Capture of Anti-Poverty Programs: An Analysis of the National Rural Employment Guarantee Program in India*

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Abstract

Using pooled household level data for the Indian states of Rajasthan and Andhra Pradesh we find that the size of landholdings is a negative predictor of participation in the National Rural Employment Guarantee Program (NREGP). In state level analysis this pattern survives in Rajasthan but reverses in Andhra Pradesh where we notice a positive relationship. This paper examines whether this sign reversal in Andhra Pradesh is indicative of program capture in Andhra Pradesh and better targeting in Rajasthan. We compare land inequality, political interference, and geographical remoteness across the two states and conclude that program capture may be an issue in Andhra Pradesh, largely because of these reasons. We also find evidence of complementarity between NREGP and the Public Distribution System (PDS).

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I. Introduction

One of the major challenges in delivering benefits of anti-poverty programs to the poor is the threat of program capture by the non-poor. The non-poor can exercise their economic power and contribute to the campaign funds of the major political parties in exchange for preferential treatment in welfare services. This represents the phenomenon of capture. In theory, capture can take place at any level of government.[1] The empirical evidence however remains inconclusive as studies suggest that the relative vulnerability of different levels of government to capture may very well be context specific (Bardhan and Mookherjee, 2000, 2005; Crook and Manor, 1998; Gaiha et al., 1998, 2000; Tendler, 1997).[2]

In a related literature Lanjouw and Ravallion (1999), Ravallion (2000), Gaiha (2000), Alderman (2002), Galasso and Ravallion (2005), and others empirically evaluate the likelihood of program capture by the non-poor and the issue of targeting in general.[3] The findings are inconclusive as they find targeting effectiveness to be context specific and varying widely across programs, levels of government, countries, and regions. Lanjouw and Ravallion (1999) also analyse the timing of program capture and find that the non-poor enjoy the majority of the benefits early on but the share of benefits to the poor increases over time. Gaiha (2000) however observes the reverse in a study of the Employment Guarantee Scheme in the Indian state of Maharashtra where, over time, the program experienced capture by the non-poor.

In this paper, we examine the extent of capture using household level data on participation in the National Rural Employment Guarantee Program (NREGP) in the states of Andhra Pradesh (AP) and Rajasthan in India. The NREGP was instituted pursuant to the National Rural Employment Guarantee Act (NREGA) of 2005. The choice of the states is deliberate and has the following advantages. First, it allows us to compare the extent of capture between AP — a high growth high poverty elasticity state, and Rajasthan — a low growth low poverty elasticity state (Besley et al. 2005). Second, it also allows us to compare

[1] Seabright (1996) argue that the likelihood of capture is less at the local level as the accountability is higher in a locally homogeneous community. Alderman (2002) also finds evidence using Albanian data that local knowledge facilitates effective targeting of the poor. However, Galasso and Ravallion (2005) disagree and they argue that the assumption of locally homogeneous community is not tenable in a developing country context as distributional conflicts are rife at the local level.

[2] Bardhan and Mookherjee (2000, 2005) build on earlier theoretical contributions by Baron (1994) and Grossman and Helpman (1996). The other papers cited above are empirical in nature. Also see Hartmann and Boyce (1983) and Un Nabi (1999) for anecdotal evidence on capture.

[3] See Conning and Kevane (2000) for a survey of these results.

the extent of capture in a northern state (Rajasthan) with the same in a southern state (AP). Our results show that in a combined sample the size of landholdings is a negative predictor of participation in NREGP. This pattern survives in Rajasthan. However, the pattern reverses in AP where we notice a positive relationship. This may be due to program capture in AP and its relative absence in Rajasthan. Comparing land inequality, political interference, and geographical remoteness across the two states we find that program capture may be an issue in AP. The sample villages in AP have greater inequality in terms of landholdings,[4] are more geographically remote, and experience more political interference compared to the sample villages in Rajasthan. We also find evidence of complementarity between NREGP and the Public Distribution System (PDS).[5] This result stands in contrast to that of Galasso and Ravallion (2005) who report evidence of substitution between programs in Bangladesh. They notice that the poor receive relatively less benefit from Food-for-Education (FFE) in villages in which alternative transfers to the poor are already in place.

