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Does MGNREGA have an equal Impact on Livelihood Security Across Different Regions? A Study based on National Sample Survey Data

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Abstract: MGNREGA is the biggest drive in human history to ensure social protection of vulnerable rural people by providing at least 100 days of wage employment in a financial year. Several studies have been made so far to capture the impact of the program on livelihood related outcomes. This paper is to examine the potential impact of the scheme upon livelihood security of rural people across different regions of the country. More precisely, it compares if the scheme has equal beneficial impact upon different regions of the country as a whole. The study exploits unit level large sample data of the national sample survey. The study is a distinctive attempt to date seeing that it has immense policy implications in terms of locating the regions that lagging behind and need for special attention. Propensity score matching technique has been applied for identification of target households and, difference and differences frame work has been utilised for estimating the impact of the program. We find a varied extent and pattern of impact across the regions. On the whole, growth impact is stronger than true program impact in improving the spending capacity of beneficiary households, and, who did not avail the scheme were better-off compared to those who took the treatment.

Keywords: Livelihood security, Social protection, Employment generation scheme, National sample survey, Policy evaluation

1. INTRODUCTION

Context

Poverty reduction is the central concern of undertaking work fare program in developing countries during past few years. There is a long history of food-for-work programs emerging as the means to come out from economic distress. The

developing countries run public works programs for the empowerment of poor in addition to utilize the up-and-coming labour force towards the economic and the social infrastructural improvement to attain sustainable economic development in the region. The Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA[1]) is an Indian job assurance scheme, enacted by legislation in 2005. The aim of the scheme is to ensure social protection of vulnerable rural people, especially poor, by providing wage employment in works that develop the infrastructure base of that particular locality, like, durable assets, improved water security, soil conservation, higher land productivity etc. It also aims to empower socially disadvantaged people, especially, women, Scheduled Castes and Scheduled Tribes. Accordingly, MGNREGA came into force in 2006, which is the biggest drive in human history which intends to guarantee at least 100 days of wage employment in a financial year to every household whose adult members volunteer to do unskilled manual work in public works, like irrigation, road construction, land development, reforestation projects etc. (Ministry of Rural Development, 2010)[2].

MGNREGA has been implemented in a phase manner based on the socio economic background of different regions. Initially it was implemented in 200 most economically backward districts in 2006, termed as 'phase 1' districts. In 2007 it was extended to another set of 130 poorer districts, termed as 'phase 2' districts; and in 2008 it was implemented in remaining 295 districts, termed as 'phase 3' districts, which are richer compared to phase 1 and phase 2 districts[3]. Moreover, phase 1 and phase 2 districts were also characterized by prevalence of higher percentages of Scheduled Castes and Scheduled Tribes population (Gupta, 2006). The scheme thus covers the entire country and excludes only districts that have a hundred percent urban population. Although there has been several studies made so far addressing the impact of the program on a variety of livelihood related outcomes (including income, wages, consumption and employment), there has been little attempt made until now on phase-wise impact on livelihood security of rural people. This study contributes the literature by estimating the comparative impact of MGNREGA on livelihood security of rural people under three different phases separately. It has significant policy implications in identifying the regions at national level lagging behind even after providing the treatment and so, calls for special consideration for getting better progress in program implementation in those regions.

By household livelihood security we mean if the household can adequately access income and resources to attain basic needs like food, pure water, health facilities, education opportunities, housing etc. Broadly there are three approaches for

enhancing livelihood security, namely, livelihood promotion, livelihood protection and livelihood provisioning (Frankenberger, T. R. andMcCaston, M. K., 1998). Livelihood promotion is achieved in the course of development-oriented programming, while livelihood protection is offered through rehabilitation/ mitigation-oriented programming. Livelihood provisioning, alternatively, is made by providing relief-oriented programming. In practice, MGNREGA can be considered as a blending of first two intervention strategies. With this notion of thought the present study aims to assess the phase-wise comparative impact of the scheme on accessing to the basic needs like food and non-food items. More precisely, the direct impact of MGNREGA may be assessed by examining the changes in livelihood security of the beneficiary households, where livelihood security is captured by the monthly per capita food and non-food expenditure[4]. Here, we assess the impact separately for households under phase 1, phase 2 and phase 3 districts. While previous few studies, as far as our knowledge goes, are either based on aggregated district level data of National Sample Survey (NSS), or the case studies covering small regions, the present study exploits the all-India unit level data of NSS for 61st and 68th rounds with a special focus on direct impact of the program by three different phases of implementation separately.

The article begins with context of the study with a brief review of background literature in Section 1. Section 2 provides details of the material and methods. Results and discussions are presented in Section 3 and, Section 4 concludes with some observations on the effectiveness of the program.

Background Literature

MGNREGA is the largest employment generation program in the world. It has attracted a considerable amount of academic interest due to its size and multidimensional implications for rural India. As such, there is a vast empirical research on the effectiveness of the program. MGNREGA has been a lively debate in last few years too (Dreze and Oldiges, 2011).

