing the affidavits of state and national incumbent legislators who won elections in the early 2000s and then recontested elections several years later, Sastry (2014) finds that the average wealth of sitting MPs and MLAs increased by 222 percent during their tenure in office (from an average of ₹1.8 crore in the first election to ₹5.8 crore at the time of reelection).

More systematic explorations of the financial rewards to office that take selection bias into account suggest more modest returns. Bhavnani (2012) compares the change in winners' and losers' self-declared family assets in the country's two most recent state and national elections, using a regression discontinuity design. His results indicate that the average election winner increased his assets by 4–6 percent a year.⁶ Using a similar design, Fisman, Schulz, and Vig (2014) focus on the subset of elections where both winner and runner-up from the same constituency run in the subsequent election. Their analysis reveals that incumbents enjoy a "winner's premium" of 4.5 percent on average; the additional returns to ministers, and to incumbents who face-off against freshmen legislators, are even higher, 10 and 12 percent, respectively.

Thus, careful econometric analyses suggest the financial returns to elected office are real, but perhaps not as abnormally large as one might expect. Yet there are reasons to treat these estimates with caution: they only look at reported income; the data are restricted to a small sub-sample of all candidates; and one of the two studies (Fisman et al. 2014) focuses on politicians' assets net of liabilities, a contentious decision since access to low-interest loans in India is often conditioned by political connections (Cole 2009).

Finally, the new candidate affidavit data has also shed light on the direct link between the issue of political finance and the criminalization of politics in India. Of the 543 members of the 16th Lok Sabha elected in May 2014,

^{6.} Bhavnani concludes that 4–9 percent of election winners appear "suspect," since their asset growth is greater than what they would have earned based on their salaries (and perks) as lawmakers.

34 percent face pending criminal cases while 20 percent face charges of a "serious" nature. The situation is broadly similar at the state level, where 31 percent of elected MLAs face pending cases (15 percent fall into the serious category). To compound matters, the share of elected officials with pending criminal cases has been increasing, rather than decreasing, over time. In 2004, 24 percent of MPs faced criminal cases (12 percent faced serious charges). This proportion grew to 30 percent in 2009 (15 percent serious) and 34 percent (21 percent serious) in 2014.

Research by Vaishnav (2012) has shown that one reason parties value candidates with criminal records relates to their access to financial resources. As the costs of elections have surged, parties, in response to their declining organizational strength, have grown increasingly reliant on self-financing candidates. In fact, there is a strong correlation between a parliamentary candidate's personal assets—a good proxy for financial capacity—and the likelihood of winning election. The affidavit data convincingly show that criminal candidates, in turn, have a distinct financial advantage over "clean" candidates, controlling for a range of possible confounding factors.⁷

Dutta and Gupta (2014) have a slightly different explanation, but it too emphasizes the importance of money. The authors present a formal model which assumes that candidates facing criminal charges do face a certain degree of negative stigma amongst the voting population. In other words, voters will—all else equal—be less likely to vote for candidates under criminal scrutiny. However, there are offsetting considerations. Since campaigns are costly, candidates with wealth can draw upon their largesse to win disaffected voters by convincing them of their "innocence." In a related vein, the authors argue that wealth offsets the electoral disadvantage criminal candidates face on account of negative stigma. The authors validate their hypotheses using data from the 2009 Lok Sabha election.

2.4. Public Sector Recruitment, Postings, and Transfers

A final proximate cause of corruption is the broken system of public sector recruitment, postings, and transfers, which perpetuates—indeed, practically mandates—corruption by public officials. There are at least two primary reasons this system is dysfunctional. First, recruitment, transfers, and postings are often conducted on the basis of bribes rather than merit. Second, the wage and incentive structure does not adequately reward performance and punish malfeasance.

7. A descriptive analysis by Sastry (2014) confirms this association as does a more systematic regression approach by Dutta and Gupta (2014).

It has long been known that recruitment, transfers, and promotions across the administrative services at the state and central levels in India are regularly made on the basis of bribes rather than merit (with the recruitment of elite IAS officers serving as a prominent exception). Wade (1985) in his aptly titled and seminal article "The Market for Public Office" blames "the corruption-transfer mechanism and its effects on bureaucratic initiatives" for the failure of the Indian development state. At the very least, the consequences of the allocation of public sector posts on the basis of money rather than merit include a multiplier effect on corruption, since officials who paid to obtain these posts must recoup their costs through rent extraction. For example, Wade documents that the cost of obtaining the post of Superintendent Engineer in the Irrigation Department was 40 times the average salary for the position. This leads to a vicious circle: the cost is high because of the rents that can be extracted from the post, incentivizing the employee to recover their investment once in office. A related further consequence is that it is unlikely that honest officers could obtain these lucrative posts.

Before a skeptic claims that the evidence we cite is 30 years old, let us point out that the situation has not improved since. Krishnan and Somanathan (forthcoming) note that, "the promotion of state service officers has been heavily politicized." Using data on the universe of serving IAS officers, Iyer and Mani (2012) empirically document the system of political control over bureaucrats, again pointing out that transfers are the key mechanism used. In one highly publicized recent case, the media reported that IAS officer Ashok Khemka, who earned a reputation for fighting graft (including lodging investigations against dodgy land deals involving Robert Vadra, Sonia Gandhi's son-in-law) has been transferred no fewer than 46 times in a 22-year career (Siwach 2015).

In addition to hiring, the system of remuneration of public sector employees leaves much to be desired. There are at least two problems. First, the wage structure is compressed, with entry level wages too high relative to private sector wages (see Figure 2 from Muralidharan and Sundaraman 2013) and top wages too low relative to comparable private sector compensation. Second, there are virtually no rewards or punishments on the basis of performance, and hence little incentive to perform well.

High entry level wages lead to too many people spending too much effort trying to simply enter public service. This problem is exacerbated by rules governing attempts at clearing the civil service entry examinations, with current regulations allowing 4–7 attempts (depending on caste category) between the ages of 21–30 (Krishnan and Somanathan, forthcoming). If a

candidate spends nine years outside the labor force simply trying to get a public sector job, it is quite likely that this expenditure in terms of opportunity cost and investment in studying must again be recouped. On the other end of the spectrum, wages for top level administrators lag behind their counterparts in the private sector, increasing the temptation to be corrupt. For example, Krishnan and Somanathan point out that wage compression (at least until the 1990s) "led to a loss of morale and an excuse and justification for corruption."

Finally, there is little reward to performing well, and worse, rarely any punishment to nonperformance. The entrenched power of employee unions and onerous government regulations means that, short of murder, it is nearly impossible to fire a public sector employee. The news media recently reported on the amazing case of a government official who did not show up for his job for 24 years, yet continued to draw salary while numerous attempts were made to fire him (*Agence France-Presse*, 2015). Krishnan and Somanathan suggest euphemistically that "judicial interpretation and, in particular judicial leniency to civil servants who perform inefficiently, has reduced efficiency." Under such circumstances, the only surprise is that there remain honest public officials at all.

3. Varieties of Corruption: Magnitudes and Consequences

Having reviewed some of the leading drivers of corruption, in this section we turn to a review of the literature on corruption in India, focusing on evidence on the scale and scope of corruption and on the crucial issue of whether corruption actually affects economic and political outcomes. To make sense of this vast literature, we follow a simple rubric. Since our definition of corruption is based on actions of public officials, we categorize corruption according to the nature of the corrupt actions taken by these officials.

Our first category involves *facilitative* corruption. This type of corruption involves officials charging fees or bribes for activities that they should be doing in the first place. For example, this category would include all types of "speed money" bribes to obtain government services like ration cards, passports, etc.

The second category is *collusive* corruption. This involves officials breaking or bending rules to benefit bribers, and is particularly difficult to detect since no party has an incentive to report the crime. Bribes paid to bypass fines and regulations, kickbacks from procurement in government, and bribes paid to illegitimately obtain government contracts or licenses would all fit into this category.

The final category relates to *extractive* collusion. In this case, the official simply extracts funds from the government or private parties, either through harassment or stealth. Within this category we would include embezzlement from public funds, harassment bribes, as well as actions like shirking or not showing up to work.

Our categorization may not necessarily encompass every instance of corruption by bureaucrats or politicians, although it does cover the majority of cases in the literature. Furthermore, it provides us with a useful tool for conceptualizing the impact of corruption. Hence, we not only summarize the empirical literature on each category of corruption, but also attempt to outline how each type of corruption might distort allocations.

A word of caution is in order prior to delving into the existing body of corruption-related research: India is vast and heterogeneous, and many of the studies conducted in one state or region may not be easily extrapolated to other states or regions. When issues of external validity and small sample size warrant particular attention, we highlight them. When multiple studies in different contexts reach the same conclusion, we are more confident in drawing policy prescriptions. In all other cases, we leave the reader with this general caveat.

3.1. Facilitative Corruption

The first category is a form of corruption that a majority of Indians have likely experienced: the payment of bribes to obtain routine government services and documents such as ration cards, driver's licenses, passports, residence and caste certificates, etc. Transparency International notes that 54 percent of urban respondents who had contact with nine common government service organizations had to pay a bribe to obtain the service (Transparency International 2011 South Asia Barometer). The popular website www.ipaidabribe.com was started in part because of the commonality of this type of experience, and although the self-reports collected there are not representative, the site claims millions of visits and tens of thousands of reports from 600 cities and towns across India. Popular resentment against this type of corruption has led to the introduction of Right to Service legislation, although the bill is still languishing in the Lok Sabha.⁸

^{8.} The bill's full title is: the Right of Citizens for Time Bound Delivery of Goods and Services and Grievance Redressal Bill, 2011.

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Theoretically, this type of corruption likely comes under the heading of "corruption without theft," where officials pass on the official price of the good or service to the government but charge additional fees or bribes that they keep (Shleifer and Vishny 1993). Under this scenario, officials need to artificially restrict the quantity of service provided so that they can charge a higher overall price. Further, social and efficiency consequences are likely to arise from the "wrong" people—from the point of view of society—getting the document or service: e.g., unqualified drivers getting driving licenses, rich people obtaining Below Poverty Line (BPL) cards, etc. Of course, if bribes simply serve as user fees or "speed money" to incentivize bureaucrats to work faster but do not allow "bad" types to obtain services or documents, the negative consequences might be mitigated.

Recent empirical work provides us with good evidence on the extent and consequences of this type of corruption. Bertrand, Hanna, Djankov, and Mullainathan (2007) followed 822 applicants for driver's licenses in Delhi. As predicted by theory, bureaucrats artificially restrict licenses and create red tape in order to charge applicants more than official fees and clear the market: government officials seem to arbitrarily fail applicants taking the official driving test, as the authors find that failure on this test is uncorrelated with actual driving ability as measured by an independent driving test. Accordingly, applicants must make multiple trips to obtain licenses, and end up paying 2.5 times the official fees for the license.

These bribes do not simply represent a transfer from applicants to bureaucrats, but are actually harmful to society: 71 percent of license getters do not take the licensing exam, and most damningly 62 percent of license getters failed the independent driving test. Further, the authors experimentally manipulate willingness to pay (private value) by offering a random subset of study subjects a substantial bonus if they obtain their licenses quickly. They find that the licensing process is very responsive to private value, but not to social value: those offered a bonus were much more likely to both get a license but also to be unable to drive when compared to the control group. At this point, bribes to obtain licenses cross over from being simply facilitative corruption to collusive corruption (discussed below).

A similar story of extra-statutory fees and the "wrong" people getting government services and benefits holds true for BPL cards. These cards entitle households to a range of welfare benefits, most importantly to subsidized food under the Targeted Public Distribution System (TPDS). Niehaus et al. (2013) surveyed 14,074 households in rural Karnataka to learn about the process for obtaining BPL cards. They found that bribery is widespread: 75 percent of households reported paying bribes to obtain the cards, although the average payment above official fees was small: ₹14.

More importantly, however, they found that 48 percent of households are misclassified. Seventy percent of households that were ineligible to receive BPL cards—based on criteria such as owning a vehicle, color TV, gas connection, or more than 5 acres of land—had a card (type 1 error), and worryingly, 13 percent of eligible households did not (type 2 error). Overall, statutory eligibility was much more strongly correlated with income than actual ownership of cards, suggesting that reasonable targeting rules were perverted by the corrupt allocation process.⁹

Two studies in Delhi (Peisakhin and Pinto 2010; Peisakhin 2012) found similar arbitrariness and restriction in the provision of ration cards (required for TPDS benefits) as well as voter ID cards, although these results must be viewed with caution given the small and nonrepresentative samples (86 and 121 individuals in one slum and university area, respectively). For study subjects, it was practically impossible to obtain these documents without paying a bribe or resorting to a Right to Information request. We discuss these studies further in Section 4.

3.2. Collusive Corruption

Collusive corruption occurs when officials, conspiring with bribers, bend or break rules and regulations. Assuming that the given rule was good for society in the first place, distortionary effects can be large. For example, government agents might grant firms contracts in exchange for bribes or kickbacks, which could result not just in economic distortions but also efficiency losses. If an agent awards an infrastructure contract to a firm for reasons independent of firm quality, it is possible that the firm is unqualified to execute the contract faithfully or will shirk in order to recoup the financial loss incurred by the bribe payment. A 2014 survey of "Global Economic Crime" by the accounting firm Pricewaterhouse Coopers LLP (PwC) found that the industry reporting the greatest degree of procurement fraud was government/state-owned enterprises (PwC 2014). In India, corruption in public procurement is a well-identified obstacle to improving the country's investment climate (UNODC 2012).

9. Besley et al. (2007) examine data from four south Indian states and find that while local-level politicians target BPL cards to households which are relatively disadvantaged on average, households in which politicians themselves are living are much more likely to possess BPL cards.

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Unfortunately, this type of corruption is also difficult to empirically document, since neither the bribe-giver nor bribe-taker has an incentive to publicize this transaction (Bardhan 1997). However, a recent paper by Duflo et al. (2013) breaks new ground. In most markets in which the state plays a regulatory function, regulated firms themselves often choose and pay for the "third-party" audits meant to monitor compliance. This naturally creates a conflict of interest: the firm has an interest in an audit that paints the firm in a good light, while the auditor has an interest in satisfying the client in order to maintain business. This creates an incentive for rampant corrupt behavior although it need not necessarily have an adverse direct impact on economic efficiency.

In the context of a third-party audit experiment involving pollutant-emitting plants in the state of Gujarat, the authors uncover systematic evidence of corruption in the audit reporting for plants in the control group—that is, those plants that are audited by firms selected and paid for by the plants themselves. When auditors were hired and paid by the firms they were auditing, 29 percent of auditors falsely reported pollution below the regulatory standard (even though actual emissions were above the standard). For control group emitters, auditors reported that only 7 percent of plants violated the government standard, when in reality 59 percent were emitting more than the standard.