The remainder of the paper is organized as follows. In section II, we discuss the background on NREGP. Section III introduces the data and the estimation approach. Section IV reports our results and section V concludes.

II. Background on NREGP

The NREGA of 2005 is perhaps the most significant social policy initiative in India in the last decade. The NREGA states that,

> [its main objective is] to provide enhancement of livelihood security of the households in rural areas of the country by providing at least 100 days of guaranteed wage employment to every household in unskilled manual work. (Ministry of Law and Justice, 2005)

This commitment is clearly a landmark event in the history of rural development policies in India. During its first year of operation NREGP involved an expenditure of $4.5. billion and was expected to generate 2 billion days of employment. The NREGP's performance is also crucial to the success of the Millennium Development Goal of halving global poverty by 2015 (compared to 1990 levels) as rapid reduction in poverty in India will

[4] Galasso and Ravallion (2005) report similar results in the context of Bangladesh's Food-for-Education (FFE) Program. They find targeting improves with low levels of land inequality. Baland and Platteau (1997), Dayton-Johnson (2000), and La Ferrara (2002) also look at the effect of inequality on participation in local groups and the management of common property resources. However, these papers are not directly related to anti-poverty programs.

[5] PDS is a system of public distribution of food grains established in 1951 by the Government of India to promote food security and poverty alleviation.

have an important bearing on the global poverty numbers. Recent figures show that poverty in India has declined, albeit slowly, over the period 1993 to 2005 (Himanshu, 2007). However, the challenge is to sustain and improve this trend. Perhaps it is fair to say that a considerable amount depends on the success of NREGP.

III. Data and Estimation Approach

The present analysis draws upon household data drawn from the states of Rajasthan and AP to assess the effectiveness of social safety nets, in particular NREGP and PDS. The sampling strategy is to minimize sampling error by selecting sampling units with unequal probabilities. In other words, we select districts with probability proportional to size at the first stage with size being rural population/households as reported in the 2001 Census. Hence, our sample is fairly representative in nature. The survey covers three villages (Dhundiya, Karanpur, and Prithvisingh Ji Ka Khera) in Udaipur district of Rajasthan and three villages (Kaligiri, Obulattapale, and Reddivaripalle) in Chittoor district of AP. The total number of households interviewed in December 2007 was 942 with 340 from Rajasthan and 602 from AP. The data includes information on caste, occupation, landholdings, household size, NREG participation, type of ration card, and PDS participation.[6] Table 1 presents summary statistics for the key variables of interest.

Table 1 here

To analyze the extent of capture we estimate the following binary response model

$$NREG_i = \alpha + \beta LNDOWN_i + \gamma PDS_i + \mathbf{X_i}\Phi + \varepsilon_i \qquad (1)$$

where $NREG_i = 1$ if household i is a participant in NREGP and 0 otherwise, $LNDOWN_i$ is the total landholdings of household i measured in hectares, $PDS_i = 1$ if household i is a participant in PDS and 0 otherwise, $\mathbf{X}_i$ is a vector of all other determinants of participation in NREGP including caste fixed effects, occupation fixed effects, and total household size, and ε_i is the random error term. The impact of changes in the independent variables on the probability of NREGP participation is estimated by assuming a logistic distribution. Therefore, the coefficients β, γ and Φ indicate the impact of a change in the corresponding

[6] NREG participation is measured using the question – are you are beneficiary of NREGS? PDS participation is measured using the questions – whether the household draws food grain from PDS, whether the household draws sugar from PDS, whether the household draws kerosene from PDS?

independent variable on the natural log of odds of participation in NREG.[7] We are interested in the sign and estimate of the coefficients β and γ. If $\beta < 0$ then the odds of participation in NREGP decline with size of landholdings, which will lead us to conclude that the project is reasonably well targeted and relatively free from capture by the non-poor. However, if we observe $\beta > 0$ then the reverse would be true. The sign and estimate of the coefficient γ would indicate complementarity or substitutability between the two programs. A positive sign would indicate the former and a negative sign the latter.

