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Targeting Accuracy of the NREG:
Evidence from Madhya Pradesh and Tamil Nadu

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Abstract

This paper focuses on the targeting accuracy of NREG in two Indian states, Madhya Pradesh (MP) and Tamil Nadu (TN), based on household data for 2008–09. In order to overcome the difficulties arising from the use of a headcount index and a specific poverty threshold, stochastic dominance tests are used. Madhya Pradesh demonstrated much better targeting than Tamil Nadu in terms of the FGT class of poverty indices over a wide range of poverty thresholds. This finding is significant as the proportion of poor is twice as high in the former as in the latter. It raises doubts about prevailing views that there is greater underprovision of jobs under NREG in the poorer states. That the self-selection of the poor was undermined and (relatively) affluent crowded in because of the high NREG wage (relative to the agricultural wage) raises a serious concern. Another serious concern is that the transfer benefits in the form of additional income to the poor were small mainly due to short spells of work, considerably lower than the maximum number of days permitted under this scheme.

Keywords: Employment Guarantee, Poverty, Self-Selection, Wage, India

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I.   Introduction

In developing countries where the majority of the poor work in the informal sector and lack verifiable records of their earnings, it is hard for the government to target anti-poverty programs using means testing (i.e., delivering benefits to those with incomes below a particular threshold). The alternate method used is some form of proxies — e.g., the government collects information on assets and demographic characteristics to create a proxy for a household's income or expenditure (as in Mexico's Progresa Opportunidades and Colombia's Familias en Accione Program). Another way is to use some form of community based targeting where the government allows some sections of the community to select the beneficiary households. Both methods have advantages and disadvantages; the government proxy method where investigators focus on assets (e.g., TV or a house) may not take into account changes in that household's circumstances (such as straitened circumstances due to death of the earning member of the household). The community method opens up the possibility of 'capture' by local leaders (i.e., a disproportionately large share of the benefits accrues to their kith and kin). In this paper we test a variation on the above methods by asking the household head to report the per capita monthly consumption expenditure by answering a questionnaire on annual household expenditure on thirteen non-food items, monthly consumption expenditure on eighteen food items and on kerosene. Based on these figures, we classified the household into acutely poor, moderately poor, moderately non-poor and affluent (see Table A.1).

In this paper we focus on an anti-poverty programme, the national rural employment guarantee scheme (NREG), that relies, in principle, on a self-selecting mechanism in its design to exclude the non-poor from crowding out the poor in accessing its benefits. A distinction may be drawn between broad and narrow targeting. Public spending that matters to the poor (e.g., primary education and health care) implies broad targeting. Since the non-poor usually have enough of these services, the benefits to the poor are greater. Considering that no particular group is excluded, broadly targeted programs tend to be more popular than narrowly targeted ones, and hence more sustainable. However, not unexpectedly, a broadly targeted program is often a costly way to reduce poverty.

By contrast, narrowly targeted programs (e.g., rural public works) concentrate on the poor. This is sought to be achieved through self-selection or indicator targeting. In the case of self-selection, a cost of participation is built into the program so that the non-poor are effectively screened out (a work-requirement at a (relatively) low wage, for example, tends to exclude the non-poor from rural public works). Indicator targeting through income or its correlates such as landownership, caste affiliation, and gender is also widely used (as in *Swaranjayanti Gram Swarozgar Yojana* or SGSY). In either case, the concern is with minimizing targeting errors: leakage of benefits to the non-poor and limited coverage of the poor. However, poverty alleviation is not just a question of avoiding targeting errors. What is also important is that the costs of achieving this objective are minimized (Haddad and Kanbur, 1992).

This paper assesses the effectiveness of the targeting accuracy of the NREG scheme in reaching the poor. The plan of the paper is as follows. Section II outlines social protection schemes in India and the NREG; the third section outlines the sample design and its implementation; the fourth section uses some descriptive measures to throw light on the targeting of the NREG; the fifth section focuses on the determinants of participation in this scheme; and, section six concluding observations from a broad policy perspective are made.

II. Social Protection and the NREG

About 70 per cent of Indians live in rural areas, and of these, a majority earn their livelihood from agriculture. Agricultural labourers (253 million in 2004–5) comprise 57 per cent of workers in the workforce and of these about 249 million live in rural areas (Chhabra et al., 2009). About 64 per cent of agricultural labourers are self employed or are farmers and the rest (87 million) depend on labour, mainly of the casual variety. Not surprisingly, a vast majority (77 per cent) of rural inhabitants is poor and has an average expenditure of less than Rs. 20 per day per capita.[2] India's economic liberalization that started two decades ago had a mixed impact on poverty. The debate is still on as to whether economic growth (of about 5 per cent per annum since the mid-1990s) has reduced poverty and/or increased the intensity of poverty. Several scholars (Ravallion, 2009; Gaiha and Kulkarni, 2010; Deaton and Dreze, 2009; Sen and Himanshu, 2004) argue that inequality (in rural and urban areas) has risen along with economic growth and dulled the impact on poverty. Datt and Ravallion (2009)

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[2] About 42% of Indians lived below the poverty line of $1.25 a day in 2005 prices, as compared to 16% in China and 8% in Brazil; while India's official headcount index of about $1 at 2005 PPP reduced the headcount index from 42% in 1981 to 24% in 2005 (Ravallion, 2009).

provide evidence of geographic and sectoral divergences in India's growth process, and highlight the dismal picture provided by national statistics on health and education. For instance, the government's National Statistical Sample Survey (61st round) figures from 2004–5 show that about 30 per cent of the rural population in Maharashtra, Madhya Pradesh, Bihar, Orissa, Uttar Pradesh and West Bengal were still poor, while other states (Andhra Pradesh, Punjab, Haryana, Kerala) had succeeded in reducing the rural poor numbers to 5 per cent (from 26 per cent in 1983).[3] High illiteracy — only one in three adult women was able to read and write at the start of the reform process — high infant mortality rates (80 deaths per thousand live births — 1990 figures) when combined with low farm productivity and low rural living standards inhibited the capacity of the poor to participate in the non-farm sector (Ravallion and Datt, 2002). The unemployment rate for agricultural labourers by daily current status continues to be high in rural areas: 16 per cent for men and 17 per cent for women and has increased from the figures in 1993–94 (61st round of the NSS).

