

**E-governance, Accountability, and Leakage in Public Programs:
Experimental Evidence from a Financial Management Reform in India**

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ONLINE APPENDIX

A.1. Data Appendix

We first discuss the official data on expenditures and employment, then the surveys we implemented to assess actual MGNREGS implementation, and finally three additional sources we use to measure corruption.

A. Administrative data on MNREGS implementation

We use two sources of official reports on MGNREGS expenditures and employment.

CPSMS portal: In July 2014, we were granted access to detailed information on MGNREGS expenditures via the Central Planning Scheme Monitoring (CPSMS) Portal. Both treatment and control GPs were monitored in the system from July 2011 onward, and we could observe all credit and debit transactions from GP savings account. We use this information to compute MGNREGS spending per GP for the different periods of interests: from July 2011 to the start of the intervention in September 2012, from September 2012 to December 2012, from January 2013 to March 2013 and from the end of the intervention in April 2013 until July 2014.

Website nrega.nic.in: The government website nrega.nic.in provides publicly available information on MGNREGS expenditures per GP for every financial year (a financial year starts on April 1st). Using a newly available facility called the Public Data Portal (jointly produced by the Ministry of Rural Development and Evidence for Policy Design), we downloaded data in July 2014 on GP spending on labor and material for the financial years 2011-12, 2012-13 and 2013-14. These expenditures include payments that are recorded and bills for which the payment date is missing (which are hence considered as pending in nrega.nic.in).

Labor expenditure figures in nrega.nic.in aggregate across work and payment details for specific MGNREGS workers. These worker-level data are also entered on the website and made publicly available in the form of muster rolls and job cards. The online job card mimics the physical job card delivered to all households who register for MGNREGS work: the rule of one job card per household is not always followed in practice, so that members of a given households may appear on different job cards. We requested access to job card information from the Ministry of Rural Development and were provided with the details of 4,197,904

job cards and 6,292,307 workers in our sample districts for the financial years 2011-12, 2012-13 and 2013-14.

The online muster roll mimics the attendance roll on which working days and earnings are recorded on site. It gives for each job card the total number of days worked, wages earned, payments received and the date of the payment, from which we compute the delay between work and payment.

B. Independent surveys on MGNREGS implementation

In order to provide independent measures of MGNREGS implementation, we carried out our own survey in the 12 sample districts between May and July 2013. We visited every block in these districts, surveying a total of 195 blocks – 69 treatment blocks and 126 control blocks. We surveyed 2 randomly sampled GPs in each block, giving us a total of 390 GPs. The survey consisted of three main surveys: a household survey, a survey of MGNREGS assets and a survey of GP head (or Mukhiya).

Household Survey: We conducted a household survey covering 9,670 households. In each GP, we attempted to cover 25 households sampled from the list of households obtained from the District Rural Development Authority (DRDA). These lists were initially compiled in 2002 for the purpose of identifying Below Poverty Line households, so each household was given a poverty score, based on various criteria. From these lists, we sampled 72 percent of households below the median poverty score and 28 percent households from above the score. If a sampled household had left the village or all its members were defunct, surveyors were asked to interview a replacement household who had been randomly chosen from the initial list. Because the sampling lists were 10 years old and many areas had high migration rates, the proportion of households interviewed as replacements was also high, about 30 percent.

Asset Survey: We sampled 10 infrastructure projects from each GP. These were randomly sampled from the MIS (www.nrega.nic.in). In total, we sampled a total of 4165 infrastructure projects.

Mukhiya Survey: We attempted to interview the Mukhiya of every single GP we visited, and managed to locate and interview a total of 346 Mukhiyas out of 390 GP visited. The response rate is balanced across treatment and control blocks. Unlike the other two surveys, the Mukhiya survey was conducted on paper and was both quantitative and qualitative in nature.

C. Additional administrative data

We use three additional sources of administrative data to provide evidence on corruption in MGNREGS implementation: the Socio-Economic Caste Census, affidavit data and audits data.

SECC and name matching: To identify “ghost workers,” we attempt to match each working household reported on an nrega.nic.in job card to a house-

hold within the SECC data. The 2012 Socio-Economic Caste Census (SECC) is a national survey of all persons and households in rural and urban India. It is based on the National Population Register from the 2011 Population Census, but was conducted mostly in 2012 due to various implementation issues. The SECC data includes the name, father's name (or husband's name for married women), gender, education, and other information for each member of the household and the household overall. In the 12 districts of our sample (inclusive of rural villages only), the SECC data covers 16,480 villages, five million households, and 34 million individuals. The job cards data covers 18,513 villages, 4,197,904 working households, and 6,292,307 working household members.

In the first step, we pair villages in the job cards with corresponding villages in the SECC data to impose the restriction that we search for matching households only within the same village. In the second step, we match households from the job cards data to the SECC data within village pairs based on similarity of name, gender, and household composition. We calculate the closeness of village names in the first step and individuals' names in the second step using a modified levenshtein algorithm graciously made available by Paul Novosad (`lev.py` downloaded from <http://www.dartmouth.edu/~novosad/code.html>). We partially alter this algorithm to account for alternative spellings, missing/additional portions of names, and abbreviations.

In the first step, we take the following approach to determine village pairs. While the job cards data contains information on block, GP, and village name, the SECC data contains corresponding information for block and village name only. We attempt to match by name each of the 18,513 unique villages in the job cards data within block with a corresponding SECC village. We are able to match 84 percent of the job cards villages (containing 88 percent of households). We match the other 16 percent of the job card villages (12 percent of households), to all SECC villages which are matched with job card villages belonging to the same GP. For about 0.5 percent of villages (0.7 percent of households), we are unable to do either and match them with all the villages in the block.

