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A Long History of World Bank Research Focusing on India

India is the world's seventh largest economy and among the fastest growing large ones, with average annual growth of about 7 percent. Yet India is also home to the world's largest concentration of poverty, with more than 250 million people living below the international poverty line of \$1.90 a day. Indeed, one in four people living in extreme poverty around the world is Indian. And income inequality has worsened in recent years. According to the World Inequality Lab's *World Inequality Report 2018*, around 56 percent of national income accrues to the top 10 percent of Indian earners and only 15 percent to the bottom 50 percent. The growing inequality, particularly since the opening of the economy in the early 1990s, has emerged as a potential fault line in the economic and social progress made in the past 60 years. Moreover, poverty reduction efforts are constrained by some aspects of the country's culture and institutions as well as by inadequate physical and financial infrastructure.

The World Bank's twin goals of ending extreme poverty and ensuring shared prosperity for the bottom 40 percent globally depend on their success in India. The Bank's research program has made substantial contributions to this endeavor. The Bank has had a strong research program in India ever since President Robert McNamara created a separate department for development policy research in 1970. Under the leadership of Hollis Chenery, the first to head the department, the Bank expanded its economic research and focused on India as one

of the main target countries for addressing income disparity and poverty. World Bank research has shown that the poorest 40 percent of households in India are stymied by limited access to quality education, health care, and financial services. Studies have also shown that inequality reinforces the cost and cultural barriers to socioeconomic mobility for poor households.

This issue of the Research Digest features recent Policy Research Working Papers that empirically analyze the persistence of poverty and inequality in India and discuss ways of overcoming these challenges. One paper shows that India's large investments in education have led to gains in school quality, but argues that effective school monitoring is critical for reducing teacher absence. Another paper demonstrates that there is no shortage of resources or ideas in India in the area of public health services; the challenge is spreading the word about success stories so that others can learn from them. Comparing experience in two metropolises, it shows that Delhi could substantially improve its delivery of public health services simply by replicating the Chennai model. Two other papers investigate cultural impediments to poverty reduction. Several others highlight policy successes and failures in different areas. These studies and others offer innovative ideas on a multitude of issues crucial for the overall development of India.

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Looking Back on Two Decades of Poverty and Well-Being in India

Poverty reduction has accelerated in India. But there is still room to make the gains more inclusive and more responsive to growth

India made rapid progress in reducing absolute poverty in the two decades leading up to 2012. As measured by India's official poverty line, based on daily per capita consumption expenditure, the share of the population living in poverty fell by half between 1994 and 2012, from 45 percent to 22 percent. During this period 133 million Indians—more than the total population of Japan or Mexico—emerged from poverty. Moreover, the pace of poverty reduction accelerated over time: it was three times as fast between 2005 and 2012 (the years for which the latest government data are available) as in the previous decade. At this pace India's reduction in extreme poverty, pegged at \$1.90 a day, matched or exceeded the average rate of decline for the developing world as a whole and for middle-income countries as a group (figure 1).

But as a recent paper by Narayan and Murgai shows, the reduction in poverty did not benefit all segments of the population equally. The decline in poverty could have been much greater

if economic growth had been more inclusive. While consumption levels have increased rapidly in recent years, the incomes of the poorest 40 percent of households have grown more slowly than the average income of the overall population. On this measure of “shared prosperity”—or equitable improvement among all people—India lags behind countries at a similar stage of development. Although India ranked 16th among 51 middle-income countries in average consumption growth during 2005–12, it ranked only 27th within this group in consumption growth among the poorest 40 percent of households.

Moreover, even the rapid reduction in poverty during 2005–12 was less than would be expected given India's high rate of economic growth during that period. The responsiveness of poverty to per capita GDP growth in India was lower than the average for developing countries. A couple of telling indicators reveal the extent of this divergence: while India ranked among the top 10 percent of developing countries in per capita GDP growth during 2005–12, it ranked just above the 60th percentile in the rate of poverty reduction. And this relationship between growth and poverty reduction varied widely between Indian states.

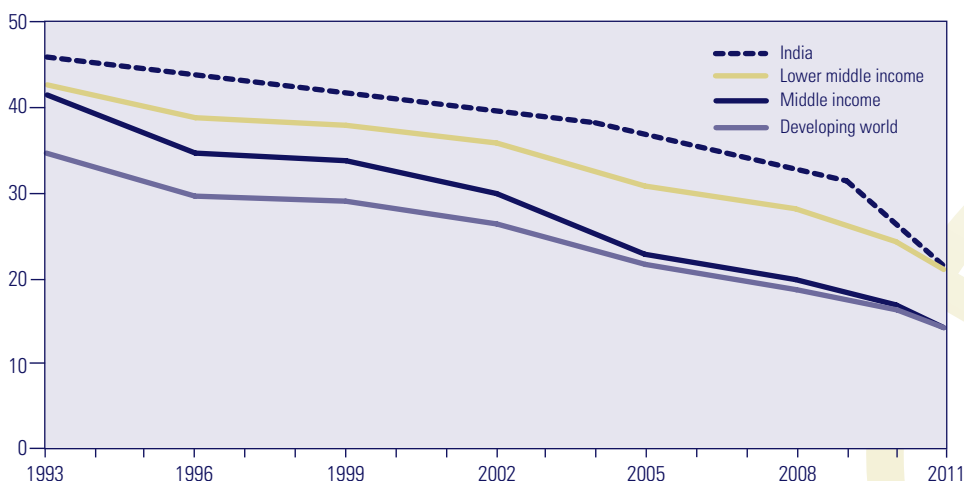
The sheer scale of poverty in the country remains sobering. In 2012 India was home to 262 million people living below the international poverty line of \$1.90 a day. Put differently, one in four people living in extreme poverty across the world is Indian. (India's poverty rate at \$1.90 a day might be significantly lower if new consumption estimates for 2009/10 and 2011/12 from the National Sample Survey Organization are used. Based on these measures, India would account for a smaller share of the world's extreme poor, roughly 15 percent, but would still be home to the largest number.)