Obtaining consistent estimates of β and γ requires overcoming the following challenges. First, it can very well be the case that the estimates of β and γ are driven by unobserved heterogeneity (culture, or some other factors) or observed fixed effects such as caste and religion which influences landownership, participation in PDS, and participation in NREGP. To tackle this potential source of bias we control for caste and occupation fixed effects.[8] Second, the estimates may also suffer from endogeneity bias. NREGP participation may influence participation in PDS rather than the other way round. If this is the case the coefficient estimates will be biased away from zero. However, the chances of this occurring may be low as PDS is an old program (established in 1951) and NREG is a new program (established in 2005). Nevertheless, we formally test for exogeneity of PDS participation using a Hausman style test and we fail to reject the null.[9] As a test of robustness, we also use predicted probabilities of PDS participation as an instrument and estimate the model using maximum likelihood methods.[10] The estimates are very similar to our preferred model and are not reported here in order to save space.

[7] Odds are defined as the ratio of probabilities of participation and non-participation in NREGP.

[8] Caste fixed effects are four caste dummies indicating backward caste, schedule cast, schedule tribe, and other caste. Others is the omitted category. Occupation fixed effects are four occupation dummies indicating agricultural labour, self-employed agriculture, self-employed non agriculture, and other labour with others as the omitted category.

[9] The test follows a Hausman style two step procedure. First, it generates the predicted error from running PDS participation on all other exogenous variables (excluding NREG participation). Then it runs equation (1) with the predicted error as an additional control and performs a t-test on it. A test of this nature is valid since under the null of exogeneity, the distribution of the predicted error plays no role. Therefore there is no need to assume normality which increases the power of the test (see Grogger, 1990; Wooldridge, 2002: p. 474). We perform this test using both non-standardized and Pearson's standardized residuals. The results are qualitatively identical. Only results using non-standardized residuals are reported here to save space.

[10] The predicted probabilities are generated by running PDS participation on all other exogenous factors (caste, occupation, landownership, household size, type of ration card) except NREG that may influence PDS participation.

IV. Evidence

Table 2 presents regression estimates of equation (1) using a pooled sample of AP and Rajasthan. Column 1 reports estimates when foodgrains measure of PDS participation is used. This is our measure of choice as it is less likely that the non poor would draw foodgrains from PDS because of their low quality.[11] Hence this measure is our best hope of capturing the participation of the poor in PDS. We find that agricultural landholding is negatively related to the odds of NREGP participation. A one standard deviation increase in landholdings (4.5 hectares) reduces the odds of NREGP participation by 1.3 fold. To put this into perspective, the difference in marginal effects of a 4.5 hectare increase in landholdings between a landless respondent and a respondent with 20 hectares landholdings is approximately 100 percent with a larger effect for the landless. This indicates that NREGP as a program is reasonably well targeted and there is little evidence of capture in the pooled sample. We find evidence that PDS and NREGP participation are complementary with the former positively impacting the latter. The magnitude of the effect is also larger than the effect of landholdings with an impact coefficient[12] of 1.8 fold. This is in contrast to Galasso and Ravallion (2005) who find evidence of substitutability between anti-poverty programs in Bangladesh. We also test for the exogeneity of PDS and fail to reject the null. The model predicts approximately 75 percent of the outcomes correctly. In column 2 we use the sugar measure of PDS participation. This may not be the best measure of PDS participation as many non poor households choose to draw sugar from PDS in order to retain their ration card (which is also an important ID) active. Nevertheless, the negative coefficient on landholdings survives, with the magnitude increasing marginally. We also find evidence of complementarity between NREGP and PDS. In column 3, we replace sugar measure with kerosene measure of PDS. The negative coefficient on landholdings and the positive coefficient on PDS participation survive. Having established the negative relationship between landholdings and NREGP participation, we examine the extent of capture when joint participation in NREGP and PDS is considered. Columns 4 to 6 report these findings. We notice that the negative relationship between landholdings and joint participation in NREGP and PDS survives with all three measures (foodgrain, sugar, and kerosene) of PDS participation. This indicates that in our pooled sample both NREGP and PDS are well targeted.

[11] However there is a possibility that the non poor could draw food grains from PDS and use them to pay for the services of their servants. Our measure does not rule out this possibility.

[12] Impact coefficient is the effect of one standard deviation increase in PDS participation on the odds of NREG participation.

Table 2 here.