Liu and Deininger (2010) find significant impact of MGNREGA on consumption expenditure, calorie consumption, protein intake, and asset accumulation of the participants in five districts of Andhra Pradesh. Azam (2012) reports a favorable impact of MGNREGA on average wages of casual workers. Bordoloi (2011) in his impact study in Assam finds that MGNREGA increased purchasing power of households to meet up some basic needs on food and non-food items. Similar impact has been found in a study carried out by Kaur and

Randhawa (2016) in the state of Punjab. Using the panel data from 1064 households in 198 villages of Andhra Pradesh over two years, Ravi and Engler (2015) conclude that the program significantly increased the monthly per capita expenditure on food by 9.6 percent and non-food consumables by 23 percent. They report that the program also improved food security by reducing significantly the number of meals forgone by households per week. Harish *et al* (2011) in a study based on Karnataka showed that the program has contributed to increase the consumption expenditure by increasing income by 9.04 percent due to additional employment generated by MGNREGA. Similar findings are evidenced in a number of studies carried out in different states of the country (Vetrivel and Regunath, 2014; Rangappa, 2014; Pamccha and Sharma, 2015; Kurinjimalar and Prasanna, 2017).

Jha *et al* (2010) made a study on three villages of Andhra Pradesh confirming the pro-poor targeting in this state. They also report that the disadvantaged groups are more likely to participate in the program as well as they get a hold of longer duration too. A study on Madhya Pradesh made by Kumar and Sah (2012) reports a long lasting impact of the program on the living condition of the deprived sections of the society including an increase in expenditure on items like child education, health care, sanitation etc. Similar impact has been found in a study made by Kharkwal and Kumar (2015) in a district of Uttarakhand. Participation of people belonging to weaker section has also been found to be very high in a study made by Ambilikumar *et al.* (2015) in Kerala. MGNREGA has also led to increase in savings, decrease in the number of borrowers and amount of borrowings among the beneficiaries shifting the overall expenditure pattern (Vasanthakumari and Nair, 2012).

The desirable impact of MGNREGA runs into the difficulty of the operational implementation also. It offers ample scope for misuse of funds (Dreze *et al*, 2008). In an evaluation of the scheme, Chakraborty (2007) points out those economically poor states with restricted managerial capabilities have a tendency to delay in the implementation of the scheme. The evaluation study made by Dreze and Khera (2009) finds that MGNREGA meets only a fraction of the demand for 100 days-work. In Assam, the program is able to provide 100 days-employment to only 3.7 percent of job-card holders (Das, 2013). Moreover, due to stronger information base non-target population could increase the propensity for the program to be accessed by them (Shankar *et al*, 2011). It is revealed from some studies (Shankar and Gaiha, 2012; Jha *et al*, 2013) that due to lack of social and political awareness about the mechanism of MGNREGA, the beneficiaries are unable to prevent the opportunity of the non-poor in capturing the benefits of the program. Dutta *et al.*

(2012) finds that the states with higher percentages of poor people have much lower participation rates. They show that in Bihar, the poorest state in India (with 56.5 percent poor), only 10 percent rural households worked on the program in 2009-2010. A survey on two selected districts of West Bengal reports inadequate number of employment days provided in the scheme is much lower than the guaranteed 100 days. Moreover, delayed process in issuing of job cards, lack of awareness of the rural people about the benefits of the program, delayed payment of wages are other shortcomings that claim immediate attention (Singh and Datta, 2016). Anall-India level study carried out by Das (2016) utilizing NSS data of 61st and 66th rounds finds that the increase in expenses of non-participating households was greater than MGNREGA participating households. It also finds that the overall growth trend is more effective in improving the livelihood security of the rural people than the estimated programme-effect.

2. MATERIALS AND METHODS

Data

The conceptual structure and empirical strategy followed in this study is that set out by Das (2016). The study was based on household level data of two large sample rounds of National Sample Survey (NSS), viz. 61st (2004-05) and 66th (2009-10) rounds. As has been stated earlier, the program has been implemented in a phase manner, starting from February 2006. In 2004-05, the program had not been implemented any where in the country. Hence, 61st round data serveas the base line. By 2007/2008 MGNREGA has been implemented in phase 1 and phase 2 districts, while by 2008/2009 it completed its implementation effectively all over the country, including phase 3 districts. As 66th round survey was conducted during 2009-10, so it was too early to assess the impact of the program all over the country using 2009-10 survey data. Only phase 1 and phase 2 districts were included in that study. Moreover, 2009-10 being a non-normal year, the National Statistical Commission decided that the 68th round of NSS would be devoted to repeating the quinquennial survey on employment-unemployment situation with a provision in the employment schedule to measure employment under MGNREGA (NSSO, 2014). Hence, in the present study we are capable to examine the impact of the program all over the country using 68th round data taking the 61st round data as base line.

NSSO adopted stratified multistage design for both the rounds. The first stage units (FSUs) were the 2001 census villages in the rural sector. The ultimate stage

units were households. The fieldwork of both rounds was for 1 year, between 1 July 2004 and 30 June 2005 for 61st round, and, 1 July 2011 and 30 June 2012 for 68th round. Both 61st and 68th rounds covered the whole of India[5].