In the second step, we attempt to find a match for each of the job cards from within the paired village or list of villages. We declare a household with one working member listed on the job card as matched if a single matching individual in the SECC data is found, and we declare a household with two or more members listed on the job card as matched if at least two individuals within the same SECC household are matched. The matching rate is thus mechanically lower for households with two working members (37 percent of households, of which 25 percent are matched) than for households with one working member (63 percent of households, of which 64 percent are matched). Individuals are matched based on two primary criteria: gender, which must match exactly, and name, which must be sufficiently close based on the algorithm described above. Note that once a suitable household match is found according to this process for one or more members, all other members of the job cards household are declared as

coming from a matched household. In contrast, the matched SECC household is not removed from the pool of potential matches as the algorithm moves on.

Our outcome of interest is the match rate, calculated separately for people reported to have worked during the period of the intervention and people reported to have worked after the intervention; the idea is that a name or household who is supposed to have a job card in the MGNREGS data but is not found in the SECC database is more likely to be a “ghost” than those who are found in both. This exercise is therefore a population-level version of the forensic method pioneered by ?, using exclusively administrative data. We recognize that the databases are both imperfect. There are surely errors in both directions (individuals might be omitted from the SECC census for example, or the matching could have failed because the names are spelled too differently to match, or someone could be matched to someone else with the same name). But these errors should not be different in treatment and control groups as the process of uploading worker details into nrega.nic.in was unaffected by the reform: in treatment blocks, it was independent from data entry into CPSMS.

Affidavit data: We also collected affidavits of MGNREGS employees. In the financial years 2012-13 and 2013-14, the Ministry of Rural Development of Bihar made it mandatory for all its employees to declare their personal assets, including cash, movable and immovable assets owned by them or a member of their household. The affidavits were scanned and the pdf files were made available online on the website of each district. Compliance was not perfect: in total we collected 2,463 affidavits for the financial year 2012-13 and 1,741 for the financial year 2013-14 in the 12 districts of our experimental sample. We construct our measure of MGNREGS employees’ personal wealth by adding the value of movable (cash, bank deposits, bonds, jewellery, other financial assets, vehicles) and immovable assets (land, buildings, other immovables) of the employee and his or her spouse. When the value of the jewellery is missing but the weight of gold or silver owned is given, we impute the value using international prices from <http://www.bullion-rates.com>. For District Development Coordinators, who are in charge of MGNREGS implementation in each district, we have data for all districts of Bihar for three financial years: 2011-12, 2012-13 and 2013-14.

Audits data: Finally, we use reports on MGNREGS audits carried out by the administration of each district between May 2012 and June 2013. These reports were compiled in July 2013 by the Rural Development Department to inform the process evaluation of MGNREGS audits by ?. The data include the audit date, block and GP names, the number of MGNREGS projects audited and irregularities found. We aggregate this information and compute the number of audits, the number of projects audited, the number of irregularities found and the number of irregularities per project audited in each block for three periods: May to August 2012 (pre-intervention), September 2012 to March 2013 (intervention period) and April to June 2013 (post-intervention). Unfortunately, completion date of each project audited is not recorded, but the Rural Development Department

letter no.120078 (September 1st, 2012) instructs audit teams to select projects undertaken in the financial years 2011-12 and 2012-13. Since the financial year 2012-13 ended in March 2013, projects audited in April to June 2013 had been undertaken during the intervention period. Data on administrative sanctions, dismissals and police investigations against MGNREGS officials responsible for these irregularities were not collected in a systematic manner.

Figure A.1. : Map of Sample Districts and Border Blocks

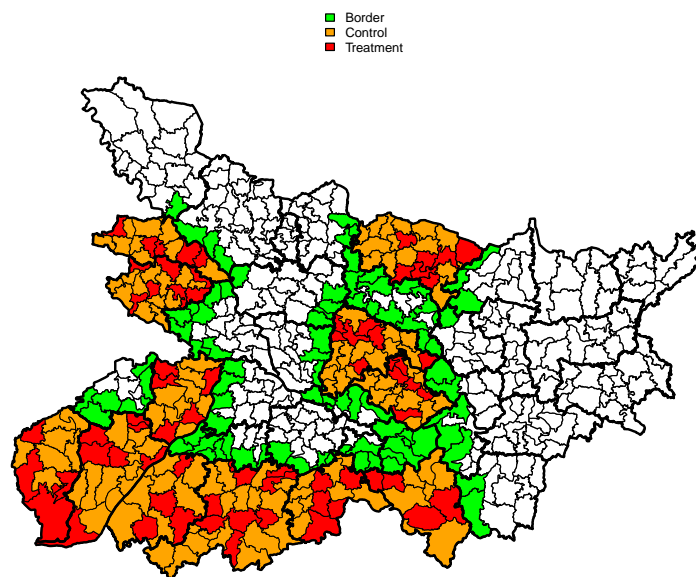


Figure A.2. : Total MGNREGS Expenditures (2006-2016)