India has a long history of direct and targeted interventions to fight poverty through workfare schemes, subsidized food, farm-input and credit subsidies. The NREGA of 2005 is the most recent and perhaps the most significant social policy initiative in India in the last decade and includes income transfer, infrastructure development and promotion of rural production and consumption. Its main objective is 'to provide enhancement of livelihood security of the households in rural areas of the country by providing 100 days of guaranteed wage employment to every household in unskilled manual work,' at the minimum wage on demand within 15 days of asking for employment (GOI, 2005). Some of its unique features include a time-bound employment guarantee and wage payment (otherwise the government is penalized), prohibition of private contractors (to reduce leakage of funds) and machinery (to enhance direct benefits of the program to the participants), and a mandatory 33 per cent participation for women. The program was rolled out in stages, starting with implementation in 200 poorest districts in the first stage, 130 more districts in 2007–8, and now covers the entire country (593 districts). The budget in 2009–10 was Rs. 39000 crore and has increased to Rs. 40100 crore in 2010–11.

The NREG's design (which was influenced by a 1970s employment guarantee scheme in Maharashtra) conforms to Galasso and Ravallion's (2005) prescription of a targeted program. They posit that capture by the non-poor occurs when public spending is on a private

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[3] According to the 61st round of the NSS, the percentage of rural poor in the three states was 8% (AP), 14% (Rajasthan), and 22% (Maharashtra).

(excludable) good targeted to the poor, and there is no self-targeting mechanism to ensure that only the poor want to participate. Instead of relying on an administrator to choose the beneficiaries, the program relies on the beneficiaries to select themselves by creating incentives so that only the poor will participate in the scheme. The self- selecting mechanism, is supposed to ensure that anyone who can earn above the minimum wage will opt out of the program. The program's ability to provide self-targeted insurance against down-side risks — idiosyncratic and covariate — has a marked advantage (in theory) over conditional cash transfer schemes targeted to poor families (conditional on their children staying in school and obtaining basic health care) in Brazil and other countries (Ravallion, 2009). The NREG devolves considerable powers in planning and allocating resources to the local governments (panchayats) and through social audits allows the community to monitor the progress.[4] Unlike previous employment guarantee schemes, the NREG is an Act of the Parliament, and treats employment as a right (contains provisions like minimum wages, worksite facilities and mandatory participation of female workers who should comprise one-third of the total participants).

In practice, however, the self- selection mechanism has been weakened in areas where the NREG wage was higher than the prevailing market wages, and by the low awareness of the scheme's components. Other studies (Chhabra et al., 2009) and our own results show that a vast majority of participant households did not know that they would receive additional wages if work was given at a distance of more than five kilometres, or that they were entitled to unemployment allowance in case they were not provided with work within 15 days (Shankar et al. 2010). An audit by the Comptroller and Auditor General (CAG, 2007) also revealed glaring weaknesses and leakages in the program, and sparked a contentious public debate on the efficacy of anti-poverty programs. For instance, only 3.2 per cent of the registered needy households in 200 of India's poorest districts received the guaranteed 100 days of employment in a year. The benefits varied across states: Rajasthan emerged among the top performers — the average employment per participating household was 77 days of work. Kerala, a state with a good record of human development, was at the bottom. Other studies have found that the underprovision of NREG jobs was greater in districts with higher

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[4] Section 17 of the NREGA provides for a social audit of all project work in a village by the village assembly (*gram sabha*). The village governing council (*gram panchayat*) has to provide requisite details to the auditors. For a critique of the social audit process in AP, Rajasthan and Madhya Pradesh, see Shankar (2010).

poverty ratios.[5] These results suggest that excess demand was higher in districts with a higher incidence of poverty.[6] Besides, they increase the importance of understanding whether the NREG has been targeted to the poor and poorest.

III. Sample Design

The present analysis draws upon primary household data drawn from two Indian states: Madhya Pradesh (hereafter MP) and Tamil Nadu (hereafter TN). The data were collected during 2008–09. The sampling is done in three stages, namely selection of districts, villages and households. A list of NREG districts was compiled for both MP and TN. In MP, nine districts[7] were selected from these districts on the basis of probability proportional to size (in this case, rural population as reported in the 2001 Census). In the next stage, 25 villages were randomly selected from these nine districts, followed by a random selection of 20 households from each village. In a similar manner, three districts[8] were selected for TN on the basis of probability proportional to size. Then 25 villages were randomly selected from these districts, followed by a random selection of 20 households from each of the villages. In this way, total number of sample households was 500 for both the states. Apart from household level information, individuals within households were also interviewed. The number of individuals interviewed for MP and TN were, respectively, 2647 and 1914. The data include information on caste, occupation, landholdings, household size, NREG participation, type of ration card, and Public Distribution Scheme (PDS) participation, among other variables.

IV. Descriptive Profile of Beneficiaries

Let us first consider a few cross-tabulations of our complete sample (*beneficiaries and non-beneficiaries*) based on household characteristics that are often used as correlates of poverty (Table 1).

Table 1 here

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[5] Another assessment (Dreze and Khera, 2009) comes to a similar conclusion. 'As things stand, NREGA meets a fraction of this demand: only 13 per cent of the respondents had actually secured 100 days of NREGA work during the preceding 12 months. There were, of course, wide inter-state variations in this respect. While the proportion of sample workers who had completed 100 days of work was particularly low in Chhattisgarh (1%), Bihar (2%), Uttar Pradesh (3%) and Jharkhand (7%), it was considerably higher in Madhya Pradesh (17%), and as high as 35% in Rajasthan' (p.3). See also Ambastha et al. (2008) for a balanced and comprehensive assessment.

[6] For a more detailed corroboration of sensitiveness of excess demand to district level poverty, see Gaiha et al. (2010).

[7] The nine districts chosen in Madhya Pradesh were Sheopur, Tikamgarh, Satna, Shahdol, Sidhi, Jhabua, West Nimar (Khargone), East Nimar (Khandwa) and Dindori.