As has been discussed previously, livelihood security of rural poor is manifested via accessibility to food and non-food expenditure. The broad categories of food items considered by NSS are, 'cereals and cereal products', 'pulses and pulse products', 'milk and milk products', 'edible oil', 'vegetables', 'fruits and nuts', 'egg, fish and meat', 'sugar', 'salt and spices', and, 'pan, tobacco and intoxicants'. The list for consumable non-food items considered by NSS is quite bigger and it includes, 'fuel and light', 'entertainment', 'personal care and effects', 'toilet articles', 'sundry articles', 'consumer services excluding conveyance', 'conveyance', 'rent', 'consumer taxes and cesses', 'medical expenses', 'tuition fees and other fees', 'school books and other educational articles', 'clothing and bedding', 'footwear', and, 'durable goods'.

Methodology

Our objective is to estimate the impact of MGNREGA upon beneficiary households that needs to make sure the finest selection of the target groups, i.e., who should be the treatment and control households. For this purpose we broadly follow the methodology developed in Das (2016). We cluster the treatment households as being those who got MGNREGA jobs during last 365 days and that of control households as being those who did not work in this scheme[6]. For a finer selection of target households we use the quasi-experimental method, known as 'propensity score matching' technique (Gertler, P. J. *et al*, 2011), based on observable socio-economic-demographic characteristics of probable set of target households. So, we define,

$$P(x) = \text{Prob}\,(D = 1 \mid x) \qquad (1)$$

Where x is a vector of observable characteristics, which is determined in a standard logit model using 68th round data on probable set of target households. The observable socio-economic-demographic characteristics considered in this study are defined as follows.

Household type 1 (Htpe 1): It takes value 1 if the household is of type 1, i.e., self-employed in agricultural sector and 0 otherwise.

Household type 2 (Htpe 2): It takes value 1 if the household is of type 2, i.e., self-employed in non-agricultural sector and 0 otherwise.

Household type 3 (Htpe 3): It takes value 1 if the household is of type 3, i.e., labourer category (both agricultural and non-agricultural) and 0 otherwise.

Religion (RL): It is an indicator variable that takes value 1 if the household belongs to Islamic religion and 0 otherwise.

Scheduled Tribes (ST): It is an indicator variable that takes value 1 if the household belongs to Scheduled Tribes and 0 otherwise.

Scheduled Castes (SC): It is also an indicator variable taking value 1 if the household belongs to Scheduled Castes category and 0 otherwise.

Other Backward Castes (OBC): This indicator variable takes value 1 if the household belongs to a category that has been listed under 'Other Backward Castes' and 0 otherwise.

Per capita cultivated land (LDPC): This is a continuous variable which is cultivated land divided by household size.

Small farmer: It is an indicator variable that takes value 1 if the household possessed more than 1 hectare to 2 hectares of cultivated land during agricultural year 2010-11and 0 otherwise.

Marginal farmer: This indicator variable takes value 1 if the household possessed up to 1 hectare of cultivated land during agricultural year 2010-11 and 0 otherwise.

Landless farmer: It is an indicator variable that takes value 1 if the household did not possess any cultivated land during agricultural year 2010-11 and 0 otherwise.

Food expenditure: This is a continuous variable which is monthly sum of expenditure on food items divided by household size.

Non-food expenditure: This is also a continuous variable which is monthly sum of expenditure on non-food items divided by household size.

Poor: It takes value 1 if the household is identified as poor and 0 otherwise.

We estimate the regression equation (1) for three phases separately (Table 1). Estimated coefficients of most of the variables are highly significant. Each broad category of households is highly probable to be MGNREGA job holders, especially households characterized as labourers in both agricultural and non-agricultural sectors. Socially disadvantaged groups (ST, SC and OBC) are likely to be MGNREGA participants, except OBC households of phase 2 districts. Small and marginal farmers of phase 1 and phase 3 districts are likely to hold MGNREGA jobs, though this is not true for phase 2 districts. Surprisingly, landless households of phase 2 districts are negatively associated with getting MGNREGA jobs, while, households of phase 1 and phase 3 districts are not showing significant association in any way. Accessing to MGNREGA jobs by non-target population has been revealed in some other

Table1: Results of logit regression

Dependent variable: got MGNREGA work = 1						
Variables/Characteristics	*Phase-1*		*Phase-2*		*Phase-3*	
	Coefficient	*t-value*	*Coefficient*	*t-value*	*Coefficient*	*t-value*
Htp1	0.84019	12.61*	0.66495	9.77*	0.52162	9.74*
Htp2	0.63552	10.02*	0.37231	5.77*	0.39323	7.5*
Htp3	1.56180	25.02*	1.21114	18.84*	1.11980	21.71*
RL	-0.06527	-1.03	0.03358	0.49	-0.21237	-3.8*
St	1.03491	17.31*	1.76394	27.54*	1.62460	30.28*
Sc	0.69685	11.07*	0.41603	6.25*	0.65554	11.72*
OBC	0.20903	3.83*	-0.02081	-0.37	0.39322	8.61*
LDPC	-2.90748	-2.6*	-6.22942	-4.1*	-5.25355	-3.02*
Small farmer	0.33707	2.94*	-0.16585	-1.42	0.39684	4.37*
Marginal farmer	0.53553	4.23*	0.17334	1.47	0.60553	6.65*
Landless	0.07401	0.54	-0.28513	-2.19*	-0.11202	-1.12
Food expenditure	1.03890	1.93**	1.01200	1.34	-7.86367	-7.28*
Non-food expenditure	-11.32884	-8.08*	-38.52177	-10.21*	-13.33908	-7.56*
Poor	0.09844	1.79**	-0.21964	-2.79*	-0.30487	-3.99*
Constant	-2.56746	-16.02*	-1.57837	-10.6*	-1.96776	-16.99*
Number of observations	19492		14321		24010	
Pseudo R2	0.1010		0.1255		0.1053	

*Significant at 1% level.