Poverty is closely intertwined with geography. Poor people are still far more likely to be found in India's villages—home to 80 percent of its poor—than in its cities. And its poorer states are not catching up with their more prosperous counterparts. If the current trend of slower poverty reduction in the poorer states persists, poverty will become increasingly concentrated in a handful of states. In 2012 just three large, lower-income states (Uttar Pradesh, Bihar, and Madhya Pradesh) accounted for 44 percent of India's poor people.

Nonetheless, the story of India's transformation remains an optimistic one. Although the full potential of economic growth to reduce poverty has yet to be unleashed, the links between growth and poverty reduction have strengthened.

Figure 1. Extreme Poverty Rate in India and Selected Country Groups, 1993–2011

Share of population below \$1.90 a day (%)



Source: World Bank, World Development Indicators database (accessed November 16, 2015).

Note: Based on the international poverty line of \$1.90 a day (2011 PPP). Figures are available at roughly three-year intervals during 1990–2008; for India actual survey years are used.

Ambar Narayan and Rinku Murgai. 2016. “Looking Back on Two Decades of Poverty and Well-Being in India.” Policy Research Working Paper 7626, World Bank, Washington, DC.

For India's Rural Poor, Growing Towns Matter More Than Growing Cities

In India today, the growth of secondary towns may do more to reduce rural poverty than the growth of big cities

Since beginning economic reforms in earnest in the early 1990s, India has made much progress in reducing poverty, with faster rates of decline than in the prereform era. The indications are that urban economic growth since the early 1990s has had a greater effect in reducing poverty—and that this has come with larger gains for India's rural poor. Does the pattern of urban growth—that is, whether it emanates from large cities or smaller towns—matter for its effect on the rural poor? Which type of urban growth is more poverty reducing?

Secondary towns may be more tightly connected to the surrounding rural hinterland than are cities, so growth in small towns may have more effect on rural poverty. But growth in larger cities may also spill over to the towns and rural areas both through labor market adjustment and because the larger cities may also generate larger trade and remittance flows.

Investigating these questions in a recent paper, Gibson, Datt, Murgai, and Ravallion show that even in a simple theoretical model that allows for only labor adjustment as a mechanism for spillovers, it is ambiguous whether the growth of cities matters more for the rural poor than the growth of towns. The model produces conditions under which a given proportionate gain in the output of big cities has less impact on the rural wage rate than does growth in the output of secondary towns. But this is only one possible outcome. Even in this simple model, city growth could more effectively “trickle down” to the rural poor. Ultimately, it is an empirical question as to which type of urban growth is better for the rural poor.

Empirically, it is difficult to relate variation in the growth of different types of cities to variation in rural

poverty reduction. One difficulty arises because India measures city growth (in terms of population rather than economic output) only once every 10 years, using the census. Much of the variation in rural poverty reduction occurs within the 10-year period between censuses and so would be missed by studies that rely on the census data to measure urban growth. The lack of agglomeration-level boundaries, such as the metropolitan statistical areas in other countries, also means that India's census data correspond to administrative rather than economic definitions of cities. Another difficulty is the absence, unlike in China, of economic statistics that are both timely and spatially detailed (such as at the city level).

Lacking spatially disaggregated production data, the authors use night lights data as an indicator of growth in urban incomes, distinguishing between growth on the extensive and intensive margins and between the growth of cities and of secondary towns. Night lights are used to demarcate the edge of cities for examining effects of expanded areas (the extensive margin), and to calculate the intensity of light—the “digital number”—emanating from within these boundaries (the intensive margin).

These new measures of urban economic activity using night lights data are econometrically related in a spatial Durbin fixed-effects model to subnational rural poverty estimates between 1993/94 and 2011/12. Poverty estimates are formed at a finer spatial resolution (59 National Sample Survey regions) than in the existing literature, which relies on estimates at the state level. At the heart of the empirical strategy is the fact that for some regions the urban growth has come mainly from a brightly lit big city like Bangalore while for other regions it has come mainly from the expansion of less brightly lit secondary towns, as in inland Tamil Nadu.

Results show that it is the expansion of India's cities and other urban areas on their extensive margin that

seems to have the most significant relationship with rural poverty reduction. The authors consistently find this effect using different specifications, while they find little apparent effect on the rural sector from the brightness of lights coming from urban areas.

Comparison of the effects of big-city economic growth on rural poverty with those of secondary towns leads to some consistent associations, indicating that the growth of towns matters far more than does the growth of cities for reducing rural poverty in India. This effect is close to inequality-neutral, being associated with neither higher nor lower inequality within rural areas.

At India's current stage of development the growth of secondary towns may do more to reduce rural poverty than the growth of big cities. This pattern may not hold at all stages of development; indeed, the theoretical model suggests that cities may eventually take over from towns as the drivers of rural poverty reduction. For now, however, the authors' findings suggest that along with promoting agricultural and rural development, India should look to its towns, not its cities, to help reduce rural poverty.

John Gibson, Gaurav Datt, Rinku Murgai, and Martin Ravallion. 2017. “For India's Rural Poor, Growing Towns Matter More Than Growing Cities.” Policy Research Working Paper 7994, World Bank, Washington, DC.

Weighing the Cost-Effectiveness of Strategies to Reduce Teacher Absence in India

Hiring more teachers increases the time teachers spend with students. So does hiring more inspectors. Which is more cost-effective?

Most discussions about increasing the time that teachers spend with children revolve around class size and student-teacher ratios. But in many low-income countries teachers are frequently absent, a striking indicator of weak governance. Indeed, some studies show absence rates regularly exceeding 40 percent. In this context the notional student-teacher ratio matters less than the *effective* student-teacher ratio—the actual time that a teacher who is present spends with children in the classroom. Thus while many discussions focus on hiring new teachers, policies that reduce the rate of teacher absence may be equally efficacious—and far more cost-effective.