[8] In Tamil Nadu, the three districts chosen were Tiruvannamalai, Viluppuram, and Sivaganga.

Female-headed households, scheduled castes (SC) and scheduled tribes (ST) followed by other backward castes (OBC) and the landless generally tend to be socially and economically disadvantaged. Only 4 per cent from MP and 11 per cent from TN belonged to female-headed households; the vast majority came from male-headed ones. OBC households were predominant in both states (42 per cent in MP and 55 per cent in TN). In MP, STs were the second most dominant social group (35 per cent), while in TN that position was occupied by SCs who accounted for 37 per cent of the sample. The share of the landless in TN was the highest (52 per cent), while those owning more than 2 acres were the lowest (6.3 per cent). In MP, while the proportion of landless was the highest (39 per cent), the share of households owning more than 2 acres of land was five times higher than in TN (30 per cent). Household size distributions for MP and TN also differed, with smaller households of four or less persons in TN (71 per cent), and five to eight member households in MP (57 per cent).

Profile of NREG Households

The share of participating households in the NREG was higher in TN (77 per cent) than in MP (63 per cent). In both the states, the composition of participating households by gender of its heads corresponded broadly to their shares in the population. In MP, among the NREG participants, the largest share was that of the STs (45 per cent), followed by the OBCs (about 39 per cent) and the SCs (about 14 per cent). Moreover, among the STs, the participants accounted for the highest share (about 79 per cent). In contrast, in TN, the OBCs accounted for more than half the participants (about 52 per cent) and the STs for barely 7 per cent. But these corresponded to their shares in the (household) population. What is indeed striking is that in both the states majorities of the two disadvantaged groups (in TN, for example, about 90 per cent of the STs and 84 per cent of the SCs) participated in the NREG, indicating that large segments of the socially and economically disadvantaged groups benefited from it.

Going by the share of the landless among the participants, TN had the higher share (about 53 per cent, as compared with MP's of about 37 per cent). Further, the share of participants among landless households was as high as 78 per cent in TN, as against 60 per cent in MP. But the shares among households owning modest amounts of land (<2 acres) were also high. By landownership, the distributions of participating households correspond largely to distributions of households in both the states.

Participants by household size also reveal an interesting pattern. While NREG participant shares of different household sizes follow broadly their shares in the population, the within-group shares in both the states increase with household size group.

Poverty in the MP sample is twice as high (71 per cent) as in TN (36 per cent). The proportion of poor households among the participants was 82 per cent; 72 per cent of all poor households participated in the program. In TN, by contrast, 40 per cent of the participating households were poor, and about 86 per cent of poor households were NREG beneficiaries.

Poverty Status and Targeting

Based on the per capita monthly household consumption expenditure, we classified the households in terms of their poverty status and assessed the targeting in Table 2.[9]

Table 2 here

Of all participants, while acutely poor households had the highest share (64 per cent) in MP, that of affluent households was highest (33 per cent) in TN. Also, while more than 80 per cent of the participants were concentrated in acutely and moderately poor households in MP, they were more evenly distributed across various categories in TN. However, of the acutely poor households, the higher share of NREG participants was in TN (about 89 per cent), as compared with MP's (about 72 per cent). A similar pattern is observed for all other categories (including the non-poor).

At the other end of the income distribution are the affluent participants. The affluent accounted for one-third of the total participants in TN, as against a little over 7 per cent in MP. Also, in the latter, a considerably smaller share of the affluent participated in NREG (over 29 per cent, as against 65 per cent in TN). It follows, therefore, that the attractiveness of this scheme to the affluent was considerably greater in TN.

Thus, the contrast between MP and TN is striking -both among the acutely poor and affluent NREG was far more attractive in TN. A more definitive assessment of targeting accuracy can only be done using stochastic dominance tests, as shown below.

Since the benefits to these groups depend on both numbers participating and days worked by individual households, let us first consider differences in duration of participation by poverty status.

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[9] For the cut-off points used for this classification, see Table A.1.

Duration of Participation

Table 3 shows that mean number of days varied within a small range across the different groups in both MP and TN. What is indeed striking is that the means are less than half of the

100 days guaranteed under NREG. While the range of minimum and maximum days worked appears large in both states and varies somewhat across these groups, the standard deviations are largely similar. Finally, there were segments that worked below 10 days in 2008-09 as also others that worked 100 or more days.

Table 3 here

Share of NREG earnings in total household income net of NREG

To assess the benefits of NREG, it is necessary to take into account its transfer benefit[10]. As an approximation (on the presumption that the opportunity cost of time used in NREG is 0), we consider shares of NREG earnings in household income (net of NREG earnings). Some interesting findings are obtained, based on Table 1.

In both states, the share of NREG earnings is barely 6 per cent of household income. The small shares imply the low importance of NREG as a supplementary source of income. However, the dependence of the poor was considerably greater than that of the non-poor on NREG.

This share is equal for both male and female- headed households in MP. In contrast, in TN, the share for female- headed households (about 11 per cent) is more than twice that of male-headed households (5 per cent), suggesting that NREG is more important as a source of income for female- headed households.

The shares of NREG earnings in the household income of various social groups vary over a small range. In MP, SCs had highest share of about 11 per cent, followed by STs (8 per cent) and OBCs (5 per cent). In contrast, STs in TN had the highest share of about 10 per cent, followed by SCs (about 6 per cent) and OBCs and Others had equal shares of 5 per cent each. Among the landless, the share of NREG earnings is higher in MP (7.43 per cent as compared with 5.52 per cent in TN). Among the landholders, the share of NREG earnings in household

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[10] See, for example, Ravallion and Datt (1995).

income falls off with increased land owned categories, with the exception of nearly landless, in both the states. However, the shares are higher in MP.

The share of NREG earnings is about the same across household size groups of 4 and less, 5-8 and 9-12 persons in MP (about 6 per cent each). In TN, on the other hand, while this share is about the same for the two household size groups, <4 persons and between 5-8 persons; the share of NREG earnings is higher for the household size group of 9 to 12 persons (about 11 per cent). This implies that the larger households depended more on NREG.