** Significant at 5% level.

studies also (Shankar *et al*, 2011). As expected, LDPC has significantly negative association with holding MGNREGA jobs.

Average monthly food expenditure is positively associated with likelihood of holding MGNREGA jobs for households of phase 1 districts. This is quite possible because phase 1 districts are basically economically backward districts. As expected, non-food expenditure is negatively associated with likelihood of holding MGNREGA jobs. Main objective of the scheme is to secure livelihood of the rural poor, but poor households only of phase 1 districts are likely to be MGNREGA job holders (at 10 percent level of significance). Poor households of phase 2 and phase 3 districts are not likely to be the program participants. This kind of undesirable impact is evidenced in different regional studies too (Shankar *et al,* 2011; Shankar and Gaiha, 2012; Jha *et al*, 2013; Dutta *et al*., 2012).

In next step, we calculate the predicted score, i.e., propensity score for each target household, by means of the estimated values of the coefficients, presented in Tables 1.1, 1.2 and 1.3. Once the propensity scores are computed for all target households, then households in the treatment group can be matched with households in the control group that have the closest propensity scores.

Selection of the target households for 61st round using a secondary source of data like NSS is seemingly not so straight forward. In fact, for this round the target households cannot be split up into treatment and control groups. Here, we select at first step, Htpe1, Htpe2 and Htpe3 (comparable to 68th round target households) as the probable set of the target households. In next step, following Das (2016) we use the estimated coefficients of logit model fitted for three phases (presented in Table 1) to calculate the propensity score of each household in the probable set of target households. Finally, to estimate a valid time impact on outcome variables, we select only those households from the pool of target households that have propensity scores lying within the range as obtained from the 68th round data set[7].

Next, our intention is to compare changes in the outcome variables for the treatment and the control households before and after initiation of the program. Here, we apply the difference-in-differences frame work due to Card and Kruger (1994) as has been reframed in Das (2016). For ready reference we describe it very briefly here.

Let the outcome variable be Y_i and the linear regression equation is,

$$Y_i = \alpha + \beta T_i + \gamma t_i + \delta (T_i * t_i) + \varepsilon_i, \quad (2)$$

Where, T is the indicator variable for treatment status (T = 1 for the treatment household, and 0 for the control household); t is the indicator variable for time (t = 1 for 68th round and 0 for 61st round). In our present situation for the pre-treatment time point (61st round) since the treatment households and control households are same, so, we can expect $E[Y_0^T] = E[Y_0^C]$ (as $Y_0^T = Y_0^C$). Hence, we can write the outcome Y_i of the model by the following linear regression equation,

$$Y_i = \alpha + \gamma t_i + \delta (T_i * t_i) + \varepsilon_i \quad (3)$$

There are three single differences estimators and one double-differences estimator. Three single differences estimators are, (i) simple pre- versus post- estimator (corresponding regression equation is $Y_i = \alpha_1 + \delta_1 t_i + \epsilon_i$, which we fit with the sample households consisting of treatment households of the 68th round and target households of the 61st round), (ii) simple treatment versus control estimator (corresponding regression equation is $Y_i = \alpha_2 + \delta_2 T_i + \epsilon_i$, which we fit with the

sample households consisting of the treatment and control households of the 68th round), and, (iii) simple pre- control versus post- control estimator (corresponding regression equation is $Y_i = \alpha_3 + \delta_3 t_i + \epsilon_i$, which we fit with the sample households consisting of the control households of the 68th round and target households of the 61st round). The difference-in-differences (DID) estimator, $\hat{\delta}_{DD} = [\bar{Y}_1^T - \bar{Y}_0^T] - [\bar{Y}_1^C - \bar{Y}_0^C] = \delta$. We estimate the operators from the corresponding specific equations to check the consistency of the values of γ and δ (Das, 2016).