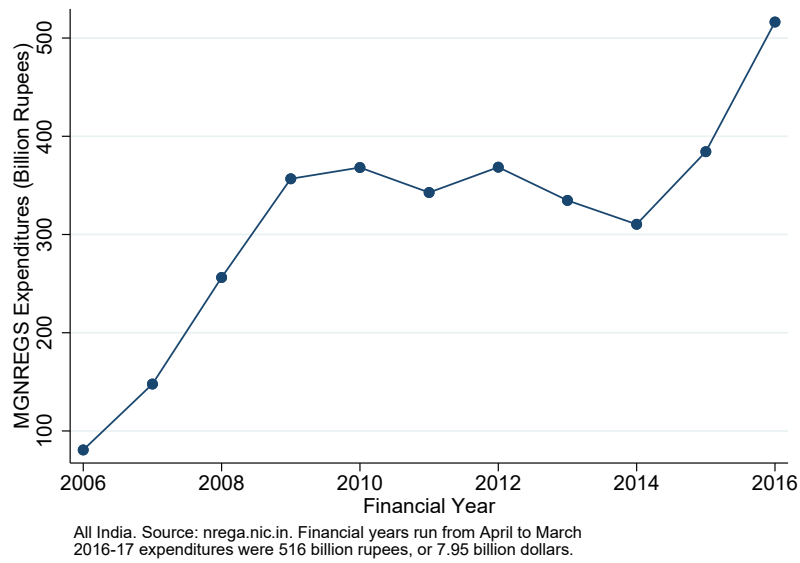


Figure A.3. : Fraction of Treatment GPs that used CPSMS at least once

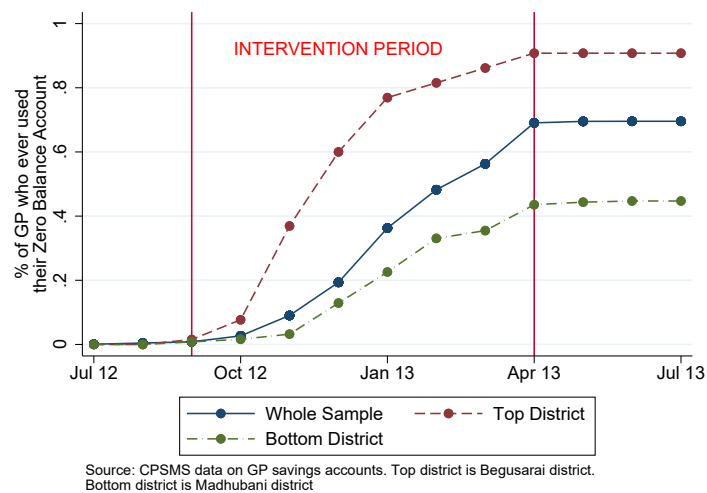


Table A.1—: Infrastructure Availability

	Required in Treatment	July '12		January '13		April '13	
		Treatment	Control	Treatment	Treatment	Control	
<i>Infrastructure</i>	(1)	(2)	(3)	(4)	(5)	(6)	
Computers (number)	3	1.32	1.06	2.48	2.06	1.61	
Operators (number)	3	1.22	0.86	2.20	1.75	1.27	
Generator (1=Yes 0=No)	1	0.67	0.56	0.97	0.90	0.85	
Internet (1=Yes 0=No)	1	0.38	0.33	0.85	0.71	0.60	
Scanner (1=Yes 0=No)	1	0.57	0.37	0.73	0.81	0.65	
Printer (1=Yes 0=No)	1	0.59	0.43	0.71	0.83	0.76	
Sampled Blocks		69	126	66	69	123	

Source: Phone surveys of block level MGNREGS functionaries (Program officers). Only treatment blocks were called in January 2013. In preparation for the intervention, infrastructures requirement were communicated to treatment blocks at the end of June 2012. The intervention started in September 2012 and ended in April 2013.

Table A.2—: MGNREGS Spending Levels from Different Data Sources

		Control	Treatment	Difference	P-value
		(1)	(2)	(3)	(4)
Panel A: CPSMS and MIS					
Debit in CPSMS					
	2012-13	19.23	16.81	-2.43	0.11
	2013-14	16.18	16.04	-0.15	0.91
Total Expenditures in MIS					
	2012-13	21.62	18.24	-3.38	0.05
	2013-14	22.24	22.40	0.16	0.92
Difference CPSMS-MIS					
	2012-13	-2.38	-1.43	0.95	0.15
	2013-14	-6.05	-6.36	-0.31	0.63
Panel B: Job cards and MIS					
Payments in Job Cards					
	2011-12	7.66	8.81	1.15	0.19
	2012-13	15.69	14.24	-1.45	0.30
	2013-14	17.71	16.16	-1.55	0.33
Labor Expenditures in MIS					
	2011-12	7.57	9.02	1.45	0.07
	2012-13	13.86	11.64	-2.23	0.06
	2013-14	13.76	13.56	-0.20	0.86
Difference Job Cards-MIS					
	2011-12	0.09	-0.21	-0.30	0.54
	2012-13	1.82	2.60	0.78	0.03
	2013-14	3.95	2.59	-1.35	0.05

Source: CPSMS Credit Debit Data, MIS Financial Reports (nrega.nic.in), Job Cards (nrega.nic.in). All amounts are annual GP averages in 100,000 rupees. CPSMS data is not available for the whole financial year 2011-12. P-values take into account correlation of errors at the block level. Years are financial years (Apr 1st-Mar 31st).

Table A.3—: Reform Impact on MGNREGS Audits

	Before	Intervention	Post-
	Jan 2011 - Aug	Period	Intervention
	2012	Sep 2012 -	Apr - Jun 2013
	(1)	Mar 2013	(5)
Panel A: Number of audits			
Treatment	0.173	0.113	0.0371
	(0.149)	(0.464)	(0.191)
Observations	195	195	195
Mean in Control	1.079	7.286	2.540
Panel B: Number of works audited			
Treatment	2.278	-1.483	0.519
	(4.847)	(2.984)	(1.091)
Observations	195	195	195
Mean in Control	16.82	34.72	9.341
Panel C: Number of works where irregularities were found			
Treatment	-0.863	-0.191	0.264
	(1.780)	(0.813)	(0.192)
Observations	195	195	195
Mean in Control	4.397	3.302	0.460
Panel D: Share of works where irregularities were found			
Treatment	-0.0476	0.00593	0.0452
	(0.0518)	(0.0194)	(0.0261)
Observations	113	188	143
Mean in Control	0.217	0.0889	0.0509

Note: The unit of observation is a block. Data was collected by the Rural Development Department, Government of Bihar. The dependent variables are the number of audits in each period (Panel A), the number of works audited (Panel B) the number of works where irregularities were found (Panel C), and the share of works where irregularities were found (Panel D). Each column presents results from a separate regression using data for a different time period. There are missing observations in Panel D for blocks that had no works audited in a given period.