Thus, in both the states, the poor depended much more than the non-poor on NREG as a supplementary source of income. However, the fact that the transfer benefit is small implies that duration of participation for large numbers was small-in fact, it was only a fraction of the maximum number of days stipulated.

E and F Errors

To overcome the difficulty arising from inclusion of non-poor and exclusion of poor, the E and F errors are computed. As these are *additive*, an assessment of overall targeting accuracy is feasible.

The E error is defined as $(NP)^P_h / N_h$, where the numerator denotes the number of non-poor participants and the denominator, N_h, denotes total household population. The F error, on the other hand, is defined as $(P)_h^{NP}/N_h$, where the numerator denotes number of poor not participating in NREG. The first error is often referred to as *excessive* coverage (denoted by E), and the second refers to failure to include the poor (denoted by F) or *exclusion* of the poor. Both are expressed as proportions of total household population. The sum of the two errors i.e., $E+F= [((NP)^P_h + (P)_h^{NP})] / N_h$, yields an aggregate measure of accuracy of targeting. The greater the (E + F) value (the maximum being 1), the lower is the overall accuracy.

Two issues are pertinent here: one is the relationship between these two types of errors and the other is their relative weights. It is arguable that an attempt to reduce the E error can cause the F error to rise, as some members of the target group are eliminated along with the non-target population. Social stigma associated with participation in a programme targeted to the poor may, for example, deter some among the target group from participating. So a concentration on one or the other index may be somewhat restrictive. However, whether

equal weights are justified is not obvious. This is merely a convenient procedure in the absence of a consensus on appropriate weights. Moreover, in the context of inter-temporal comparisons, the normalization used above is problematic. If, for example, the number of poor participating in the scheme falls marginally while the size of the poor population falls somewhat rapidly, the F error may register a substantial reduction, implying an improvement in targeting. In order to circumvent this difficulty, an alternative normalization could be used, in which the non-poor included and the poor excluded are expressed as proportions of the non-poor and poor, respectively. It is relevant in the present context as shares of poor vary across the states. This of course suffers from the limitation of non-additivity. Our results are shown in Table 4.

Table 4 here

If we go by the E error, TN is considerably worse than MP. When excessive coverage is normalized by the number of non-poor households, this ranking remains unaffected. On the other hand, the F error is relatively small, with TN emerging as the better performer. With the normalization by the number of poor households, TN remains the better performer. However, taking the sum of the E and F errors, MP is the better performer.

Stochastic Dominance

How well anti-poverty programmes are targeted may depend on both the poverty threshold and the poverty index. Usually, there is considerable disagreement on the poverty threshold. Nor is the use of a particular poverty index appealing, since different indices capture specific aspects of deprivation (Sen, 1979). Accordingly, some tests of stochastic dominance have been devised (Atkinson, 1987). These enable ordinal poverty comparisons for a range of poverty thresholds and a class of poverty indices. Extending these tests to the NREG, similar comparisons of their targeting accuracy can be made. Suppose that there is agreement on a range of poverty thresholds (or on the upper limit). If the cumulative income distributions of participants in this programme are plotted and in case the cdf of NREGS participants in one state lies above that of another over the complete range of poverty thresholds, the first-order stochastic dominance (FOD) holds. This implies that the targeting of the former is better in terms of a class of poverty indices comprising the head-count ratio, the poverty gap and a distributionally sensitive measure over the complete range of poverty thresholds (the Rawlsian maximin principle is a special case). If, however, the two curves intersect, a second-order dominance test is used that permits such comparisons for all such indices except

the head-count index and so on. These dominance tests supplement the previous analysis, as the latter is based only on the head-count index and a particular poverty threshold (the latter is of course relaxable but tedious). Let us apply the stochastic dominance test to the NREG program.

As shown in Figure 1, the CDF of participating households in MP lies above that in TN. It follows therefore that NREG is better targeted in MP than in TN. A similar result is obtained if monthly per capita expenditure is replaced by per capita income (net of NREG earnings)[11] (see Figure 2).

Figures 1 and 2 here

Thus, contrary to prevailing views, *despite* the fact that the incidence of poverty is twice as high in MP as in TN, the targeting of NREG is far superior in the former in terms of the FGT class of poverty indices and over the permissible range of poverty thresholds.

V. Determinants of Participation in NREG[12]

We constructed a participation equation that enables us to assess the profile of a participant in NREG. This offers more definitive insights into individual, household and village characteristics that influence participation. The dependent variable is participation in NREG that takes the value 1 for participation and 0 otherwise. The right side variables include the following: gender, age, age square, marital status, education (primary, middle, secondary, above secondary, all relative to illiterate), social group (SC, ST, OBC, all relative to 'Others'), land owned (in acres), number of adult males and females in household, whether a family member is an official, district dummies, ratio of NREG wage to agricultural wage in a village and its square, land inequality in a village (the Gini coefficient), average distance of worksite from the village, percentage of households attending village meetings and percentage of households in the village with both television and cellphone.[13.] This equation is estimated using a probit specification.

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[11] Note that expenditure is not adjusted for extra income through NREG as it must allow for endogeneity of both NREG earnings and consumption.

[12] In this section, a participant refers to a person working under NREG (and not a household). So some of the characteristics (e.g amount of land owned) relate to households while others (age, gender) relate to individuals.

[13] For details of the variables used, see Table A.2 in the Annex.

(a)   Probit Model

The probit specification takes the following form:

$$P[y = 1 \mid \mathbf{x}] = \Phi(\beta_0 + \beta_1 x_1 + \beta_2 x_2 + ... + \beta_k x_k) = \Phi(\beta_0 + \mathbf{x}\beta). \qquad (1)$$

where Φ is the standard normal cumulative distribution function (CDF) and is defined as

$$\Phi(z) = \int_{-\infty}^{z} \phi(v)dv.. \qquad (2)$$

where $\phi(.)$ is the standard normal density

$$\phi(z) = (2\pi)^{-1/2} \exp(-z^2 / 2). \qquad (3)$$

The function $\Phi(.)$ in (2) is increasing in z and takes on values strictly between 0 and 1. It increases most quickly at $z = 0$, $\Phi(z) \to 0$ as $z \to -\infty$ and $\Phi(z) \to 1$ as $z \to \infty$.