Table 3 reports estimates of the model using the Rajasthan sample. We notice that landholdings continue to negatively influence the odds of participation in NREGP. Furthermore, the impact coefficient marginally increases to 1.4 fold when the foodgrain measure of PDS is used (see, column 1).[13] There is also evidence of complementarity between NREGP and PDS participation in Rajasthan (columns 1 and 2). We however find very weak evidence of non capture by the elite when we consider joint participation of NREGP and PDS as our dependent variable (columns 3 to 6). The coefficients on landholdings remain negative but they are no longer statistically significant except for column 6 (which uses the kerosene measure). Overall, Rajasthan seems to conform to the trends of the pooled sample. NREGP in Rajasthan is reasonably well targeted.[14]

Table 3 here.

These trends however reverse in AP. These results are reported in Table 4. We find a positive relationship between landholdings and NREGP participation. One standard deviation (1.1 hectares) increase in landholdings increases the odds of NREGP participation by 1.3 fold. This is indicative of program capture in AP. Given that AP is a high growth and high poverty elasticity state (Besley et al. 2005), this result is somewhat puzzling. In fact one would expect Rajasthan to show this pattern since it is a low growth and low poverty elasticity state. The answer to this puzzle may rest with inequality, distribution of political power in the village, geographical remoteness of a village, and access to information. We analyze these four factors in turn.

Table 4 here.

First, high level of land inequality at the village level may translate into higher incidence of capture because individuals with larger landholdings are observed to have more influence over village level decision making (Bardhan and Mookherjee, 2000; and Galasso and Ravallion, 2005). The land Gini and coefficient of variation for Rajasthan (0.50 and 1.05 respectively) are lower than corresponding values for AP (0.66 and 1.47 respectively) indicating that land is more unequally distributed in AP than Rajasthan. This may explain why NREGP is better targeted in Rajasthan as compared to AP and also experiences less

[13] This is calculated by using sample standard deviation of landholdings in Rajasthan which is 6.14 hectares.
[14] In a companion paper Jha et al. (2008) presents summary statistics and some preliminary results on Rajasthan. They however do not deal with program capture.

capture. This finding is consistent with Galasso and Ravallion (2005) who also report that more unequal villages in Bangladesh are worse at targeting the poor.

Second, if a social policy intervention is neutral to the distribution of power in the village, redistribution is less likely to experience capture since the village elite may not feel challenged. The reverse may occur when the intervention alters the distribution of power. Our qualitative data in Rajasthan shows that the introduction of NREGP did not alter the distribution of power within the village, but altered the distribution of power between the village head (Sarpanch), the block head (Pradhan) and the constituency head (MLA). The qualitative survey also shows that within the village power is still concentrated in the hands of the upper castes and landed who are historically the power centers.[15] Therefore, this is consistent with our result that NREGP is better targeted in Rajasthan. In AP too, the NREGP did not alter the existing distribution of power. This, without doubt, is a puzzle. The answer may lie with the involvement of politicians. However there is some subtlety in this argument.

Kohli (2001) argues that highly competitive political systems are more likely to experience lower capture than monopolistic systems. But both Rajasthan and AP have a competitive two party set-up; the BJP and the Congress are the two main parties in Rajasthan, while the Telgu Desam Party and Congress are the main competitors in AP. So Kohli's argument does not help us understand the variation between AP and Rajasthan. Chhibber and Nooruddin (2004) argue that politicians who work through political parties engaged in two party competition are more likely to provide public goods than those who have to make decisions within the context of multi-party environment. The rationale underlying the argument is that two party competition forces both parties to build alliances across social groups, while multi-party competition forces the politicians to provide resources directly to their core support groups. But our qualitative analysis shows that in all six villages surveyed, the main competition was between the candidates sponsored by the two main competing parties in the state. Hence, this is not an adequate explanation for the difference either. However, there is one significant difference across the two states in our qualitative data. Local politicians in AP are considerably more involved in NREGP than they are in Rajasthan. They use social policy programs as an opportunity for advancement for their followers and encourage capture.[16] As one Block Development Officer (BDO) in AP put it, the political

[15] For a detailed account of the qualitative survey in Rajasthan and AP, see Shankar (2008).
[16] This is also consistent with the qualitative evidence presented by Powis (2007).

interference in the appointments process makes it very difficult to terminate corrupt Field Assistants after their selection. This may explain why NREGP is experiencing capture in AP.

