Determinants and Persistence of benefits from the National Rural Employment Guarantee Scheme: Panel Data Analysis for Rajasthan, India

Raghbendra **Jha**, Raghav **Gaiha,** Manoj K. **Pandey** and Shylashri **Shankar**[1]

Abstract

India's National Rural Employment Guarantee Scheme (NREGS) has been hailed as one of the country's most creative social initiatives.   Since the program was begun only recently (in 2004-05) there is a need to assess household access to this program and persistence of benefits to households not just in one year but over time. Using a unique panel data set for 2007-08 and 2009-10 for the Indian state of Rajasthan, this paper analyzes the transitions into and out of the NREGS. It models the impact of such transitions on earnings of workers as well the determinants of such transitions. To the best of our knowledge this is the first study of this kind. Several policy conclusions are advanced.

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All correspondence to:
Prof. Raghbendra Jha,
Australia South Asia Research Centre,
College of Asia and the Pacific
H.C. Coombs Building (09)
Australian National University,
Canberra, ACT 0200, Australia
Phone: + 61 2 6125 2683; Fax: + 61 2 6125 0443; Email: r.jha@anu.edu.au

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I.   Introduction

There is high incidence of both open unemployment and poverty in rural India. According to
the Current Daily Status definition of unemployment in the 66th Round Household data from
the National Sample Survey 6.4 percent of male workers and 8.0 percent of female workers
and 6.8 percent of all workers were unemployed in rural India in 2009-10. This fact, along
with a high incidence of poverty in rural India (22.2 percent according to traditional poverty
line and 33.8 percent according to Planning Commission's revised poverty line in 2009-10),
indicate the high relevance of using a well-designed workfare program to address the twin
problems of high poverty and high unemployment in the rural sector.

When the National Rural Employment Guarantee Act came into effect in November,
2005 it was hailed as one of India's most creative social initiatives. The act guarantees 100
days of employment a year to at least one member of any rural household who is willing to
perform unskilled labor for the minimum wage. By combining rural development with
livelihood protection, the work is designed to develop infrastructure such as roads, irrigation
and flood protection measures. Beginning with the poorest 200 districts, this became a
nationwide program in April, 2008.

During its first year of operation National Rural Employment Guarantee Scheme
(NREGS) involved an expenditure of $4.5 billion and was expected to generate 2 billion days
of employment. NREGS's performance is also crucial to the success of the Millennium
Development Goal of halving global poverty by 2015. In the budget of 2010-11 expense
earmarked for NREGS was Rs. 401 billion (>$8 billion).[2]

Against this backdrop it is important to ask both how much benefits have accrued
from this program to eligible workers and whether these benefits have persisted over time.
The first issue can be addressed using household level cross-section data and some
dimensions have been addressed in a series of papers (Jha et al. 2012b, for employment and
Jha et al. 2011, for nutritional impact).   The second issue can only be addressed using

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[2] For recent evidence on performance of NREGS at the national level see Jha and Gaiha (2012a).

household level panel data to track the movement of workers in and out of employment in the NREGS.

We use a unique data set for two years for the state of Rajasthan in India to address this question. The plan of this paper is as follows. Section II discusses sources of data, section III contrasts the results of 2007-08 with those for 2009-10 and describes the movement of workers in and out of NREGS. Section IV models the determinants of such transitions; section V analyzes the dynamics of participation and exit from the NREGS. Section VI concludes.

II.   Data

Our analysis is largely based on primary household level panel survey data from Rajasthan for years 2007-08 and 2009-10. The modus operandi for collecting the data from household survey in the year 2007-08 was as follows. A list of Rajasthan NREGS districts[3] was compiled. From these districts, three were selected on the basis of probability proportional to size (in this case, rural population as reported in the 2001 Census). In the next stage, a total of 25 villages were randomly chosen from districts selected in the previous stage. Finally, from each selected village, 20 households were again randomly selected giving us a sample of 500 households. In 2009-10 also, a total of 500 households were sampled. However, only 476 households were panel (those are common in both the years). The remaining 24 households were different, partly because some NREGS villages in 2007-08 were no longer NREGS villages in 2009-10.

Thus, our analysis is based on a panel of 476 households. We reiterate that the same set of villages, household and individual level questionnaires were canvassed again in 2009-10 as in 2007-08. Apart from household level information, individuals within the households were also interviewed. Data include information on personal attributes of household's head, social group, occupation, landholdings, income and expenditure, household size, NREGS participation[4], type of ration card, Public Distribution Scheme (PDS) participation along with other village and individual level information.[5]

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[3] Please note that NREGS was implemented only in 7 districts of Rajasthan in 2007-08. Subsequently, coverage of districts under NREGS increased in the state.

[4] A household is said to be a NREGS participating household if at least one of its individual member has worked for some time under NREGS in the last 365 days.

[5] A household is said to be PDS participating household if it has drawn foodgrain (rice or wheat) or sugar or kerosene from PDS.

In addition, detailed ethnographic interviews were conducted in 2008-09 in the period between the first and second surveys. About 20-25 respondents belonging to a cross -section of villagers and block level officials/political leaders were interviewed in a subset of eight villages selected according to the political affiliation of the village president (sarpanch). Since the sarpanch is elected along non-political party lines, we found his/her political affiliation during the larger household survey. Fifty percent of the villages had sarpanches affiliated to one party, and the other half were affiliated to the opposing party. Two trained interviewers in each state team who spoke the local language and were cognizant of the requirements of ethnographic research conducted the interviews. The interviews contain anecdotes and examples of corruption, the decision making process of the panchayat (village governing body), the process of choosing NREGS projects, the influence of political parties on village level issues, migration rates and agricultural wages in the village, the impact of caste and income on the ability to influence decisions, the information available to the respondent about the NREGS, and awareness of social audit, right to information, among others.[6] We also conducted focus group sessions in 25 worksites per state. These ethnographic interviews provide us with the perceptions of the beneficiaries, policymakers and village level elites on the dynamics of power and the impact of the NREGS.

III.   Results

The performance of the NREGS, as revealed by government statistics, has been disappointing and, if anything, has deteriorated over time. For 2007-08 and 2009-10 Table 1 presents data on actual expenditure against planned expenditure for India and Rajasthan as well as summary statistics for various states of India. Both actual expenditure as a percentage of planned expenditure and work completed have gone up.

Table 1 here.

The actual performance of NREGS in terms of employment has, however, been disappointing. Table 2 shows data on average person days of employment under NREGS per household as well as the proportion of households who had competed the promised 100 days of work in the first nine months of 2009-10.

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[6] The interviewees included the village sarpanch, ex-sarpanch, deputy sarpanch, gram sevak, NREGS assistant, caste leaders, panchayat members, village development committee members, political activists from the leading parties, NGOs in the village, the Patwari, moneylender, ration shop owner, worksite supervisor, NREGS beneficiaries at the worksite, and individual asset creation beneficiaries. At the block level, we interviewed the Block Development Officer, the NREGS program officer, the junior engineers, ward panchayat members, and the Pradhan. We also interviewed the member of the Legislative Assembly (MLA).

Data on average number of days worked under NREGS per household and percentage of household worked on NREGS projects for 100 days are available only for nine months (April to December) of 2009–10. The data are reported in Table 2.

Table 2 here.

Rajasthan outperforms the country as well as across state averages in respective of both categories, although the percentage of households getting 100 days of employment under NREGS at 15 percent is low.

Tables 1 and 2 provide information at the aggregate level but do not reveal household behavior with respect to NREGS, in particular transitions between 2007-08 and 2009-10 and welfare implications thereof. To do this we turn to the primary household level data that we have collected.

Table 3 shows changes in the distribution of households over the two time periods 2007-08 and 2009-10.

Table 3 here.