In a recent paper Muralidharan, Das, Holla, and Mohpal discuss the relative trade-offs between strategies that augment inputs (hire more teachers) and those that decrease inefficiencies (reduce absences) using data that they collected from 1,297 villages in India. The sample retained the rural portion of earlier work in 2003, allowing the authors to construct a panel of villages seven years apart.

First the good news. Between 2003 and 2010 public primary schools improved dramatically along multiple dimensions. The share of teachers with a college degree increased from 41 percent to 58 percent, and the share reporting that they were being regularly paid rose from 49 percent to 78 percent. The share of schools with toilets and electricity more than doubled (from 40 percent to 84 percent for toilets, and from 22 percent to 45 percent for electricity); the share with functioning midday meal programs nearly quadrupled (from 22 percent to 79 percent); the share with a library rose from 51 percent to 69 percent; and almost all schools now have access to drinking water (96 percent). The Indian

government's greater focus on primary education in the past decade led to substantial improvements in input-based measures of school quality as well as in administrative and community monitoring.

Now the not so good news. Even as all these input-based measures of schooling improved, there was little decline in the rate of teacher absence. The population-weighted national average rate for rural India fell by 10 percent, from 26.3 percent to 23.6 percent. Students receive less teacher attention when teachers are absent, so even though the all-India student-teacher ratio fell to below 40 in this period, the effective student-teacher ratio after accounting for teacher absence was still over 52. Combining the rate of absence with salary costs suggests that the annual fiscal cost of teacher absence was a staggering 81–93 billion rupees (Rs), around \$1.4–1.6 billion a year at 2010 exchange rates.

What should the government do about this? Using the panel structure of the data, the authors compared and contrasted different correlates of teacher absence. The two headline results: First, a reduction in the notional student-teacher ratio of 10 percent was associated with a 0.5 percent *increase* in average teacher absence; perhaps if there are more teachers, it is easier to manage the school even when one of them is absent. Second, improved school monitoring through inspections was associated with a significant decline in absences. Increasing the probability of inspection in the previous three months from zero to one was associated with a decline in the absence rate of 6.4–8.2 percentage points, or 27–35 percent.

These numbers set up an illuminating trade-off. Consider two policies to reduce the effective student-teacher ratio: hiring more teachers and hiring more inspectors. What would their relative costs and benefits look like? Hiring enough supervisors to increase the probability of a school being inspected by 10 percentage points would cost Rs 448 million a year. But the

resulting reduction in teacher absence would lead to savings in wasted salary amounting to Rs 4.5 billion a year—10 times the cost of hiring more supervisory staff. Alternatively, hiring enough additional teachers to achieve the same effective student-teacher ratio would involve estimated salary costs of Rs 5.7 billion a year. Thus as a strategy to reduce the effective student-teacher ratio, increasing the probability of inspections is 12.8 times as cost-effective as hiring more teachers.

These results should not be over-interpreted. They are correlations, and while panel data help remove potential confounders that are fixed over time, they cannot address time-varying unobserved changes in the villages. Perhaps villages where the probability of inspection increased were also those where overall governance improved in other ways that could not be measured. Similarly, inspections are by nature a punitive policy, and any punitive policy requires that the government be granted a degree of legitimacy. Nevertheless, the results make a strong case that where governance is weak, strategies to reduce inefficiencies may be many times as cost-effective as those that seek to augment inputs.

Karthik Muralidharan, Jishnu Das, Alaka Holla, and Aakash Mohpal. 2017. "The Fiscal Cost of Weak Governance: Evidence from Teacher Absence in India." *Journal of Public Economics* 145: 116–35. (Also issued as *Policy Research Working Paper 7579*, World Bank, Washington, DC, 2016.)

Flies without Borders: Lessons from Chennai on Improving Municipal Public Health Services

Chennai offers some lessons for other Indian cities on how to improve the governance of public health services

India's fast-growing cities face three key challenges in improving public health outcomes. The first is the persistence of *weak links in the chain*—notably, badly underserved slums, from which contagion can spread across a city. Richer residents corner public resources such as water and sanitation services, but the health indicators of their children suggest that they are deeply affected by contagion from the broader urban environment.

While access to medical care ensures low mortality among these privileged children, repeated infections expose them to stunting. Indeed, a quarter of children in the wealthiest quintile of Indian households are stunted, compared with 5–8 percent of their counterparts in Sri Lanka or in lower-income countries in Latin America, which have better public health systems. Stunting is associated with lower cognitive ability, lower earnings, and shorter life expectancy. The realization that poor slum sanitation also affected wealthier people helped motivate municipal governments in Western countries to improve slum conditions. As John Duffy wrote in 1971, describing late 19th-century slum improvements in New York City,

The knowledge that the diseases of the workers who sewed clothes in their filthy tenement homes or who processed food could be spread to decent, clean, and respectable citizens served as a powerful incentive to the reform of public health.

The second challenge is *devolution of service delivery* that transfers funds and responsibilities to local elected bodies without strong arrangements for holding them accountable for effective financial management or service delivery. Devolution works poorly for intangible and highly technical services like public health.

Indeed, public health services are especially vulnerable to such devolution, for at least two reasons. First, their success is defined by a *lack* of (adverse) events. It is far easier for elected representatives to gain credit with their constituents by opening a hospital. Second, decision making for public health services is highly technical and needs to respond rapidly to ever-shifting disease conditions. This kind of agile decision making is difficult to achieve if key decisions must be approved by nontechnical people.

The third challenge is *fragmentation of services* with inadequate coordination arrangements. Public health outcomes depend on the provision of multiple services—including water supply, sewerage, solid waste, and drainage. Poor drainage or uncollected garbage can hamper mosquito control efforts. Poor coordination of these services threatens public health outcomes. It also demoralizes public health staff and citizens seeking to improve health conditions.