Table A.4—: Main Results with and without Controlling for MGNREGS Employment and Expenditures Levels before the Reform

	Without Control (1)	With Control (2)		Without Control (3)	With Control (4)
Table 2					
Panel A: Total debit from GP accounts					
Treatment/use system	-2.306 (0.530)	-2.567 (0.520)			
Observations	3,025	3,025			
Mean in Control	9.540	9.540			
Panel B: Closing balance in GP accounts					
Treatment/use system	-1.266 (0.240)	-1.313 (0.244)			
Observations	3,025	3,025			
Mean in Control	4.270	4.270			
Panel C: Total credit to GP accounts					
Treatment/use system	-3.441 (0.548)	-3.660 (0.545)			
Observations	3,025	3,025			
Mean in Control	9.151	9.151			
Table 3					
Panel A: GP expenditures on labor from nrega.nic.in					
Treatment/use system	-2.246 (0.758)	-2.839 (0.707)			
Observations	2,965	2,965			
Mean in Control	13.78	13.78			
Panel B: GP expenditures on material from nrega.nic.in					
Treatment/use system	-1.078 (0.529)	-1.351 (0.519)			
Observations	2,965	2,965			
Mean in Control	7.728	7.728			
Table 4					
Panel A: Days worked from nrega.nic.in					
Treatment	-672.4 (363.6)	-859.4 (367.6)			
Observations	2,959	2,959			
Mean in Control	5028	5028			
Panel B: Days per working household from nrega.nic.in					
Treatment	-0.00410 (0.930)	-0.0554 (0.934)			
Observations	2,868	2,868			
Mean in Control	33.65	33.65			
Panel C: Number of working households from nrega.nic.in					
Treatment	-13.60 (8.150)	-18.65 (7.946)			
Observations	2,959	2,959			
Mean in Control	140.2	140.2			
Panel D: Wages received from nrega.nic.in (100,000 rupees)					
Treatment	-1.058 (0.570)	-1.347 (0.582)			
Observations	2,959	2,959			
Mean in Control	7.780	7.780			
Panel E: Average delays in payment from nrega.nic.in					
Treatment	20.36 (3.813)	20.04 (3.776)			
Observations	2,735	2,735			
Mean in Control	53.28	53.28			
Table 5					
Panel A: MGNREGS participation					
Treatment	0.00892 (0.00462)	0.00809 (0.00469)			
Observations	195	195			
Mean in Control	0.0296	0.0296			
Panel C: Wages received for MGNREGS employment					
Treatment	14.41 (20.53)	13.11 (21.84)			
Observations	195	195			
Mean in Control	78.73	78.73			
Panel D: Average delays in payment (days)					
Treatment	47.00 (13.42)	47.99 (13.79)			
Observations	148	148			
Mean in Control	64.47	64.47			
Table A.6 Fraction of assets found					
Treatment	0.310 (0.239)	0.267 (0.242)			
Observations	385	385			
Mean in Control	11.68	11.68			
Table 6					
Panel A: Match rate for job cards with one name only					
Treatment	0.0152 (0.00787)	0.0161 (0.00783)			
Observations	2,836	2,836			
Mean in Control	0.679	0.679			
Panel B: Match rate for job cards with two names or more					
Treatment	0.0119 (0.00810)	0.0125 (0.00821)			
Observations	2,803	2,803			
Mean in Control	0.281	0.281			

Note: Column 1 presents the treatment effect for the whole intervention period estimated without controls. Column 2 presents the treatment effect for the whole intervention period estimated with a normalized index of four indicators of MGNREGS implementation in 2011-12 (the four indicators are presented in Panel C of Table 1). The panels correspond to the main tables of the paper. The unit of observation is the Gram Panchayat for Table 2, 3, 4, 6 and 7. The unit of observation is a block in Table 5. The data sources are CPSMS financial data (Table 2), official reports from nrega.nic.in (Table 3 and 4), our own survey data (Table 5 and 6) and the match between nrega.nic.in reports and socio-economic and caste census data (Table 7).

Table A.5—: Reform Impact on MGNREGS Expenditure: Evidence from CPSMS Data. Specification with Inverse Hyperbolic Sine (IHS).

	Before	Set-up	Intervention Period			After
	Sept 2011 - June 2012	July - Aug 2012	Sept - Dec 2012	Jan - Mar 2013	Whole Period	Apr 2013 - Jan 2014
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: IHS of total debit from GP accounts						
Treatment	-0.0701 (0.0613)	0.0518 (0.0590)	-0.210 (0.0496)	-0.371 (0.0636)	-0.289 (0.0542)	-0.00269 (0.0576)
Observations	3,025	3,025	3,025	3,025	3,025	3,025
Mean in Control	14.37	4.122	5.394	4.146	9.540	16.01
Panel B: IHS of closing balance in GP accounts						
Treatment	-0.0262 (0.0516)	0.0180 (0.0363)	-0.238 (0.0451)	-0.324 (0.0452)	-0.314 (0.0450)	-0.0252 (0.0486)
Observations	3,025	3,025	3,025	3,025	3,025	3,025
Mean in Control	4.166	4.429	4.091	4.271	4.270	4.291
Panel C: IHS of total credit to GP accounts						
Treatment	0.00578 (0.0678)	0.0926 (0.0701)	-0.447 (0.0604)	-0.205 (0.0770)	-0.493 (0.0689)	0.137 (0.0616)
Observations	3,025	3,025	3,025	3,025	3,025	3,025
Mean in Control	15.27	4.282	5.146	4.006	9.151	15.90

Note: The unit of observation is a Gram Panchayat (GP). Data was downloaded from the CPSMS portal in November 2014. The dependent variable in Panel A is the inverse hyperbolic sine of the sum of debits from the savings account of each GP for each period (in 100,000 Rupees). In Panel B, it is the inverse hyperbolic sine of the closing balance on the savings account of each GP at the end of each period (in 100,000 Rupees). In Panel C, it is the the inverse hyperbolic sine of the sum of credits made to the savings account of each Panchayat for each period (in 100,000 Rupees). Treatment is a dummy set equal to one for the blocks selected for the intervention. All specifications include district fixed effects. Standard errors are clustered at the block level.