Third, the likelihood of program capture is relatively high in more isolated villages (Galasso and Ravallion, 2005). Our sample villages in Rajasthan are about 30 minutes to an hour away from Udaipur — one of the major cities in Rajasthan. This could be a reason for low capture in Rajasthan. Interviews with landowners and NREGP beneficiaries in the villages also support this explanation. Our NREGP beneficiary respondents indicated that men preferred to work in the city rather than dig earth in the heat in the village. They sent their wives to work on NREGP projects instead. The landowners with 15-30 bighas whom we met at the local tea shop in Karanpur (one of the sample villages in Rajasthan) complained about not getting enough unskilled and skilled labour and having to hike up the market wages for both sets of workers. This is in stark contrast to the sample villages in AP, which are remote.

Fourth, lower informational constraints are expected to produce lower capture of benefits by the non-poor. Informational constraints could occur because of cultural reasons and/or because of elite capture of the decision making process. The Indian parliament enacted a Right to Information Act (RTI) in 2005, which allows a citizen to ask for and get information on the activities of state officials. As a start, we take the use of RTI as a proxy for lower informational constraints. Our qualitative data shows that the usage of RTI to get information about NREGP is almost non existent in Rajasthan even though the campaign for RTI was spearheaded by an organization (MKSS) in Rajasthan. In AP, on the other hand, in one of the sample villages, an individual filed a petition under RTI and received information on NREGP. One person in Reddivaripalli village used the RTI to request information on the muster rolls and material payments made in NREGP projects. An enquiry was launched and concluded that the payments had reached the right persons. Our qualitative interviews with the NREGP beneficiaries in both states indicate that the use or non-use of RTI is not a good proxy for determining the extent of informational constraints. In all the six villages in our sample, the beneficiaries knew the amount and the work that they were entitled to do under NREGP. The beneficiaries said that they found such information from other villagers and the ‘sarpanch’.

Furthermore, bureaucratic procedures such as the computerization of records, and payments through post office are expected to reduce the propensity of capture of NREGP.

However, AP is ahead of Rajasthan in paying wages through post office accounts, as well as in maintaining computerized records of the NREGP beneficiaries, thus making it harder for us to use the informational constraint argument to explain the variation in capture across the two states.

Finally, we also find evidence of complementarity between PDS and NREGP participation in AP as PDS participation positively predicts NREGP participation (columns 1 to 3 in Table 4). However we notice that landholdings do not play a role in predicting joint participation in PDS and NREGP as all coefficients reported are statistically insignificant (columns 4 to 6 in Table 4). We also perform robustness tests by eliminating influential observation using the Pregibon's Dbeta statistic and our results are robust. Robustness results are not reported to save space but are available upon request.

V. Concluding Remarks

In this paper we examined the extent of capture using household level data on NREGP participation in the Indian states of AP and Rajasthan. Our results show that in a combined sample the size of landholdings is a negative predictor of participation in NREGP. This pattern survives in Rajasthan. However, the pattern reverses in AP where we notice a positive relationship. This indicates that the program is experiencing capture in AP whereas it is reasonably well targeted in Rajasthan. This may be due to the varied level of land inequality in the two states with AP more unequal than Rajasthan. It can also be due to the geographical remoteness of the villages in AP, and relatively greater political interference in NREGP at the village level in AP. We also find evidence of complementarity between NREGA and the Public Distribution System (PDS).

The results contribute to a growing literature on capture of anti-poverty programs. It supports the theoretical observation that the extent of capture is context specific (Bardhan and Mookherjee, 2000). The findings vary across region, country, and also the nature of programs. Therefore, there is a need for more empirical research on what context leads to what outcome in terms of capture.