Some cities in India have addressed these challenges more effectively than others, as is shown in a recent paper by Das Gupta, Dasgupta, Kugananthan, Rao, Somanathan, and Tewari. The authors explore the management of municipal public health services in two major Indian metropolises with sharply contrasting health and sanitation indicators. One is Delhi, where services are quite constrained. The other is Chennai, the capital of Tamil Nadu state, which mitigates these challenges in several ways:

- *A considered approach to devolution and management.* Tamil Nadu state does not transfer all control over funds and line agency staff to local bodies. Moreover, the Chennai Municipal Council Act empowers the state government to sanction errant elected representatives. The municipal council's work is overseen by elected representatives but managed by professional administrators and technical professionals. Its field staff are helped in maintaining professional standards by monitoring and support from

the council's headquarters and from the Tamil Nadu State Public Health Directorate.

- *A strong state public health directorate* whose head is empowered to monitor and support the municipal council's public health services. This directorate is unusual in India in its strong capacity for public health administration, with a clear mandate and budget. Its staff are experienced in managing public health services. They participate in meetings at all levels of the state administration to discuss public health threats, raising awareness of the complexities involved in generating good public health outcomes. Most other state public health directorates are too weak to do this, and resources are concentrated instead on medical services.

- *An active approach to service delivery, especially to vulnerable populations.* Chennai's municipal health department conducts regular health camps in slums. These screen slum residents for diseases, for the purpose of both treating them and collecting disease prevalence data to inform service planning and avert outbreaks. This outreach is crucial given the high externalities of communicable diseases. Unlike Delhi, Chennai also has very high coverage of maternal and child health services in slums.

Chennai has lower levels of child stunting than other major Indian metropolises, suggesting that its approach has gone far toward improving health outcomes. But it could accomplish much more if its municipal health department were given the authority to ensure better environmental sanitation.

These lessons from Chennai could be applied in other Indian cities, which share the same overall administrative system. Some might argue that Tamil Nadu is "different" because of its bureaucracy's strong work culture. This misses the point that good management practices can generate

Are Invisible Walls Inhibiting Internal Migration in India?

India has unusually low migration across state borders. One possible reason: state-level administration of benefits and preferences

National borders clearly limit international migration. But we do not necessarily expect provincial or state borders to prevent people from moving within a country. After all, most countries do not impose restrictions on internal mobility, with the famous exception of China's *hukou* system. Yet in India state borders form "invisible walls," leading Indians to display puzzling reluctance to cross state borders.

In 2001 internal migrants made up 30 percent of the Indian population, but this is a deceptively large number. Two-thirds were migrants within districts, and more than half were women migrating for marriage. Internal migration rates in the five years ending in 2000 were nearly four times as high in Brazil and China—and more than nine times as high in the United States. Indeed, in a comparison among 80 countries based on data between 2000 and 2010, India ranked last.

These internal migration patterns in India are explored in a recent

paper by Kone, Liu, Mattoo, Özden, and Sharma. Working with the Indian authorities, the authors obtained a unique data set from the 2001 census on district-to-district migration between each pair of India's 585 districts. These data were disaggregated by age, education, duration of stay, and reason for migration, leading to a detailed migration profile.

Nagpur, a district in Maharashtra, illustrates the restrictive effect of state borders on internal migration. Located at the center of India, Nagpur is close to three other states: Chhattisgarh, Madhya Pradesh, and (until the formation of Telangana in 2014) Andhra Pradesh. Map 1 shows the color-coded distribution of the origin districts of the migrants coming to Nagpur, with darker shades indicating higher shares. The thin lines represent district borders, while the thick lines represent state borders. The four neighboring districts in Maharashtra sent 31 percent of Nagpur's immigrants. In contrast, the other three neighboring districts, all in Madhya Pradesh, sent only 13 percent. More migrants came to Nagpur from other districts in Maharashtra that are hundreds of kilometers away than from neighboring districts in other states. Almost

identical patterns hold for emigration from Nagpur.

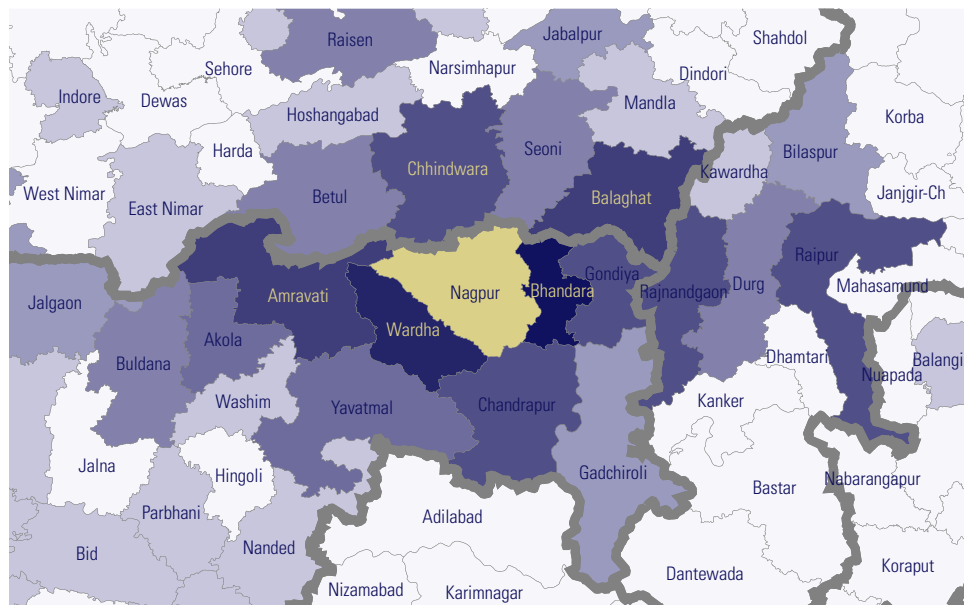
In an econometric analysis based on a gravity model, the authors use the detailed bilateral migration data to control for origin- and destination-specific factors, such as climate, natural resource endowments, and social and economic conditions. This makes it possible to focus on the bilateral variables, such as physical distance and linguistic overlap, as well as the critical contiguity variables—being in the same state, being neighbors, or both.