To our knowledge, only one rigorous empirical study documents corruption in public sector procurement practices. In the context of a study on the introduction of electronic procurement, Lewis-Faupel, Yusuf, Olken, and Pande (2013) examine the tendering process for manual procurement drawing on a random sample of road contracts issued by the state of Uttar Pradesh. As the authors note, manual procurement is subject to corruption on several grounds. Because documentation is not public and exists only in the written form, the government can provide private information to favored bidders that would give them a competitive advantage or use its discretionary authority to disqualify bidders on spurious grounds. Indeed, the authors find there is little competition for public sector road-building contracts because many firms are disqualified on "technical" grounds. In 95 percent of cases, the government only ended up evaluating a single firm's financial bid. Where there are multiple initial bidders, in the case of any technical disqualification, the authors report that "all but one bidder are disqualified 100 percent of the time." The pattern of disqualification is consistent, the authors argue, with corrupt officials rigging the procurement process to favor a pre-determined winner.

At least one study (Kapur and Vaishnav 2015) has drawn a link between collusive corruption and India's broken system of financing elections.

The motivating premise of their study is that politicians often turn to private firms for illicit election finance in sectors where the discretionary powers of the state are large, in line with our discussion of one of the two "deep" drivers of corruption in India. Firms operating in highly regulated sectors are natural targets as election donors since politicians can exchange policy discretion or regulatory forbearance for campaign contributions.

The authors specifically focus on the role of the construction sector, which depends heavily on the availability of land, an input that is tightly controlled by state authorities. Kapur and Vaishnav hypothesize that builders operating in the sector will experience a short-term liquidity crunch as elections approach because of their need to re-route liquid funds to campaigns in the form of election payments. Using a novel monthly level dataset that captures variation in the state-wise demand for cement—the indispensable ingredient of the modern construction sector—the authors confirm the presence of an electoral cycle in cement consumption in India, confirming the original prediction. Consistent with their theoretical predictions, the negative shock in cement consumption is more intense for state elections (states have primary regulatory responsibility for land), urban states, and in especially competitive elections.

Finally, there is a burgeoning literature on politicians manipulating the targeting of goods, services, licenses, jobs, or other transfers in order to reap electoral benefits (see Golden and Min 2013 for a broad review). Whether these activities are "corrupt" in a narrow sense can be debated; distributive transfers in this realm are variously referred to as pork, clientelism, or patronage. While such transfers can entail a misallocation of public resources, we consider these as part of the political process, and difficult to define as "corruption," thus do not explore the literature in this area.

3.3. Extractive Collusion

This third category of corruption is variously described as leakage, diversion, or embezzlement. In its simplest form, the government tries to send benefits of some kind (money, food, medicine) to recipients, and officials in charge of delivery simply steal them rather than delivering them to the poor. Late Prime Minister Rajiv Gandhi once famously estimated that only 15 percent of benefits disbursed by the government of India actually reach the poor. In addition, overbilling the government for benefits in the name of fake recipients also falls under this category. Thus, theft can be from both beneficiaries, which directly harms them (underpayment), and from the government, which harms taxpayers in general (overreporting).

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Embezzlement has distortionary consequences for optimal public finance. First, it might make seemingly progressive public programs regressive, if officials are generally richer than beneficiaries and taxpayers (Olken 2006). Second, it affects optimal rules for the allocation of public funds: without corruption, governments would simply equate the marginal social costs of raising funds to the marginal social benefits of delivery, but with embezzlement the marginal social benefits need to be adjusted by the fraction of funds that actually reach the poor (Niehaus and Sukhtankar 2013b).

In addition, leakage may have systemic negative consequences too: officials may allocate time towards activities focused on embezzlement (Murphy et al. 1991) rather than implementing public programs as they are meant too. However, one line of argument suggests these rents may keep officials incentivized to implement programs.

Recent empirical work provides evidence on leakage from at least the two largest welfare programs, NREGS and TPDS. The methods used in these studies are straightforward: they involve comparing official records of disbursements of benefits against beneficiary surveys. Of course, beneficiary recall and misreporting are concerns with this methodology, so precise levels must be viewed with caution.

Niehaus and Sukhtankar (2013a, 2013b) surveyed about 3,000 listed NREGS beneficiary households in three districts in Odisha and one in Andhra Pradesh (AP), comparing official records of disbursements of NREGS wages against beneficiary reports in original surveys. The results are disheartening: about 70–80 percent of the NREGS labor budget is embezzled before it gets to beneficiaries. This corruption directly hurts beneficiaries, as the work they do is not correctly remunerated, and their wages are underpaid. It also hurts taxpayers, through over-reporting of work done, as the exchequer pays out far more than intended.

In addition, government efforts to increase benefits—the statutory wage in this case—are entirely thwarted, as *none* of the increase is passed on to beneficiaries. The authors show that with this kind of corruption, a program that is meant to set market wages instead ends up being a price-taker: beneficiaries are just paid the prevailing market wage in the area.

It is important to keep in mind that these results, although representative for the areas surveyed, correspond to districts that are likely more backward and corrupt than the median district in India.

Khera (2011) highlights heterogeneity across India in embezzlement from public programs while examining diversion of food grains from the TPDS. Comparing state-level offtake for TPDS (i.e., the amount of grains that states obtain from the Food Corporation of India (FCI)) of rice and wheat to NSS survey reports of grains received by beneficiaries from Fair Price Shops (FPS, or ration shops), she finds that the overall rate of diversion in India in 2007–08 was about 44 percent. Estimates range from essentially no diversion in Chhattisgarh to almost 90 percent diversion in Bihar. These estimates are likely to be the upper bound of pure leakage, since some of the grains that do not reach beneficiaries may simply be due to losses in transport or spoilage or other mismanagement.

These estimates are very close to the Government of India's own estimates of diversion in the TPDS. A report by the Planning Commission (Programme Evaluation Organization 2005) finds that 58 percent of food grains issued by the FCI do not reach the poor (defined as BPL families), which is comparable to the 54 percent figure that Khera estimates for 2004–05. The report also monetizes the magnitude of the loss and the cost of delivery, calculating that for every Rupee transferred to the poor, the government spent ₹3.65. In other words, the poor obtain only 27 percent of the benefits they are meant to receive.

In addition to pure theft, an insidious type of corruption involves public sector employees not showing up to work when they are supposed to, or, more broadly, shirking on the job. It is, in a way, similar to embezzlement, since it effectively equates to theft of time from the government. However, the causes, consequences, and strategies to combat this form of corruption differ significantly. Absence or shirking on the job is common in the public sector across the world, since disciplining public sector employees proves to be difficult given strong unions and other political economy factors.

The consequences of absence could include long-run harm to human capital, mainly through education and health, in the country. As Chaudhury, Hammer et al. (2006) point out, absent health and education workers basically mean closed hospitals and schools in developing countries, since there are no substitutes and many of them have single providers. The unpredictability of absence may also discourage users from attempting to access these services in the first place. Moreover, alternatives to public schools and hospitals may be too expensive and/or just as ineffective.

Chaudhury et al. (2006) conducted a representative survey across India to measure absence amongst teachers and health care workers in government schools and health centers. After conducting random checks of schools and clinics during working hours, they found that the rate of absence of teachers is 25 percent and health care workers 40 percent. This compares to 5 percent in developed countries. Other work corroborates these absence findings in smaller samples: Banerjee et al. (2010a) find 27 percent teacher absence

in Jaunpur district in Uttar Pradesh, and Banerjee, Duflo, and Glennerster (2008) find 54 percent health care worker absence in Udaipur in Rajasthan. An updated survey conducted by Muralidharan et al. (2014b) returned to the same schools surveyed by Chaudhury et al. (2006), and found that little had changed: teacher absence rates were 23 percent across India.

What is worse is that these absence rates are likely a lower bound, since Chaudhury et al. were conservative in what was counted as an absence: e.g., they did not count part-time employees, and took the head of the school/ clinic at her word if she said an employee was not supposed to be working. In addition, the authors also find that even when teachers are present, they are teaching only 45 percent of the time. This is in spite of also being conservative in defining teaching activity to include any time a teacher was in the classroom. Similarly, health care worker absence is compounded by the fact that even when they are present, public doctors treat patients much worse in public clinics than they do in their own private practices (Das and Hammer 2007).

The depressing news continues, as Chaudhury et al. also find that absence rates are higher in poorer areas: a doubling of per capita income is correlated with absence rates that are 6 percentage points lower. Health care also suffers: the quality of care is such that in poor areas, unqualified private doctors tend to perform better than qualified public doctors (Das and Hammer 2007). Further, hiring additional teachers only leads to greater absence: hence effective marginal rates of absence were even greater than average rates (Muralidharan et al. 2014b).

The causes of education and health worker absence are fairly straightforward to understand. Given political economy constraints, these civil servants rarely, if ever, face any sort of punishment for shirking. Chaudhury et al. found only one instance of an employee firing out of 3,000 cases where a teacher was absent. Further, they also find that in more powerful positions, occupants were more likely to shirk: e.g., doctors were more likely to be absent than nurses, men more likely than women, and head teachers more likely than ordinary teachers.

The consequences of absence are, of course, poor health and education outcomes. For example, while enrollment rates are almost 100 percent amongst children aged 6–14, only 56 percent of children in rural India can read a simple story by grade 5 (Chaudhury et al. 2006). Duflo, Hanna, and Ryan (2012) find that reducing teacher absence from 42 percent to 21 percent in rural Rajasthan improved student test scores by 0.17 standard deviations, which is a very large effect in this literature. Finally, there is a

large fiscal cost to the government: Muralidharan et al. (2014b) estimate this to be \$1.5 billion a year, or 60 percent of the revenues raised by the special education tax.

4. Strategies and Legislation to Combat Corruption: What Might Work?

The previous section catalogued the categories of corruption scholars have rigorously studied in India and their impacts on society more broadly. In this section, we turn our attention to solutions. We begin with a categorization of broad strategies to combat corruption. We use this schema to classify the current set of reforms, and to examine what evidence there is on the potential effectiveness of each strategy.

The broad categories of tools to combat corruption are as follows:

- 1. Information/ bottom up monitoring
- 2. Technology
- 3. Financial incentives/ performance pay / efficiency wages
- 4. Electoral reform/ political incentives
- 5. Legal reform
- 6. Policy reform

4.1. Information/Bottom-up Monitoring

Information is seen as a basic pillar of the fight against corruption worldwide. According to Transparency International, "access to information and a strong civil society are essential for good governance and public accountability."¹⁰ Remarkably, India's RTI Act (RTIA) that was passed in 2005 is ranked as the second best right to information law in the entire world by the Center for Law and Democracy, placing it above every single OECD nation in this regard.¹¹

Of course, having a law on the books is one thing, and implementing it is quite another. India also has laws that guarantee employment for rural

^{10.} http://www.transparency.org/whatwedo/activity/action, accessed June 25, 2014.

^{11.} The universe of eligible laws is not limited to developing countries, or emerging nations, but only to countries that have an existing law on the books. The ranking is based on overall score in the categories of Right of Access, Scope, Requesting Procedures, Exceptions and Refusals, Appeals, Sanctions and Protections, and Promotional Measures: http://www.law-democracy.org/live/wp-content/uploads/2012/08/Chart.pdf, accessed June 25, 2014.

dwellers (NREGA), access to basic education (Right to Education), and the right to food (National Food Security Act), yet their implementation leaves much to be desired. The good news, however, is that two very similar studies suggest encouraging effects of the RTIA on citizens' ability to obtain public services.

Peisakhin and Pinto (2010) examined the process of obtaining ration cards in one slum in Delhi. The study randomized 86 applicants into four groups: the main treatment group was assisted in preparing RTIA requests, and outcomes of this group were compared to groups who either: (a) paid a middleman to obtain cards through (ostensibly) bribing officials; (b) presented a letter of support from an NGO; and (c) a control group that simply submitted the necessary paperwork. The RTIA request in the intervention asked the relevant official "for information about the status of their application and about the average time for ration card applications in this district." The letter from the NGO noted that "the application was eligible for a ration card and urged prompt administrative action."

Remarkably, 94 percent of applicants in both the bribe and RTIA groups received their ration cards within a year, while only 21 percent received them in the NGO and control groups. The bribe and RTIA groups also both had much shorter median processing times: 82 days for the bribe, 120 days for the RTIA, and 343 days for the control.

A related experiment compared RTIA requests, bribes, and a control group in the process of registering 121 applicants for a voter ID card, with an additional element that distinguished between applicants from a middleclass university area and in a slum in Delhi. Again, the bribe and RTIA groups performed significantly better than the control group, in both poor and middle class areas.

The very small sample sizes and the fact that the studies were done in small urban areas in Delhi means the results must be viewed with caution.¹² While the results are encouraging, the mechanism through which the RTIA works for these requests is not clear. In particular, it hardly seems like the binding constraint for receiving the service is "information on the status of the application," and further, penalties for noncompliance with RTIA requests are extremely rare and not very large. Interestingly, the authors themselves speculate that the RTIA requests work "not so much because of the Act's penalty provisions, which are rarely used, but rather because in India's ultra-competitive bureaucracy, any blemish on a public servant's career can negatively affect his chance of promotion."

12. For example, Roberts (2010) reports that awareness of the RTIA in urban areas is three times that in rural areas.

Thus, it appears that the RTIA is less about information than shifting the bargaining power to applicants, and giving them a threat which they can use credibly to potentially sanction the official. This interpretation fits our framework above, and also helps explain why no other study which provides information to applicants or beneficiaries finds any effect of providing this information, whether in public works or education.

In the case of NREGA, e.g., Ravallion et al. (2013) conducted a largescale randomized trial in Bihar to test for the effects of providing information to actual and potential program participants on their rights under the act. Baseline levels of information about and participation in NREGS were very low. While 56 percent of the rural population was BPL, only about 10 percent participated, even though more than 75 percent of those surveyed—5,000 rural individuals in 150 villages spread across rural Bihar—had heard about NREGS. In the control group, only 22 percent knew how many days they are allowed to work, 32 percent knew the wage rate, 29 percent knew about receiving unemployment insurance if work is not provided within 15 days of applying, and almost no one knew that applicants are supposed to get work within 15 days.

To test whether this situation could be remedied, the authors showed a randomly selected treatment group of villages an educational, emotionally captivating film about NREGS to the village. The intervention increased knowledge of the program: a 53 percent increase in knowing about number of days allowed to work, a 36 percent increase in people who know about wage rate, a 33 percent increase in knowing about unemployment insurance, and a 70 percent increase in knowledge of getting work within two weeks. Despite this increase in awareness, however, reported survey outcomes on actual or desired participation, wage rates or days worked remained entirely unchanged. While the NREGA guarantees employment, on average participants said they would like 44 more days of work, so rationing was evident.

These results are also consistent with evidence from Odisha presented in Niehaus and Sukhtankar (2013b). They survey a large sample of listed NREGS participants in three districts in Odisha, and ask about days worked and wages received around a time during which the official minimum wage rate increased from ₹55 per day to ₹70 per day. While over 80 percent of respondents knew about the wage change, and over 70 percent could accurately name the new wage, on average almost no one working on NREGS received a wage increase. The only exception to the rule was that villages where an NGO was active received modestly higher wages after the wage change, perhaps because these NGOs helped keep local officials accountable.