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Table 1. Descriptive Statistics

Variable	Number of obs.	Mean	Standard Deviation	Minimum	Maximum
Participation in NREG ($NREG_i$)	942	0.60	0.49	0	1
Agricultural Land Holdings ($LNDOWN_i$)	942	2.83	4.52	0	50
PDS participation – food grain ($FGPDS_i$)	941	0.69	0.46	0	1
PDS participation – sugar ($SPDS_i$)	941	0.68	0.47	0	1
PDS participation – kerosene ($KPDS_i$)	941	0.93	0.25	0	1
Total household size ($TOTHS_i$)	942	4.42	2.03	1	17

Table 2. Capture of Anti-poverty Programs: The Case of NREGA in Andhra Pradesh and Rajasthan

Dependent Variable	**Participation in NREG** ($NREG_i$)			**Joint Participation in NREG & PDS**		
	(1) Logit (MLE)	(2) Logit (MLE)	(3) Logit (MLE)	(4) Food Grain Logit (MLE)	(5) Sugar Logit (MLE)	(6) Kerosene Logit (MLE)
Independent Variables Agricultural Land Holdings ($LNDOWN_i$)	-0.06*** (0.0247)	-0.07*** (0.0251)	-0.11*** (0.0273)	-0.10** (0.0446)	-0.09** (0.0442)	-0.06** (0.0267)
PDS participation – food grain ($FGPDS_i$)	1.24*** (0.2018)					
PDS participation – sugar ($SPDS_i$)		1.27*** (0.2009)				
PDS participation – kerosene ($KPDS_i$)			0.55* (0.3296)			
Other Controls						
Total household size	YES	YES	YES	YES	YES	YES
Caste fixed effects	YES	YES	YES	YES	YES	YES
Occupation fixed effects	YES	YES	YES	YES	YES	YES
Ration Card dummies	NO	NO	NO	YES	YES	YES
Number of observations	940	940	940	939	939	939
Percent correctly predicted	75.2	75.4	72.9	82.8	83.2	78.5
Log-likelihood value	-476.98	-475.18	-496.65	-327.46	-328.62	-443.53
Pseudo R^2	0.25	0.25	0.21	0.49	0.49	0.31
Exogeneity test (p-value)	0.68	0.98	0.16	--	--	--

Notes: ***, ** and * indicates significance level of 1%, 5% and 10% respectively against a two sided alternative. Figures in the parentheses are cluster standard errors and they are robust to arbitrary heteroskedasticity and arbitrary intra-group correlation. All the regressions reported above are carried out with an intercept. Caste fixed effects are four caste dummies indicating backward caste, schedule cast, schedule tribe, and other caste. Others is the omitted category. Occupation fixed effects are four occupation dummies indicating agricultural labour, self-employed agriculture, self-employed non agriculture, and other labour with others as the omitted category. Ration card dummies are BPL, APL, and Annapurna with no card being the omitted category. The Exogeneity test follows a Hausman style two step procedure. First, it generates the predicted error from running PDS participation on all other exogenous variables (excluding NREG participation). Then it runs equation (1) with the predicted error as an additional control and performs a t-test on it.

Table 3. Capture of Anti-poverty Programs: The Case of NREGA in Rajasthan

Dependent Variable	**Participation in NREG** ($NREG_i$)			**Joint Participation in NREG & PDS**		
	(1) Logit (MLE)	(2) Logit (MLE)	(3) Logit (MLE)	(4) Food Grain Logit (MLE)	(5) Sugar Logit (MLE)	(6) Kerosene Logit (MLE)
Independent Variables Agricultural Land Holdings ($LNDOWN_i$)	-0.05* (0.0307)	-0.05* (0.0308)	-0.06** (0.0294)	-0.02 (0.0529)	-0.02 (0.0542)	-0.05* (0.0284)
PDS participation – food grain ($FGPDS_i$)	1.15*** (0.2910)					
PDS participation – sugar ($SPDS_i$)		1.16*** (0.2849)				
PDS participation – kerosene ($KPDS_i$)			1.94 (3.012)			
Other Controls						
Total household size	YES	YES	YES	YES	YES	YES
Caste fixed effects	YES	YES	YES	YES	YES	YES
Occupation fixed effects	YES	YES	YES	YES	YES	YES
Ration Card dummies	NO	NO	NO	YES	YES	YES
Number of observations	338	338	337	337	337	337
Percent correctly predicted	71.6	71.3	73.0	87.2	87.5	72.1
Log-likelihood value	-180.98	-180.70	-189.41	-77.43	-76.30	-177.48
Pseudo R^2	0.15	0.16	0.11	0.51	0.52	0.17
Exogeneity test (p-value)	0.89	0.57	0.72	--	--	--