3. RESULTS AND DISCUSSIONS

Descriptive Statistics

To start with let us see the socio-economic profiles of beneficiaries and non-beneficiaries of two rounds, 61st and 68th (Table 2). Above 80 percent of beneficiary households of 68th round belong to the socially and economically disadvantaged (ST/SC/OBC) groups. In 61st round, percentages of OBC households are quite high compared to ST and SC households. Over the rounds, average MPCE increases consistently for households of all districts of three phases, though gaps between beneficiary and non-beneficiary households are very prominent. Average monthly per capita food expenditure of non-beneficiary households is higher than beneficiary households. Surprisingly, in phase 2 and phase 3 districts, average monthly per capita food expenditure of beneficiary households is marginally lower than households of 61st round. In 61st round, percentages of Htpe1 are higher compared to both beneficiary and non-beneficiary households in 68th round. Contrarily, in 68th round, percentages of Htpe2 are higher among non-beneficiary households. Households in Htpe3 category are largely prevalent among beneficiary households in all three phases. As a whole, about half of the beneficiary households are marginal farmers and this percentage has been increased over the rounds. Prevalence of landless farmers is highest among non-beneficiary households. Very likely, percentage of poor households is highest among households of phase 1 districts, while households of phase 2 and phase 3 districts come in second and third position respectively. In all phases these percentages are marginally higher among beneficiary households than non-beneficiary households. It may be noted that percentages below poverty line have been decreased over the rounds in all three phases. Non-beneficiary households possess higher per capita cultivated land consistently for all phases. Average man-days per week are consistently lower for MGNREGA job holders than non-participants.

Table 2: Socio-economic profile of target households

Household characteristics	*Phase 1*			*Phase 2*			*Phase 3*		
	61st round (2004-05)	*68th round (2011-12)*		*61st round (2004-05)*	*68th round (2011-12)*		*61st round (2004-05)*	*68th round (2011-12)*	
	Baseline survey households	*Treatment households (%)*	*Control households (%)*	*Baseline survey households*	*Treatment households (%)*	*Control households (%)*	*Baseline survey households*	*Treatment households (%)*	*Control households (%)*
Household size	5.05	4.78	4.65	4.98	4.72	4.64	5.07	4.90	4.72
	(2.60)	(2.08)	(2.28)	(2.47)	(1.88)	(2.27)	(2.50)	(2.06)	(2.32)
Htpe1 (%)	33.66	26.79	28.25	35.74	28.55	27.11	36.42	31.00	28.66
Htpe2 (%)	26.63	22.32	29.72	23.03	20.66	27.37	20.82	20.44	24.29
Htpe3 (%)	23.38	41.87	18.85	24.35	34.75	18.82	25.21	32.02	18.29
Islamic households (%)	11.74	9.01	12.61	11.04	9.81	13.20	10.78	9.50	12.93
ST households (%)	12.30	30.62	16.38	18.41	34.75	10.68	12.14	26.88	9.21
SC households (%)	19.93	23.03	15.64	19.16	19.99	17.65	16.54	19.46	15.30
OBC households (%)	41.98	32.67	42.34	34.52	26.79	40.88	41.34	37.04	43.50
Small farmers (%)	13.08	8.81	10.25	12.48	7.57	9.37	11.24	10.26	8.92
Marginal farmers (%)	36.24	46.64	34.15	35.74	45.16	34.73	38.21	47.79	33.56
Landless farmers (%)	40.19	39.43	44.69	23.03	41.18	46.67	38.39	35.55	45.93
Poor (%)*	22.91	18.39	10.67	12.48	8.86	7.03	9.67	6.06	4.21
Average MPCE (Rs.)**	546.79	597.78	743.49	662.56	682.96	826.33	749.47	765.38	1012.46
	(270.80)	(322.40)	(482.75)	(366.58)	(354.53)	(521.42)	(566.71)	(503.07)	(859.94)
Average monthly per capita food expenditure (Rs.)*	378.00	393.46	439.38	445.55	438.73	478.12	470.18	460.08	538.57
	(155.09)	(180.33)	(201.04)	(197.04)	(179.37)	(220.78)	(214.88)	(225.09)	(271.82)
Average monthly									

contd. table 2

Household characteristics	*Phase 1*			*Phase 2*			*Phase 3*		
	61st round (2004-05)	*68th round (2011-12)*		*61st round (2004-05)*	*68th round (2011-12)*		*61st round (2004-05)*	*68th round (2011-12)*	
	Baseline survey households	*Treatment households (%)*	*Control households (%)*	*Baseline survey households*	*Treatment households (%)*	*Control households (%)*	*Baseline survey households*	*Treatment households (%)*	*Control households (%)*
per capita non-food expenditure (Rs.)*	168.79 (149.01)	204.32 (202.77)	304.11 (343.62)	217.01 (213.89)	244.23 (222.03)	348.21 (366.84)	279.29 (436.45)	305.30 (359.11)	473.89 (711.61)
Cultivated land (hectare)	0.75 (1.36)	0.48 (0.95)	0.74 (1.62)	0.77 (1.44)	0.50 (1.06)	0.71 (1.86)	0.90 (1.93)	0.61 (1.17)	0.84 (2.04)
Per capita cultivated land (hectare)	0.14 (0.24)	0.10 (0.19)	0.17 (0.47)	0.16 (0.34)	0.11 (0.21)	0.16 (0.44)	0.17 (0.36)	0.13 (0.25)	0.18 (0.51)
Average man-days/week	6.56	6.19	6.79	6.61	6.30	6.81	6.57	6.22	6.74

+ Figures in parentheses are standard deviations.

*All-India poverty line for rural area is Rs.356.30 at 2004-05 prices.