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Providing information as well as encouraging community-based monitoring was also largely ineffective in other contexts in India. Community-based monitoring is fast becoming a buzzword in the development community around the implementation of public programs (Björkman and Svensson 2009). The enthusiasm derives from the idea that local communities have easier access to information regarding the performance of local government officials, and hence involving these communities in program management might improve the functioning of programs. Worldwide, there are mixed results on the performance of community-based monitoring, with Björkman and Svensson (2009) finding improved health outcomes in Uganda but Olken (2009) finding no effects on public works in Indonesia.

In the context of NREGS, "social audits" have been touted as a means to tackle corruption. The state of AP is the leader in implementing these audits, in which a team of district and state auditors train local villagers in auditing techniques and conduct a week-long exercise together whereby official expenditure records on NREGS are tracked in villages. At the end of the exercise in each subdistrict, a public hearing is held in the presence of NREGS officials as well as local beneficiaries, and complaints and testimonies are read out.

Afridi and Iversen (2013) analyzed social audits in AP by collecting a panel dataset on three rounds of social audits in 300 villages across 8 districts between 2006 and 2010. They find that these audits largely do not have a deterrent impact on corruption: having an initial audit does not change the number of easy-to-detect irregularities in round two, and it actually increases the number of hard-to-detect irregularities. There are no effects on other important program outcomes such as employment generation. The authors suggest that a leading explanation for the lack of effect is that once discovered, official malpractice is rarely punished.¹³

In rural Uttar Pradesh, village education committees (VECs), which include parents of children in local schools, are mandated by law to serve as intermediaries between the village and educational authorities. Banerjee et al. (2010a) conducted a randomized trial in 280 villages in the Jaunpur district, in which an NGO provided information on the roles and responsibilities of the VECs, invited villagers to create "report cards" on the status

13. Less than one percent of corrupt officials are actually removed from office or face serious action; even mild punishments such as suspensions are meted out in fewer than three percent of cases; and amazingly officials seem to be able to get away scot-free with their earnings, since over 87 percent of embezzled amounts were not recovered three to seven years after the audits.

of education in villages, and trained volunteers in teaching basic reading skills to primary school children. None of these treatments were successful in encouraging increased involvement in public schools.

Overall, our assessment is that information and encouragement of community participation, on their own, will have little effect in addressing corruption. Instead, putting more bargaining power in the hands of beneficiaries and applicants is more likely to result in greater impact. In this regard, the various "Right to Service" bills which have been passed in many states and are being considered in several others as well as Parliament, have the potential to reduce corruption in public service delivery provided they include effective penalties for misbehaving officials. As of January 2012, at least nine states had passed "Right to Service" laws. While the specific provisions of the respective states laws differ, they all guarantee the right to a specified list of services to citizens in a time-bound fashion and institute penalties for government officers who fail to comply (see Raha 2012 for a review).

A central act, The Right of Citizens for Time Bound Delivery of Goods and Services and Grievance Redressal Bill, was introduced in 2011 and is pending in the Lok Sabha (PRS Legislative Research 2012). This bill in, its current form, seems promising. It forces public authorities to detail timelines for delivery for all goods and services that it provides, and allows citizens to file complaints if these are not delivered on time, or if they experience misconduct from a government officer of the authority. The bill also mandates the appointment of a Grievance Redressal Officer (GRO) and State and Central Grievance Redressal Commissions, which can judge appeals. Complaints must be addressed within 30 days, and multiple appeals are possible to higher authorities. Most importantly, the bill allows for fines up to ₹50,000 on the GRO or officers guilty of misconduct, and also allows some of this fine to be awarded as compensation to the complainant.

These provisions of the bill have the potential to both reduce ability of bureaucrats to arbitrarily restrict public services in order to extract bribes, and increase bargaining power of applicants for public services. Of course, it remains to be seen how central and state government authorities and officials respond to the provisions, whether loopholes can be exploited, and whether fines and penalties are actually assessed.

The recent history of the RTIA provides us with some cautionary fodder. A 2010 review of the law suggested that the "use of the law has been constrained by uneven public awareness, poor planning by public authorities, and bureaucratic indifference or hostility" (Roberts 2010). Furthermore, recent attempts have been made to reduce the number of entities under its purview, most importantly the Central Bureau for Investigation (CBI) and political parties.¹⁴

While these attempts prove that the act has some bite, actual cases of penalties and sanctions imposed are rare. For instance, several studies (quoted in Roberts 2010) have found that State Information Commissions are often reluctant to levy penalties on noncomplying officers since that would unfairly penalize officers who lack training or experience or who have to deal with systemic shortcomings. Meanwhile, anecdotal evidence grows that the RTIA can be misused for competitive or personal gain; overall, a rigorous analysis of the impact of this act is imperative.

A final transparency mechanism, which does not yet exist but is awaiting parliamentary approval, is a central procurement portal, embedded within the Public Procurement Bill (2012).¹⁵ The bill mandates the establishment of a "Central Public Procurement Portal," which would serve as a repository for materials related to government procurement, such as documents related to prequalification, registration and bidding, as well as participation details and final decisions or appeals. While such a move is a good first step, a real breakthrough could be achieved if the government were to consider publishing actual government procurement contracts. Kenny and Karver (2012) have argued that such "Publish What You Buy" provisions can not only reduce corruption but also lower the costs of contracting to the benefit of governments, contractors, and citizens.

4.2. Technology

Given the emergence of information technology services as a dynamic sector of the Indian economy, state and central governments have often looked towards technology as a potential silver bullet for tackling corruption. The recently defeated UPA government embarked on an ambitious initiative— *Aadhaar*—to deliver biometrically authenticated unique IDs to all residents of India. Authorities believed that this initiative would revolutionize the delivery of government services, with the Unique ID Authority claiming that "*Aadhaar* will empower poor and underprivileged residents in accessing services such as the formal banking system and give them the opportunity to easily avail various other services provided by the Government and the

14. Parliament exempted the CBI from the RTI in 2011, while political parties are in a pitched battle with the CIC, which ruled parties to be "public authorities" subject to RTI in June 2013. We discuss the latter dispute in greater detail in Section 4.4.

15. The bill is pending before the Lok Sabha. More detail can be found in PRS Legislative Research (2013).

private sector."¹⁶ Former UPA Finance Minister P. Chidambaram called it "a game changer for governance" (Harris 2013). After some murmurings to the contrary, the NDA government, shortly after taking power in May 2014 decided to fully implement *Aadhaar*.

State governments have also embarked on their own initiatives to deliver services, in particular online services for applying for ration cards, certificates of various kinds, obtaining land records, etc. (commonly referred to as "e-sewa" initiatives).

The academic evidence on the impact of technology to reduce corruption, however, is somewhat mixed across various sectors. For example, on the e-sewa initiatives, Bussell (2012) writes that "while there was considerable initial enthusiasm to use new technologies, the actual benefits offered to citizens are constrained in many cases by persistent efforts to retain access to a rich source of corruption: the bribes citizens pay to get the services they are promised by the state." Nonetheless, the studies provide some obvious and clear lessons that can be used to inform future policy.

A first set of interventions using technology involve attempts to reduce shirking and absence by teachers and health workers. Duflo et al. (2012) worked with an NGO in the Udaipur district to employ digital cameras to monitor attendance, along with financial incentives to reduce absence, in single-teacher rural schools run by the NGO. Baseline absence rates of 44 percent were higher than all-India averages. In the randomly assigned treatment group, teachers were given tamper-proof cameras and asked to have students take date-stamped photos of the teacher and other students at the beginning and end of each school day. This provided proof of attendance, and teacher salaries were based on the number of days attended.

Comparing attendance for teachers who were given cameras and incentives with a control group who did not receive either, the authors found that absence was reduced by 50 percent in the treatment classrooms. More importantly, teacher attendance actually translated into improved educational outcomes for students: test scores were 0.17 standard deviations higher in the treatment group after a year of the program.

Unfortunately, the promise shown by this intervention has not been replicated in other settings. Banerjee et al. (2008) attempted a similar intervention with nurses in government-run rural health centers, also in Rajasthan. Again, baseline absence rates were very high, at around 60 percent. In this case, assistant nurse midwives in the treatment group were given locked

^{16.} http://uidai.gov.in/index.php?option=comcontent&view=article&id=58&Itemid=106, accessed 3 October 2013.

and password-protected time-stamp machines and asked to stamp cards at various points during the day, again with financial incentives for attendance. The expectations for attendance were very low: the only monitored days were Mondays, and pay was docked only once attendance dipped below 50 percent.

Initially, the intervention appeared to be successful, as absence rates almost halved. However, nurses soon found a way to co-opt the system. Official excuses for absence started going up, and 16 months after the program started, there were no differences between treatment and control group attendance.

A similar program attempted by Dhaliwal and Hanna (2014) in Karnataka also showed the limitations of technology. While initially outcomes improved, eventually the state health system found it increasingly difficult to attract nurses to work at rural outposts. This suggests that another constraint is the lack of human capital in rural areas.

One of the main differences between the teacher and health worker studies was that the teachers worked for NGO-run schools, and the NGO was willing to enforce penalties for absence. Governments face political economy constraints arising from the power of teacher and health care worker unions and their ability to help local politicians win elections, and hence interventions that succeed in small scale pilots may not easily scale up when run by the government (Acemoglu 2010).

For instance, Bold, Kimenyi, Mwabu, Ng'ang'a, and Sandefur (2013), e.g., conducted a contract teacher intervention in Kenya where half of the sample was devoted to a trial run by an NGO and the other half run by the government, and find that while outcomes improved under the NGO, they did not under the government. In sum, larger systemic constraints matter.

Other technological incentives, even those run by the government, show more promise. Muralidharan et al. (2014a) study the Andhra Pradesh Smartcard initiative, which used biometrically authenticated Smartcards to make payments under NREGS and Social Security Pensions (SSP), the latter of which makes monthly payments to elderly, widowed, and disabled individuals. Smartcards were a functional precursor to the integration of UID/*Aadhaar* with these programs. The evaluation was conducted in partnership with the Government of AP using one of the largest randomized controlled trials ever done, and featured a randomized rollout of the program across 19 million beneficiaries, which enabled an empirically rigorous evaluation of the new payments system.

Previously, payments were made in cash to beneficiaries, often by the same officials who implemented these programs. The new system made payments through local customer service providers (CSPs) who were employees of banks contracted by the government to manage payments, and added fingerprint authentication to ensure that actually intended beneficiaries received the money. This large-scale initiative faced both vast implementation challenges and pushback from local officials who stood to lose rents. Despite the best efforts of the government, only about 50 percent of payments in treatment areas were made via Smartcards after two years.

Nonetheless, the results are extremely promising. The poor gained significantly from the reform, through improvements in the payment processes that reduced both the time to collect payments and delays in transferring payments. There was also a significant reduction in NREGS and SSP leakage, about 40 percent for both programs, with most of the effect coming from reductions in overcharging the government for benefits that recipients never received. Despite the reduction in leakage, there was no reduction in access on either program. Smartcards were highly cost effective: time savings to beneficiaries *alone* exceeded the entire cost of the program for NREGS; further, the reduction in NREGS leakage was *nine times* greater than the cost of program implementation. Finally, beneficiaries strongly supported the program: 87 percent of NREGS and 92 percent of SSP beneficiaries prefer the new payment system over the old one.

These results are highly relevant to understanding the likely impacts of UID-integrated benefit transfers in India and similar programs in the developing world, and suggest that investing in secure authentication and payment infrastructure can significantly enhance "state capacity" to effectively implement a broad range of programs.

Given our framework, the reasons why this intervention worked become clearer. First, the electronic benefit transfer through CSP bypasses the local officials who are the source of hold-up and asymmetric information, or at least forces them to collude with CSPs. Further, live biometric authentication forces the presence of beneficiaries while collecting money, increasing their bargaining power. Previously, officials could simply collect money on behalf of beneficiaries even when they were not around (or in some cases did not even exist).

Finally, using technology in government procurement also shows some promise. A study by Lewis-Faupel et al. (2013) examines the impact of electronic procurement (henceforth, e-procurement) on public works projects in India and Indonesia. As the authors point out e-procurement seeks to address three common shortcomings associated with standard procurement practices: information asymmetries, collusion among bidders, and corruption. There is, however, the possibility of negative impacts should there be
large variation in access to Internet technology or the continued existence of coercive tactics by powerful firms.

In India, the authors examine procurement practices between 2000 and 2006 in the central government rural roads scheme, *Pradhan Mantri Gram Sadak Yojana*. Although the authors only have observational data, they rely on the phasing in of e-procurement over time, which allows for a difference-in-difference empirical strategy. In both countries, the study finds that e-procurement actually increases the probability of the winning bidder coming from outside of the region where the project is to be implemented. This suggests that e-procurement improves competition in the market given that it reduces the barriers to entry for firms to participate without being physically present.

However, the authors found no statistically significant evidence that e-procurement lowered prices paid by the government in India. They did find declines in Indonesia, although they were modest in size and not statistically significant. When it comes to quality improvements, e-procurement yielded positive gains on at least one measure in India. On the one hand, the authors found no evidence in India of an improvement or reduction in project delays although they found large declines in Indonesia. However, for India they also had access to data on an independent audit on construction quality. E-procurement was responsible for a 13 percent improvement in quality grades compared to projects with standard procurement norms.

In sum, e-procurement did not drive prices down through greater economic competition. It did, however, improve competition by attracting new firms—often from other regions—which were often of a higher quality. Furthermore, there was a positive impact on the actual quality of road construction, as assessed by an independent quality audit.

Overall, the lessons from technological interventions are similar to those from the information interventions, with one important caveat. Technological interventions that rely on enforcement from higher authorities will necessarily be constrained by political economy considerations, but those that simply bypass middlemen bureaucrats or those that transfer bargaining power to beneficiaries will be more likely to succeed.

4.3. Financial Incentives/Performance Pay/Efficiency Wages

While not quite as fashionable as technological interventions, financial incentives are one of the most straightforward methods that governments might use to combat corruption. Incentives could include simple bonuses based on outcomes or penalties if public officials are caught engaging in corruption. Indeed, many of the technological interventions described in the

previous section are combined with financial incentives, and, thus, we do not discuss these studies in this section. The main lesson from these studies is straightforward: high-powered incentives work, as long as they are enforced.

While financial or performance-based incentives for undertaking specific actions may indeed work, there is also a potential concern that they may also lead to negative consequences. For example, nurses may now show up to work but put in less effort at work. Teachers paid on the basis of student test scores may "teach to the test" at the expense of encouraging "real" learning.

Fortunately, evidence from a large-scale randomized experiment of government teachers in AP suggests that these types of concerns are perhaps overblown (Muralidharan and Sundaraman 2011). Teachers in 300 government schools in AP were randomly allocated incentive programs that gave them bonuses of up to 3 percent of their salary based on the performance of students on tests. After two years, student test scores improved significantly in the subjects whose test results counted for bonuses: math and language. Importantly, however, test scores also improved in subjects whose test results did not count towards bonuses—science and social studies —suggesting that enhanced teaching effort spilled over into these subjects. Moreover, results were positive across the distribution of students, suggesting that teachers did not just concentrate on the best or worst students.