The following points about Table 3 are notable. As expected, there was no significant change in the gender composition of the household heads. Households headed by males remained in vast majority (more than 95 percent) in 2007-08 as well as 2009-10. There was no significant change in the social status of households either. Household size increased slightly from 2007-08 to 2009-10 for all households except for those with 4-8 family members. However, this change is not statistically significant.

We next examine how economic conditions of panel households changed between 2007-08 and 2009-10. To measure economic status, we use different poverty categories based on per capita monthly expenditure (PCME) (defined in annex Table A.1) as well as land ownerships.

The results are depicted in Table 4.

Table 4 here.

The top panel of Table 4 documents how the distribution of households changed by their poverty status during 2007-08 and 2009-10. Based on their PCME, while about 40 percent households were below the poverty line in 2007-08 this proportion increased by

about 18 percentage points in 2009-10. More significantly, much of the increase in the proportion of poor households was because of an increase in acutely poor households. In such households, percentage of poor increased from 29 percent in 2007-08 to about 43 percent in 2009-10. In contrast, the proportion of affluent households decreased by more than 16 percentage points during the same period. Change in poverty status is validated by Chi-square test at 1 percent level of significance.

We next investigate the distributional shift in the poverty status of those households. The second panel of Table 4 reports that about 70 percent of the acutely poor households in 2007-08 remained acutely poor in 2009-10 too. The remaining 30 percent became better-off over time. Among households that were moderately poor in 2007-08, only 18 percent retained their status. About 64 percent of them became acutely poor in 2009-10 and the remaining 18 percent became non-poor.

Among households that were moderately non-poor in 2007-08, less than 27 percent remained so in 2009-10 and about 23 percent became affluent. However, nearly half of them became poor (out of which 36 percent became acutely poor and 15 percent became moderately poor). Only 43 percent of those households who were affluent in 2007-08 remained so in 2009-10; 19.51 percent of such households moved to the moderately non-poor category, while nearly 20 percent and 17 percent of them, respectively, were acutely and moderately poor in 2009-10. About 41 percent of the non-poor households in 2007-08 became poor in 2009-10, and about 17 percent of the poor households in 2007-08 became non-poor in 2009-10. Thus there was a significant change in the poverty status of panel households between 2007-08 and 2009-10. This result is validated by Pearson's Chi-square test at the 1 percent level of significance.

The third and fourth panels of Table 4 report changes in the percentage distribution of households and mobility of those households by land holding between 2007-08 and 2009-10, respectively. The proportion of landless households fell from 31.35 percent to 29.69 percent. The share of those with land holdings between 0-1 acre and between 1-2 acres decreased in this period (greater reduction occurred in the former category of households). Interestingly, the proportion of households with land holding $>2 \leq 5$ acres increased dramatically from just 12 percent in 2007-08 to more than 31 percent in 2009-10. A similar pattern also emerged for households in the largest land owning group (>5 acres). Their proportion rose by 8 percentage points in 2009-10. Pearson Chi-square statistics with 4 degrees of freedom suggests that land holding is time variant. Among households that were landless in 2007-08,

more than 26 percent moved out of the landless category (11 percent held >2 acres in 2009-10). Among households with land holdings of between 0-1 acre in 2007-08, 9.69 percent remained in the same category whereas 16.16 percent were landless in 2009-10. Land holdings increased among the remaining households. Similarly, among households with land holdings between 1-2 acres in 2007-08, 11 percent experienced a reduction in their land ownership (5 percent become landless and 6 percent had 0-1 acre) in 2009-10. Among those households with 2-5 acres land in 2007-08, 7 percent became landless, 22 percent were in the group owning 1-2 acres, 37 percent remained unchanged and the remaining 34 percent shifted into the highest land owned category (i.e. > 5 acres) in 2009-10. Finally, among those households with more than 5 acres of land in 2007-08, only 46 percent remained in the same land ownership category in 2009-10. Thus, overall, there were significant changes in land holdings movements of panel households during 2007-08 and 2009-10- the result is validated by Pearson's Chi-square test at the 1 percent level of significance.

Table 5 here.

Table 5 shows changes in the participation of households in NREGS. Overall, proportion of NREGS participating households decreased from 68 percent in 2007-08 to 48 percent in 2009-10. The participation of female households did not increase significantly with their participation corresponding to their proportion in the population. While participation of Scheduled Castes (SCs) and Others in NREGS increased slightly between 2007-08 and 2009-10, the proportion of Scheduled Tribes (STs) and Other Backward Castes (OBCs) participants dropped. However, this change is not statistically significant for any of the groups. The proportion of households with family size less than 5 and more than 8 persons rose and the proportion of households with family size 5-8 persons fell but this variation was statistically insignificant. Participation in NREGS by acutely (moderately) poor increased by 22 (2) percent. The proportions of moderately non-poor and affluent (and hence, of non-poor households) decreased by 0.26 and 24 percentage points, respectively. Participation in NREGS by landless households and those households with holdings of between 0-1 acre and 1-2 acres decreased by 5, 20 and 10 percentage points, respectively. The participation in NREGS of those with more than 2 acres of land increased sharply. The Pearson Chi-square statistics suggest that participation in NREGS by households with various economic status (based both on PCME as well as land holdings) changed significantly.

To analyze switches into and out of NREGS, based on 476 panel households for 2007-08 and 2009-10, we classify households into four categories:

I. Those who participated neither in 2007-08 nor in 2009-10;

II. Those who participated in 2007-08 but withdrew in 2009-10;

III. Those who did not participate in 2007-08 but participated for the first time in 2009-10 and;

IV. Those who participated in 2007-08 and continued participation in 2009-10.

Based on this classification, we define four types of households: Type I, Type II, Type III and Type IV.

Figure 1 here.

The percentage distribution of these households shown in Figure 1 suggests that 30 percent of households never participated in NREGS. 23 percent withdrew in 2009-10 after participating in 2007-08. Only slightly less than 3 percent of households entered in the scheme for the first time in 2009-10. 45 percent of households continued their participation.

Table 6 depicts distribution of four types of households by these characteristics in 2007-08.

Table 6 here.

Both row and column percentages are reported. However, we comment only on row percentages. Key observations are as follows:

In both female and male headed households, the proportion of Type IV households is the highest. However, while the proportion of Type II households is the second highest among former, Type I households comes second in the latter. While Type IV households are in majority among SCs, STs and OBCs households, among 'others' social group the proportion of Type I is the highest. Going by poverty status of the households in 2007-08 and 2009-10, we observe that while among acutely poor, moderately poor (hence, among all poor) and moderately non-poor households, the proportion of Type IV households is the highest, among affluent and non-poor at large, proportion of Type I households is the highest. The majority of the landless households are Type I households. Among households with land holdings >0≤5 acres, the proportion of Type IV households is the highest. However, majority of those with land holding >5 acres in 2007-08 were Type I households.

We then investigated whether households who moved out of the NREGS are better off. To determine this, we see how distribution of CPIAL adjusted income net of NREGS and PCME changed over this period. This is documented in Table 7.

Table 7 here.

Table 7 documents mean, median, standard deviations of PCME and per capita monthly income net of NREGS earnings (PCMINNE) for all four types of households for years 2007-08 and 2009-10. We also test whether changes between 2007-08 and 2009-10 are statistically significant. Significance of differences in paired means is tested using t-test (a parametric test). Further, non-parametric tests: Wilcoxon signed-rank test[7] and sign tests[8] were used to test whether distribution of these variables is same (i.e., median is equal) over time.