Results show that migration between neighboring districts in the same state is at least 50 percent greater than migration between neighboring districts in different states. Interestingly, state borders are a bigger hindrance to migration for men—especially for younger men—than for women. And the more educated are more reluctant to cross state lines.

The low level of internal mobility across state borders is a puzzle because there are no explicit legal restrictions. The authors suggest a possible explanation: explicit and implicit entitlement programs implemented at the state level discourage mobility.

Many social benefits are not portable across state boundaries, even if they are federally funded, because they are administered by the state governments. For example, the public distribution system for subsidized food, and even admission to public hospitals, are administered through "ration cards," issued and accepted only by the home state government. The authors find that in states where the public distribution system offers higher levels of coverage, unskilled migrants are relatively less likely to move out of state. These are people who would realize large wage gains from mobility. But they do not move from their home state for fear of losing welfare benefits.

Map 1. Origins of In-Migrants in the District of Nagpur



(continued on page 12)

Making It Easier to Apply for a Bank Account in India

India's financial inclusion program has made it easier to get a bank account. But applicants continue to incur a range of costs

About 2 billion adults worldwide lack an account at a formal financial institution. India is home to about a fifth of them. But given mounting evidence that accounts help enable a wide range of development goals, the government is seeking to improve this situation. In August 2014 it launched a flagship program aimed at achieving universal account ownership. Known as the Jan Dhan Yojana (JDY) scheme, the program has yielded impressive results: by the end of 2016 about 250 million accounts had been opened thanks to the new policy.

Using a survey of 13,000 adults across India, a new paper by Demirgüç-Kunt, Klapper, Ansar, and Jagati investigates the JDY program. The survey finds that women, poor people, and illiterate adults were more likely to apply for an account after the program was introduced. Women and poor adults were 5 percentage points more likely to apply for JDY accounts than men and wealthier adults. And application rates were 10 percentage points higher among illiterate adults than among those who had studied beyond primary school. Overall JDY application rates are negatively correlated with wealth at the state level, unlike traditional application rates. This suggests that the policy has disproportionately helped adults in poorer states.

Drawing on additional individual-level data, the paper also explores the costs of opening an account, the efficiency of the account application process, and demographic differences between those who choose to apply and those who do not. The JDY program aims to open one account per Indian household by offering zero-balance accounts with no opening fees. And compared with traditional applicants, adults who applied for a JDY account in the year before the survey were half

as likely to say that the application process was difficult.

Yet people who wish to apply for an account continue to incur a range of costs, including the cost of traveling to bank branches, the cost of collecting documentation, and various other monetary costs. Most applicants face a combination of these costs, and their cumulative impact may be enough to dissuade people without an account from applying.

People who ended up applying faced a host of other challenges. More than half of JDY applicants reported paying a required minimum initial deposit, even though the program carries no such requirement. It's understandable that banks need deposits to make accounts commercially viable. But such a minimum deposit violates the intent of the government's program.

Among applicants, 70 percent cited receiving, sending, and saving money as their main reason for applying for an account, while 13 percent applied because they expected the government to hand them a cash bonus for opening a JDY account. Some accounts will be used to receive future government transfer payments. But the false expectation of free money could leave many people with accounts that are not used.

The survey results point to several recommendations that could improve the account application process, including more effectively communicating the requirements for opening a JDY account. Better marketing of the policy could address the concerns of the 35 percent of adults who said they did not apply for an account because the process is too expensive. People need to be informed that JDY accounts are free and that there are no minimum deposit requirements.

While clarifying and simplifying the procedures for opening a JDY account is the first step, better governance of bank agents and NGOs assisting with the vast task of bringing hundreds of millions of adults into the formal financial system is just as important. These correspondent agents can play a

key part in connecting rural residents and poor adults with formal financial institutions, and trust in their integrity is therefore critical to the success of the JDY program.

The survey also reveals opportunities for India to build on its financial inclusion successes. While financial inclusion begins with having an account, the benefits come only from active use of the account to make payments, save money, and manage risk. The 2014 Global Financial Inclusion (Global Findex) database showed that 43 percent of accounts in India were inactive. One promising initiative centers on payment banks—which can offer remittance services, mobile payments and transfers, and other banking services such as ATM or debit cards (though not loans or credit cards). By allowing access to financial services through mobile phones, the payment banks offer a way to reduce travel time and transportation costs for poor and rural residents.

The survey shows the value of extending the scope of questions to include metrics of the cost, time, and documentation challenges of opening new accounts. This information can help inform policy makers, researchers, and practitioners working toward greater and more inclusive access to and use of formal financial services.

Aslı Demirgüç-Kunt, Leora Klapper, Saniya Ansar, and Aditya Jagati. 2017. "Making It Easier to Apply for a Bank Account: A Study of the Indian Market." Policy Research Working Paper 8205, World Bank, Washington, DC.

Managing Food Price Volatility in India

India's food security policy has been successful in stabilizing the prices of staples, though at a high cost. Are there less costly alternatives?

India has pursued an active food security policy for many years. This combines trade policy interventions, public distribution of food staples, and assistance to farmers through minimum support prices defended by public stocks. The policy has been successful in stabilizing staple food prices. But stabilization has come at a high cost, raising concerns about whether the costs exceed the benefits. Moreover, the policy risks the accumulation of unmanageably large stocks. Indeed, in recent years stocks have far exceeded the established norms for buffer stocks and strategic reserves.