In addition to the specific incentives described above, there is a longstanding idea that government officials need to be paid more overall: they are only corrupt because they are so poorly paid and need to supplement their income through illicit activities. More generally, the idea that "efficiency wages" could prevent corruption is very old, going back to at least the seminal work by Becker and Stigler (1974). In practice, however, there is little evidence that such measures will be effective.

Niehaus and Sukhtankar (2013a) indirectly test if efficiency wages matter for corruption, by checking whether increased *illicit rents* in the future can reduce corruption today. Taking advantage of a change in wages in the NREGS in Odisha that increased the possibility of higher rents to corrupt officials in the future, they find that corruption indeed was significantly lower today in areas that expected more lucrative projects to be forthcoming. While on the one hand this provides support for the efficiency wage hypothesis, the magnitudes of wage increases necessary to reduce corruption are out of the range of what might be deemed feasible: they find that corrupt rents were 100 to 1,100 times official wages.

A corollary to providing disincentives to engaging in corruption is to provide incentives to uncover corruption, by both protecting and incentivizing whistleblowers. The Whistleblowers Protection Act (which came into force in May 2014), however, appears to fall short in this regard. In balancing the rights of potential whistleblowers against the rights of officials to do their jobs free of harassment, the current provisions seem to tilt the balance towards officials. For example, there is no penalty for victimization of complainants, the Central Vigilance Commission (charged with investigating complaints) has no power to impose penalties, and—unlike the comparable US law, for example—there is no provision for the whistleblower to be compensated from any funds recovered as a result of the complaint (PRS Legislative Research 2011).

A final intervention in this category is the introduction of independent, third-party auditing. Duflo et al. (2013) implement a field experiment in Gujarat in which they introduce the random assignment of auditing in two heavily industrial regions of the state with the universe of "audit-eligible" plants. The intervention has several components. First, the researchers randomly assigned a third-party auditor to treatment plants who were paid from a central pool rather than by the firm directly. Second, the researchers verified a random sample of each auditor's pollution readings with follow-up visits. Finally, halfway through the study, treatment auditors were told that their pay would be linked to the accuracy of their audit reporting.

The treatment resulted in more truthful reports by auditors for treated firms. In terms of actual pollution outcomes, the treatment also succeeded in reducing emissions with the "dirtiest" plants reducing emissions the most. Finally, the authors demonstrate nonexperimental evidence that the financial incentives for reporting accuracy, implemented mid-way through the study, had an independent positive effect on reporting quality.

Hence, the introduction of independent "third-party" auditing resulted in more accurate reporting, less "cheating," and improved environmental outcomes. The random assignment of independent auditors was clearly a key component of the intervention, but equally important is the fact that the auditor was paid from a central pool of funds rather than directly by the audited firm. One could imagine a scenario in which the two are not delinked, which could potentially undermine the benefits of a third-party audit.

4.4. Electoral Reform/Political Incentives

When it comes to electoral reform, there are two distinct pathways through which policymakers seeking to curb the influence of corrupt or criminal politicians can operate. The first is to address the supply of "tainted" candidates into the electoral domain, while the second is to tackle the demandside incentives. To curtail the entry of candidates associated with illegal activity in the electoral domain, the Supreme Court issued two important judgments in 2013.

The first found that any MP or MLA currently holding office, if convicted by a court of law (for charges listed under Sections 8(1), 8(2), or 8(3) of the Representation of the People Act, 1951) would be immediately disqualified from the date of conviction (unless he or she obtained a stay on the conviction). Prior to Supreme Court intervention, convicted lawmakers could hold on to their seat as long as an appeal on that conviction was pending before the courts.¹⁷

The Supreme Court's order disqualifying convicted legislators has already had some impact. Shortly after the judgment, Bihar MP (and former Chief Minister) Lalu Prasad Yadav was forced to give up his seat in Parliament after the prosecution obtained a conviction in the fodder scam case. More recently, the chief minister of Tamil Nadu, Jayalalithaa, was forcibly removed from office after being convicted on graft charges, although her conviction was later thrown out by an appeals court. According to an analysis by ADR, there are 53 members of the 16th Lok Sabha who are at risk of being disqualified and, hence, vacating their seat should pending cases against them result in a conviction (and should they fail to obtain a stay on that conviction). However, converting charges framed by a court into a conviction is no small task. Of the 76 MPs serving in the 15th Lok Sabha who faced serious ongoing criminal action, the average case faced by this group had been pending for seven years (with some cases pending for 25 years or more).

The court also ruled, in a separate judgment, that any candidate who was either in jail or in police custody could not stand for elections (on the logic that such a candidate is not an eligible *elector* in the election) under Indian Law. Political parties across the spectrum alleged that the ruling provided perverse incentives for the government to falsely imprison or detain political opponents. In response, parliament swiftly passed a bill that clarified that that a person does not cease to be an elector even if he or she cannot vote due to police custody or incarceration. This effectively nullified the court's ruling.

In addition to judicial action on removing convicted legislators, the Election Commission and many good governance campaigners have also suggested preventive action. For instance, the ECI has formally

17. In order to counteract the court's move, the UPA government quickly introduced a bill in parliament that would nullify the ruling, but it was later forced to withdraw the bill under harsh public criticism. The government also considered promulgating an ordinance to the same effect, but again had to retreat in light of public outrage. recommended that candidates against whom charges have been framed by a Court should be disqualified from contesting elections. In order to guard against politically motivated charges, the ECI has suggested two additional caveats: that only cases filed at least six months prior to the election and those involving offences punishable by imprisonment of five years or more should be considered (on the premise that cases which meet these criteria are less likely to be subject to political motivation). Odisha MP Jay Panda has introduced a private member bill which, if passed, would subject such politicians to a newly created "fast track" tribunal to handle cases facing politicians. Recently, Prime Minister Modi rhetorically backed the idea, requesting that the Supreme Court set up a judicial mechanism to expedite cases against "any Members of Parliament upon whom an FIR is lodged," and reach a verdict within one year.

There have also been numerous steps either initiated or proposed to crack down on "black" money in politics (see Gowda and Sridharan 2012; Sridharan 2006 for a review). There is, as we discussed above, a well-established link between illicit election finance and criminality in politics, or what is referred to in common parlance as "money and muscle."

One basic remedy would be to improve the transparency of political party finances, which is sorely lacking. To this end, in June 2013, the Central Information Commission (CIC) ruled that for the purposes of the Right to Information Act, political parties were to be considered "public authorities" and, as a consequence, subject to provisions of the Act. Parliament quickly introduced a bill to remove political parties from the ambit of the RTI Act, but the bill was not passed during the 15th Lok Sabha. The CIC's ruling is controversial even for proponents of enhanced transparency, who contend that it is the ECI, not the CIC or the RTI, which should have jurisdiction over the affairs of political parties. However, in March 2015, the issue became moot as the CIC effectively threw up its hands, declaring that its decision was not implementable since parties had simply refused to cooperate with the agency and it had no mechanisms by which to compel the participation of the parties (Shrinivasan 2015).

Going forward, the ECI has proposed that it be granted greater authority to regulate political parties. For instance, the ECI has no ability under existing law to de-register political parties who flout democratic norms or who set up parties with the sole purpose of exploiting tax loopholes. One longstanding suggestion, also supported by many civil society organizations, is that political parties submit annual, independent audits of their finances to the ECI for public dissemination. To date, parties have resisted this move.

A second remedy under consideration is to enhance the ECI's authorities with respect to election-related disclosures. For instance, the ECI has also been in a pitched legal battle with the Government of India to bring charges against candidates who knowingly file false affidavits detailing election expenditures. The UPA-2 Government openly challenged the commission's power to disqualify a candidate for falsifying election finance filings, stating the Commission has the power to sanction candidates who do not file disclosures but not necessarily those who file incorrect ones (Hindu 2013). In a closely watched case in July 2014, the ECI framed charges against Congress MP Ashok Chavan, the former Maharashtra Chief Minister, for filing false election expenditure disclosures, accusing him of willfully hiding the fact that he paid off journalists to write positive news articles about him during a 2009 election campaign. The proceeding was seen as a test case of the agency's powers, but in September 2014, the Delhi High Court exonerated Chavan in the paid news case before the announcement of the state assembly elections in Maharashtra (Garg 2014). In order to avoid future legal uncertainty, the ECI has asked that the law be amended to clarify the ECI's authorities to sanction those who file false disclosures. In a similar vein, the ECI has suggested that "paid news," the practice of politicians paying journalists for favorable media coverage masquerading as "news," be explicitly classified as an "electoral offence" and made punishable under the Representation of the People Act.

All of these proposed reforms deal with reducing the supply of potentially "tainted" politicians into electoral politics. They work by changing the incentives of political parties to give tickets to such politicians, reducing the flow of illicit money in politics, or simply disqualifying politicians from contesting elections or holding office. Yet, there is a "demand" side to the equation as well, which relates to voter incentives and the electoral popularity of allegedly criminal or corrupt candidates. None of the remedies described above on the supply side grapple with the basic notion that, at the end of the day, "tainted" legislators would not be in office were it not for voters electing them.

When it comes to voter motivations and support for criminal candidates, there are broadly two schools of thought. The first believes this is an issue about information asymmetries and "ignorant voters." The second, in contrast, believes that the appeal of criminal candidates is related to their credibility to act as effective representatives. According to this view, voters support such criminal candidates *because*, rather than *in spite*, of their criminality.

There are a few studies that have explicitly tested the proposition that improving the awareness of voters through the provision of information reduces support for criminality. Banerjee, Kumar, Pande, and Su (2011) conducted an experiment with Delhi slum dwellers in advance of municipal elections in which a local NGO distributed newspapers containing report cards on politicians to randomly selected residents. The report card presented information on the performance of the incumbent legislator and the qualifications of the incumbent and two main challengers. The report card contained information on legislative activism, legislator performance, and expenditures from the incumbent's local constituency development fund. In addition, the report card contained data, gleaned from candidate affidavits, on educational qualifications, criminal records, and financial assets. Relative to control slums, the researchers find that treatment slums (which received the report card) experienced higher voter turnout, reduced vote buying (measured directly through participant observation), and increased support for better performing and more qualified incumbents. Interestingly, however, information on criminality seems to have no impact. The results indicate that neither information on the criminality of incumbents nor on that of challengers have any statistically significant impacts on incumbent vote share.

A paper by Banerjee, Green, Green, and Pande (2010b) reports on a voter mobilization, as opposed to information, campaign in Uttar Pradesh. In a set of randomly selected villages, an NGO conducted meetings and puppet shows to mobilize voters. In the first treatment, the NGO urged people in the village to vote on Election Day but to do so responsibly by *voting on issues, not on caste*. The second treatment involved an abstract plea, by the same NGO, to vote for "clean politicians." The treatment imparted the message: "Corrupt politicians steal money set aside for development funds and do nothing for you. Vote for clean politicians that care about your development needs."

The results of the first treatment indicate that it both has a positive impact on raising voter turnout and also reduces the extent of caste-based voting (as measured by a follow-on survey). The reduction in caste-based voting is linked to a significant decline in support for candidates charged with heinous crimes (although not those deemed to be "corrupt," as measured by a survey of local journalists). The authors conclude that low-information voters who are urged not to vote on the basis of caste will consider alterative evaluative criteria (such as past criminality). They surmise that support for criminal candidates, then, is a by-product of caste-based voting. The null result on the corruption measure, however, complicates the picture. The second treatment, urging voters not to elect corrupt candidates, had no impact on voter turnout or vote share of corrupt or criminal candidates. The authors reconcile these divergent findings by arguing that the nonpartisan anticorruption campaign may have been too abstract and failed to provide sufficient information needed to reshape voter preferences. On the other hand, the anti-caste/pro-development messaging directly addressed an important voter "heuristic," while simultaneously offering voters a new evaluation criterion (i.e., development).

It should be emphasized that the latter study relies on a voter mobilization, rather than voter information and treatment; and the two are not identical. Voter information had no impact on support for criminal candidates while the anti-caste voter mobilization campaign did have an impact. This latter finding is in line with Chauchard's (2013) work, which finds that support for criminality is not necessarily support for "criminals" per se, but a by-product of ethnic voting.

The second school of thought regarding the success of criminal politicians treats the issue of criminality in politics not as an information problem but one of credibility. Criminality in this case, researchers have shown, is often expressed through the language and symbolism of identity politics. This is consistent with a growing qualitative and ethnographic literature on criminality in Indian politics.

Recent survey data analyzed by Sircar and Vaishnav (2015) finds that at least 26 percent of respondents from an all-India sample admitted that they would vote for a candidate with serious criminal charges but who also delivers benefits to them. What is especially intriguing is that there is a strong association—at the state level—between support for criminality and expressions of caste bias (as measured through a list experiment from the same survey). This finding is in line with the "criminality as credibility" hypothesis.

Thus, the prospects for addressing the demand for criminal politicians are mixed. On the one hand, Banerjee et al. (2011) find that updating voter information on the criminal records of incumbents and challengers has no impact on voter behavior in Delhi. This is consistent with the literature that downplays the role of information; perhaps telling voters about criminal antecedents is not actually updating their beliefs in a meaningful way. Yet Banerjee et al. (2010b), in their study from Uttar Pradesh, seem to suggest that while voters may not be susceptible to the provision of factual information on candidate criminality, they might be influenced by a hortatory voter mobilization campaign. The literature reveals that there is clearly a linkage between identity politics and support for criminality; what remains unresolved is whether this connection is incidental or represents something deeper. In other words, do voters support candidates who are co-ethnics and hence deemed more credible (in which case, criminality is incidental) or is the credibility of co-ethnicity in some way conditioned by criminality? Clearly, more research is needed on the "demand" side before we can disaggregate these nuanced relationships.

4.5. Legal Reform

This category of anticorruption remedies involves enacting new laws to curb corrupt activities. There is, indeed, a large legislative agenda—comprised of several bills already introduced in parliament—on this score.

As mentioned previously, the Right of Citizens for Time Bound Delivery of Goods and Services and Grievance Redressal Bill (2011) seeks to create a mechanism to ensure the timely delivery of publicly provided goods and services to citizens. The Bill requires all public authorities to appoint officers to redress grievances and, if grievances are not redressed within 30 days, financial penalties are imposed on the relevant bureaucrat. Many states have set up identical mechanisms, raising questions about duplication as well as jurisdictional authority given that many goods and services are state subjects and involve state-level bureaucrats (PRS Legislative Research 2012). The central bill, much like its various state-level incarnations, is meant to address acts belonging to the first category of corruption mentioned in Section II, "facilitative corruption."

The Public Procurement Bill (2012) could help curb abuses in the category we call "collusive corruption," such as kickbacks from government procurement, by regulating central government procurement and improving its transparency. The bill establishes an open competitive bidding process as the default for public procurement (unless otherwise justified). The bill also mandates the publication of all procurement-related information on a central portal.