Table A.6—: Reform Impact on Household MGNREGS Participation (Household Survey)

	Household Participation in MGNREGS	
	Anytime Before (1)	Since July 2012 (2)
Treatment	-0.00646 (0.0144)	0.00508 (0.00818)
Observations	195	195
Mean in Control	0.238	0.0775

Note: The unit of observation is a block. In Column 1, the outcome is the fraction of households who worked for MGNREGS any time in the past. In Column 2, the outcome is a the fraction of household who worked for MGNREGS since July 2012. The data was collected by a representative survey of 9,670 households across 390 GP and 195 blocks in May-July 2013. Treatment is a dummy set equal to one for the blocks selected for the intervention. All specifications include district fixed effects and household controls. Household controls include the fraction of Hindu households, of Other Backward Castes households, of Scheduled Castes households, of Scheduled Tribes households, of households who live in a house made of mud, and of land-owning households in the GP. It also includes average household size and average number of adults per household in the GP.

Table A.7—: Reform Impact on Household Consumption (Household Survey)

	All (1)	Log Monthly Consumption		
		Frequent Expenditures (2)	Recurrent Expenditures (3)	Rare Expenditures (4)
Treatment	0.0192 (0.0251)	0.0123 (0.0201)	-0.0149 (0.0304)	0.0308 (0.0463)
Observations	195	195	195	195

Note: The unit of observation is a block. The dependent variables are the log of household monthly expenditures for different categories of expenditures. Frequent expenditures include cereals, milk and paan/tobacco expenditures in the last week. Recurrent expenditures include egg/fish/meat, personal care and mobile phone expenditures in the last month. Rare expenditures include clothing, health and celebration expenditures in the past five months. The data was collected by a representative survey of 9,670 households across 390 GP and 195 blocks in May-July 2013. Treatment is a dummy set equal to one for the blocks selected for the intervention. All specifications include district fixed effects and household controls. Household controls include sets of dummies for religion, caste, type of housing, land ownership, gender and literacy of the household head, household size and number of adults.

Table A.8—: Reform Impact on MGNREGS Implementation Issues: Evidence from GP Head (Mukhiya) Survey

Panel A: Lack of demand for MGNREGS work	
Treatment	0.0116 (0.0458)
Observations	346
Mean in Control	0.379
Panel B: Mandated price of material lower than market price	
Treatment	0.0206 (0.0284)
Observations	346
Mean in Control	0.833
Panel C: Lack of funds from the government	
Treatment	-0.0107 (0.0490)
Observations	346
Mean in Control	0.718
Panel D: Corruption in the administration	
Treatment	-0.118 (0.0556)
Observations	346
Mean in Control	0.471
Panel E: CPSMS fund flow creates delays	
Treatment	0.181 (0.0508)
Observations	346
Mean in Control	0.167

Note: The unit of observation is a Mukhiya (head of GP). The dependent variables are the fractions of Mukhiya who declared that the lack of demand for MGNREGS work (Panel A), the mandated price of material lower than the market price (Panel B), the lack of funds from the government (Panel C) corruption in the administration (Panel D) and delays in fund flow created by CPSMS (Panel E) were important issues in MGNREGS implementation. The data was collected from a representative sample of 346 Mukhiya from treatment and control blocks in May-July 2013. Treatment is a dummy set equal to one for the blocks selected for the intervention. All specifications include district fixed effects and Mukhiya controls. Mukhiya controls include sets of dummies for Mukhiya's religion, caste, gender, education, age, and whether any member of the family was elected Mukhiya in 2001 and 2006. Standard errors are clustered at the block level.

Table A.9—: Reform Impact on Leakages of MGNREGS funds: Difference between Survey-Based Population Estimates and Official Reports

	Set-up	Intervention Period			Post-Intervention
	July-Aug 2012	Sept-Dec 2012	Jan - Mar 2013	Whole Period	Apr - Jun 2013
	(1)	(2)	(3)	(4)	(5)
Panel A: Days worked per HH (survey vs MIS)					
Treatment	-0.177	0.263	0.0747	0.337	0.641
	(0.239)	(0.340)	(0.320)	(0.592)	(1.146)
Observations	194	194	194	194	194
Mean in Control	-0.456	-1.367	-0.894	-2.261	-4.897
Panel B: Wages received per HH (survey vs CPSMS)					
Treatment	0.0146	0.100	0.102	0.202	-0.0911
	(0.0301)	(0.0393)	(0.0338)	(0.0632)	(0.105)
Observations	193	193	193	193	193
Mean in Control	-0.225	-0.269	-0.176	-0.445	-0.866

Note: The unit of observation is a block. Within each block, we only use information about the two GP who were surveyed. The dependent variable in Panel A is the difference between the number of days worked per household in the survey and the number of days worked in the MIS divided by the number of households from the 2011 census. The dependent variable in Panel B is the difference between wages received per household according to the the survey and debits from GP accounts according to the CPSMS portal divided by the number of households from the 2011 census. The survey data was collected by a representative survey of 9,670 households in 390 GP in May-July 2013. The MIS data for 2959 GPs were extracted from job card and muster roll information on the nrega.nic.in server in June 2014. Data were downloaded from the CPSMS portal in November 2014. Treatment is a dummy which is equal to one for the blocks selected for the intervention. All specifications include district fixed effects.

Table A.10—: Reform Impact on MGNREGS Projects: Evidence from the Asset Survey

	Number Registered		Number Found	
	All Projects (1)	Ongoing (2)	All Projects (3)	Ongoing (4)
Treatment	0.0494 (0.263)	-0.210 (0.413)	0.310 (0.239)	0.0269 (0.265)
Observations	390	390	385	385
Mean in Control	13.8	11.69	11.68	9.75

Note: The unit of observation is a Gram Panchayat (GP). The dependent variables are the number of projects registered in the public information database (nrega.nic.in) on May 15, 2013 (Column 1), the number of projects declared as ongoing in nrega.nic.in (Column 2), the number of registered (Column 3) and ongoing (Column 4) projects found by surveyors in June-July 2013. We surveyed a random subset of 3900 projects (10 per GP) out of 5390 projects registered in nrega.nic.in for the 390 GPs in our survey sample. We scaled up the number of projects found in the survey using the number of registered projects divided by the number of sampled projects rate. 5 GPs (28 projects) could not be surveyed. All specifications include district fixed effects. Standard errors are clustered at the block level.