Results are also supplemented by Stochastic Dominance test (Atkinson, 1987).[9] In this test, cumulative distribution functions (CDFs) of PCME/PCMINNE separately for two years are plotted for all the four type of households. If the cumulative income distributions functions for year 2007-08 lies above that of year 2009-10 over the complete range of poverty thresholds, the first-order 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.[10]

Our key conclusions are as follows. Both PCME and PCMINNE fell significantly over the period 2007-08 to 2009-10 for all four types of households. This is validated by means of statistical tests such as t-tests, signed rank tests and sign test (Table 5). Stochastic dominance test confirms first order dominance implying that PCME in 2009-10 for each of the four types of households are dominated by respective magnitudes for 2007-08, i.e., PCME fell between 2007-08 and 2009-10 for all four categories of households. A similar result holds in case of PCMINNE for all types of households.

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[7] It tests the equality of matched pairs of observations by using the Wilcoxon matched-pairs signed-ranks test (Wilcoxon 1945). The null hypothesis under Wilcoxon signed-rank test is that distributions for both the years 2007-08 and 2009-10 are the same.

[8] It tests the equality of matched pairs of observations. The null hypothesis is that the median of the differences is zero.

[9] The test enables ordinal poverty comparisons for a range of poverty thresholds and a class of poverty indices.

[10] These details are not reported here to conserve space but are available from the corresponding authors.

To measure changes in the per capita income over time, we construct two variables as follows: We define percentage increase in MPCE by subtracting its value for base year (2007-08) from the current year (2009-10) multiplied by 100 and then dividing by base year's value. Similarly, percentage increase in PCMINNE over time by subtracting its value for base year (2007-08) from the current year (2009-10) multiplied by 100 and then dividing by base year's value. Then, we examine whether the households which never participated in NREGS have higher changes in the MPCE and PCMINNE over time than those who withdrew in 2009-10, those who entered first time in 2009-10 and those who continued participation in 2009-10. To do this we rely on ordinary least squares (OLS) regression with robust standard errors.[11] Controlling variables other than dummy for types of household (Type I being the reference group) are dummies for social group of household (SC, ST, OBC vs. Others), household size for both base year and change in it (household size in 2009-10 minus household size in 2007-08) and initial year's per capita income. These models are validated by F-test at the 1 percent level of significance.

Table 8 reports estimates for percentage change in both MPCE and PCMINNE over 2007-08 and 2009.

Table 8 here.

We find that there is no significant difference in the percentage change in MPCE or PCMINNE for Type I and Type II households. This suggests that there isn't a significant increase in the income with respect to the initial year's income in those households which participated in 2007-08 but withdrew in 2009-10 and those who participated neither in 2007-08 nor in 2009-10. However, as compared to those households who never participated, percentage change (increase) in MPCE or PCMINNE is significantly lower for those who either entered first time in NREGS or who continued their participation. This indicates that households with lower change in income are more likely to join the scheme or continue their participation if already in the program. As expected, the higher the base year's per capita

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[11] Another way to deal with this problem is to use Analysis of Variance (ANOVA) analysis. However, an essential assumption of ANOVA is the equality of variances of the dependent variable across the types of household. When this assumption is violated, the reported p-value from the significance test may be too liberal (yielding a higher than expected type I error) or too conservative (yielding a lower than expected type I error). In our analysis, Bartlett's test for equal variances suggests that variances are significantly unequal (results are not reported here but can be obtained from the corresponding author upon request). As a remedy of violation of this assumption, W and F* robust one way ANOVA is performed. Both w-test and F* are more robust to violations of homogeneity of variances than traditional F-test. However, commands for these tests in STATA do not permit any types of sampling weights and, therefore, we rely on OLS regression with robust standard errors.

income, the lower is the percentage change with respect to the base year's per capita income. However, other control variables are insignificant.

We then investigated whether changes in the share of per capita income from agricultural and non-agricultural sources (net of NREGS earnings) lured or kept households from participation in NREGS. For this, we summarize some of the descriptive statistics (such as mean, standard deviation and median) for share of per capita income from agricultural sources (agriculture, live-stocks and agricultural wages) in total per capita income for base year 2007-08 and percentage change in the period 2007-08 to 2009-10. We also summarize these descriptive statistics for share of per capita income from non-agricultural sources (non-agriculture wages, salary, self-employed business trade/artisans/professionals, and others such as pensions, remittances, rent, interest and dividends) in total per capita income for base year 2007-08 and percentage change in this between 2007-08 and 2009-10 with respect to base year. A positive value of these changes indicates increases and negative changes reductions in the share over time. Table 9 reports descriptive statistics and pair-wise comparisons of means for these shares and percentage changes in these.

Table 9 here.

Now, to examine the significance of pair-wise differences of means among four types of households in these shares as well as percentage changes in them, we employ Bonferroni multiple-mean comparison test along with one-way ANOVA. Table 10 depicts t-statistics for the multiple comparison tests for the means of shares and their changes from both – agricultural and non-agricultural sources.

Table 10 here.

Our key conclusions are as follows. In the base year (2007-08) the mean share of per capita annual income from agricultural sources in total per capita income for all other households as compared to the households who never participated, were significantly higher. Further, as compared to the households who participated in 2007-08 but withdrew in 2009-10, mean share of per capita annual income from agricultural sources in total per capita income for those who participated first time in 2009-10 and continued participation in 2009-10 were significantly higher. However, mean share of per capita annual income from agricultural sources in total per capita income is higher for those who continued participation in 2009-10 as compared to first time participating households.

As far as mean percentage change (increase) in the household's share of per capita income from agricultural sources is concerned, as compared to never participating households, it is significantly higher for those who ceased participating, but significantly lower for those who participated for the first time in 2009-10 and those who continued participation. Further, as compared to those households who withdrew, there were significantly lower mean percentage changes (increase) in the household's share of per capita income from agricultural sources for those who enter first time and for those who continued participation in NREGS. Between those who participated for the first time and those who continued participation, mean percentage change (increase) in the household's share of per capita income from agricultural sources is significantly higher for latter.

In the base year (2007-08) as compared to the households who never participated, mean share of per capita annual income from non-agricultural sources net of NREGS earnings in total per capita income for all other households were significantly lower. Further, as compared to the households who participated in 2007-08 but withdrew in 2009-10, mean share of per capita annual income from non-agricultural sources net of NREGS earnings in total per capita income for those who participated first time in 2009-10 and continued participation in 2009-10 were significantly lower. Also, mean share of per capita annual income from non-agricultural sources net of NREGS earnings in total per capita income is lower for those who continued participation in 2009-10 as compared to first time participating households.

As far as mean percentage change (increase) in the household's share of per capita income from non-agricultural sources net of NREGS earnings is concerned, as compared to never participating households, it is significantly higher for those who withdrew and those who continued their participation but significantly lower for those who participated first time in 2009-10. Further, as compared to those households who withdrew, there was significantly lower mean percentage change (increase) in the household's share of per capita income from non-agricultural sources net of NREGS earnings for those who enter first time and for those who continued participation in NREGS. Between those who participated for the first time and those who continued participation, mean percentage change (increase) in the household's share of per capita income from non-agricultural sources net of NREGS earnings is significantly higher for latter.

Thus, our results strongly suggests that there is a significant reduction in the share of per capita income from both agricultural as well as non-agricultural sources net of NREGS

wages among those households who participated either for the first time in NREGS or those households who continued their participation, as compared to those who never participated or withdrew after initial participation. Also, mean shares of per capita income from both sources (those who never participated and those who withdrew after initial year's participation) significantly increased from 2007-08 to 2009-10.