The Public Procurement Bill, as well as the Prevention of Corruption (Amendment) Bill (2013) and the Prevention of Bribery of Foreign Public Officials and Officials of Public International Organizations Bill (2011), all contain provisions on bribery. For example, the Procurement Bill criminalizes the acceptance of a bribe by a public servant as well as the offering of a bribe or exerting "undue influence" on the procurement process by prospective bidders. The Prevention of Corruption Bill criminalizes the act of bribe-giving and expands the definition of bribe-taking (which is already illegal

under Indian law). The latter bill makes giving bribes to, or receiving bribes from, foreign public officials or international public officials a criminal act (PRS Legislative Research 2014). This bill, if passed, would also ratify the United Nations Convention Against Corruption, which India signed nearly one decade ago in 2005. This highlights the role that external anchoring, whereby membership in an international body incentivizes domestic reform, can play in India's fight against corruption (Morlino 2005).¹⁸

On the specifics of India's bribery laws, the idea of criminalizing bribegiving, long part of the received wisdom, has recently been contested. In a well-known paper, Basu (2011) argues that, insofar as "extractive corruption" is concerned (or harassment bribes ordinary citizens must pay in order to receive what they are legally entitled to), the act of bribe giving should be deemed "legitimate." Basu argues that this will result in a sharp decline in the incidence of bribe giving, and the reasoning is actually quite simple. To quote the author: "[O]nce the law is altered in this manner, after the act of bribery is committed, the interests of the bribe-giver and the bribe-taker will be at divergence. The bribe-giver will be willing to cooperate in getting the bribe-taker caught. Knowing that this will happen, the bribe-taker will be deterred from taking a bribe."

A paper by Abbink, Dasgupta, Gangadharan, and Jain (2014) experimentally tested Basu's theoretical proposal, using a lab experiment conducted with university students in India. The authors find that when the bribe-giver is provided legal immunity, reporting of bribe demands increases while the demand for bribes declines (compared to a scenario in which both bribegiver and bribe-taker are held liable). This core finding is consistent with Basu's theoretical predictions. The authors, however, extend the analysis in two important ways. They authors test how bribe-givers react when bribetakers can retaliate and when the bribe-giver's payment is not refunded (hence eliminating monetary incentives). Their findings suggest that strict financial incentives do not overwhelmingly influence reporting behavior. However, when retaliation is an option, bribe demands and reporting are roughly on par with the baseline case (when both bribe-givers and takers are legally liable). The authors thus conclude that asymmetric liability alone

18. Similarly, India's decision to join the Financial Action Task Force (FATF), an international collective of nations dedicated to combating money laundering and terrorist finance, helped to galvanize a series of reforms to modernize India's financial and regulatory regime in order curb the flow of illicit funds. These alterations, many of which were contained in The Prevention of Money Laundering (Amendment) Bill, 2009, were stipulated as pre-conditions to India's joining the group as a full member in 2010. may not reduce corruption. Legitimizing bribe giving must proceed hand in hand with implementing procedures to limit retaliation.

In addition to legislation specifically designed to take action against corruption, there are also legal changes that structure (or restructure) economic interactions in ways that might minimize corruption. For instance, in the lucrative domain of natural resources, the NDA government has already taken steps to enact legal changes that will act to curtail *collusive* corruption. During the decade of the 2000s, on account of skyrocketing commodity prices, growing Chinese demand, and the booming domestic economy, India's natural resource sector was rife with rent-seeking. One of the gravest abuses was the arbitrary and wholly discretionary power of government authorities to allocate resources (such as spectrum, mining licenses, and land) to hand-selected proprietors. The discretion inherent in allocation rules paved the way for several of the biggest corruption scandals of the 2000s. Although the government's hand was forced by series of tough Supreme Court judgements, in March 2015 the NDA successful obtained parliamentary approval for two reform bills: the Coal Mines (Special Provisions) Bill (2015) and the Mines and Minerals (Development and Regulation) Amendment Bill (2015). Both bills compel the government to allocate mining leases via auction.¹⁹ As scholars have argued and history has confirmed, auctions can be an improvement but in and of themselves are no panacea (Klemperer 2002). Indeed, in March 2015 media reports surfaced suggesting the Government might cancel newly auctioned coal licenses on suspicion that private firms may have colluded in the auction process to artificially lower bid prices (Economic Times 2015).

4.6. Policy Reform

The final category of strategies to combat corruption involves simple reforms in rules and regulations. Under this heading, we discuss user fees, streamlining of permissions, and the rule of law.

A straightforward fix to many types of day-to-day corruption, particularly the type described in Section 2.1, is to institute user fees for faster delivery of public services. This would simply take the place of "speed money" bribes, hence redistributing these resources from wayward officials to government coffers, while at the same time reducing inefficiency by removing uncertainty and not taxing honest citizens who may refuse to pay bribes.

19. The one exception relates to the 204 coal leases cancelled by the Supreme Court in August 2014 on the heels of the "Coalgate" scandal. The government can provide licenses for these coalmines either through allotment or auction.

Such systems are common all around the world, and have been successfully implemented in India through the implementation of "tatkal" (immediate) schemes for obtaining train tickets, passports, phone services, etc. As one former academic who is now a senior member of government noted *tatkal* has basically eliminated bribes in obtaining railway tickets.

Another example of low-hanging fruit when it comes to policy reform is the streamlining of permission to minimize the prevalence of harassment bribes. In October 2014, Prime Minister Narendra Modi announced the creation of a new online portal that would allow more than 600,000 firms doing business in India to essentially "self-certify" their compliance with 16 different labor laws currently in force (Yadav 2014). This is a measure many leading business groups had been clamoring for, and a step some investorfriendly states have already pursued (FICCI 2014). Under the status quo, each of the 16 laws provided an opportunity for government inspectors to harass firms and seek bribes in exchange for filing favorable compliance reports. Under the new system, the feared "Inspector Raj" will not completely disappear, but instead be replaced by a system of random audits to ensure that participating firms are truthfully reporting compliance. While the new regime allows for some discretion on the part of the government, it significantly constrains it.

A final area deserving of greater attention is the rule of law. Intellectually, the rule of law is a slippery concept to pin down because there is, of course, no single institution that is charged with protecting the "rule of law." As Kapur and Vaishnav (2014) have argued, it is more useful to conceive of the rule of law as a set of linked activities in a supply chain. On one end, there are the laws on the books and the lawmakers who write them. Further along the chain come the courts, which are in charge of adjudicating the laws. At the opposite end sit prosecutors and the police, who are the front-line functionaries of the state in charge of enforcement. Weaknesses or shortcomings in any single link have obvious repercussions for the entire chain. For instance, what good are sterling laws on paper if the police do not have the capacity to enforce them?

Without reforming the rule of law in India, it will be impossible to deter corrupt acts before they take place or to take action once corrupt acts eventually come to surface. Any strategy to reform the rule of law must begin with reforming India's legal undergirding. In the previous section, we discussed several new laws that could have a salutary impact on the corruption environment. But just as important as adding new laws on the books is eliminating outmoded and outdated ones. The regulation of labor, for instance, is a domain badly encumbered with onerous and excessive laws that do more to provide venal government officers with tools to extort businesses than to protect the rights of workers.

With regards to the remaining links in the chain, under-capacity is a major constraint. As we discussed in Section 2, India's rule of law institutions are woefully undermanned in personnel terms. Even leaving aside the possibility that contractors or private sector employees might be able to correct for an under-provision of public sector workers (think, for instance, of the booming labor market for private armed guards), the strength of most law enforcement entities is well below where it should be. Even after boosting alternative justice mechanisms or systems of grievance redressal, there are limits to the progress that can be achieved short of hiring more judges. One solution which has been recommended by the Law Commission of India is to create an all-India judicial service, akin to the other all-India civil services (like the IAS). This idea was first mooted in the 1960s, and was endorsed as recently as 2012 by a Committee of Secretaries chaired by the Cabinet Secretary, but has yet to see the light of day due to continuing differences among the various state governments and high courts (*Times of India* 2015).

Even if political disagreements could be overcome, the crunch of financial resources poses a considerable obstacle to boosting the capacity of the public sector. While resources are a major consideration, one should not overestimate their role as the binding constraint. Recent experimental work by Banerjee, Hanna, and Mullainathan (2012) on police reform in Rajasthan demonstrates how relatively costless policy changes can greatly aid the capacity of existing public sector agencies. Using a randomized design, the researchers implemented a series of recommendations repeatedly suggested by various police reform panels over the years, including limiting arbitrary transfers, enforcing the rotation of duty days and days off, increasing community involvement and training, and deploying "decoy" visits. Due to the autonomy of middle managers, many of the interventions were not effectively implemented. However, the researchers did detect significant impacts from the training and decoy interventions.

Of course, a final impediment to reform is political will. In many instances, politicians prefer the status quo to pushing for reform because it protects their ability to use (and abuse) their discretionary authority to benefit themselves. Consider the consequences for the main parties involved in recent high-profile corruption scandals. On the one hand, it appears as though the state is fairly good at taking obvious action upon discovery of the scam: canceling contracts or licenses, starting investigations, and even arresting the main parties involved. True, many of these actions reflect the will of the courts rather than incumbent politicians, but nonetheless some action is taken.

When the dust settles, however, the news is quite depressing. Referring back to our inventory of corruption scandals since the year 2000, the most powerful actors—defined as serving or having served at the level of Chief Minister of a state or above—who are implicated in alleged wrongdoing are never actually found guilty (none out of the 12 cases in our sample). Instead, the pattern is to arrest involved parties and file a CBI case as soon as the scam breaks, but following up on this is practically impossible in the cases of such big players, and each of them is out on bail.

On the other hand, those with limited political protection, particularly those involved in financial scams defrauding other parties, are much more likely to actually serve jail time, as the experience of Ketan Parekh, Abdul Kareem Telgi, and even Harshad Mehta in the past suggest. The recent conviction of two former chief ministers (Lalu Prasad Yadav in Bihar, Om Prakash Chautala in Haryana) and one sitting chief minister (Jayalalithaa in Tamil Nadu) presents a hopeful sign that the culture of impunity may be coming to an end, but it is too early to declare a new trend.

It is precisely because of weaknesses of existing agencies tasked with combating corruption that good government campaigners lobbied for Parliament to create a *Lokpal*, or anticorruption ombudsman with enhanced powers to go after malfeasance in government. The bill, which was passed in December 2013—45 years after it was first discussed on the floor of Parliament—also mandates that states establish state-level ombudsmen, or *Lokayuktas*, to curb corruption at the subnational level. Even before Parliament passed the bill, at least 18 states already had such agencies up and running.

It is too soon to tell whether the Lokpal will be more effective than India's existing graft-fighting institutions because, at the time of writing, the agency is still in the process of being established and the government is still framing the rules that will guide the new agency. However, there are a number of contentious issues, yet to be resolved, that will determine the new body's effectiveness (see also Kapur and Vaishnav 2014).

After nearly one year in office, the NDA government has not yet initiated the process of appointing a chairperson and the various subordinate members who will manage the new agency. In addition, there are numerous procedural issues regarding the Lokpal's investigative powers that have not been finalized. For instance, there is no clarity regarding how the Lokpal will receive complaints from those who are affected by, or who witness, corrupt acts. If the new agency requires approval by state governments in order to investigate central government officials on state deputation, as is widely understood to be the case, the end result will be a continued lack of a unified body to decide all cases of sanction for prosecution. Furthermore, while the Lokpal Act gives the new agency broad powers of superintendence over the CBI, how the lines of authority actually operate in practice remains to be seen.

5. Political Economy of Reform

In this penultimate section, we reflect on some of the deeper political economy considerations related to fighting corruption in India. We begin by addressing the question of the political conditions under which anticorruption reforms take place. We then discuss the thorny issue of relying on politicians associated with criminality and corruption conduct to actually implement anticorruption reforms. We end by discussing new research on voter behavior and whether shifts among the electorate might alter the prospects of politicians linked with corruption.

5.1. Conditions for Reform

We begin by documenting some of the most frequent conditions under which anticorruption reforms gain traction. Our core motivation here is to get a better handle on the circumstances under which political space can be created in democratic societies to enact serious anticorruption remedies. To what extent, for instance, can India learn from the example of other societies that have evolved out of patronage politics and toward a pro-development equilibrium?

5.1.1. POLITICAL RETRIBUTION

The most obvious response to the question of when political space arises to address corruption is when the incumbent can use the issue to attack its political opponents. Unfortunately, such an approach is likely to fail because it is opportunistic and reeks of arbitrary enforcement or manipulation. Consider, for instance, the farcical case of former Uttar Pradesh chief minister and Samajwadi Party (SP) President Mulayam Singh Yadav, who the CBI first charged with corruption (in Indian parlance, "accumulating disproportionate assets") in March 2007 (Srivastava 2013). In July 2008, the SP provided outside support to the UPA government in New Delhi when it was facing a vote of no confidence over the contentious US–India civil nuclear bill. Months after the SP bailed out the UPA government, the CBI withdrew the case against Yadav, claiming it possessed insufficient material to prosecute. Yet a little more than two years later, in the spring of 2011, the SP and the Congress Party were at loggerheads over a potential seat-sharing agreement in the coming Uttar Pradesh assembly elections. Months later, the CBI reversed its stand and reintroduced charges against Yadav. In December 2012, the SP once again came to the aid of the Congress central government by allowing a controversial bill involving foreign direct investment in multi-brand retail to sail through Parliament. By September 2013, the CBI had once more closed its case against Yadav, citing "grossly insufficient evidence." Clearly, using the state machinery to prosecute alleged corrupt acts on the basis of political motivations has inherent shortcomings.

5.1.2. Access to Alternative Sources of Rents

A second condition under which political elites can take on corrupt activities is when they have access to other financial flows that can compensate for foregone rents. For instance, one hypothesis about why retail corruption has declined in states such as AP and Tamil Nadu compared to Bihar is that in the former states, the rents politicians (and bureaucrats) used to extract from service delivery or entitlement programs have been replaced with rents (often larger in magnitude and less cumbersome to collect) from infrastructure or contracts. While such hypotheses are difficult to test, this view is backed up by multiple conversations the authors have had with senior IAS officers, politicians, and academics.

Moreover, it is also possible that at least some of these big-ticket rents have less of an impact on the economy than regular corruption. For example, it is apparently more and more common to pay officials and politicians via equity stakes rather than bribes. This type of quid pro quo more closely aligns officials' and businessmen's incentives in support of the eventual success of the project. In their work on political finance, Kapur and Vaishnav (2015) provide one such case: "a builder constructing a hotel in Mumbai told the authors that the government told him it would only issue building permits if there was a quid pro quo. The quid pro quo sought was not cash but a 5 percent equity stake in the hotel in the name of a firm connected to a local politician."²⁰ In other interviews conducted by one of us (Vaishnav), several builders in the state of Gujarat claimed that it was common knowledge that a senior level politician insisted on a 5 percent equity stake in any new major

^{20.} Kapur and Vaishnav cite an interview with a builder in New Delhi on December 3, 2012.

construction project in the city of Rajkot, where his constituency is located (Author interview, Ahmedabad, December 2012).