Table A.11—: OLS and IV Estimates of the Main Results

	OLS	IV		OLS	IV
	(1)	(2)		(3)	(4)
Table 2					
Panel A: Total debit from GP accounts					
Treatment/use system	-3.441	-5.363			
	(0.548)	(0.910)			
Observations	3,025	3,025			
Mean in Control	9.151	9.151			
Panel B: Closing balance in GP accounts					
Treatment/use system	-1.266	-1.973			
	(0.240)	(0.385)			
Observations	3,025	3,025			
Mean in Control	4.270	4.270			
Panel C: Total credit to GP accounts					
Treatment/use system	-2.306	-3.593			
	(0.530)	(0.863)			
Observations	3,025	3,025			
Mean in Control	9.540	9.540			
Table 3					
Panel A: GP expenditures on labor from nrega.nic.in					
Treatment/use system	-2.246	-3.442			
	(0.758)	(1.192)			
Observations	2,965	2,965			
Mean in Control	13.78	13.78			
Panel B: GP expenditures on material from nrega.nic.in					
Treatment/use system	-1.078	-1.652			
	(0.529)	(0.815)			
Observations	2,965	2,965			
Mean in Control	7.728	7.728			
Table 4					
Panel A: Days worked from nrega.nic.in					
Treatment	-672.4	-1,031			
	(363.6)	(566.7)			
Observations	2,959	2,959			
Mean in Control	5028	5028			
Panel B: Days per working household from nrega.nic.in					
Treatment	-0.00410	-0.00616			
	(0.930)	(1.398)			
Observations	2,868	2,868			
Mean in Control	33.65	33.65			
Panel C: Number of working households from nrega.nic.in					
Treatment	-13.60	-20.85			
	(8.150)	(12.75)			
Observations	2,959	2,959			
Mean in Control	140.2	140.2			
Panel D: Wages received from nrega.nic.in (100,000 rupees)					
Treatment	-1.058	-1.622			
	(0.570)	(0.889)			
Observations	2,959	2,959			
Mean in Control	7.780	7.780			
Panel E: Average delays in payment from nrega.nic.in					
Treatment	20.36	30.40			
	(3.813)	(5.821)			
Observations	2,735	2,735			
Mean in Control	53.28	53.28			
Table 5					
Panel A: MGNREGS participation					
Treatment/use system	0.00892	0.0131			
	(0.00462)	(0.00684)			
Observations	195	195			
Mean in Control	0.0296	0.0296			
Panel C: Wages received for MGNREGS employment					
	14.41	21.17			
	(20.53)	(30.29)			
Observations	195	195			
Mean in Control	78.73	78.73			
Panel D: Average delays in payment (days)					
Treatment/use system	47.00	70.49			
	(13.42)	(21.71)			
Observations	148	148			
Mean in Control	64.47	64.47			
Table A.6 Fraction of assets found					
Treatment/use system	0.310	0.454			
	(0.239)	(0.347)			
Observations	385	385			
Mean in Control	11.68	11.68			
Table 6					
Panel A: Match rate for job cards with one name only					
Treatment/use system	0.0152	0.0227			
	(0.00787)	(0.0118)			
Observations	2,836	2,836			
Mean in Control	0.679	0.679			
Panel B: Match rate for job cards with two names or more					
Treatment/use system	0.0119	0.0176			
	(0.00810)	(0.0120)			
Observations	2,803	2,803			
Mean in Control	0.281	0.281			

Note: Column 1 presents the treatment effect for the whole set-up and intervention period estimated with OLS. Column 2 presents the treatment effect for the whole set-up and intervention period estimated using treatment as an instrument for the use of CPSMS system. The panels correspond to the main tables of the paper. The unit of observation is the Gram Panchayat for Table 2, 3, 4, 6. For Table 5, the unit of observation is a block. The data sources are CPSMS financial data (Table 2), official reports from nrega.nic.in (Table 3 and 4), our own survey data (Table 5 and A.6) and the match between nrega.nic.in reports and socio-economic and caste census data (Table 6). GPs that were present in the survey or nrega.nic.in data but could not be found in CPSMS data were considered as non-compliers.

Table A.12—: Correlation between the Match Rate of Job Cards in the Public Information Data Base with SECC Census and Reported Employment

	Days Worked	Household Participants	Days per Household	Log Functionary Movable Assets	Log Functionary Total Assets
	(1)	(2)	(3)	(4)	(5)
Panel A: Job cards with one name					
Match Rate	-0.193 (0.0999)	-0.241 (0.0840)	0.0475 (0.0499)	-1.818 (0.455)	-0.805 (0.557)
Observations	2,936	2,936	2,936	2,453	2,455
Mean in Control	8.798	5.304	3.494	1.162	1.644
Panel B: Job cards with two or more names					
Match Rate	-0.0309 (0.104)	-0.0333 (0.0880)	0.00239 (0.0531)	-0.859 (0.447)	0.575 (0.545)
Observations	2,915	2,915	2,915	2,453	2,455
Mean in Control	8.798	5.304	3.494	1.162	1.644

Note: The dependent variable in Column 1 is the total number of days worked for MGNREGS to official data. In Column 2, it is the total number of households reported as having worked in official data. In Column 3, it is the average number of days worked per participating household according to official data. In Columns 1 to 3, the unit of observation is a GP. Outcomes pertain to the period April 2011 to June 2012 and have been collected from job cards publicly available in nrega.nic.in. The dependent variable in Column 4 is the log of the total personal assets declared by MGNREGS functionaries. In Column 5, it is the log of the total movable personal assets declared by MGNREGS functionaries. The unit of observation in Columns 4 and 5 is a MGNREGS functionary, and the specification includes functionary controls. Functionary Controls include the age, the square of age, dummies for gender and functionary designation, and a dummy for whether the functionary is posted in the district she was born in. In Panel A, the match rate is the fraction of job cards with one worker (49% of all job cards) that we were able to match with the SECC population census. In Panel B, the match rate is the fraction of job cards with two or more workers (51% of all job cards) that we were able to match by name with the SECC population census. All specifications include district fixed effects. Standard errors are clustered at the block level.