IV. Determinants of Switches into and out of NREGS

The Model

We constructed an estimation equation for the four types of households. This was a multiple response categorical dependent variable that taking the value 1 if household was of Type I, 2 if household is of Type II, 3 if household is of Type III and 4 if household was of Type IV. This provides definitive insights into the household and village level characteristics that determine the likelihood of these households' types. Explanatory variables used in the model to test their effects included (i) characteristics of households such as social group (SC, ST, OBC vs Others), proportion of adults, and land holdings; and (ii) village level characteristics such as ratio of NREGS to agriculture wage rate, average distance of NREGS sites, and per capita annual earnings from non-agricultural sources net of NREGS earnings (as a proxy for employment opportunities in the village other than NREGS). For time variant household and village level variables, both initial (base) as well as change in the variables over time under study are used. Average distance of NREGS sites from the village is an exception, where only base variable is used due to very small changes during 2007-08 and 2009-10. Definitions of these variables are given in annex Table A.2.

The model for household type j is

$$P[Y_i = j] = \frac{e^{\beta'_j x_i}}{\sum_{k=1}^{4} e^{\beta'_k x_i}}, \ j = 1, 2, 3, 4 ....(1)$$

where $j = 1, 2, 3, 4$ refers to type of household. This model is called multinomial logit model (Greene, 2003) since we believe the dependent variable is unordered. The estimated equations yield a set of probabilities for $j + 1$ choices for a decision maker with characteristics x_i. Following Greene (2003), out of four choices, only three parameter vectors are needed to determine all the four probabilities. The probabilities are given by

$$P[Y_i = j/x_i] = \frac{e^{\beta'_j x_i}}{1 + \sum_{k=1}^{J} e^{\beta'_k x_i}}, \, for \quad j = 1,.....J, \beta_0 = 0 ....(2)$$

For our purpose, we use $j = 4$ with Type1 being the omitted or reference group. Further, β coefficients in this model are difficult to interpret (Greene, 2003) and therefore, we compute marginal effect corresponding to each $j = 1,2,3$ as

$$\delta_j = \frac{\partial P[Y_i = j]}{\partial x_i} = P[Y_i = j][\beta_j - \bar{\beta}]; j = 1,2,3,4 ....(3)$$

Thus every sub-vector of β enters every marginal effect, both through the probabilities and through the weighted average that appears in δ_j. These values can be computed from the parameter estimates and standard errors are computed using the delta method.

Econometric Results

The estimation results are given in Tables 11 and 12. Table 11 contains coefficient estimates. Note that the base (reference or omitted) case is Type I households, leaving Type II, III and IV households for detailed analysis. The model specification is validated by Wald chi-square statistics at 1 percent level of significance. Table 12 reports their corresponding marginal effects. As the latter are more meaningful, we shall confine our comments to them.

Tables 11 and 12 here

(1) Type I households

As compared to others, the probability of never participating is significantly lower in SCs, STs and OBCs households. Higher land ownership in the base year increases the likelihood of never participating in NREGS. However, increase in land holding over time does not have a significant effect. Ratio of village level NREGS to agricultural wage rates in the initial year reduces the probability of never participation in NREGS. However, increase in the ratio does not have a significant effect on it. Increase in the village level per capita annual earnings from non-agricultural sources net of NREGS earnings in the base year increases the probability of never participation under NREGS. However, percentage change in village level per capita annual earnings from non-agricultural sources net of NREGS earnings in current year relative to the base year does not have a significant effect on the likelihood of never participation. Effects of household composition in terms of share of adults (both initial percentages and change) and village distance from the NREGS work sites in 2007-08 are statistically insignificant.

(2) Type II households

The likelihood of a household to withdraw from NREGS is significantly higher if they are from SCs, STs and OBCs social groups as compared to others. This means that as compared to others SCs, STs and OBCs are more likely to withdraw from NREGS participation after participating in 2007-08. Household composition in terms of proportion of adults and land ownership of households (both initial and change) do not have a significant effect on the probability of moving out from NREGS participation after participating initially. Higher initial year's ratio of NREGS to agricultural wage rates in a village increases the likelihood of its households to withdraw from NREGS participation in the current year. However, change (increase) in the ratio does not have a significant effect. Increase in the village level per capita annual earnings from non-agricultural sources net of NREGS earnings in the base year also increases the likelihood of the households to withdraw from the NREGS after partici-pating in initial years. However, percentage change in village level per capita annual earnings from non-agricultural sources net of NREGS earnings in current year relative to the base year does not have a significant effect on the probability of existence of Type II households. Initial year's village distance from the NREGS work sites is not statistically significant.

(3) Type III households

There is no significant difference in the likelihood of newly entered participating households (Type III households) among SCs, STs and OBCs as compared to 'others' social group. Also, household composition in terms of proportion of adults both initially and subsequent change do not increase or decrease the probability of first time entrance in NREGS. Increase in the household's land ownership in the base year (but not increase over time) increases the likelihood of a household to participate first time in the scheme.

Though initial year's ratio of village level NREGS to agricultural wage rates does not alter likelihood of a household to participate first time in the scheme significantly, increase in its value over time has significant and positive effect on the probability of a household to participate first time in the scheme. Similarly, initial year's village level per capita annual earnings from non-agricultural sources net of NREGS earnings do not increase the likelihood of a household to participate first time in the scheme significantly. However, percentage change in village level per capita annual earnings from non-agricultural sources net of NREGS earnings in current year relative to the base year increases the likelihood of Type III households significantly. Initial year's village distance from the NREGS work sites is not statistically significant.

(4) Type IV households

As compared to 'others' social group, the probability of a household of continuing in the NREGS does not vary significantly for SCs, STs and OBCs. Also, increase in the proportion of adults in the household in initial year as well as increase over time do not have a significant effect on the likelihood of Type IV households. In contrast to those who participated for the first time in 2009-10, likelihood of a household continuing under scheme decreases significantly with increases in its initial year's land ownership. However, change in the land holdings over time does not change the likelihood of Type IV households. Neither initial year's ratio of village level NREGS wage to agricultural wage ratio nor increase in its value over time have significant effects on the probability of a household's continued participation. The higher the village level per capita annual earnings from non-agricultural sources net of NREGS earnings in the base year, the lower is the probability of continued participation in NREGS. However, the percentage change in village level per capita annual earnings from non-agricultural sources net of NREGS earnings in current year relative to the base year does not have a significant effect on the likelihood of households to continue their participation in the scheme. Initial year's village distance from the NREGS work sites is not statistically significant.

Thus, the role of incentives in participation in NREGS is confirmed. Workers exit from NREGS when they see better economic opportunities elsewhere in the village economy while others enter the scheme because of the lure of remunerative wages.

V. Explaining the dynamics of participation and exit from the NREGS

The ethnographic study conducted in the period between the first study and the panel study illuminates some of the perceived dynamics triggered by NREGS. The patterns that emerge from these interviews are consistent with the above analysis. This explains why those belonging to Type II households exited NREGS in 2010. Exits could have occurred due to several reasons:

a) Workers found more lucrative work as agricultural laborers. There was considerable agreement that wages in the agricultural sector had increased as a result of NREGS (to keep pace with the NREGS wages). The perception in the villages is that NREGS, whose wage rates are pegged to the statutory minimum agricultural wages, has been instrumental in increasing agricultural wages.

b) They worked on their own expanded land holdings. Our panel data shows that 30% of Type II households owned >1<2 acres of land in 2007-8, and about 56% owned >2 acres, but in 2010, only 1% owned >1<2 acres and over 70% owned more than 2 acres. These figures indicate that these households increased their ownership of land. However, since the numbers of acutely and moderately poor among these households also increased (though not as dramatically as for the Type III households), it is clear that ownership of land (especially if it is non-arable land) alone cannot lift a household out of poverty. Perhaps the explanation is as follows: In Rajasthan, the worksites functioned all year round, and not just in lean seasons. If the worksite was functional during the agricultural season, these Type II households (who had increased their landholdings) may have exited since they needed to work on their own lands and also needed to pay the hired workers. In the qualitative survey, several farmers complained that they were unable to get labor during the harvest season because of ongoing NREGS work, and that the agricultural wages had gone up.

c) Worked in non-farm jobs: Type I and Type II households were more likely to live closer to markets (which we take as a proxy for a town) than the other two types of households. If we take the distance to the market as a proxy for distance to the nearest town, the figures show that for all three types of households, the distances to the nearest market have decreased. For instance, the distance as 12.31 km in 2008 and is now 10.45 km for Type III households, while it was 10.15 km in 2008 and is now 9.28 km for Type II households. Type I and Type II households are closer to the nearest market (7.24 and 9.28 km respectively) than Type III and Type IV households (10.45 and 10.70km, respectively).