If x_j is a continuous variable, its partial effect on $p(\mathbf{x}) = P[y = 1 \mid \mathbf{x}]$ is obtained as

$$\frac{\partial p(\mathbf{x})}{\partial x_j} = \phi(\beta_0 + \mathbf{x}\beta)\beta_j,$$

where $\phi(z) \equiv \dfrac{d\Phi)}{dz}(z)..$ \qquad (4)

Since $\Phi(.)$ is the standard normal cumulative distribution, $\phi(.)$ is the normal density function, $\phi(z) > 0$ for all z. Thus the partial effect of x_j on $p(\mathbf{x})$ depends on $\mathbf{x}$ through the positive quantity, $\phi(\beta_0 + \mathbf{x}\beta)$, implying that the partial effect always has the same sign as β_j. The model is estimated using maximum likelihood estimation and the marginal effects are computed. [14]

(b)   Results

The Probit estimates of NREGS participation equation for MP and TN are reported in Table 5. Though both the coefficient and marginal effect estimates are reported, we will confine our comments to the latter.

Table 5 here

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[14] For details of the probit model, see Wooldridge (2006).

The results show that, while in MP the likelihood of participation in the NREG is significantly higher for males, the opposite is true in TN. In both states, the probability of participation rises with age but this effect becomes weaker for older persons, implying that the old are less likely to participate in manual labour. The probability of participation is higher for married individuals in both states. Illiterates tend to participate more than those with higher levels of education, and the probability of participation reduces with each higher level of education in both the states. However, in MP, there is no significant difference between illiterates and those with primary education. In both the states, while the extent of participation by SCs and OBCs is not significantly different from that of 'Others', the likelihood of NREG participation is significantly higher for STs, as compared to 'Others'. As land continues to be an important asset in rural areas *despite* declining importance of agriculture, it is interesting to note that there is an inverse relationship between the amount of land owned and participation in both the states. In MP, while an increase in number of males in the household reduces the probability of member participation, the opposite is true with higher numbers of females in the household. However, in TN, neither number of males nor females has a significant effect on participation in NREG. Some of the district dummies are significant. Since the incentive argument hinges on the NREG wage to agricultural wage ratio, its role is analysed taking into account its direct effect. Participation increases with the ratio of village NREG wage to agricultural wage rates in MP. In TN also, an increase in the ratio of village NREG wage to agricultural wage rates increase the propensity of participation. However, in the latter, the square of this ratio has a large negative effect, implying that the positive relationship between participation and NREG/agricultural wage ratio weakens at higher values of the ratio.

While there is no significant effect of attendance in village meetings on NREGS participation in MP, in TN it is positively, though weakly, linked with participation. Surprisingly, in neither state, average distance of the worksite from village has a significant effect on participation.

In brief, several correlates of poverty (e.g., illiteracy, affiliation to disadvantaged groups such as SCs and STs, landlessness) are associated with higher probabilities of participation. So while the poor self-select themselves into NREG, this mechanism is weakened by high NREG wage relative to agricultural wage.

VI. Conclusions

Several tests of targeting accuracy of the NREG were employed in this paper. These focus on descriptive measures such as proportions of poor and non-poor participants, and more disaggregated measures such as whether they belonged to acutely poor, moderately poor, moderately non-poor and (relatively) affluent households. These were supplemented by computations of the E (excessive coverage) and F (failure to include the poor) errors of targeting accuracy. As these are based on specific cut-off points of expenditure per capita, these are no more than variants of the headcount index.

In order to overcome the difficulties arising from the use of a headcount index and a specific poverty threshold — including separate ones for acute and moderate poverty — we used stochastic dominance tests that allow for inferences on targeting accuracy for the FGT class of poverty indices and a range of (permissible) poverty thresholds.

As benefits from this scheme depend not just on participation but also on number of days worked and wage rates earned, additional exercises taking these aspects into account were carried out.

Finally, to understand better the factors that enable or impede participation of different groups of households, a probit analysis was carried out. A distillation of the results is given below from a broad policy perspective.

As the stochastic dominance results are the most informative, it is worth emphasising that MP demonstrated much better targeting of NREG than TN for all FGT poverty indices and over a wide range of poverty thresholds. This finding is significant as the proportion of poor is twice as high in the former as in the latter. This raises doubts about earlier findings pointing to greater underprovision of employment opportunities under this scheme in the poorer states.

An assessment of whether the poor benefited substantially requires us to look at shares of NREG earnings in household income. In both the states, though the poor depended more on the NREG as a source of supplementary income than the non-poor, the share is small. Illustrative evidence suggests that the benefits are small mainly because on average the number of days worked is less than half of the maximum number of days permitted under this scheme.

Interesting insights emerge from the analysis of determinants of participation. Some correlates of poverty that favoured participation in NREG included illiteracy, landlessness and membership of disadvantaged groups such as SCs and STS. However, the self-selection of the poor was undermined by the high ratio of NREG wage to agricultural wage.

In sum, while large numbers of poor in both MP and TN participated in NREG, large numbers of (relatively) affluent — especially in the latter — also participated in it. That the self-selection of the poor was undermined and (relatively) affluent were crowded in by the high NREG wage raises a serious concern. Another concern is that the benefits in the form of additional income to the poor were small. No light, however, was thrown on the factors impeding longer spells of participation. Whether, for example, delays and inefficiencies in the selection and execution of projects restricted the benefits needs a careful investigation.