Academic evidence, albeit limited to one article, also supports this view. The much-publicized 2G scam apparently had no effect on wireless telecom markets, basically because the illegally acquired licenses were then sold off to legitimate telecom operators at a large cost to the government but not necessarily at the cost of consumers (Sukhtankar 2015).

5.1.3. POPULAR ANTICORRUPTION MOVEMENTS

Another condition under which anticorruption reforms can come to the fore is when strong movements create political space for reformers to push through pivotal changes. This is what transpired in the decades following the Gilded Age in the USA, one popular historical example of political corruption, as the country transitioned toward what later became known as the "Progressive Era," a period spanning from roughly 1890 to 1920.²¹ During this three decade-long stretch, the USA saw a number of major reforms to the structure of American government and society, underpinned by a new conception of the state's role in private affairs. The Progressive Era was a product not of any single reform movement but at least four separate ones: the "business regulation" movement, which fought to introduce competition in industries that had reaped the benefits of consolidation and monopoly; the "good government" movement, which tackled the corrupt machines that held sway during the Gilded Age and sought to introduce new managerial practices into governance; the "social justice" movement, which was motivated by upgrading the quality of life for the urban poor (especially immigrants and factory workers); and, finally, the "social control" movement, which was imbued with a moral imperative to inculcate middle-class Christian values into society.

In India, reformist anticorruption movements have been episodic to date. The most recent example is the India Against Corruption (IAC) movement, launched by Anna Hazare, Arvind Kejriwal, and their colleagues and supporters, which shot to prominence in 2010 following revelations of massive corruption scandals in the final years of the UPA-2 government. IAC was narrowly focused on pressuring the government to enact what it called the "Jan Lokpal" bill, which was more sweeping that the government's draft Lokpal bill. Although the government eventually passed a revised version

^{21.} The authors are grateful to Alec Sugarman for his research on the American historical case.

of its original bill in 2013, IAC's leadership fractured, with Kejriwal leading the faction that would eventually morph into a new political party, the AAP. After its initial 49 days running the Delhi government, in which it aggressively pushed anticorruption legislation, AAP's majority government in Delhi (formed in December 2014 following fresh elections) has been less insistent. Whether AAP can make headway on corruption remains to be seen, as is its ability to scale up to other geographies outside of the immediate National Capital Region. Outside of winning four seats in Punjab, the party performed poorly in the 2014 Lok Sabha election. To date, it has not succeeded in creating a pan-Indian organization that could expand its footprint outside of Delhi. Furthermore, judging by the high degree of internal party conflict it is experiencing at the time of writing, there is some evidence that the party is possibly sacrificing its fervent anticorruption modus operandi for political expediency (Joshi 2015). There have been similar instances in India's post-Independence history of movements coming to the fore (the JP movement in the 1970s or the example of V.P. Singh in the 1980s) motivated by an underlying obsession with fighting corruption only to quickly dissipate or be overtaken by other issues once they entered the political domain.

By and large, IAC, AAP, and other such groups are in line with the "good government" strand of the Progressive Era reform movement. India has also seen elements of the "social justice" movement discernible in many of the rights-based movements of the 2000s around issues such as the right food, water, employment, shelter, etc. Unfortunately, these movements were far more effective in advocating for new legislation to enshrine these rights than in the actual design of social programs that emerged out of this rights-based agenda. Notably weak is the "business regulation" movement, which in the USA helped push landmark legislation such as the Interstate Commerce Act of 1887, the Federal Trade Commission Act of 1914, and the Clayton Anti-Trust Act of 1914. But while this strand of the movement is weak, it is not totally absent. Many of the corruption scams we have documented in Table 1 (6 of 28, or 21 percent) are from the financial services sector, typically involving private parties or entities conning other private parties. Indeed, there are likely direct correlations between the creaky regulatory structure, outmoded laws and gaps in consumer protection, and corruption in the financial sector. Partially in reaction to this, the Government established the Financial Sector Legislative Reforms Commission (FSLRC) to revamp India's archaic legal and regulatory framework governing India's financial sector. The effort, described by Patnaik and Shah (2014), serves as a potential template for future reform initiatives.

5.2. Voting for Corruption and Criminality

One difficulty in enacting anticorruption reforms is a practical one: many politicians currently in power are suspected of engaging in criminal or corrupt acts. As Section 4.4 has shown, there is a burgeoning literature on the criminalization of politics in India.

Because "criminality" is a broad category, encompassing a range of potential criminal activity, it is worth noting that descriptive analyses suggest that the picture is not qualitatively different if one looks at a more narrow definition of "corruption."

To illustrate the point, drawing on the affidavits submitted by candidates contesting the 2014 general election, we isolate those candidates who declare pending criminal cases in which they are specifically charged with committing readily identifiable acts of "corruption" (Table 3). These charges include violations of the Prevention of Corruption Act or any other cases overtly related to vigilance or anticorruption charges, as identified by the candidate on his or her affidavit. We identify 24 such candidates contesting the 2014 general elections, representing a range of parties and a wide diversity of states. Of these 24 candidates facing corruption cases, the median candidate finished in second place, earning 37 percent of the constituency vote. These candidates performed impressively, when considering that the median candidate in the 2014 election finished in ninth place and earned less than one percent of the vote. Indeed, nine of the "corruption-tainted" candidates (37.5 percent) actually won their elections. When we examine a smaller subset of seven candidates who had won in 2009 and stood for reelection as incumbents in 2014, we see that corruption-accused candidates endured only modest penalties for their alleged transgressions (Table 4). Three of seven candidates claimed victory while five increased the number of votes they won (indeed, 2G accused former Union Telecommunications Minister A. Raja won nearly 42,000 more votes than 2009 even though he lost his reelection) and the median vote share penalty was around 5 percent.

This data starkly portrays the dilemma facing India's anticorruption reformers: a significant proportion of the politicians they must rely on to pursue reforms that might curb malfeasance are themselves suspected of engaging in illegal activity. For obvious reasons, such politicians might not be the most aggressive anticorruption reformers. But an even more fundamental problem is that voters are affirmatively electing (and often reelecting) such individuals.

In this vein, one encouraging development worth highlighting is the significant shift underway in Indian voter behavior in recent years. The vast

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Candidate	Constituency	State	Party	Rank	Vote Share	Elector Share	
Captain Amarinder Singh	Amritsar	Punjab	INC	-	0.48	0.33	
Patil Nitin Suresh	Aurangabad	Maharashtra	INC	2	0.37	0.23	
B. Sreeramulu	Bellary	Karnataka	BJP	-	0.51	0.36	
Rakesh Dhar Tripathi	Bhadohi	Uttar Pradesh	BSP	2	0.25	0.13	
N. Dharam Singh	Bidar	Karnataka	INC	2	0.38	0.23	
Natubhai G. Patel	Dadra & Nagar Haveli	Dadra & Nagar Haveli	BJP	-	0.49	0.41	
Anbumani Ramadoss	Dharmapuri	Tamil Nadu	PMK	-	0.43	0.34	
Rakesh Sachan	Fatehpur	Uttar Pradesh	SP	ო	0.17	0.10	
Anurag Singh Thakur	Hamirpur	Himachal Pradesh	BJP	-	0.54	0.36	
Agrawal Kunjbihari Jugalkishor	Jalna	Maharashtra	SP	11	0.00	0.00	
Prem Chand Vishavkarma	Kangra	Himachal Pradesh	IND	7	0.01	0.00	
Lalit Mohon Suklabaidya	Karimganj	Assam	INC	ო	0.26	0.19	
Anosh Ekka	Khunti	Jharkhand	JKP	2	0.24	0.16	
Mohammed Faizal.P.P	Lakshadweep	Lakshadweep	NCP	-	0.50	0.43	
Paresh Baishya	Mangalldoi	Assam	AIUDF	4	0.06	0.05	
Ayodhya Rami Reddy Alla	Narasaraopet	Andhra Pradesh	YSRC	2	0.47	0.39	
Gokaraju Ganga Raju	Narsapuram	Andhra Pradesh	BJP	-	0.50	0.41	
A. Raja	Niligiris	Tamil Nadu	DMK	2	0.38	0.28	
Pongalur Palanisamy.N	Pollachi	Tamil Nadu	DMK	ო	0.25	0.18	
Bandhu Tirkey	Ranchi	Jharkhand	AITC	5	0.04	0.03	
Ganesh Singh	Satna	Madhya Pradesh	BJP	-	0.41	0.26	
B.S. Yeddyurappa	Shimoga	Karnataka	BJP	-	0.54	0.39	
Atiq Ahmed	Shrawasti	Uttar Pradesh	SP	2	0.27	0.15	
Churchill Alemao	South Goa	Goa	AITC	ę	0.03	0.02	
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Electoral Performance of Candidates with Declared Corruntion Cases. 2014 Lok Sahha Elections TARIF 3

Source: Author's calculations based on affidavits submitted to Election Commission of India by candidates contesting the 2014 general election.

Candidate	Constituency	State	Party	Rank 2009	Rank 2014	Change, # votes	Change, vote share	Change, elector share
Lalit Mohon Suklabaidya	Karimganj	Assam	INC	-	e	-33155	-0.123	-0.049
Rakesh Sachan	Fatehpur	Uttar Pradesh	SP	-	ę	-39229	-0.145	-0.043
A. Raja	Niligiris	Tamil Nadu	DMK	-	2	41958	-0.062	-0.033
N. Dharam Singh	Bidar	Karnataka	INC	-	2	29111	-0.051	0.000
Anurag Singh Thakur	Hamirpur	Himachal Pradesh	BJP	-	-	74437	0.002	0.044
Natubhai G. Patel	Dadra & Nagar Haveli	Dadra & Nagar Haveli	BJP	-	, -	29548	0.024	0.079
Ganesh Singh	Satna	Madhya Pradesh	BJP	-	-	180664	0.116	0.096
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Source: Author's calculations based on affidavits submitted to Election Commission of India by candidates contesting the 2009 and 2014 general elections.

literature on Indian elections suggests that Indian voters have traditionally conditioned their electoral choices on parochial issues such as ethnicity, patronage, or clientelism, rather than issues concerning governance and development (Chandra 2004). These priorities, in turn, have had an adverse impact on the nature of political selection, providing the electoral basis for politicians associated with criminal or corrupt backgrounds to thrive (Banerjee and Pande 2009). There is some evidence to suggest that the situation is gradually changing. For instance, a study by Gupta and Panagariya (2014) finds that, contrary to the received wisdom, voters in the 2009 Lok Sabha elections rewarded candidates associated with strong economic records, with incumbents in "high-growth" states significantly outperforming those from states that experienced either "moderate" or "low" growth. In the 2014 general elections, post-poll survey evidence suggests that economic issues, such as inflation, economic development, and lack of employment, weighed heavily in voters' minds as they cast their ballots on election day (CSDS 2014).

The shift toward economic voting, which has been commonplace in many advanced industrial democracies for many years, is discernible in state elections as well. Vaishnav and Swanson (2015) study the relationship between economic growth and electoral returns in more than 120 state elections held between 1980 and 2012. While they find little association between economics and elections in the 1980s and 1990s, they find a robust, positive relationship in the post-2000s era. In the most recent period, the authors document statistically significant electoral returns to those state governments able to deliver faster rates of economic growth.

The rise of economic voting is encouraging from the perspective of accountability, but the fact that economic voting coexists with a large prevalence of suspected criminal and/or corrupt elected representatives suggests that there is not a one-to-one relationship between economic voting and a decline in the salience of "parochial" interests. How do we square these seemingly contradictory impulses—a shift toward retrospective economic voting and a penchant for electing candidates with "tainted" backgrounds?

One possibility is that, in some circumstances, voters can simultaneously vote on the basis of the macro-economy *and* for tainted politicians if their vote choice is being driven by the identity of a chief ministerial or prime ministerial candidate or a party label. Likewise, voters could have differing preferences for who they want to run the state or country as opposed to represent them as an MLA or MP in their constituency.

A second, more troubling possibility is that voters are voting for better governance, but tend to view tainted politicians in this light as well. In other words, referring back to the notion that criminals often are deemed more "credible" representatives, it could be that voters are selecting so-called tainted politicians precisely because they view them to be effective representatives in the context of a weak state. However, to the extent criminal or corrupt politicians gain strength by filling a governance vacuum, they face incentives to purse temporary, rather than lasting, solutions. If criminal representatives, for instance, serve a useful role resolving disputes or providing security, they have every reason to undermine lasting governance solutions that risk making their services irrelevant.

6. Conclusion

The overall objective of this paper is to bring the research on corruption and the policy discourse into the same conversation. Because the literature on corruption in India is-to put it mildly-voluminous; our aim is to provide a framework for thinking through the many issues raised by this body of work. To that end, this paper offers a framework for thinking through the underlying drivers of corruption in contemporary India, provides a rubric for classifying corrupt acts, and discusses broad strategies for combating corruption and what the literature tells us about their relative effectiveness. To embed our overall discussion in India's political context, we have also offered some parting thoughts on India's political economy of reform when it comes to fighting corruption. To make our task manageable (and coherent), we have made two important choices in this paper: to focus narrowly on public sector corruption and to draw primarily from academic studies that combine analytical rigor with causal analysis and rich sources of data. In an effort to provide guidance to policymakers and other agents of change addressing India's corruption challenge, we conclude by highlighting five principles that should guide future reform efforts.

First, information provision is an important tool in the toolbox, but, on its own, it is not always an effective anti-graft strategy. Our review of the literature reveals that information works best when accompanied by investments in enhancing the bargaining power of ordinary citizens, improving coordination and collective action, or strengthening the state's ability to punish impunity. Social audits and information campaigns that uncover malfeasance in a context of weak public sector enforcement institutions can have limited impact, as demonstrated by Afridi and Iversen (2013) in their study of social audits in Andhra Pradesh. In the case of criminal or corrupt actors in electoral politics, there is compelling evidence that the factors which give rise to this nexus are perhaps less related to information asymmetries but instead have more to do with social divisions embedded within India's weak rule of law society. This is not to say improving the information environment is not a laudable goal; to the contrary, improving the availability of information on criminality in politics has been essential to both diagnosing the challenge as well as forging social pressure. The key take-away, however, is that the absence of information may not the binding constraint.

Second, technological solutions to curb corruption have limited effectiveness unless they are able to bypass the local machinery that hampers status quo solutions. Technological innovations that require higher level authorities to provide enforcement risk falling prey to the usual principal-agent dilemmas that plague public service delivery. Instead, interventions such as the one involving smart cards in Andhra Pradesh evaluated by Muralidharan et al. (2014a), which can transfer bargaining power to citizens and circumvent the broken local state machinery, hold significant promise. To this end, the new NDA government in Delhi has an opportunity to build on the *Aadhaar* program launched by the prior regime and further marginalize middlemen in service delivery.

Third, there is a sensible and wide-ranging legislative agenda to reduce corruption that the 16th Lok Sabha should pursue with renewed vigor. Measures such as the "Right to Services" and the "Public Procurement" bills contain important provisions that can constrain abuses of government discretion while shifting bargaining power in favor ordinary citizens. To be clear, these bills, as they stand, are imperfect; for instance, the "Right to Services" bill would create a dedicated grievance redressal mechanism in a context where there are legitimate concerns about the multiplicity of grievance redressal mechanisms already in existence (on paper at least if not always in practice). Parliament must debate and discuss these details and forge reasonable compromise.