**AverageMPCE, Average monthly per capita food and non-food expenditure-all are adjusted using consumer price index numbers for rural labours taking 2004-05 prices as the base. The conversion factor between two rounds becomes to be 1.83.

Table 3: MGNREGA status of households by three implementing phases

*MGNREGA status**	*Phase 1*	*Phase 2*	*Phase 3*
Worked	53.40	56.41	55.59
Sought but did not get work	16.40	15.91	14.15
Did not seek work	30.20	27.68	30.26
Registered (greater than equal to 18 years)	23.17	24.09	17.80
Got job among registered	53.32	56.20	55.44

*This is among households reporting their MGNREGA status.

Households of phase 2 districts got highest percentage of MGNREGA jobs (Table 3). Surprisingly, households of phase 1 districts got lowest percentage of work. This might be due to delayed implementation of the scheme in economically poor states that has been pointed out by Chakraborty (2007) in an evaluation of the scheme. Fourteen to sixteen percent households sought for work but they did not get it, while, about 30 percent households did not seek MGNREGA jobs. In phase 1 and phase 2, only about 23 to 24 per cent of rural population, 18 years and above, registered for getting job in the program. In phase 3, this percentage is as little as about 18. Lack of awareness about the benefit of the program is possibly the reason for it (Shankar and Gaiha, 2012; Jha *et al*, 2013). Among the registered, 50 to 60 percent got jobs in the program.

Estimated Impact

To evaluate the phase-wise impact of the MGNREGA on livelihood security we consider two outcome variables, i.e., average monthly per capita food and non-food expenditure of households. Let us first consider the impact of the program in accessing food items. We estimate the regression equations for this outcome variable, separately, for three phases (Tables 4.1, 4.2 and 4.3). In each table, the first equation estimates the common time trend and the true program effect on the average monthly per capita food expenditure. Other equations estimate the robustness check of the stability of the model, whether it follows an equal time trend for the treatment and control households. Obviously, the intercept in the first equation (α) measures the average monthly per capita food expenditure in baseline period (61st round), while, other two coefficients, γ and δ measure common time trend (both for treatment and control households) and true program effect on the treatment households respectively. Estimated coefficients of all regression equations in each table appear to be significant

at 1% level. The estimated values of $\hat{\delta}_1, \hat{\delta}_2$ and $\hat{\delta}_3$ validate the assumption of common time trend for treatment and control households within error.

Table 4.1: Regression results for average monthly per capita food expenditure, phase1

Forms of fit/ Coefficients	*Estimated values*	*Standard errors*	*T-values*	*P>|t|*	*Confidence intervals*		*Adjusted -R^2*
$Y_i = \alpha + \gamma t_i + \delta(T_i * t_i) + \epsilon_i$							
γ	61.38	1.85	33.09*	0.00	57.74	65.01	0.0255
δ	-45.92	2.92	-15.74*	0.00	-51.64	-40.20	
α	378.00	1.16	325.23*	0.00	375.72	380.28	
No. of observations	42214						
$Y_i = \alpha_1 + \delta_1 t_i + \epsilon_i$							
δ_1	15.46	2.54	6.08*	0.00	10.48	20.44	0.0013
α_1	378.00	1.06	356.75*	0.00	375.92	380.07	
No. of observations	27515						
$Y_i = \alpha_2 + \delta_2 T_i + \epsilon_i$							
δ_2	-45.92	3.27	-14.06*	0.00	-52.32	-39.52	0.0100
α_2	439.38	1.62	271.56*	0.00	436.21	442.55	
No. of observations	19480						
$Y_i = \alpha_3 + \delta_3 t_i + \epsilon_i$							
δ_3	61.38	1.85	33.22*	0.00	57.76	65.00	0.0286
α_3	378.00	1.16	326.46*	0.00	375.73	380.27	
No. of observations	37433						

*Significant at 1% level.

Similar exercise has been done to assess the impact of the program on accessing to non-food items, where the outcome variable considered is average monthly per capita non-food expenditure (Tables 5.1, 5.2 and 5.3). It appears from these tables that all the estimated coefficients for all three phases are significant at 1% level and the estimated values of $\hat{\delta}_1, \hat{\delta}_2$ and $\hat{\delta}_3$ validate the assumption of common time trend for treatment and control households within error.

We summaries estimated impact of the program on average monthly per capita food and non-food expenditure in Table 6. Estimated average monthly per capita food expenditure in pre-treatment round (61st) in each phase is consistent with the selecting criteria of districts to include under a particular phase[8]. At the same time as

it is the baseline period, so, as per specification of our model, figures for treatment and control households are similar for 61st round. The estimated first difference in average monthly per capita food expenditure between post-treatment and pre-treatment averages for phase 1districts is only Rs. 15.46. Surprisingly, for districts of other two phases the first differences become even negative (reductions are by Rs. 6.98 and Rs. 10.10 for treatment households of phase 2 and phase 3 districts respectively[9]). Control households of all districts of three phases experience betterment due to time trend. The second difference between post-control and pre-control averages is estimated to be Rs. 61.38 for households of phase 1 districts. The estimated true effect of the program, i.e., difference-in-differences estimator hence is negative, implying that average monthly per capita food expenditure of treatment households is lower than that of control households after implementation of the program. It indicates that equal time trend and true program effect are acting in a different way so that the net effect is detrimental for beneficiary households of