With the boom in the construction industry in the state since 2008, the opportunities for skilled and unskilled laborers increased and were more lucrative than working on the NREGS. Type III households, on the other hand, were more likely to live further away from the market, had less connectivity, and less access to such jobs. These perceptions need to be examined more systematically.

Among Type IV households, the reasons for continuing to stay within the program can be traced to their use of NREGS as an additional source of income. The story seems to be that of a Type IV household that has seen a marginal improvement in its circumstances from the NREGS. The figures from the website of the Rajasthan government on the NREGS indicate an increase in individual beneficiary schemes. About 113468 projects were taken up

in 2008-9 for land development and provided irrigation facilities to those who owned land and qualified as individual beneficiaries and increased to 156468 projects in 2010-11.[12]

Another perception of the interviewees in several villages was that migration had reduced since 2007-8. In addition, our panel data in Table 4 reveal that almost 50 percent of Type III households were STs, and were first time entrants into NREGS. Hence, the story that emerges is one where females were sent to NREGS worksites while males went to find better paying jobs in the city. However, since all these are based on perceptions, we need to assess whether the migration has actually reduced, and if so, is it because people prefer to work in NREGS projects or is it because there has been an expansion of lucrative non-NREGS (farm and non-farm jobs) in the villages. At this time this is an open question.

What is clear from the ethnographic survey is that the general perception is that the NREGS has increased wage rates in other jobs (farm and non-farm).

VI.   Conclusions

Using household level panel data for the Indian state of Rajasthan this paper has considered the important issue of how the benefits in terms of employment and earnings from a workfare program vary over time. It has described movements in and out of the NREGS for various groups of households in the sample as well as the impact such transitions have on earnings. We also modelled the determinants of such transitions; and the dynamics of participation and exit from the NREGS. Hence, this paper provides the first systematic analysis of the dynamics of entry, participation in and exits from the NREGS. A major policy implication of our analysis is that incentives to participation matter-lack of remunerative employment opportunities. A related issue therefore is that the strong case against workfare on the grounds that public support in the form of guaranteed employment induces dependence on it and discourages job search and investment in human capital is exaggerated, if not mistaken. This of course should not be taken to imply that all is well with NREGS. Targeting is often unsatisfactory and leakage of funds and earnings is scandalous. Raising awareness of local communities about the potential benefits of this scheme and mobilizing them for greater accountability and transparency are crucial for ensuring that the benefits accrue to the needy as their economic circumstances deteriorate.

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[12] http://164.100.12.7/Netnrega/mpr_ht/nregampr_dmu.aspx?state_code=27&flag=21&page1=D&month= Latest&fin_year=2008-2009 (Accessed 12th January 2011).

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**Table 1: Actual Expenditure (percentage) against Planned Expenditure
and Completed Work (percentage) against Planned Work**

	Actual Expenditure (percentage) against Planned Expenditure		Completed Work (percentage) against Planned Work	
	2007-08	2009-10	2007-08	2009-10
INDIA	82.26	82.99	46.04	48.94
RAJASTHAN	102.54	78.73	28.61	45.39
Summary Statistics across states	Mean=78.66; Median= 81.59; Standard Deviation= 15.28.	Mean=80.38; Median=79.27; Standard deviation= 14.73.	Mean=50.08; Median= 47.04; Standard Deviation=19.85.	Mean=56.28; Median= 54.83; Standard Deviation=18.59.

Source: Computed from Government of India (2012)

**Table 2: Average Person Days of Employment under NREGS per household and
Percentage of Households completing 100 days of employment under NREGS**

Average Person Days of Employment under NREGS per Household 2009-10		Percentage of Households completing 100 days of employment under NREGS 2009-10	
INDIA	46.83	INDIA	7.08
RAJASTHAN	65	RAJASTHAN	15
Mean across states	39.06	Mean across states	3.0

Source: Computed from Government of India (2012)

**Table 3: Changes in the Percentage Distribution of Household's Composition in Rural
Rajasthan: 2007-08 to 2009-10**

Household Composition	2007-08	2009-10	Changes	Pearson Chi-square
Gender of Household Heads				
Female	4.14	4.37	+0.23	Pearson chi2(1) = 0.0356
Male	95.86	95.63	**-**0.23	
Social Group				
SC	25.58	25.58	0.00	Pearson chi2(3) = 0.0000
ST	30.59	30.59	0.00	
OBC	32.92	32.92	0.00	
Others	10.91	10.91	0.00	
Household size group				
4 and less	36.95	38.01	+1.06	Pearson chi2(3) = 1.0416
>4-<8	56.67	53.98	**-**2.69	
>8-<12	6.28	7.87	+1.59	
>12	0.11	0.15	+0.04	

Table 4: Change in the Percentage Distribution of Households: 2007–08 to 2009–10

Poverty Status	2007–08	2009–10	Changes	Pearson Chi-2
Acutely Poor	29.11	42.79	+13.68	
Moderately Poor	11.31	15.60	+4.29	Pearson chi2(3)
Moderately Non-poor	19.30	17.70	-1.60	= 63.6828***
Affluent	40.27	23.91	-16.36	
Non-Poor	59.58	41.61	-17.97	Pearson chi2(1)
Poor	40.42	58.39	+17.97	= 47.6951***

Mobility of Households by Poverty Status: 2007–08 to 2009–10

| Poverty Status in 2007–08 | Poverty Status in 2009–10 | | | | | | Pearson Chi-square |
	Acutely Poor	Moderately Poor	Moderately Non-poor	Affluent	Non-poor	Poor	
Acutely Poor	**70.24**	13.5	9.85	6.41	-	-	
Moderately Poor	64.08	**18.30**	16.30	1.31	-	-	Pearson chi2(9)
Moderately Non-poor	35.74	14.88	**26.59**	22.79	-	-	= 78.72***
Affluent	20.34	16.70	19.51	**43.45**	-		
Non-poor	-	-	-	-	**58.56**	41.44	Pearson chi2(1)
Poor	-	-	-	-	16.64	**83.36**	=38.27***

Land Ownership: 2007–08 to 2009–10

Land owned group (in acres)	2007–08	2009–10	Changes	Pearson Chi-square
Landless	31.35	29.69	-1.66	
>0-≤1	27.19	6.07	-21.12	
>1-≤2	25.28	20.66	-4.62	Pearson chi2(4)
>2-≤5	11.90	31.20	+19.30	= 146.8763***
>5	4.28	12.38	+8.10	

Mobility of Households by Land Ownerships: 2007–08 to 2009–10

| Land Ownership in 2007–08 (in acres) | Land Ownership in 2009-–10 (in acres) | | | | | Pearson Chi-square |
	Landless	>0-≤1	>1-≤2	>2-≤5	>5	
Landless	**73.58**	6.39	8.83	10.06	1.14	
>0-≤1	16.16	**9.69**	40.56	27.62	5.97	Pearson chi2(16) =
>1-≤2	5.19	5.65	**14.82**	57.03	17.31	298.50***
>2-≤5	6.58	0.00	22.41	**37.01**	34.00	
>5	3.17	0.00	10.49	40.03	**46.30**	

N.B. ***indicates significance at 1%.