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Table 1: Correlates of Poverty, Participation in NREG, and Share of NREG Earnings in Household Income in Madhya Pradesh and Tamil Nadu, 2008-09

Household Characteristics	Madhya Pradesh			Tamil Nadu		
	S1	S2	S3	S1	S2	S3
Gender of household head						
Male	95.80	96.15(62.81)	5.79	89.2	88.79(76.61)	5.28
Female	4.20	3.85(57.29)	5.80	10.8	11.21(79.93)	11.39
Social Group						
SC	14.67	14.04(59.90)	11.21	37.02	40.4(84.00)	6.24
ST	35.45	44.95(79.36)	8.30	5.84	6.81(89.76)	9.96
OBC	41.68	38.78(58.23)	4.65	55.3	51.62(71.84)	4.91
Others	8.21	2.23(16.97)	1.07	1.83	1.16(48.82)	4.99
Poverty Status						
Poor	71.08	81.50(71.76)	9.54	35.98	39.98(85.50)	9.72
Non-poor	28.92	18.50(40.03)	2.15	64.02	60.02(72.17)	4.34
Land owned group (in acres)						
Landless	38.46	36.75(59.80)	7.43	51.76	52.72(78.39)	5.52
>0-<1	15.91	19.62(77.19)	13.30	30.79	31.68(79.19)	7.75
>1-<2	15.76	17.52(69.57)	7.17	11.16	11.15(76.89)	4.72
>2-<5	22.54	23.07(64.05)	5.25	5.14	3.99(59.79)	2.32
>5	7.34	3.04(25.93)	1.09	1.15	0.46(30.82)	0.61
Household size group						
4 and less	37.44	33.82(56.52)	5.54	71.16	67.43(72.93)	5.48
>4-<8	56.89	59.59(65.54)	5.99	28.11	31.62(86.58)	5.75
>8-<12	5.54	6.39(72.21)	5.71	0.73	0.95(100.00)	10.74
>12	0.13	0.20(100.00)	1.47	0.00	0.00(0.00)	-
All	100.00	100.00(62.58)	5.79	100.00	100.00(76.97)	5.60

Note: S1: Share (%) in population, S2: Share (%) in NREG Participation, S3: Share (%) of NREG earnings in household's income net of NREGS. All calculations are at the household level. Figures in brackets represent shares within groups (row %).

Table 2: Disaggregation of Targeting

State	Poverty Status					
	Acute poverty (1)	Moderate poverty (2)	Moderate Non-poverty (3)	Affluent (4)	All Poor (5=1+2)	All Non-poor (6=3+4)
Madhya Pradesh						
Participants	64.09 (71.72)	17.41 (72.75)	11.31 (51.78)	7.19 (29.16)	81.50 (71.76)	18.50 (40.03)
Non-participants	42.26 (28.28)	10.91 (27.25)	17.61 (48.22)	29.22 (70.84)	53.64 (28.24)	46.36 (59.97)
All	55.92	14.98	13.67	15.44	71.08	28.92
Tamil Nadu						
Participants	22.87 (88.79)	17.11 (81.47)	27.13 (83.29)	32.90 (65.01)	39.98 (85.5)	60.02 (72.17)
Non-participants	9.64 (11.21)	13.01 (18.53)	18.19 (16.71)	59.16 (34.99)	22.65 (14.5)	77.35 (27.83)
All	19.82	16.17	25.07	38.95	35.98	64.02

Note: All calculations are at the household level. Figures in parentheses are the column percentages.
All row percentages in columns (1) through (4) add to 100 and similarly, column (5) and (6) add to 100.

**Table 3: Duration of NREGS Participation by Poverty Status:
Madhya Pradesh and Tamil Nadu**

State and Poverty status	Mean	Standard Deviation	Minimum	Maximum
Madhya Pradesh				
Acute poverty	44.32	28.99	10	180
Moderate poverty	46.68	31.34	5	140
Moderate Non-poverty	40.94	27.35	7	100
Affluent	40.36	29.49	10	100
Poor	44.82	29.46	5	180
Non-poor	40.71	27.98	7	100
All	*44.06*	*29.19*	*5*	*180*
Tamil Nadu				
Acute poverty	45.55	22.16	6	102
Moderate poverty	41.30	28.84	6	158
Moderate Non-poverty	40.55	22.79	4	100
Affluent	41.81	25.09	4	124
Poor	43.73	25.24	6	158
Non-poor	41.24	24.04	4	124
All	*42.24*	*24.52*	*4*	*158*

Table 4: E and F Targeting Errors in NREGS

| State	% Participants		E Error	E′ Error	F Error	F′ Error
	Poor	Non-poor	$(NP)^P_h/N_h$	$(NP)^P_h/(NP)_h$	$(P)_h^{NP}/N_h$	$(P)_h^{NP}/(P)_h$
Madhya Pradesh	81.50	18.50	0.12	0.40	0.20	0.28
Tamil Nadu	39.98	60.02	0.46	0.72	0.05	0.14

Note: E′ and F′ are variants of E and F errors with normalisation by number of non-poor and poor respectively.