In a recent paper Gouel, Gautam, and Martin analyze the welfare and cost implications, using a rational expectations storage-trade model to represent India's wheat market and its relations with the rest of the world. The model evaluates the current policies for managing wheat price volatility in India and considers alternatives.

Representing current policies is a challenge, however, because they appear to be highly discretionary. To capture their essence, simple rules are used, defined as functions of world and domestic conditions. The alternative policies are derived from the maximization of a social welfare function that includes a motivation for price stability. The study includes two innovations for developing price stabilization policies: It designs optimal price stabilization policies for a large country. And it considers simple rules for stabilization and demonstrates how closely their effects can approximate those of a fully optimal policy.

India's current policies are costly for two reasons: trade and storage policies are not well coordinated, and lacking clearly defined rules for stock release (other than for the public distribution system), the storage policy

is effectively a buy-and-hold strategy. Large stocks are held for long periods, and procurement continues regardless of the level of stocks. But stock releases, beyond those by the public distribution system, are insufficient to dampen domestic price rises or to keep stock levels in check. Instead, the government has occasionally had to dispose of wheat stocks on the world market.

Another key consideration is the cost of public grain storage. The current costs, declared by the Food Corporation of India, are four times the long-run cost estimates for other countries, making it difficult to justify public storage in India on economic grounds. Relying on domestic private storage or on world trade and storage abroad would be much less costly. For this reason the alternative policies considered are based on providing sufficient incentives to induce more cost-efficient private stock holders, or a lower-cost public storage agency, to store grains in a socially optimal way.

The model is used to identify the levels of storage and trade under an optimal policy that maximizes total welfare. But because a fully optimal policy is state-dependent and may be difficult to implement, optimal simple rules are considered for more practical policy guidance. These are simple predetermined rules whose parameters are chosen to maximize the same welfare function. Two rules considered are a constant subsidy to private storage (as storage policy) and tariffs defined by an isoelastic function of border price (as trade policy).

A notable result from the model is that the optimal simple rules achieve welfare gains approaching those under a fully optimal policy. The storage subsidy provides incentives for private storage to exceed the level in the absence of intervention. The variable tariff results in lower volatility of domestic prices, without attempting to eliminate all volatility. Since private storage responds in appropriate ways to price, it combines well with the trade policy, a result that is extremely

difficult to achieve with a price-band program (or its variants).

Two main messages emerge from this analysis. First, the approach adopted by India, combining trade and storage policies, has helped achieve its objective of stabilizing prices. Second, with some modifications India could significantly improve its total welfare and reduce its costs (primarily storage costs). Price stabilization policies are generally not regarded as first-best policies because they do not directly target the underlying market failures, which are often thought to be related to the economic agents' lack of capacity to cope with shocks. Yet stabilization policies appeal to policy makers with a strong dislike for price instability, and certain market failures may prevent the first-best policies from achieving their goals. These factors point to the importance of identifying better policies to achieve price stability.

The analysis suggests that given the current circumstances in India, a less insulating trade policy, combined with storage rules that are similar to but above competitive storage levels, could lead to significant cost savings (through a combination of storage and trade costs) with no significant net loss in pure welfare (defined as the sum of producer and consumer surplus). These gains are predicated on efficient storage, however. The current public costs of storage are extremely high and make it difficult to justify any level of public storage in the country without significant loss in overall welfare.

Christophe Gouel, Madhur Gautam, and Will J. Martin. 2016. "Managing Food Price Volatility in a Large Open Country: The Case of Wheat in India." Oxford Economic Papers 68 (3): 811–35. <https://doi.org/10.1093/oenp/gpv089>. (Also issued as Policy Research Working Paper 7551, World Bank, Washington, DC, 2016.)

Uncertainty and Inefficiency in South India's Groundwater Markets

Inefficiencies in South India's groundwater markets may reduce the likelihood that small farmers adopt water-saving technologies

India uses far more groundwater than any other country, primarily for agriculture. In recent decades private investment in borewells has surged, unleashing a wave of agricultural intensification, a boon to the rural poor. But because of the extreme fragmentation of land and the high costs of well drilling in India, many farmers still gain access to dry-season irrigation through highly localized groundwater markets.

In principle, these markets should allow for an efficient allocation of groundwater across farms—important because of concern about the sustainability of this vital resource. India's main policy related to groundwater has been its effort to promote water-saving technologies (drip and sprinkler irrigation), through subsidies targeted particularly to small farmers. For these farmers, however, the benefit of water-saving technology depends on their ability to expand water sales to neighboring cultivators—that is, on the efficiency of groundwater markets. Yet our understanding of these markets remains limited.

In a recent paper Giné and Jacoby focus on the groundwater economy of South India. Here the hard-rock aquifers undergo an annual cycle of replenishment during the monsoon season followed by drawdown as millions of borewells pump out groundwater for dry-season irrigation. Depending on local conditions, borewells may unexpectedly run partially or totally dry during the growing season, leaving crops vulnerable to water stress. Because planting involves an up-front and irreversible investment, a farmer's standing crop can effectively become hostage to a single potential water seller.

In this context bilateral transactions between well owners and neighboring farmers take one of two simple

forms: spot contracts, in which groundwater is sold on a per-irrigation basis throughout the season, and long-term contracts, in which the area irrigated and the price are determined before planting and guaranteed for the entire season.

In a special groundwater markets survey developed by the authors and covering around 2,400 borewells across six districts of Andhra Pradesh and Telangana in 2013, farmers were asked to assess the probability distribution of borewell flow at the end of the season given the typical flow at the beginning of the season. On this basis only a handful of well owners report zero uncertainty, and for many the uncertainty is substantial. Moreover, this uncertainty affects behavior; the greater it is, the more likely that a per-irrigation contract will be chosen over a seasonal contract.