Notes: ***, ** and * indicates significance level of 1%, 5% and 10% respectively against a two sided alternative. Figures in the parentheses are cluster standard errors and they are robust to arbitrary heteroskedasticity and arbitrary intra-group correlation. All the regressions reported above are carried out with an intercept. Caste fixed effects are four caste dummies indicating backward caste, schedule cast, schedule tribe, and other caste. Others is the omitted category. Occupation fixed effects are four occupation dummies indicating agricultural labour, self-employed agriculture, self-employed non agriculture, and other labour with others as the omitted category. Ration card dummies are BPL, APL, and Annapurna with no card being the omitted category. The Exogeneity test follows a Hausman style two step procedure. First, it generates the predicted error from running PDS participation on all other exogenous variables (excluding NREG participation). Then it runs equation (1) with the predicted error as an additional control and performs a t-test on it.

Table 4. Capture of Anti-poverty Programs: The Case of NREGA in Andhra Pradesh

Dependent Variable	**Participation in NREG** ($NREG_i$)			**Joint Participation in NREG & PDS**		
	(1) Logit (MLE)	(2) Logit (MLE)	(3) Logit (MLE)	(4) Food Grain Logit (MLE)	(5) Sugar Logit (MLE)	(6) Kerosene Logit (MLE)
Independent Variables Agricultural Land Holdings ($LNDOWN_i$)	0.22** (0.0884)	0.21** (0.0882)	0.23** (0.0889)	0.11 (0.0971)	0.10 (0.0973)	0.12 (0.0993)
PDS participation – food grain ($FGPDS_i$)	1.11*** (0.3273)					
PDS participation – sugar ($SPDS_i$)		1.19*** (0.3103)				
PDS participation – kerosene ($KPDS_i$)			1.20*** (0.3249)			
Other Controls						
Total household size	YES	YES	YES	YES	YES	YES
Caste fixed effects	YES	YES	YES	YES	YES	YES
Occupation fixed effects	YES	YES	YES	YES	YES	YES
Ration Card dummies	NO	NO	NO	YES	YES	YES
Number of observations	602	602	602	602	602	602
Percent correctly predicted	81.2	81.6	81.1	84.2	83.6	84.6
Log-likelihood value	-252.51	-250.77	-251.75	-218.95	-222.22	-219.52
Pseudo R^2	0.25	0.25	0.25	0.39	0.39	0.39
Exogeneity test (p-value)	0.89	0.45	0.56	--	--	--

Notes: ***, ** and * indicates significance level of 1%, 5% and 10% respectively against a two sided alternative. Figures in the parentheses are cluster standard errors and they are robust to arbitrary heteroskedasticity and arbitrary intra-group correlation. All the regressions reported above are carried out with an intercept. Caste fixed effects are four caste dummies indicating backward caste, schedule cast, schedule tribe, and other caste. Others is the omitted category. Occupation fixed effects are four occupation dummies indicating agricultural labour, self-employed agriculture, self-employed non agriculture, and other labour with others as the omitted category. Ration card dummies are BPL, APL, and Annapurna with no card being the omitted category. The Exogeneity test follows a Hausman style two step procedure. First, it generates the predicted error from running PDS participation on all other exogenous variables (excluding NREG participation). Then it runs equation (1) with the predicted error as an additional control and performs a t-test on it.

Data Appendix

Participation in NREG ($NREG_i$): $NREG_i = 1$ if household i is a participant in NREG and 0 otherwise.

Agricultural Land Holdings ($LNDOWN_i$): Measured in hectares.

PDS participation – food grain ($FGPDS_i$): $FGPDS_i = 1$ if household i draws food grain from PDS and 0 otherwise.

PDS participation – sugar ($SPDS_i$): $SPDS_i = 1$ if household i draws sugar from PDS and 0 otherwise.

PDS participation – kerosene ($KPDS_i$): $KPDS_i = 1$ if household i draws kerosene from PDS and 0 otherwise.

Caste fixed effects: Caste dummies signifying backward caste, schedule cast, schedule tribe, and other caste with others being the omitted category.

Occupation fixed effects: Occupation dummies signifying agricultural labour, self employed non agriculture, self employed agriculture, and other labour with others being the omitted category.

Ration card dummies: Ration card dummies are Below Poverty line (BPL) card, Above Poverty line (APL) card, and Annapurna with no card being the omitted category.