Table 5: Changes in Household NREGS Participation Distribution (%): 2007-08 to 2009-10

Household Characteristics	2007-08	2009-10	Changes	Pearson Chi-square
Gender of Household Heads				
Female	5.23	5.53	+0.30	Pearson chi2(1) = 0.0845
Male	94.77	94.47	-0.30	
Social Group				
SC	27.12	27.76	+0.64	
ST	33.39	32.21	-1.18	Pearson chi2(3) = 0.0548
OBC	33.87	32.92	-0.95	
Others	5.62	7.11	+1.49	
Poverty Status				
Acutely Poor	34.09	56.26	+22.17	
Moderately Poor	15.56	17.49	+1.93	Pearson chi2(3) = 61.6195***
Moderately Non-poor	19.97	19.71	-0.26	
Affluent	30.37	6.54	-23.83	
Non-Poor	50.34	26.25	-24.09	Pearson chi2(1) = 42.5181***
Poor	49.66	73.75	+24.09	
Land owned group (in acres)				
Landless	25.85	21.10	-4.75	
>0-≤1	30.13	10.03	-20.10	
>1-≤2	30.46	20.35	-10.11	Pearson chi2(4) = 114.2382***
>2-≤5	10.67	37.25	+26.58	
>5	2.89	11.27	+8.38	
Household size group				
4 and less	38.39	40.11	+1.72	
>4-≤8	54.45	49.57	-4.88	Pearson chi2(3) = 2.6313
>8-≤12	7.08	10.02	+2.94	
>12	0.09	0.31	+0.22	
All	67.81	47.74	-20.07	

N.B. ***indicates significance at 1%.

Table 6: Percentage Distribution of Four Types of Households by Households Characteristics in base year 2007-08

Household Characteristics	Type I Households	Type II Households	Type III Households	Type IV Households
Gender of Household Heads				
Female	14.29 (2.00)	21.98 (4.01)	0.00 (0.00)	63.73 (5.85)
Male	30.24 (98.00)	22.70 (95.99)	2.73 (100.00)	44.33 (94.15)
Social Group				
SC	25.60 (22.14)	22.58 (25.47)	2.52 (24.67)	49.3 (27.94)
ST	21.78 (22.52)	27.94 (37.69)	4.20 (49.19)	46.07 (31.23)
OBC	28.23 (31.42)	24.04 (34.9)	2.02 (25.41)	45.72 (33.35)
Others	64.86 (23.92)	4.02 (1.93)	0.17 (0.73)	30.94 (7.48)
Poverty Status				
Acutely Poor	18.08 (17.79)	25.32 (32.51)	2.52 (28.04)	54.08 (34.89)
Moderately Poor	6.70 (2.56)	40.17 (20.04)	0.00 (0.00)	53.13 (13.32)
Moderately Non-poor	25.47 (16.62)	22.82 (19.43)	4.38 (32.39)	47.33 (20.24)
Affluent	46.30 (63.03)	15.78 (28.03)	2.57 (39.57)	35.36 (31.55)
Non-Poor	39.55 (79.64)	18.06 (47.45)	3.16 (71.96)	39.24 (51.79)
Poor	14.90 (20.36)	29.47 (52.55)	1.81 (28.04)	53.82 (48.21)
Land Owned Group (in acres)				
Landless	42.35 (44.88)	21.30 (29.45)	1.74 (20.85)	34.62 (24.05)
>0-≤1	24.50 (22.52)	25.25 (30.28)	0.37 (3.81)	49.88 (30.05)
>1-≤2	12.98 (11.09)	24.04 (26.80)	5.31 (51.41)	57.67 (32.30)
>2-≤5	34.79 (14.00)	18.04 (9.47)	4.41 (20.07)	42.76 (11.28)
>5	51.91 (7.51)	21.22 (4.00)	2.35 (3.85)	24.51 (2.32)
Household Size Group				
4 and less	26.41 (32.99)	24.28 (39.56)	3.15 (44.50)	46.16 (37.79)
>4-≤8	33.01 (63.23)	21.16 (52.87)	1.84 (39.92)	43.99 (55.24)
>8-≤12	17.81 (3.78)	27.33 (7.57)	5.68 (13.66)	49.17 (6.84)
>12	0.00 (0.00)	0.00 (0.00)	45.98 (1.93)	54.02 (0.13)
All	*29.58*	*22.67*	*2.61*	*45.13*

N.B. Figures in parentheses are the column percentages. Type I households: those who never participated; Type II households: Those who participated in 2007-08 but not in 2009-10; Type III households: Those who participated first time in 2009-10; Type IV households: Those who participated in both years.

Table 7: Descriptive Statistics of Household's CPIAL adjusted Per Capita Monthly Consumption Expenditure and Per Capita Income Net of NREGS Earnings: 2007-08 and 2009-10

Type of Households	Mean (Standard Deviation)		Paired t-test for difference of means: 2007-08 and 2009-10	Median (Standard Deviation)		Tests for equality of median/distribution: : 2007-08 and 2009-10	
	2007-08	2009-10		2007-08	2009-10	Signed Rank test	Sign test
CPIAL adjusted Monthly Per Capita Consumption Expenditure							
Type I households	811.83 (507.02)	676.51 (304.52)	t(74) = 3.12***	692.13 (507.02)	642.69 (304.52)	Z= 2.40**	P= 0.1778
Type II households	500.25 (229.58)	562.59 (743.47)	t(103) = 2.38***	437.67 (229.58)	395.98 (743.47)	Z= 5.14***	P= 0.0000***
Type III households	543.75 (165.78)	380.62 (109.31)	t(21) = 2.82***	565.43 (165.78)	379.65 (109.31)	Z= 2.52**	P= 0.0669*
Type IV households	503.26 (237.67)	391.05 (206.00)	t(274) = 4.31***	470.42 (237.67)	360.43 (206.00)	Z= 7.25***	P= 0.0000***
ALL	594.91 (364.75)	514.12 (431.98)	t(475) = 6.06***	514.25 (364.75)	406.80 (431.98)	Z= 9.21***	P= 0.0000***
CPIAL adjusted Per Capita Income Net of NREGS Earnings							
Type I households	1370.57 (1236.18)	868.70 (592.34)	t(74) = 3.34***	1188.19 (1236.18)	815.74 (592.34)	Z= 3.59**	P= 0.0026***
Type II households	539.33 (348.89)	433.25 (245.97)	t(103) = 4.35***	443.75 (348.89)	382.05 (245.97)	Z= 4.34***	P= 0.0011***
Type III households	625.29 (196.48)	352.57 (95.14)	t(21) = 3.47***	596.88 (196.48)	341.13 (95.14)	Z= 2.78**	P= 0.0669*
Type IV households	524.28 (317.00)	342.15 (197.13)	t(274) = 9.99***	453.57 (317.00)	285.43 (197.13)	Z= 9.43***	P= 0.0000***
ALL	780.67 (816.91)	518.84 (432.16)	t(475) = 8.63***	546.88 (816.91)	366.82 (432.16)	Z= 11.07***	P= 0.0000***

Note: Type I households: those who never participated; Type II households: Those who participated in 2007-08 but not in 2009-10; Type III households: Those who participated first time in 2009-10; Type IV households: Those who participated in both the years. ***,**,* refer to significance at the 1 %, 5 % and 10 % level, respectively. t(m) denotes for t-statistics with m degrees of freedom. Z refers to Z-statistics and P refers to the probability of number of positive outcome (say X) larger than the observed positive outcome (say x in a sample of n with probability of success p) = Binomial (n, X >= x, p = 0.5). Positive values of t and z suggest that base year 2007-08 values (mean or median) are significantly higher than those in 2009-10.