The intuition for this finding is simple. Suppose that a borewell's flow drops off unexpectedly late in the season. Under a seasonal contract the borewell owner (water seller) bears the cost. Since he has committed to fully irrigate his buyer's field, his own crop must suffer. By contrast, in the per-irrigation arrangement buyer and seller share the pain, through adjustment in the groundwater price and quantity.

The seasonal contract has an upside, however. The buyer plants more area than he would under the per-irrigation arrangement because he knows that, once he has committed his crop, he will not lose his power to bargain for a good price of irrigation because price and quantity are fixed in advance. This commitment benefits the seller as well because it expands his market. As flow uncertainty increases, the cost of the inflexibility inherent in the seasonal contract rises so that the per-irrigation contract is eventually preferred.

The authors estimate an economic model of irrigation decisions incorporating precisely this trade-off. The key contribution lies in quantifying the groundwater market inefficiencies

using the observed covariation of borewell flow uncertainty with sales contract type as well as with neighboring plot area irrigated. The model also makes it possible to distinguish the contracting distortion from the fixed cost of arranging water transactions.

How costly are groundwater market distortions to the typical borewell owner? Using the estimated model, the authors find that the overall cost for a well owner with the median plot size is \$39, or 5.7 percent of dry-season income. The contracting distortion alone costs \$13, or 1.9 percent of dry-season income.

Importantly, however, the distortion costs are highly regressive. Borewell owners with the smallest plots, who also tend to be the poorest ones, face the greatest proportionate loss of surplus, because they are the most reliant on groundwater markets. Since smaller farmers would have a greater need to sell excess groundwater as the efficiency of irrigation improves, their return to water-saving technology is also lower. In this way the uncertainty of groundwater supply and the concomitant distortions may reduce the likelihood that smallholders adopt water-saving technologies.

Deliberative Inequality: A Text-as-Data Study of Village Assemblies in India

Deliberations in village meetings in India are strongly influenced by gender inequality. But female leadership can reverse this bias

Electoral democracy is based on the simple but elegant notion that tallying votes aggregates preferences. But the limitations of this mechanism as a way of governing large, complex societies have become increasingly apparent throughout the world—with challenges that include elite capture, clientelism, and indeed its very legitimacy.

This has led to a revival of the very old idea of direct democracy—that interests of diverse citizens can be represented by a process of discussion, debate, and dialogue that builds consensus. This form of deliberative democracy derives from the premise that “democracy revolves around transformation rather than simply the aggregation of preferences” (Jon Elster, ed., *Deliberative Democracy*, vol. 1 [Cambridge: Cambridge University Press, 1998], p. 1). This thinking has fundamentally important implications for development as well because of the great interest in participatory development and the challenges in doing it well.

A recent paper by Parthasarathy, Rao, and Palaniswamy explores these issues, making both a substantive and a methodological contribution to the study of governance and citizen engagement. On the substance, the paper is an analysis of gender inequality in deliberative decision making, looking at transcripts of meetings from the largest deliberative institution in human history—*gram sabhas*, or village forums in rural India. These meetings deal with important decisions for the village, such as selecting beneficiaries for public programs and allocating budgets for public goods and village development plans.

The paper’s methodological contribution is to analyze 50 transcripts of village meetings using “text as data” natural language processing methods to analyze patterns of speech in textual

information. The literature has generally analyzed the quality and nature of discourse in deliberative forums through small-sample ethnographies or in university lab settings. This paper is one of the few to conduct a large-sample qualitative analysis of this topic using new machine learning methods.

The question the paper asks is whether there is gender equality in voice and deliberation. The authors analyze this question by looking at three aspects of democratic processes—equality of participation, agenda-setting power, and the responsiveness of the state. In the 50 gram sabhas analyzed, each “speech act”—that is, each statement made by a participant without interruption—counts as a “document.” The authors have 1,736 documents identified by the speaker’s sex and whether the speaker is a citizen, a bureaucrat, or an elected official.

Gram sabhas in the state of Tamil Nadu, where the study was conducted, have about 50 percent female attendance. But the authors find that men speak twice as often as women, and when they speak they do so, on average, about 40 percent longer. Interestingly, male citizens do not speak any longer than female citizens, so the male domination of the discourse is driven by male politicians.

To study the ability of individuals to set the agenda of the meeting, the authors first measure the extent to which a topic mentioned in a person’s speech is repeated in the next speech act. They then check to see whether this topic is persistent by being repeated in the five subsequent speech acts. They find that speeches by citizens are about 9 percent more likely to be setting agendas by the first measure, and about 7 percent more likely by the second one, than speeches by politicians or officials. In other words, speech acts by politicians and officials are declarations while those by citizens are more questions or conversations.

But male citizens are far more likely to set the agenda than female citizens are. The gram sabha is clearly biased

against women in a number of different ways. Remarkably, where the village presidents are women (as a third of them are, through quasi-random assignment), they correct for this bias and raise the likelihood that female citizens will set the agenda by 20 percent.

To measure whether there are gender differences in the ability of citizens to draw a response from the government, the authors assess the probability that a topic mentioned in citizens’ speech is also addressed by the village leadership in a subsequent speech. They find that women are about 20 percent less likely to elicit a response from village leaders. But once again the situation is reversed when the president is a woman, a circumstance raising the probability that a female citizen is listened to by 20 percent.

Gram sabhas in Tamil Nadu are meaningful spaces of citizen deliberation where citizens, rather than politicians or bureaucrats, dominate the discussion. But the deliberations within a gram sabha are strongly influenced by gender inequality in the prevalence of voice, in agenda-setting power, and in the responsiveness of the state. Quotas for women presidents reverse this bias because women presidents are more likely both to let women citizens set the agenda and to respond to the topics they raise.

Ramya Parthasarathy, Vijayendra Rao, and Nethra Palaniswamy. 2017. “Deliberative Inequality: A Text-as-Data Study of Tamil Nadu’s Village Assemblies.” Policy Research Working Paper 8119, World Bank, Washington, DC.