Table 4.2: Regression results for average monthly per capita food expenditure, phase2

Forms of fit/ Coefficients	*Estimated values*	*Standard errors*	*T-values*	*P>|t|*	*Confidence intervals*		*Adjusted -R^2*
$Y_i = \alpha + \gamma t_i + \delta(T_i * t_i) + \epsilon_i$							
γ	32.41	2.47	13.11*	0.00	27.56	37.25	0.0059
δ	-39.39	3.77	-10.45*	0.00	-46.77	-32.00	
α	445.71	1.46	306.13*	0.00	442.86	448.57	
No. of observations	33653						
$Y_i = \alpha_1 + \delta_1 t_i + \epsilon_i$							
δ_1	-6.98	3.36	-2.07*	0.04	-13.57	-0.39	0.0001
α_1	445.71	1.39	319.63*	0.00	442.98	448.44	
No. of observations	23372						
$Y_i = \alpha_2 + \delta_2 T_i + \epsilon_i$							
δ_2	-39.39	3.91	-10.08*	0.00	-47.04	-31.73	0.0071
α_2	478.12	2.07	230.88*	0.00	474.06	482.18	
No. of observations							
$Y_i = \alpha_3 + \delta_3 t_i + \epsilon_i$							
δ_3	32.41	2.51	12.92*	0.00	27.49	37.32	
α_3	445.71	1.48	301.75*	0.00	442.82	448.61	

No. of observations 14298

*Significant at 1% level.

Table 4.3: Regression results for average monthly per capita food expenditure, phase3

Forms of fit/ Coefficients	*Estimated values*	*Standard errors*	*T-values*	*P>|t|*	*Confidence intervals*		*Adjusted -R^2*
$Y_i = \alpha + \gamma t_i + \delta(T_i * t_i) + \epsilon_i$							
γ	68.39	2.19	31.28*	0.00	64.11	72.68	0.0192
δ	-78.50	3.68	-21.34*	0.00	-85.70	-71.29	
α	470.18	1.34	351.71*	0.00	467.56	472.80	
No. of observations	55324						
$Y_i = \alpha_1 + \delta_1 t_i + \epsilon_i$							
δ_1	-10.10	3.21	-3.15*	0.00	-16.40	-3.81	0.0002
α_1	470.18	1.22	384.52*	0.00	467.78	472.58	
No. of observations	36630						
$Y_i = \alpha_2 + \delta_2 T_i + \epsilon_i$							
δ_2	-78.50	4.08	-19.26*	0.00	-86.49	-70.51	0.0152
α_2	538.57	1.92	280.85*	0.00	534.81	542.33	
No. of observations	24007						
$Y_i = \alpha_3 + \delta_3 t_i + \epsilon_i$							
δ_3	68.39	2.20	31.12*	0.00	64.08	72.70	0.0190
α_3	470.18	1.34	349.95*	0.00	467.55	472.81	
No. of observations	50011						

*Significant at 1% level.

phase 1 districts. These two forces are rather aggravating the negativity of difference-in-differences estimates for households of other two phases. The adverse true program effect is highest for households of phase 3 districts followed by households of phase 1 and phase 2 districts.

As expected, average monthly per capita non-food expenditure is far lower than food expenditure (Table 6) and, it is lowest for households of phase 1 districts. Interestingly, average monthly per capita expenditure (adding up average monthly per capita food and non-food expenditure) is higher in post treatment period compared to pre-treatment period for beneficiary households of all districts of three phases. This implicates that treatment households of phase 2 and phase 3 districts could have increased their spending on non-food expenditure after meeting up spending on food items. It may be noted that the estimated second differences from post control to pre-control are much larger than that of first differences. As a result,

like food expenditure, in case of non-food expenditure also, the double differences become negative, indicating non-beneficial true program effect for job holding households. Double differences (DID) for three phases are Rs. 99.79, Rs. 103.99 and Rs. 168.58 respectively. Hence, undesirable true program effect is highest for households of phase 3 districts, followed by phase 2 and phase 1 districts. The gap between phase 1 and phase 2 is rather marginal. Our results thus find stronger time trend compared to true program effect on average monthly per capita food expenditure as well as non-food expenditure for treatment households.