Reformers should also take heed that as meritorious as these bills may be, passing news laws must be accompanied by a renewed effort to repeal outdated or archaic old ones. Of course, it is natural for agents of change to focus their attention on enacting new laws given the inherent benefits for mobilization; yet such an approach is shortsighted. As Kapur and Vaishnav (2014) argue, in India "the multiplicity and complexity of laws make compliance, deterrence, and effective enforcement difficult and, in many cases, impossible." Statutes regarding corrupt practices are no exception. Finally, while the state in India is often perceived to be the problem when it comes to corruption, it is no doubt also part of the solution (Kapur 2010). There is a strong case to be made that the state, particularly the local state, has historically preyed on the *aam aadmi* (common man), rather than worked on its behalf (Pritchett 2009). Yet, there are limits to how much can be achieved to reduce its corruption by circumventing, rather than strengthening, its capacity.

At the end of the day, even the most immaculate laws require effective state institutions to enforce them and judicial officers to adjudicate disputes. Yet police vacancy rates in India hover around 25 percent and existing forces are poorly trained, starved of resources, and the subject of constant political interference. Similar shortcomings plague the judiciary at the same time that the volume of litigation is rapidly increasing. The pioneering Right to Information Act gives average Indians greater recourse to redressing grievances than ever before, but if government information officers remain in short supply and appeals processes drag on, empowerment could turn into disenchantment.

The anticorruption agenda in India is massive but the enormity of the task should not dampen the spirits of reformers. To be clear, the stakes are high; this is not only because corruption can hamper India's ability to grow its economy and manage the enormous task of providing opportunities for its young, growing population, but also because corruption can negatively color popular perceptions of democracy and faith in the rule of law. Having said that, reformers should take heed of the fact that the literature is replete with successful examples of logistically simple solutions that can be implemented at minimal cost. While the ability of these solutions to circumvent weak public sector institutions has its limits, the potential gains from reform suggest that such an agenda should be pursued with alacrity.

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Comments and Discussion

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This is a carefully argued and impressively documented paper on a complex and contentious subject. Any analytical work in this area faces severe data and measurement challenges given the illegality of the subject on the one hand and the data requirements to establish magnitudes, effects, and precise causal mechanisms on the other hand. Yet given the importance of the issue, the authors' are to be commended for taking on this difficult challenge in a lucid and comprehensive manner. As is the case with all good papers they help stimulate further thinking and my comments are in that spirit.

The paper defines corruption as "the misuse of public office for private gain" (which it attributes to Pranab Bardhan). A sharp definition is essential not just for analytical clarity but also for tractability given the vast terrain the issue entails. But what do the two core components of this definition—"public office" and "private gain"—imply for understanding the nature of the problem? Take the example of two faculty, one of who teaches at a private university and the other at a public university. Now, if both give grades in exchange for money, by definition only the faculty in the public university is corrupt because he is a public official but the one in the private university is not. The latter might be guilty of something else but not corruption even though the actions are identical.

By defining corruption in a particular way it means that our understanding of corruption-like activities in the large—and growing—terrain of economic activity in the private sector is severely constrained. In the example cited above—higher education—the private sector is the dominant actor and its operations are rife with fraudulent activity. In the case of "grand corruption" in particular the private sector is integral to public corruption. Two decades ago when a minister took a bribe of ₹2 crores, he could hide it in suitcases. But when bribes run to many multiples of this amount it cannot be hid in suitcases. It must be laundered and the mechanism of laundering is the private sector.

Widespread malfeasance in the private sector often ricochets back to the state. The sordid affairs of statutory regulatory bodies of self-governance such as the Medical Council of India or the Bar Council of India, none of which are state run institutions, have had severely pernicious consequences for the medical and legal professions. This is also true of many NGOs which are often seen as heroically battling against the depredations of the state. Many indeed play that role but equally many non-profits are conduits for money laundering.

The other part of the definition which also needs a deeper understanding is the idea of "private gain." What exactly is private gain? Is private gain equivalent to pecuniary gain? So let us take a hypothetical country with a hypothetical prime minister who is completely honest but decides to look the other way when her or his ministers are engaged in patently corrupt activities in order to hold on to power. Is that an act of commission or an act of omission? If we care about welfare should we worry more about someone who takes 50 crores in illegal money or someone who has the power to stop such activities and allow certain policies that cost 500 crores to the public exchequer? If the ambition in public organizations to stay in power can sometimes cause a lot more damage than someone taking cash, then it begs the question of what exactly is "private gain" and what types of "private gain" should we focus on?

Needless to say expanding the definition of corruption would mean an entirely new paper. But it would be good to at least examine the implications of defining corruption in a very specific way for our understanding of this complex issue.

The main thrust of the paper is addressing four big questions:

- 1. The underlying causes of corruption with the authors' identifying the mismatch between regulatory complexity and weak enforcement capacity as the root institutional factor shaping India's corruption environment and election finance and weaknesses in public sector recruitment and transfers as more "proximate" causes.
- 2. Different types of corruption—facilitative, collusive, and extractive and the magnitudes, causes, and consequences of each of these types of corruption.
- 3. Strategies for combating corruption, ranging from introducing new technologies to legal changes.
- 4. India's political economy of reform which might shape how India addresses this scourge.

On the first question—the severe mismatch between regulatory complexity and enforcement capacity—there are two axes of variation that future work could exploit: variation across the principal domains of activity of a modern state and variation on each of these domains across states and between the center and states. There are four key domains of activity of the modern state: the *public goods and welfare state* where leakages have been galore and have been the subject of numerous studies ranging from PDS to NREGS, etc.... The second is the *regulatory state* which has been the source of "terrestrial rents (from the allocation of land), subterranean rents (from the allocation of rights to coal mining and oil and gas exploration) and ethereal rents (from the allocation of spectrum)"(Subramanian 2012). The consequences have been both distributional (with the consumer picking up the costs) as well as efficiency costs, with severe adverse effects on the supply capacity of the economy. The third domain of state activity is the *extractive state* at the heart of which lies taxation. Although there is a widespread belief that there is large-scale rent seeking in this domain, it is not addressed in the paper.

The fourth (which is addressed in the paper), is the *law and order state*, in particular the police and courts. The paper emphasizes how the weakness in enforcement has hampered India's ability to address corruption. If addressing corruption requires competent investigative and prosecutorial machinery, asking the very group that is amongst the most corrupt parts of the Indian state—the police—to address corruption, is unlikely to bear fruit. *Quis custodiet ipsos custodies*—who guards the guardians?—is a conundrum intrinsic to all power, but in India the dilemma has been made more acute by the virtual absence of serious reforms in the law and order institutions of the state (especially the police) since independence. While the paper draws attention to this reality, it raises a deeper question on why this issue has remained unaddressed for so long. The politician–bureaucrat–police nexus is the usual answer, but it raises the question why in such a highly competitive democracy as India's, police reform has not had much issue salience among voters.

The paper draws attention to the distributional and efficiency costs of corruption. But it is noteworthy that when the major corruption scandals under UPA-II came under scrutiny—by the media, the courts, and the Comptroller and Auditor General—growth declined as policy paralysis in the government brought decision making in the government to a halt. Indeed the costs stemming from the ensuing decline in growth rates far exceeded the costs of all the corruption scandals. Obviously this does not mean that the two were directly causal or even if they were that corruption is a price worth paying for higher growth rates given the likelihood of severe long-term institutional costs. The paper points to the reality of a certain type of democratic accountability in the Indian system. When major corruption scandals erupt in the public view, the decisions are often reversed. But the resulting slowdown in decision making not only significantly raises costs (especially in capital intensive projects) but has troubling non-pecuniary costs such as the effects of the paralysis in defence procurement on India's defence preparedness.

This points to an issue that needs better understanding in the Indian context: the difference between "efficient" and "inefficient" corruption, often seen as the difference between corruption in East Asia and Africa, or in the Indian case between a Tamil Nadu and Uttar Pradesh. It is not that corruption is less in Tamil Nadu but things actually get done there unlike Uttar Pradesh. Corruption in public contracts in India when coupled with a rigid adherence to L1 (lowest) bidding in procurement results in low-quality public infrastructure. In East Asia corruption results in higher procurement costs while maintaining quality and the resulting longer life-span of the product means that long-term costs are much less. In recent years (as the paper mentions) there are reports of politicians taking equity stakes in projects (instead of upfront cash payments). This is a form of credible contracting that aligns the incentives of the politician with that of the project promoter and ensures better project outcomes compared to cash bribes. Given the strong resistance of politicians to curbing corruption, even moving from "inefficient" to "efficient" corruption is likely to bring substantial efficiency gains.

The paper relies heavily on a wide range of survey experiments to come to broad conclusions. They are for the most part ambiguous not just for external validity reasons but even their internal logic. It is not just that most of these experiments are over very small samples. Even where they are impressively large, the policy implications are ambiguous. Take the case of salary incentives. Higher salaries in principle appear to have a positive selection effect on who joins public service (on measures such cognitive skills, personality traits, and motivation) (Ernesto Dal Bó and Rossi 2013). Yet, what they do after they join is a function of host of other institutional and organizational factors. If public teachers in India who are already paid much more than their private school counterparts are offered further financial incentives for performance and their performance improves (as in the case of teachers in AP), it is unclear if this is a new equilibrium or will it slide back as time passes and researchers (and scrutiny) have moved on and whether other parts of the public sector will demand similar deals without commensurate long-term improvements in performance. In other cases experiments that try and gauge the impact of information on say voter behavior simply cannot distinguish between the information given by the surveyor and the actual understanding of that information by the respondent.
It is an open question whether the analytical methods relative to the issue being addressed are a bit like a garden hose for a large forest fire, and how meaningful they are to address an issue as deeply systemic and which requires systemic policy options. Researchers tend to develop partisan stakes in their results which often closes them to thinking about changes over time. To take an example, amidst the many contentious debates on leakages in the PDS, several papers argued that there had been a turn around, singling out the case of Chhattisgarh which emerged as the poster state for the public distribution system. And yet in early 2015 stories emerged of vast corruption in the Chhattisgarh State Civil Supply Corporation (the nodal authority for the public distribution system in the state) with an estimated 14 lakh fake ration cards issues since the enactment of the state's much-acclaimed Food Security Act in January 2013 (Indian Express 2015).

The paper focuses on six broad categories of tools to combat corruption: (a) Information/ bottom-up monitoring, (b) Technology, (c) Financial incentives/ performance pay/efficiency wages, (d) Electoral reform/political incentives, (e) Legal reform, and (f) Policy reform. The authors' are rightly skeptical whether information and community participation on its own will make a dent on addressing corruption and advocate putting more bargaining power in the hands of beneficiaries through measures such as the passage of "Right to Service" bills. But by focusing on information provided by researchers to respondents the paper misses out on the big picture, namely the role of the media. While the media's coverage of corruption "scams" may indeed be "sensationalist" (as the paper argues), the counterfactual whether the government would have acted in the absence of the media's watchdog role—is very unlikely. Indeed the role of the electronic media and increasingly social media—in shaping political responses to ensuring some accountability and enforcement is a rich research area.

Yet all of these might matter only so much in the absence of far greater penalties on erring officials. There is a need for better research on the structure of penalties in public service, from fines to career paths to dismissal, and the institutional changes required to make them more onerous. But redesigning public institutions is more than simply a matter of incentives such as salaries and penalties. It is about designing better systems of screening and selection, training and work culture, improving organizational cohesion, and autonomy from political pressure. Here again, ethnographic case studies of specific organizations are needed to better understand organizational behavior.

Finally there is a big puzzle. Everyone knows that corruption in India is ubiquitous and recognizes that it is a serious problem. So why isn't much done about it? Is it because corruption is an inevitable penalty that India must pay to accommodate and sustain its democratic system? On the one hand this generates ever growing needs for election financing, which like a gigantic tornado sucks in enormous amounts of resources which have to be generated from corruption. On the other it might simply be that a rigidly hierarchical society in the process of complex changes provides the structural conditions for the tornado to sustain itself. Coalition governments are seen to be more susceptible to corruption. But coalition governments are a reflection of political fragmentation, which in turn is (at least to some degree) related to India's social heterogeneities. Hence, if the roots of the problem lie not so much in politics or business but in Indian society itself, the solutions might lie in the nature and pace of social change.

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It is a pleasure to be here. I think that this is a very nice paper and as Devesh said there is a very vast and disconnected body of evidence that it makes a valiant attempt at bringing together, and it does a good job putting these things in one place and I think some sections are particularly strong. For example, I particularly like the discussion on the effectiveness of providing information, and the discussion of why this may not always be enough. There is also this nice additional section that creates a list of major scams and organizes by sector just to help better understand the areas that are most vulnerable to corruption. But, I think it may work better in the beginning to motivate the rest of your paper.

I think the paper has the potential to be a go-to reference for those wanting to get up to speed on the rapidly growing literature for both academic and policy audiences but I think it needs a fair bit of work. The good news is that most of this is organizational and conceptual and I am at least not going to ask or expect you to go collect more primary data which is kind of not realistic but I think based on what you have you can make the paper a lot more punchy by doing some more organizational stuff. I am going to have three classes of comments.

The first is on organization and framework. The second is on topics covered and excluded and the third is on interpretation of some of the results that I think right now reads a little bit too much like a laundry list: putting them together in a framework that helps make sense in a more first principles kind of way.

There is also one thing I didn't mention here because Devesh did. So let me just mention that this is important and is almost worth having a little section on what I would call forensics. So the fact that corruption is really, really hard to measure means that there is a class of papers that is important just because they manage to measure convincingly the fact that corruption takes place. Ray Fisman's Indonesia Political Connections paper (Fisman 2001) is probably the best example of this, but even your sugarcane paper (Sukhtankar 2012), and Devesh and Milan's cement paper (Kapur and Vaishnav 2015) are important papers even though they are not like super well identified, just because they get at this very difficult task of measurement. So I think calling this section "forensics" is a useful way to do this because it is really about measurement and detective work as much as it is about theories and causality.

But coming to the economics of this I think the one really important paper that you are missing in terms of helping organize your thoughts is the Bandiera et al. (2009) AER paper on active and passive waste in government. The main insight of this paper is that while most of the attention goes to big headline grabbing scams—they estimate that about 80 percent of the waste in government is because of what they call "passive waste" which is not the kind of corruption that is directly going into somebody's pockets but the waste that happens because of systemic inefficiencies, and of the waste that happens because there is no residual claimant in government to internalize the returns to improving effectiveness of governance and functioning. Normally, I would say maybe this is too much and this might be biting off more than you can chew (and that you should stick to corruption defined as "active" waste above).

But because you have chosen to discuss both scams as well as the dayto-day (or annual) losses, you almost certainly want this framework because the policy implications are quite different. So, I think having that would be useful.