Table 5: Estimates of NREGS Participation Equation: Probit Analysis

| Dependent variable	NREGS Participation			
State	Madhya Pradesh		Tamil Nadu	
Explanatory variables	Coefficients (t-value)	Marginal effects (t-value)	Coefficients (t-value)	Marginal effects (t-value)
Gender	0.56***(5.74)	0.06***(5.21)	-0.73***(-7.95)	-0.19***(-8.13)
Age	0.20***(10.12)	0.02***(9.56)	0.15***(8.79)	0.04***(9.13)
Square of Age	-0.003***(-9.81)	-0.0003***(-9.12)	-0.002***(-7.87)	-0.0004***(-8.17)
Whether Married	0.40**(2.31)	0.04**(2.04)	0.32**(2.25)	0.08**(2.26)
Below primary education	-0.12(-1.04)	-0.01(-1.06)	-0.19w(-1.55)	-0.05w(-1.61)
Middle school	-0.26w(-1.57)	-0.02*(-1.81)	-0.42***(-2.85)	-0.09***(-3.27)
Secondary education	-0.39*(-1.82)	-0.03**(-2.39)	-0.79***(-5.23)	-0.15***(-6.93)
Higher secondary plus	-1.35***(-3.62)	-0.05***(-6.78)	-0.91***(-4.66)	-0.17***(-7.29)
SC	0.47*(1.83)	0.06(1.51)	0.10(0.29)	0.03(0.29)
ST	0.73***(2.82)	0.09**(2.45)	0.83**(2.29)	0.28**(1.99)
OBC	0.39w(1.57)	0.04(1.47)	0.08(0.25)	0.02(0.25)
Amount of land owned	-0.06***(-3.48)	-0.01***(-3.37)	-0.09*(-1.95)	-0.02*(-1.95)
Number of adult male	-0.40***(-3.37)	-0.04***(-3.13)	0.01(0.15)	0.00(0.15)
Number of adult female	0.25**(2.00)	0.03*(1.95)	-0.08(-1.24)	-0.02(-1.23)
Household member an official	0.30*(1.76)	0.04(1.48)		
District: Tikamgarh	-0.45w(-1.57)	-0.04**(-2.11)		
District: Satna	0.39(1.00)	0.05(0.78)		
District: Shahdol	-0.20(-0.77)	-0.02(-0.87)		
District: Sidhi	-0.19(-0.65)	-0.02(-0.72)		
District: Jhabua	-0.43(-0.99)	-0.03(-1.32)		
District: West Nimar (Khargone)	-0.29(-0.93)	-0.03(-1.12)		
District: East Nimar (Khandwa)	0.44*(1.81)	0.06(1.42)		
District: Dindori	0.57(1.45)	0.09(1.05)		
District: Viluppuram			0.01(0.11)	0.00(0.11)
District: Sivaganga			0.40***(2.73)	0.12**(2.46)
Ratio of NREG to AGR wage rate	0.48**(2.18)	0.05**(2.20)	2.15**(2.15)	0.56**(2.14)
Square of Ratio of NREG to AGR wage rate			-0.91*(-1.92)	-0.24*(-1.91)
Land Gini index	0.62(0.96)	0.06(0.96)		
Average distance of site from the village	0.12(0.85)	0.01(0.84)	-0.11(-0.94)	-0.03(-0.95)
%hhs attending meetings	0.00(1.38)	0.00(1.35)	0.004w(1.58)	0.001w(1.57)
%hhs with both TV and Cellphone	0.00(0.14)	0.00(0.14)		
Constant	-5.99		-3.78	
Number of observations	2140		1855	
Pseudo R-square	0.4032		0.3421	
Wald chi-square	486.18***		452.30***	
Log pseudolikelihood	-627.34		-732.46	
Predicted probability		0.05		0.18

N.B. ***,**,* refer to significance at the 1 %, 5 % and 10 % level, respectively; and w denotes weakly significant (>10 % level). Figures in the parenthesis are the t-values. In the Tamil Nadu equation, the estimated (marginal) effect of Ratio of NREG to AGR wage rate is 0.17, after adjusting for the quadratic term.

Figure 1: Cumulative Distribution Functions of Per Capita Consumption Expenditure for Participating Households in Madhya Pradesh and Tamil Nadu
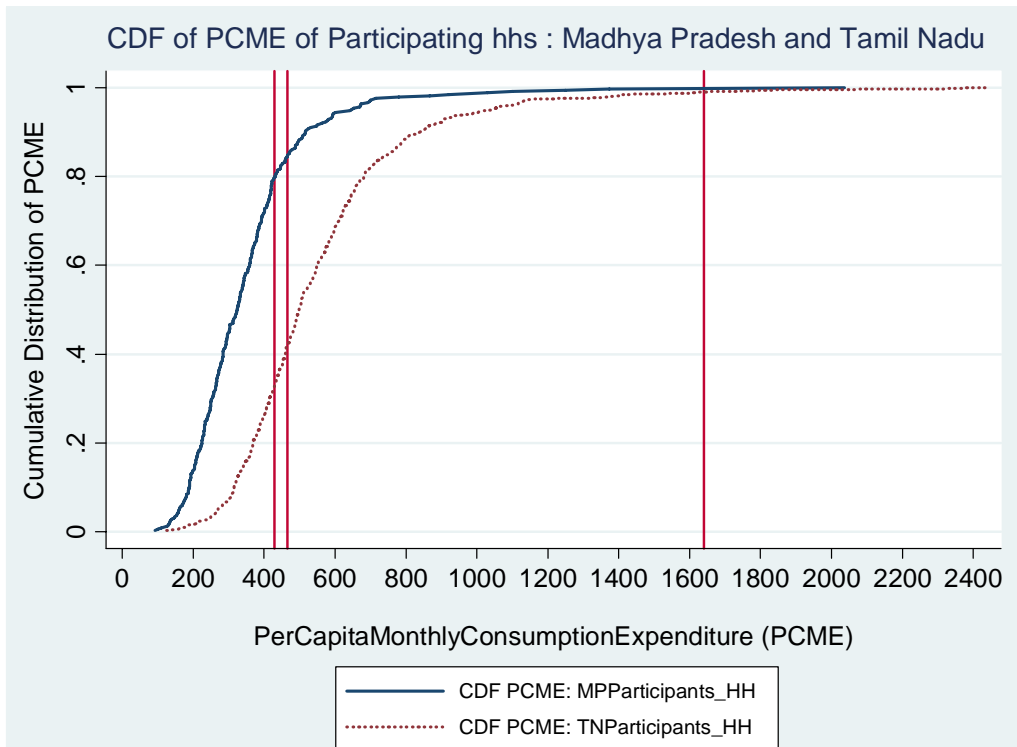
Note: The first two vertical lines correspond to the poverty cut-off points for MP (Rs 429) and TN (Rs 466).