Table 8: Variation in changes in income across four types of households: Regression Estimates from OLS with Robust Standard Errors

Dependent Variable	%change in Per Capita Monthly Expenditure	%change in Per Capita Monthly Income Net of NREGS Earnings
Explanatory Variables	Coefficients (t-values)	Coefficients (t-values)
Type II households: Dummy#	8.37(0.25)	-25.62(-1.41)
Type III households: Dummy#	-49.60***(-3.23)	-49.08***(-3.00)
Type IV households: Dummy#	-35.14***(-3.50)	-35.32*(-1.81)
Social Group Dummy: SC+	-17.35(-1.39)	-50.33(-1.25)
Social Group Dummy: ST+	3.42(0.14)	-55.52(-1.37)
Social Group Dummy: OBC+	-24.01*(-1.87)	-60.67w(-1.61)
Per Capita Monthly Expenditure: 2007-08	-0.08***(-4.43)	
Per Capita Monthly Income Net of NREGS Earnings: 2007-08		-0.04**(-2.55)
Household Size: 2007-08	-2.56(-0.92)	-2.84(-0.97)
Change in Household Size: 2007-08 and 2009-10	-25.82(-1.15)	4.37(0.65)
Constant	88.36	111.26
Number of observations	476	475
F-values	F(9, 466)= 4.91***	F(9, 465) = 3.77***
R-squared	0.1240	0.1609
Root MSE	101.05	74.993

N.B: +: Social Group Dummy for Others is the omitted group. # Type I households: Dummy is the reference group. ***,**,* 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 based on robust standard errors. Detailed definition of the variables used in the analysis can be obtained in Annex Table A.2.

Table 9: Descriptive Statistics for Household's Share of Per Capita Income from Agricultural Sources and Non-agricultural (excluding NREGS) Sources and % Changes in these Shares by Types of Household

Type of Households	Share of Per capita annual income from Agricultural Sources in Total Per Capita income in 2007-08		%Change (increase) In Household's Share of Per Capita Income from Agricultural Sources over 2007-08 and 2009-10		Share of Per capita annual income from Non-agricultural (excluding NREGS) Sources in Total Per Capita income in 2007-08		%Change (increase) in Household's Share of Per Capita Income from Non-agricultural (excluding NREGS) Sources over 2007-08 and 2009-10	
	Mean [SD]	Median	Mean [SD]	Median	Mean [SD]	Median	Mean [SD]	Median
Type I households	14.88 [26.97]	1.08	2.66 [23.97]	0.00	85.12 [26.97]	98.92	-2.66 [23.97]	0.00
Type II households	27.96 [27.77]	22.68	3.77 [27.63]	3.15	60.31 [30.43]	61.86	7.96 [29.49]	8.22
Type III households	44.12 [36.62]	30.31	-7.62 [26.55]	3.85	55.88 [36.62]	69.69	-5.56 [25.08]	-8.38
Type IV households	31.23 [27.11]	25.53	1.40 [27.66]	2.01	53.89 [28.77]	57.03	-1.09 [30.41]	-2.75

Note: Type I households: those who never participated; Type II households: Those who participated in 2007-08 but not in 2009-10; Type III households: Those who participated first time in 2009-10; Type IV households: Those who participated in both the years. SD= Standard Deviation

Table 10: Repeated t-test for differences in the mean shares of base years and changes in the share of agricultural and non-agricultural sources by types of households

Bonferroni multiple-mean comparison test	T-statistics for differences of means for			
	Share of Per capita annual income from Agricultural Sources in Total Per Capita income in 2007-08	%Change in Household's Share of Per Capita Income from Agricultural Sources	Share of Per capita annual income from Non-agricultural (excluding NREGS) Sources in Total Per Capita income 2007-08	%Change in Household's Share of Per Capita Income from Non-agricultural (excluding NREGS) Sources
Type II households-Type I households	13.08***	1.11***	-24.81***	10.62***
Type III households-Type I households	29.24***	-10.28***	-29.24***	-2.90***
Type IV households-Type I households	16.34***	-1.26***	-31.22***	1.58***
Type III households-Type II households	16.16***	-11.38***	-4.43***	-13.52***
Type IV households-Type II households	3.26***	-2.36***	-6.42***	-9.04***
Type IV households-Type III households	-12.90***	9.02***	-1.99***	4.47***

Note: Type I households: those who never participated; Type II households: Those who participated in 2007-08 but not in 2009-10; Type III households: Those who participated first time in 2009-10; Type IV households: Those who participated in both the years. *** refers to significance at the 1 % level.

Table 11: Estimation of Switches into and out of NREGS during 2007-08 and 2009-10 in Rajasthan: Multinomial Logit Coefficient Estimates

Dependent variable outcomes	Households who Withdrew Participation (Type II)	Households who Participated First Time ((Type III)	Household who Continued Participation ((Type IV)
Explanatory variables	Coefficient (z-value)	Coefficient (z-value)	Coefficient (z-value)
Social Group Dummy: SC	2.44*** (3.10)	3.73** (2.56)	1.06^w (1.58)
Social Group Dummy: ST	2.85*** (3.61)	4.70*** (3.55)	1.19* (1.76)
Social Group Dummy: OBC	2.51*** (3.05)	3.65*** (2.97)	1.09^w (1.62)
% adults in the household: 2007-08	-0.01 (-0.55)	0.02 (0.98)	-0.01 (-0.87)
Δ % adult in the household: 2007-08 to 2009-10	0.01 (0.47)	0.06** (1.96)	0.02 (0.98)
Land owned by household: 2007-08	-0.13 (-1.08)	0.09 (0.72)	-0.22** (-2.08)
Δ Land owned by household: 2007-08 to 2009-10	0.00 (-0.05)	-0.04 (-0.55)	-0.02 (-0.52)
Ratio of NREG to AGR wage rate in Village: 2007-08	4.53** (2.14)	5.99* (1.86)	2.66 (1.26)
Δ Ratio of NREG to AGR wage rate in Village: 2007-08 to 2009-10	1.73 (1.08)	5.73** (2.45)	1.26 (0.79)
Average distance of NREG Sites from the village: 2007-08	-0.23 (-0.51)	0.04 (0.06)	-0.35 (-0.87)
Per Capita Annual Earnings from Non-agricultural sources net of NREGS earnings in Village: 2007-08	-1.6×10^{-4}** (-2.30)	0.00 (-0.98)	-3.7×10^{-4}*** (-5.11)
Δ Per Capita Annual Earnings from Non-agricultural sources net of NREGS earnings in Village: 2007-08 to 2009-10	1.56 (1.21)	3.11* (1.83)	1.20 (1.00)
Constant	-4.07 (-1.40)	-11.13** (-2.22)	1.79 (0.68)
Number of observations	456		
Wald chi-square(36)	173.42***		
Pseudo R-square	0.1718		
Log pseudolikelihood	-433.8825		

Note: Type I households: those who never participated; Type II households are the reference category: Those who participated in 2007-08 but not in 2009-10; Type III households: Those who participated first time in 2009-10; Type IV households: Those who participated in both the years. ***,**,* refer to significance at the 1 %, 5 % and 10 % level, respectively; and w denotes weakly significant (>10 % level). Figures in the parenthesis are the z-values.