There is also a second distinction that is similar but subtly different. This is the difference between a corrupt state and a nonresponsive state, and so it is related active and passive waste and they are correlated but you can see why there is a different policy implication. For example, I think when you think about the RTI/RTS, the problem that these acts are trying to solve at some deep level is not necessarily corruption as much as just a nonresponsive state. It is true they might be correlated because there might be deliberate denial of service to create the bottlenecks to create the rents in the first place. But the policy implications are different: For example, once you put in place a "Right to Service" act and monitor progress with electronic tracking of files, one of the things it helps identify is cases of genuine staffing shortages in the system or cases that can be improved by simple operations improvements.

So for instance, the former collector of Hyderabad would talk about a very simple example about how students would want income and caste certificates at the time of college applications, and they know that 10 months of the year there is no demand and two months of the year there is this absolute peak demand. So even if nobody is corrupt the service is going to be very slow at the point of peak demand, which is the time when the typical beneficiary interacts with the government for this service. So the nonresponsive state might just be reflecting understaffing or mismatch of average and peak demand/supply, which can be improved a lot with just simple operational efficiencies. If you look at police, e.g., they are chronically understaffed and under-resourced, and I will come back to the connections between corruption because there is this issue of *deliberate* under-investment in state capacity which I think is really important point. But I think your discussion of RTS/RTI will really benefit from this distinction.

A final point, which is not made, is distinguishing between the class of studies and recommendations that you would make to a motivated policymaker who says: "I want to reduce corruption" versus discussing the political incentive constraints for reducing corruption in the first place. This important because the binding constraint is often not whether policy X works but whether policy X was allowed to be implemented in the first place. So we understand this and your review again has elements of each of these. But if you make the distinction clear and highlight the connections where relevant I think it will make the whole thing much more coherent and I will come back with concrete examples of this.

So choice of topics I think Devesh has talked about this. Some sections really do not belong in this review. Section 2.4 we have talked about this. It is like seven pages and it is really like calling democracy corruption, means like it was thrown in there because there is evidence in that place but I don't think it belongs at all. The one place I think where it might belong is if the motivation of that section is to use the existence of tainted politicians as a reason for *why* anticorruption policies might never get implemented. I think it was Chitra Subramaniam in the context of Bofors who once famously said every politician loves corruption scandals only to the extent that it helps show the other guy in a bad light but nobody is actually interested ever in

doing anything about it and I think that is the one area where those two get connected. But otherwise it is mostly a different literature.

The other important topic is not covered and to me the single biggest omission is corruption in public sector recruitment and I think it is important both at the highest levels, and at the entry level, and not just in terms of recruitment scams which are not in your taxonomy. The recruitment scams are not in your list and we now have several prominent examples including the Madhya Pradesh scam, or fake certificates for teacher recruitment in Bihar, there is the teacher recruitment scam in Haryana, where a former Chief Minister (Om Prakash Chautala) actually got convicted, and not to mention the recent resignation of the Railway minister on similar charges. So we have evidence of these scams but actually theoretically this might in fact be the most pernicious form of corruption, more so than individual scams and that is because you can write a very simple overlapping generation model to show how once you get a bad egg into the system in a senior place that this is going to perpetuate into eternity because the guy who has bought his way into the job has to recovery money and so it is much worse than an individual kind of corruption because you get negative selection and so if you want to think about what is that causes institutions to decay at some level, it fundamentally, in my view, comes down to corruption in public sector recruitment.

So you get negative selection in terms of who comes in, and you change the norms, because if you paid for your job, serving the public interest is going to be lower on your priority list than recovering your "investment" through corruption. Sometimes Hindi movies have a way of capturing insight better than most academic seminars. How many people have seen the movie Gangajal? There is a great scene, where you have got this corrupt cop, holding up highway traffic and extorting money and then when this honest SP catches him red handed and tries to take action he comes back and cries "Saheb I have paid ₹3 lakh for this job." I have taken a loan for this job and I have no other option. It just kind of in a very visceral way shows how the public sector recruitment, in my view at least, is probably the foundation of almost all of these problems in linking corruption and poor service delivery. I think there is a different set of issues at the top which is the discretion that officers have at the top. So when people are willing to pay to become DGPs and members of railway board, that is a different kind of corruption than for jobs at entry level where I think the real problem is just that the wages are too high. So we have got a wage compression in the public sector where over 95 percent of public sector employees are paid massive multiples of what the open market wages are but the very senior

public sector employees (in terms of skills) are massively underpaid relative to their private sector opportunity cost and this leads to distortions at both ends of the salary distribution.

Here is just one presentation to illustrate this. This is from my work on contract teachers where the education establishment thinks that these contract teachers (who are hired in the village -young women, less educated, less trained, paid 1/6 of a civil service teacher is paid) are all being exploited relative to government teachers. But if you then look at the private sector wage, if anything the private salaries are even lower. So it is not like contract teachers are being exploited but that there are massive rents in the civil service job. In the past, I used to just think this was fiscal inefficiency because what my work shows is that contract teachers are equally effective as regular teachers paid many times more. If anything, they appear even more effective because they do not have civil service tenure and they are connected to the village. In the past, I just used to feel irritated that this is a fiscal waste but I increasingly think it is worse than waste and that is because of this negative selection problem. You can never really hide from the market. The market will come back and bite you even though you don't expect it. So when you have this kind of wage premium what is going to show up is there is market for getting these jobs and so that is what all these teacher recruitment scams are about and people are willing to pay these huge premia but you just are capitalizing upfront, a lifetime of rents that is above the market clearing wage and so you cannot really hide from the market and that is why I think this issue of wage compression is so important.

The second key topic which I have already alluded to is this: The great value of adding a political scientist to a paper on corruption is the possibility of a more nuanced understanding of the political conditions under which anticorruption reforms actually can take pace and I will come back to that.

My last presentation: some connections and interpretations which I think are really useful to make. The first connection is between technology and incentives. I think it is important to make connection because I think technology makes it easier to measure and implement incentives but you still need the incentives. The most illustrative case of this is the empirical journey from first draft to publication of the famous "Cameras paper" (Duflo, Hanna, and Ryan 2011). So everybody thinks about this as the "Cameras paper," that you put cameras in school and teacher attendance went up. Actually that is wrong. So if you look at the working paper version of this paper it had the title *Monitoring Works* in 2005. By the time it got published in the year 2012 the title had changed to *Incentives Work* and the subtle difference is that the intervention combined a camera and a wage schedule that was paying

you every day for valid days in which you showed up and so eventually what happens is they can use certain structural features of the compensation formula to isolate whether the impact is from the monitoring or from the fact that you are actually paid for each day you show up and once they do that the action shifts completely from the monitoring, *to the incentives itself*.

This is not to say that technology does not matter but the important point the technology is doing from a contract theory perspective is it is making the effort not just observable but verifiable. So the difference between an individual inspector who goes to the school and finds the teacher is not there but then has to prove that in a court of law (at which point it is his word against the teacher's word) is that the camera makes it *verifiable* to a third party that the teacher was absent, which reduces the cost of taking the follow up action. So technology is a really important facilitator for reducing the cost of *implementing incentives*, sort of like George Baker's work on efficiency in the trucking industry. Once you are able to track the movement of trucks that reduces the rents that truck drivers were getting from long periods of slack because now you can track exactly where the truck is going. So the technology is an enabler in terms of reducing the measurement and monitoring cost but you need the incentives on top of that to improve service delivery.

So the other important point that has come up in this discussion this difference I think between NGO implementation versus government implementation of pilots. So we have now got multiple studies by Abhijit Banerjee and co-authors, and a similar study in Kenya, and a common thread is that when you have pilot projects implemented by researchers and non-profits they seem to work. But then when you try to transfer this to government implementation it kind of breaks down. I think it is a little more nuanced than that because this is in contrast to kind of two sets of studies we have.

One is the example of our recent work with the Government of AP where they randomized the deployment of biometric Smartcards to make NREGS payments across 20 million people. This was implemented by the government and we find big positive effects on reducing corruption. Second is our recent work on teacher absence which we just released yesterday and we are not touching any program. We are just looking at the impact of good old monitoring by the government machinery (measured by whether your school was visited in the past three months) and we find that that has a big correlation with reduced teacher absence. So what I think is going is very simple. The difference in each of these cases is that in the earlier cases, the impetus for the change came from outside the government from researchers and maybe one motivated IAS officer and then once that guy got transferred there was no institutional desire to implement the change whereas in these two cases both of these studies are evidence from cases where the government had made a policy decision on its own to implement a certain kind of improved implementation capacity intervention and there we find systematic effect. So the good news is that when you do these things in a way that the "system has bought in" it does seem to work and so that begs the question of what it takes for the "system" to buy in to implement an anticorruption initiative. To be fair, I think the smaller NGO studies have gotten a bad rap but the way to think about them is very much like in medicine. We have efficacy trials and effectiveness trials. So the efficacy trial is testing whether something works under good implementation, and then the effectiveness trial is when you take that to implementation under "typical conditions" and see whether it works. So the smaller scale studies give us the first step, but then you need systems to adopt the findings and embed them into practice.

The last point is what this really does is it begs a different question about what are the kind of political incentives for investment in anticorruption and I think the last piece that I would really think the paper would benefit from is a discussion of the political incentives deliberate under-investment in state implementation capacity and the fact that this creates scarcity which then makes the politician the arbitrator of who in fact gets access to scarce public resources. I think this is a key connection between political corruption and service delivery. Some of the best work on this has been done by former IAS officers who have then gotten PhD's. So whether it is Santosh Mathew or Anirudh Krishna they have done work on deliberate underinvestment by the state. Anirudh had this wonderful terminology to describe political incentives to develop what he calls "pooch" and "pahunch," which roughly translate into "recognition" and "influence" respectively. So, what a politician cares about is "who is coming to me for favors?" and that is his poonch and the pahunch" determines the extent to which he can deliver on that request. So the response of the politician to ideas that may improve service delivery (with say new technologies) is to say: "Meri poonch kahan rahegi?" that translates into worrying that "nobody is going to come to me for anything if the system is going to deliver these services".

I think this is a very useful point to keep in mind, and it raises the question about the conditions under which states will choose to invest in improved capacity for lower corruption and better service delivery, and to ask what can be learnt from the historical evidence of how societies move from a politics of patronage to a politics of service delivery. Then the research we have on interventions and their effectiveness work that might feed us inputs into politicians who want to make that change.

General Discussion

Pranab Bardhan started by noting that the paper could be tighter on definitions of corruption, even though they would inevitably overlap. The definition he himself used focusing on public corruption only was useful because it allowed him to confine himself to just one kind of corruption. He then referred to two other aspects he felt are important: the impact of competition from private providers contracted to provide public services (e.g., passports) on reducing corruption; and, second, wholesale versus retail corruption (e.g., some East Asian countries versus India) where the former is more "efficient" and does not affect the decision at the margin, but of course leads to political and institutional problems.

Dilip Mookherjee noted that the some societies deal with corruption by institutionalizing it, e.g., US campaign finance laws that require disclosure but legally allow contributions in an institutionalized form that many might consider corruption. On looking for remedies, he asked if they were studies in India that looked at the impact of a scam on the political career of the politician involved even if they were not convicted. He also wondered whether greater decentralization would be a solution, citing his own work in West Bengal with Pranab Bardhan. He noted that reducing the political discretion enjoyed by bureaucrats and politicians would be good for reducing corruption, citing the example of the USA. Finally, he noted that the evidence is still out on whether community monitoring and provision of information could curtail corruption.

Sanjeev Ahluwalia noted that while the paper had a lot of useful insights on corruption he felt that many of them were too generic. He felt the paper would gain from looking at measures that strengthen the social compact between the state and citizens, e.g., broad basing taxes and increasing usage charges. These sorts of measure would allow people to understand better that corruption is simply the theft of their own money.

Amartya Lahiri said that corruption in India has possibly become so endemic to society that it is simply accepted as a way of doing business. Narrow, programmatic interventions working on a specific dimension of corruption might therefore not work well since the problem may be so systematic. Simple interventions would likely lead to multiple equilibria, with spillovers from the public to the private sectors and vice versa.

Ashok Lahiri said that we could and should look at the Singapore model, where bureaucrat salaries are high, but would raising salaries alone solve the problem in India? What about recruitment and hiring and firing practices? Nirvikar Singh questioned the notion that corruption was just a transfer payment and redistributive and therefore may have no resource allocation costs. He suggested that when there is a misallocation already then corruption can have serious resource allocation costs and in that situation it would also have a long run impact on growth, though it is hard to estimate that impact. He suggested that corruption also eroded trust and degraded social norms, therefore substantially increasing its cost to society. This is not easy to estimate but is nonetheless very important.

Mihir Desai seconded Karthik's comment that the paper had the potential of being a go-to reference, but, apart from policy recommendations, wanted to see it end with many larger questions that researchers should address and on which we don't really know enough. He also cautioned against viewing mismanagement as corruption, because otherwise almost everything would be corrupt. For example, in his view, teacher abstenteeism was mismanagement and not corruption. He disagreed with Devesh Kapur that measurement of corruption was important in itself and we could stop there, and suggested that measurement should be complemented by theory if we are to look for solutions. Finally, while routine day-to-day corruption was more costly than imagined, he urged the authors not to discount the costs of high-level corruption because of its systematic effects, which Nirvikar had also referred to.

Arvind Panagariya also emphasized the need for a unifying theme. He suggesting looking at policy induced corruption that goes away when policies are changed. He felt that technology offered solutions that could reduce corruption dramatically, as for example in the case of railway ticket booking when it was computerized. He suggested that one way of organizing the paper might be to look at the difficulty of enforcement in India, an important cause of corruption.

Anupam Khanna felt that this was the most informative and useful discussion of corruption that he had heard in 20 years. He felt that a lot of corruption in India was now at the government-to-business and the business-to-business interfaces. On G2B, there is a real need to understand better how corruption happens and then what to do about it. The popular perception of the IT sector is that it is very clean, and in many ways it is, but there are pay-offs there too, and while it is hard to clearly classify this as corruption, there is something wrong with it, and it is important to understand what and why.

Rajnish Mehra (Chair) said that it would be useful to have a sense of the magnitude of the seven categories of corruption noted in the paper: what is first order, what is second order? On strategies to combat corruption, he felt that it would be good to see how they are matched to corruption categories. He felt that corruption distorted the investment-consumption tradeoff, which

then affects an economy's growth rate, and that this impact was far more important than suggested in the paper. So, one implication of this way of thinking would be to see which of the seven categories in the paper are likely to change growth rates and others that are more redistributive in their impact.

Karthik Muralidharan noted the massive wage compression in the public sector: relative to the private sector, the top 2 percent of government employees are massively underpaid and the vast majority of government employees are paid a massive multiple. The Singapore model is about paying higher salaries but with immediate exit if you are corrupt, so that it creates an efficiency wage model. The reason why efficiency wage models do not work in India is that one never gets fired. So, it is not just the level of pay but the structure of pay that matters. He pointed to his work in Indonesia where they doubled teacher pay across the board and there was absolutely zero impact on learning outcomes, but when there was a tiny performance pay, just 3 percent of their salary, now linked to performance, then they got dramatic results.

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