Table A.13—: Reform Impact on Assets of MGNREGS officials at the District Level: Non-experimental Evidence from Affidavit Data

	2011-12		2012-13		2013-14	
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Average Effects on Movable Assets (OLS)						
Intervention District	-0.174 (0.229)	0.0220 (0.238)	-0.399 (0.226)	-0.389 (0.187)	-0.634 (0.612)	0.340 (0.552)
Observations	38	38	278	278	42	42
Panel B: Effects on Movable Assets at the Median (Quantile Regression)						
Intervention District	-0.0719 (0.290)	-0.0582 (0.356)	-0.527 (0.198)	-0.464 (0.171)	-0.453 (0.488)	-0.594 (0.577)
Observations	38	38	278	278	42	42
Kolmogorov Smirnov p-value (for stochastic dominance)	.91		.01		.09	
Panel C: Average Effects on Total Assets (OLS)						
Intervention District	-0.110 (0.209)	-0.178 (0.223)	-0.300 (0.168)	-0.305 (0.133)	-0.800 (0.361)	-0.307 (0.242)
Observations	38	38	278	278	41	41
Panel D: Effects on Total Assets at the Median (Quantile Regression)						
Intervention District	-0.344 (0.322)	-0.271 (0.285)	-0.341 (0.169)	-0.362 (0.136)	-1.197 (0.386)	-0.497 (0.284)
Observations	38	38	278	278	41	41
Kolmogorov Smirnov p-value (for stochastic dominance)	.34		.03		.05	
Functionary Controls	No	Yes	No	Yes	No	Yes
District Controls	No	Yes	No	Yes	No	Yes

Note: The unit of observation is a yearly asset declaration by a MGNREGS official. Declarations 2011-12 were made from August 2011 to July 2012. Declarations 2012-13 were made from August 2012 to June 2013. Declarations 2013-14 were made from July 2013 to September 2014. The intervention period was September 2012 to April 2013. District level functionaries are Accountants, Assistants, Clerks, Computer Operators, District Development Coordinator, Engineers, Office Superintendents, Project Economists, Statistical Investigators and Technical Assistants. In Panels A and B, the dependent variable is the log of total movable assets (cash, jewellery, bank deposits, bonds, vehicles). In Panels C and D, the dependent variable is the log of all assets, including movable assets and immovable assets (e.g. land, buildings). In 2011-12 and 2013-14, the sample is smaller because only District Development Coordinators declared their personal wealth. Intervention District is a dummy set equal to one for districts in which the intervention was implemented. Functionary Controls include the age, the square of age, dummies for gender and functionary designation, and a dummy for whether the functionary is posted in the district she was born in. District controls include rural population (2011 census), MGNREGS wage expenditures and MGNREGS material expenditures (nrega.nic.in).

Table A.14—: Comparison between Border Blocks and Intervention Districts at Baseline

	Border Blocks	Intervention Districts	Difference Mean	Difference S.E.	Observations
	(1)	(2)	(3)	(4)	(5)
Panel A: Census 2011					
Area (hectares)	958.1	1004	46.00	23.08	4,208
Number of households	1997	1946	-50.65	28.75	4,208
% Scheduled Castes and Scheduled Tribes	0.175	0.191	0.0161	0.00293	4,208
Literacy Rate	0.609	0.626	0.0162	0.00254	4,208
Normalized Index	0.00	0.371	0.371	0.0655	4,208
Panel B: nrega.nic.in reports (April 2011- March 2012)					
MGNREGS beneficiary households	209	166	-42.79	4.894	4,241
MGNREGS work days provided	7834	5381	-2,453	236.4	4,241
MGNREGS labor expenditures (100,000 rupees)	8.95	7.05	-1.899	0.297	4,241
MGNREGS material expenditures (100,000 rupees)	6.69	6.74	0.0522	0.223	4,241
Normalized Index	0.00	-0.77	-0.771	0.0987	4,241
Panel C: CPSMS reports (Sept 2011- March 2012)					
MGNREGS funds spent (100,000 rupees)	9.65	8.53	-1.120	0.252	4,102
MGNREGS GP account balance (100,000 rupees)	3.81	3.57	-0.244	0.112	4,102
MGNREGS funds received (100,000 rupees)	10.12	8.86	-1.258	0.266	4,102
Normalized Index	0.00	-0.38	-0.375	0.0788	4,102

Note: The unit of observation is a Gram Panchayat (GP). Out of 4267 GPs from the border blocks and the intervention districts, we match 4208 GPs with census 2011 data (Panel A), 4241 GPs with nrega.nic.in data (Panel B) and 4102 GPs with CPSMS data (Panel C). Normalized Indexes are computed by subtracting the control mean from each variable and dividing by the standard deviation in the control, and taking the sum across all variables in the panel. The difference between border blocks and intervention districts is estimated using a regression of each GP characteristic on a dummy equal to one for intervention districts and district fixed effects (modified so that border blocks were included in the intervention district they were next to). Standard errors are clustered to take into account correlation at the block level.