Table 12: Estimation of Switches into and out of NREGS during 2007-08 and 2009-10 in Rajasthan: Multinomial Logit Marginal Effect Estimates

Outcomes	Households who Never Participated (Type I)	Households who Withdrew Participation (Type II)	Households who Participated First time ((Type III)	Household who Continued Participation ((Type IV)
Explanatory variables	**ME (z-value)**	**ME (z-value)**	**ME (z-value)**	**ME (z-value)**
Social Group Dummy: SC	-0.22*** (-3.46)	0.31* (1.80)	0.07 (0.82)	-0.16 (-0.99)
Social Group Dummy: ST	-0.26*** (-3.67)	0.35** (2.11)	0.10 (1.15)	-0.19 (-1.25)
Social Group Dummy: OBC	-0.24*** (-3.25)	0.32* (1.87)	0.06 (1.02)	-0.14 (-0.82)
% adults in the household: 2007-08	0.00 (0.78)	0.00 (-0.04)	0.00 (1.42)	0.00 (-0.83)
Δ % adult in the household: 2007-08 to 2009-10	0.00 (-0.91)	0.00 (-0.27)	0.00 (1.44)	0.00 (0.84)
Land owned by household: 2007-08	0.03* (1.90)	0.00 (0.14)	0.003** (2.14)	-0.04* (-1.76)
Δ Land owned by household: 2007-08 to 2009-10	0.00 (0.38)	0.00 (0.40)	0.00 (-0.40)	-0.01 (-0.73)
Ratio of NREG to AGR wage rate in Village: 2007-08	-0.57* (-1.75)	0.48** (2.18)	0.05 (1.35)	0.04 (0.12)
Δ Ratio of NREG to AGR wage rate in Village: 2007-08 to 2009-10	-0.26 (-1.01)	0.14 (0.75)	0.07** (2.01)	0.05 (0.19)
Average distance of NREG Sites from the village: 2007-08	0.05 (0.75)	0.00 (0.03)	0.00 (0.49)	-0.06 (-0.92)
Per Capita Annual Earnings from Non-agricultural sources net of NREGS earnings in Village: 2007-08	5.0×10^{-5}*** (4.08)	$2.0 \times 10^{-5\text{w}}$ (1.61)	0.00 (0.43)	-7.0×10^{-5}*** (-4.63)
Δ Per Capita Annual Earnings from Non-agricultural sources net of NREGS earnings in Village: 2007-08 to 2009-10	-0.23 (-1.11)	0.13 (1.02)	0.03$^{\text{w}}$ (1.63)	0.07 (0.45)
Predicted probability	*0.22*	*0.25*	*0.01*	*0.52*

Note: Type I households: those who never participated; Type II households: Those who participated in 2007-08 but not in 2009-10; Type III households: Those who participated first time in 2009-10; Type IV households: Those who participated in both the years. ***,**,* refer to significance at the 1 %, 5 % and 10 % level, respectively; and w denotes weakly significant (>10 % level). Figures in the parenthesis are the z-values. ME=Marginal Effect (dy/dx)
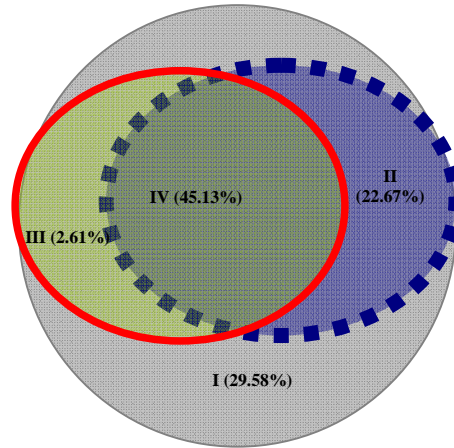
Venn-diagram for Participation Dynamics

Figure 1: Figures in parenthesis are the percentage proportions of Type I, II, III and IV households among total population of panel households.

Table A.1

Definition of different levels of Poverty

Household's poverty status	CPIAL adjusted per capita monthly consumption expenditure Ranges*
Acute poverty	<Rs.383
Moderate poverty	$\geq$ Rs. 383 but < Rs.450
Moderate Non-poverty	$\geq$ Rs.450 but < Rs.585
Affluent	$\geq$ Rs.585
Non-poor	$\geq$Rs.450
Poor	< Rs.450

*Please note that to adjust per capita monthly consumption expenditure using CPIAL we multiply per capita monthly consumption expenditure (and all other income variables) for 2009-10 by ratio of CPIAL in 2007-08 to CPIAL in 2009-10 (=0.797270955).

Table A.2
Definitions of the Variables used in the Analysis

Variables	Definition
Dependent Variable	
%change in Per Capita Monthly Expenditure	=(Per Capita Monthly Expenditure in 2009-10 minus Per Capita Monthly Expenditure in 2007-08)*100/Per Capita Monthly Expenditure in 2007-08
%change in Per Capita Monthly Income Net of NREGS Earnings	=(Per Capita Monthly Income Net of NREGS Earnings in 2009-10 minus Per Capita Monthly Income Net of NREGS Earnings in 2007-08)*100/Per Capita Monthly Income Net of NREGS Earnings in 2007-08
Type of households: mlogit	1=Type I households (those who never participated in NREGS); 2= Type II households (those who participated in 2007-08 but withdrew in 2009-10); 3= Type III households (those who did not participate in 2007-08 but first time in 2009-10, and 4=Type IV households (those who participated in 2007-08 and continued in 2009-10); 1 is the reference category
Explanatory Variables	
Type I households: Dummy (Reference)	=1 if a household neither participated in 2007-08 nor in 2009-10; 0 otherwise
Type II households: Dummy	=1 if a household participated in 2007-08 but not in 2009-10; 0 otherwise
Type III households: Dummy	=1 if a household not participated in 2007-08 but in 2009-10; 0 otherwise
Type IV households: Dummy	=1 if a household participated in both 2007-08 and in 2009-10; 0 otherwise
Social Group Dummy: SC	=1 if Social Group is Scheduled Castes, 0 otherwise
Social Group Dummy: ST	=1 if social group is Scheduled Tribes, 0 otherwise
Social Group Dummy: OBC	=1 if social group is OBC, 0 otherwise
Social Group Dummy: Others (Reference)	Omitted social group
Household Size: 2007-08	Household Size in base year 2007-08
Change in Household Size: 2007-08 and 2009-10	Change in Household Size during 2007-08 and 2009-10 (Household Size in 2009-10 minus Household Size in base year 2007-08)
% adults in the household: 2007-08	% of adults in the total household size in base year 2007-08 (=number of total adults in the household*100/household size)
Δ % adult in the household: 2007-08 to 2009-10	change in the share of adults in the household during 2007-08 and 2009-10 (% in 2009-10 minus 2007-08)
Per Capita Monthly Expenditure: 2007-08	Per Capita Monthly Expenditure in base year 2007-08
Per Capita Monthly Income Net of NREGS Earnings: 2007-08	Per Capita Monthly Income Net of NREGS Earnings in base 2007-08
Land owned by household: 2007-08	Land owned by household in 2007-08 (in acres)
Δ Land owned by household: 2007-08 to 2009-10	Change in land owned by household during 2007-08 and 2009-10 (=land owned in 2009-10 minus 2007-08)
Ratio of NREG to AGR wage rate in Village: 2007-08	Ratio of NREG wage to agricultural wage rate at the village level in 2007-08
Δ Ratio of NREG to AGR wage rate in Village: 2007-08 to 2009-10	Change in Ratio of NREG wage to agricultural wage rate at the village level during 2007-08 and 2009-10 (ratio in 2009-10 minus ratio in 2007-08)
Average distance of NREG Sites from the village: 2007-08	Average distance of NREG Sites from the village in 2007-08
Per Capita Annual Earnings from Non-agricultural sources net of NREGS earnings in Village: 2007-08	Village Level Per Capita Annual Earnings from Non-agricultural sources net of NREGS earnings in 2007-08
Δ Per Capita Annual Earnings from Non-agricultural sources net of NREGS earnings in Village: 2007-08 to 2009-10	Relative Change in Per Capita Annual Earnings from Non-agricultural sources net of NREGS earnings in Village during 2007-08 to 2009-10