Figure 2: Cumulative Distribution Functions of Per Capita Monthly Income Net of NREGS Earnings for Participating Households in Madhya Pradesh and Tamil Nadu
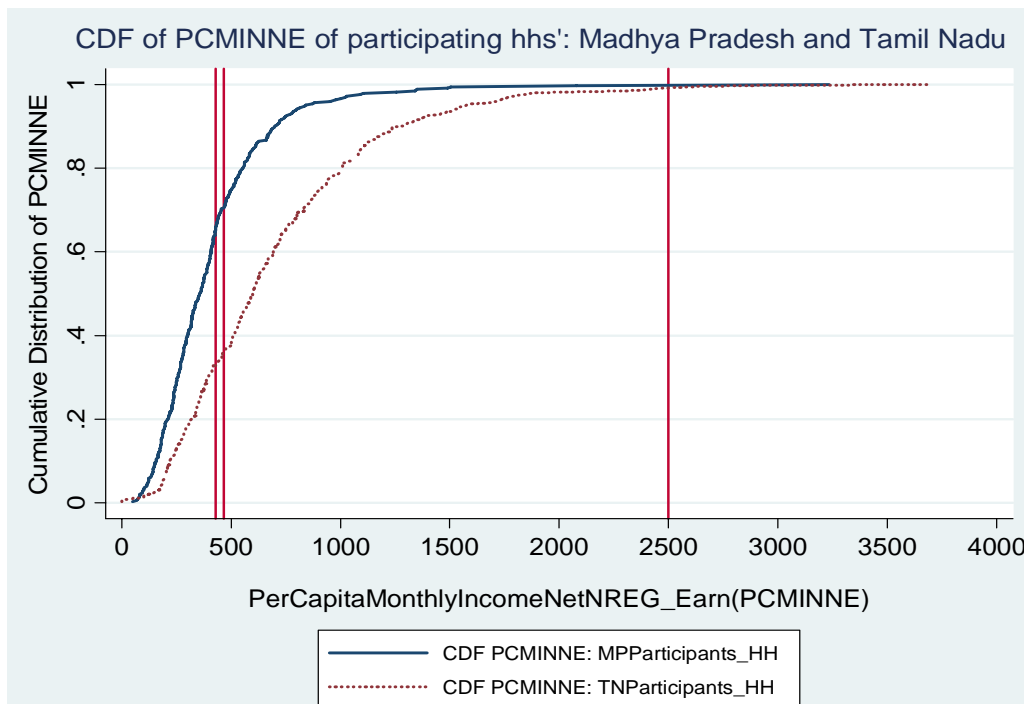
Note: The first two vertical lines correspond to the poverty cut-off points for MP (Rs 429) and TN (Rs 466).

Table A.1: Disaggregation of Households by Poverty Status

Levels of poverty	Madhya Pradesh	Tamil Nadu
Acute poverty	If per capita monthly consumption expenditure<Rs.365	If per capita monthly consumption expenditure<Rs.396
Moderate poverty	If per capita monthly consumption expenditure>=365 but < Rs.429	If per capita monthly consumption expenditure>=396 but < Rs.466
Moderate Non-poverty	If per capita monthly consumption expenditure>=Rs.429 but Rs.<558	If per capita monthly consumption expenditure>=Rs.466 but Rs.<606
Affluent	If per capita monthly consumption expenditure>= Rs.558	If per capita monthly consumption expenditure>= Rs.606
Poverty	If per capita monthly consumption expenditure< Rs.429	If per capita monthly consumption expenditure< Rs.466

Table A.2: Definitions of Variables used in Probit Analysis

Variables	Definition
Dependent Variable	
NREG Participation	NREG Participation (=1 if participated in NREGS; 0 otherwise)
Explanatory Variables	
Gender	Gender (=1 if male, 0 if female)
Age	Age (in years)
Square of Age	Square of age
Whether Married	Dummy for being Married (=1 if married, 0 otherwise)
Illiterate (Reference)	Dummy for no education (=1 if illiterate, 0 otherwise)
Below primary education	Dummy for primary education (=1 if education up to primary level, 0 otherwise)
Middle school	Dummy for middle school (=1 if education up to middle school, 0 otherwise)
Secondary education	Dummy for secondary education (=1 if education up to secondary level, 0 otherwise)
Higher secondary plus	Dummy for higher secondary and above (=1 if education level is higher secondary and above, 0 otherwise)
SC	Dummy for SC (=1 if SC, 0 otherwise)
ST	Dummy for ST (=1 if ST, 0 otherwise)
OBC	Dummy for OBC (=1 if OBC, 0 otherwise)
Others (Reference)	Dummy for Others (=1 if others caste, 0 otherwise)
Amount of land owned	Amount of land owned
Number of adult male	Number of adult male in the household
Number of adult female	Number of adult female in the household
Ratio of NREG to AGR wage rate	Ratio of NREG wage to agricultural wage rate at village level
Square of Ratio of NREG to AGR wage rate	Square of ratio of NREG wage to agricultural wage rate at village level
Land Gini index	Gini index of inequality of landholdings
Average distance of site from the village	Average distance of site from the village
%hhs attending meetings	%households attending meetings at village level
%hhs with bothTV and Cellphone	%households with both television and cell-phone at village level
District: Sheopur (Reference)	Madhya Pradesh district dummy:Sheopur (=1 if Sheopur, 0 otherwise)
District: Tikamgarh	Madhya Pradesh district dummy:Tikamgarh (=1 if Tikamgarh, 0 otherwise)
District: Satna	Madhya Pradesh district dummy:Satna (=1 if Satna, 0 otherwise)
District: Shahdol	Madhya Pradesh district dummy:Shahdol (=1 if Shahdol, 0 otherwise)
District: Sidhi	Madhya Pradesh district dummy:Sidhi (=1 if Sidhii, 0 otherwise)
District: Jhabua	Madhya Pradesh district dummy:Jhabua (=1 if Jhabua, 0 otherwise)
District: West Nimar (Khargone)	Madhya Pradesh district dummy:West Nimar (=1 if West Nimar, 0 otherwise)
District: East Nimar (Khandwa)	Madhya Pradesh district dummy:East Nimar (=1 if East Nimar, 0 otherwise)
District: Dindori	Madhya Pradesh district dummy:Dindori (=1 if Dindori, 0 otherwise)
District: Tiruvannamalai (Reference)	Tamil Nadu district dummy:Tiruvannamalai (=1 if Tiruvannamalai, 0 otherwise)
District: Viluppuram	Tamil Nadu district dummy:Viluppuram (=1 if Viluppuram, 0 otherwise)
District: Sivaganga	Tamil Nadu district dummy:Sivaganga (=1 if Sivaganga, 0 otherwise)