Cultural Impediments to Cooperating: A Study of Low- and High-Caste Men in Rural India

High-caste men in North India show a poor ability to learn to cooperate in an experiment—an impediment likely to be at work in real life

The quality of social conventions in a society is critical to its well-being. Conventions influence reciprocity, work effort, respect for private property, and much else. Laws are not a substitute; a law that runs counter to a convention rarely overturns it. The ability of a society to form efficient conventions is an important factor in its economic development.

Consider two individuals who repeatedly but anonymously interact in a coordination game in which cooperation is the best response to cooperation, but entails a risk of a small loss if the other player chooses not to cooperate. Will they learn to cooperate? Earlier work with U.S. subjects led many economists to think so. They believed that fixed pairs were almost sure to establish a convention for cooperation after a remarkably few interactions, as expectations that each would take the cooperative action converged. If this were generally true, it would be consequential, since a convention formed by a small group can often be maintained as the group gradually increases in size.

In a recent paper, however, Brooks, Hoff, and Pandey observe that the ability of most fixed pairs to learn to cooperate does not apply across all cultures—because they found one where it does not. With a sample of 122 subjects, they show that most high-caste men in North India do not have this ability in repeated rounds of a coordination game that is a prototype of the social contract. They drew their sample in 10 villages by visiting every third, fourth, or fifth house (depending on the hamlet's size) as they walked through each low- or high-caste hamlet.

The authors found that the low- and high-caste groups differed sharply in the ability to form conventions as well as in the kinds of conventions formed.

An efficient, cooperative convention quickly emerged in most low-caste pairs, just as it had for most pairs in experiments in the United States. But high-caste pairs were far less successful at forming conventions, and when they did form one, it was much more likely to be inefficient.

The only situation after which a large and robust difference in behavior occurred between low- and high-caste players was when a player suffered a loss from a coordination failure. Indirect evidence, based on a survey that the authors conducted and a theory that fits the experimental results, suggests that low- and high-caste players had different interpretations of this event that led them to respond differently in the next round of the game. The low-caste men appeared to perceive the loss as the innocent consequence of misaligned expectations. But the high-caste men appeared to construe it as an insult to which they retaliated by *not* taking the cooperative action in the next round. The apparent concern for honor is not a luxury good. The pattern of retaliation by the high caste holds for the subsample of men who live in mud houses.

To investigate the difference in caste culture, the authors presented low- and high-caste men with hypothetical scenarios in which one man harms another. Many more high-caste than low-caste men said that they would retaliate. Low-caste men often said that they would try to de-escalate the conflict or that they would not respond at all. By a standard psychological test to measure self-efficacy, a caste gap in self-efficacy does not explain the caste difference in response to harms.

The caste difference in the responses are consistent with work in anthropology and sociology that documents a culture of honor among the high castes of North India. "Honor" entails a reputation for responding aggressively to perceived insults. The culture of honor is a code for interpretation and action. In the lawless environment that historically prevailed in North India, a

family's honor could be the key to the security of its wealth. But in today's environment, where there are no invaders and formal institutions protect property rights, a central consequence of the culture of honor may be to impede the ability to form cooperative conventions. If the loss from a coordination failure triggers a strong enough desire to retaliate, that desire transforms the coordination game into a situation where the possibility of learning to cooperate vanishes.

The authors' findings challenge the view that earlier results on convention formation by fixed pairs of subjects from Western, educated, industrial, rich, and developed (WEIRD) societies apply to all humans. Instead, their results support the view that differences in cultural framing can lead two populations to perceive a coordination problem very differently.

The poor ability of the high caste to learn to cooperate in the experiment suggests that this impediment is likely to be at work in real life. The state in North India in which the studies were done is dominated by the high castes. As the Nobel Laureate Amartya Sen observes, if this state were a country, it would be among the largest and the poorest on earth. Its long history of coordination failures has stymied economic development.

Benjamin Brooks, Karla Hoff, and Priyanka Pandey. 2016. "Can the Culture of Honor Lead to Inefficient Conventions? Experimental Evidence from India." Policy Research Working Paper 7829, World Bank, Washington, DC.

Are Invisible Walls Inhibiting Internal Migration in India?

While the nonportability of such benefits inhibits the movement of the poor and the unskilled, two other factors contribute to the inertia of the skilled. Many universities and technical institutes are administered by the state governments, and state residents get preferential admission. In addition, a common requirement for employment in state government entities is state domicile, usually requiring long periods of continuous residence—and government jobs account for more than half the employment opportunities for people with higher education.

Internal mobility is critical for development and poverty reduction, especially for a country like India, which has the world's second largest labor market and hundreds of millions of people living in poverty. India's "fragmented entitlements"—welfare benefits and education and employment preferences administered at the state level—are likely to dampen the efficient allocation of labor. The introduction of a unique national identification system, the Aadhar card, is likely to lower but not eliminate moving costs. A bigger boost would come from

reforms that make welfare benefits fully portable and end state-biased recruitment for jobs and admissions to educational institutions.

Zovanga L. Kone, Maggie Y. Liu, Aaditya Mattoo, Çağlar Özden, and Siddharth Sharma. 2017. "Internal Borders and Migration in India." *Policy Research Working Paper 8244*, World Bank, Washington, DC.

(continued from page 5)

Flies without Borders

a strong work culture—including by providing training, support, and clear responsibilities and accountabilities. Conversely, work cultures unravel where there is a pervasive lack of accountability and responsiveness from above, as is starkly evident in Delhi.

Monica Das Gupta, Rajib Dasgupta, P. Kuganathan, Vijayendra Rao, T. V. Somanathan, and K.N. Tewari. 2017. "Flies without Borders: Lessons from Chennai on Improving India's Municipal Public Health Services." *Policy Research Working Paper 8197*, World Bank, Washington, DC.

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