Table A.15—: Reform Impact on MGNREGS Spending in Control Blocks

	Set-up	Intervention Period			After
	July-August 2012 (1)	Sept-Dec 2012 (2)	Jan - Mar 2013 (3)	Whole Period (4)	Apr 2013 - Jan 2014 (5)
Panel A: Total Debit from GP Accounts					
Treatment	0.000168 (0.249)	-1.244 (0.388)	-1.406 (0.290)	-2.650 (0.598)	-0.826 (0.844)
Intervention District	-0.306 (0.246)	0.0700 (0.385)	0.0895 (0.348)	0.160 (0.630)	0.541 (0.971)
Observations	4,167	4,167	4,167	4,167	4,167
Mean in Border blocks	4.324	5.424	4.130	9.554	15.76
Panel B: Closing Balance in GP Accounts					
Treatment	0.215 (0.200)	-0.925 (0.251)	-1.176 (0.250)	-1.143 (0.250)	-0.0630 (0.271)
Intervention District	0.142 (0.189)	0.701 (0.218)	0.618 (0.247)	0.594 (0.249)	1.232 (0.218)
Observations	4,167	4,167	4,167	4,167	4,167
Mean in Border blocks	4.161	3.523	3.791	3.795	3.749
Panel C: Total Credit to GP Accounts					
Treatment	0.211 (0.285)	-2.467 (0.435)	-1.330 (0.377)	-3.797 (0.618)	0.371 (0.836)
Intervention District	-0.215 (0.288)	0.665 (0.426)	-0.166 (0.424)	0.499 (0.711)	1.189 (0.982)
Observations	4,167	4,167	4,167	4,167	4,167
Mean in Border blocks	4.429	4.853	4.148	9	15.61

Note: The unit of observation is a Gram Panchayat (GP). The sample includes treatment and control GP from the 12 districts of our study and GP in 85 neighboring blocks from other districts. Data was downloaded from the CPSMS portal in November 2014. The dependent variable in Panel A is the sum of debits from the savings account of each GP for each period (in 100,000 Rupees). In Panel B, it is the closing balance on the savings account of each GP at the end of each period (in 100,000 Rupees). In Panel C, the dependent variable is the sum of credits made to the savings account of each panchayat for each period (in 100,000 Rupees). Treatment is a dummy set equal to one for the blocks selected for the intervention. Intervention District is a dummy set equal to one for all blocks of districts where the intervention took place (whether control or treatment). Specifications include district fixed effects modified in order to include border blocks in the intervention districts they are closest to. Standard errors are clustered at the block level.

Table A.16—: Year of e-FMS Implementation for Wage and Material Payments by State

State	Financial Year of EFMS Implementation							
	Wage Payments				Material Expenditures			
	2012-13	2013-14	2014-15	2015-16	2012-13	2013-14	2014-15	2015-16
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ASSAM	0	23	0	0	0	1	22	0
BIHAR	0	1	26	9	0	0	17	19
CHHATTISGARH	1	15	0	0	0	13	3	0
GUJARAT	25	0	0	0	0	24	1	0
HARYANA	3	16	0	0	0	19	0	0
HIMACHAL PRADESH	0	10	0	0	0	1	9	0
JHARKHAND	1	17	0	0	0	10	8	0
KARNATAKA	24	3	0	0	3	24	0	0
KERALA	0	14	0	0	0	1	12	1
MADHYA PRADESH	20	25	0	0	1	44	0	0
MAHARASHTRA	5	28	0	0	0	33	0	0
ODISHA	30	0	0	0	0	30	0	0
PUNJAB	1	16	0	0	0	17	0	0
RAJASTHAN	23	9	0	0	0	32	0	0
TAMIL NADU	1	28	0	0	0	17	12	0
UTTAR PRADESH	1	69	0	0	0	64	6	0
UTTARAKHAND	1	0	2	9	0	0	3	9
WEST BENGAL	0	2	15	0	0	0	14	3
Total	136	276	43	18	4	330	107	32

Note: The table gives the number of districts that started to implement e-FMS in a given year in a given state. We define a district as implementing e-FMS for labor (resp. material) expenditures when a transaction was recorded that year in nrega.nic.in for labor (resp. material) expenditures.

Table A.17—: Effect of e-FMS Implementation on Wage and Material Expenditures including District-specific Trends

	District Expenditures (in 100,000 Rupees)			
	(1)	(2)	(3)	(4)
Panel A: Expenditures on labor from nrega.nic.in				
e-FMS for wage payments in year t	-579.3 (161.8) [0]	-676.5 (160.6) [0]	-642.9 (173.2) [0]	-601.2 (197.6) [0]
e-FMS for material payments in year t		352.5 (183.3)	228.7 (199.2)	235.6 (198.2)
e-FMS for wage payments in t and t-1			283.8 (217.1)	302.2 (224.6)
e-FMS for wages payments in t, t-1 and t-2				196.4 (217.6)
Observations	4253	4253	4253	4253
Mean in Control	4140.4	4140.4	4140.4	4140.4
District-specific Time Trends	Yes	Yes	Yes	Yes
Panel B: Expenditures on material from nrega.nic.in				
e-FMS for wage payments in year t	-243.3 (80.20) [0]	-181.4 (79.16) [0]	-194.5 (84.30) [0]	-192.9 (89.63) [0]
e-FMS for material payments in year t		-224.4 (75.00)	-176.1 (81.15)	-175.9 (81.29)
e-FMS for wage payments in t and t-1			-110.6 (84.36)	-109.9 (86.78)
e-FMS for wages payments in t, t-1 and t-2				7.466 (88.39)
Observations	4253	4253	4253	4253
Mean in Control	1703.5	1703.5	1703.5	1703.5
District-specific Time Trends	Yes	Yes	Yes	Yes

Note: The unit of observation is a district*year. The dependent variables are expenditures from MIS reports for financial years 2008 to 2016 (in 100,000 Rupees). The data was downloaded from nrega.nic.in in April 2017. "e-FMS for wage (material) payments in year t" is a dummy variable set equal to one if e-FMS is effective for wage (material) payments that year. "e-FMS for wage (resp. material) payments in year t and t-1" is a dummy variable equal to one if e-FMS was used for wage (resp. material) payments both this year and the year before. It is thus the additional effect of having the program for two years (compared to one). All specifications include district fixed effects, year fixed effects and district-specific time trends. Robust standard errors are in parentheses, and p-value from randomization inference (100 replications) in brackets.