On the whole, our estimates indicate lower economic benefit of MGNREGA job holding households compared to that of households who did not participate in this work fare program. Our analysis finds the noteworthy increase in average monthly per capita food expenditure as well as average monthly per capita non-food expenditure of households of phase 1 districts, while decrease in average monthly

Table 5.1: Regression results for average monthly per capita non-food expenditure, phase1

Forms of fit/ Coefficients	*Estimated values*	*Standard errors*	*T-values*	*P>|t|*	*Confidence intervals*		*Adjusted -R^2*
$Y_i = \alpha + \gamma t_i + \delta(T_i * t_i) + \epsilon_i$							
γ	135.32	2.54	53.21*	0.00	130.34	140.30	0.0633
δ	-99.79	4.00	-24.95*	0.00	-107.63	-91.95	
α	168.79	1.59	105.92*	0.00	165.67	171.91	
No. of observations	42214						
$Y_i = \alpha_1 + \delta_1 t_i + \epsilon_i$							
δ_1	35.53	2.54	13.99*	0.00	30.55	40.51	0.0070
α_1	168.79	1.06	159.40*	0.00	166.72	170.87	
No. of observations	27515						
$Y_i = \alpha_2 + \delta_2 T_i + \epsilon_i$							
δ_2	-99.79	5.24	-19.03*	0.00	-110.07	-89.51	0.0182
α_2	304.11	2.60	117.07*	0.00	299.02	309.20	
No. of observations	19480						
$Y_i = \alpha_3 + \delta_3 t_i + \epsilon_i$							
δ_3	135.32	2.59	52.26*	0.00	130.25	140.40	0.0680
α_3	168.79	1.62	104.03*	0.00	165.61	171.97	
No. of observations	37433						

*Significant at 1% level.

Table 5.2: Regression results for average monthly per capita non-food expenditure, phase 2

Forms of fit/ Coefficients	*Estimated values*	*Standard errors*	*T-values*	*P>|t|*	*Confidence intervals*		*Adjusted -R^2*
$Y_i = \alpha + \gamma t_i + \delta(T_i * t_i) + \epsilon_i$							
γ	130.88	3.30	39.63*	0.00	124.41	137.35	0.0450
δ	-103.99	5.04	-20.65*	0.00	-113.86	-94.12	
α	217.33	1.95	111.72*	0.00	213.52	221.15	
No. of observations	33648						
$Y_i = \alpha_1 + \delta_1 t_i + \epsilon_i$							
δ_1	26.89	3.73	7.21*	0.00	19.58	34.20	0.0022
α_1	217.33	1.55	140.59*	0.00	214.30	220.36	
No. of observations	23367						
$Y_i = \alpha_2 + \delta_2 T_i + \epsilon_i$							
δ_2	-103.99	6.19	-16.80*	0.00	-116.12	-91.86	0.0193
α_2	348.21	3.28	106.16*	0.00	341.78	354.64	
No. of observations	14298						
$Y_i = \alpha_3 + \delta_3 t_i + \epsilon_i$							
δ_3	130.88	3.37	38.78*	0.00	124.26	137.49	0.0483
α_3	217.33	1.99	109.32*	0.00	213.44	221.23	
No. of observations	29631						

*Significant at 1% level.

per capita food expenditure of job holding households of other two phases. It is quite possible as because phase 2 and phase 3 districts are economically better-off districts compared to phase 1 districts. In fact, average monthly per capita food expenditure of job holding households of former two phases are much higher than that of later one. Hence, presumably the additional earning from the program helped the job holding households of phase 1 districts to meet up some spending on non-food expenditure, like, education cost, medical expenses etc. True effect of the program appears to be non-optimistic on food as well as non-food expenditure of job holding households of all districts of three phases. This is not good news for the policy makers that the program did not have any favorable impact on job holding households in any phase when it is compared with non-participating households. Using Card and Cruger it could be shown that the betterment, if any, is due to the time trend, and it is true for all job holding households, irrespective of to which phase they belong to.

Table 5.3: Regression results for average monthly per capita non-food expenditure, phase3

Forms of fit/ Coefficients	*Estimated values*	*Standard errors*	*T-values*	*P>|t|*	*Confidence intervals*		*Adjusted -R^2*
$Y_i = \alpha + \gamma t_i + \delta(T_i * t_i) + \epsilon_i$							
γ	194.59	4.99	39.01*	0.00	184.81	204.37	0.0273
δ	-168.58	8.39	-20.09*	0.00	-185.03	-152.13	
α	279.29	3.05	91.57*	0.00	273.32	285.27	
No. of observations	55324						
$Y_i = \alpha_1 + \delta_1 t_i + \epsilon_i$							
δ_1	26.01	6.32	4.11*	0.00	13.62	38.40	0.0004
α_1	279.29	2.41	115.99*	0.00	274.58	284.01	
No. of observations	36630						
$Y_i = \alpha_2 + \delta_2 T_i + \epsilon_i$							
δ_2	-168.58	10.11	-16.67*	0.00	-188.40	-148.76	0.0114
α_2	473.89	4.76	99.64*	0.00	464.56	483.21	
No. of observations	24007						
$Y_i = \alpha_3 + \delta_3 t_i + \epsilon_i$							
δ_3	194.59	5.13	37.90*	0.00	184.53	204.65	0.0279
α_3	279.29	3.14	88.98*	0.00	273.14	285.45	
No. of observations	50011						

*Significant at 1% level.

Table 6: Impact of MGNREGA on food and non-food expenditure by three phases

Estimated impacts	*Phase 1*		*Phase 2*		*Phase 3*	
	Food expenditure	*Non-food expenditure*	*Food expenditure*	*Non-food expenditure*	*Food expenditure*	*Non-food expenditure*
Pre-treatment	378.00*	168.79*	445.71*	217.33*	470.18*	279.29*
	(1.16)	(1.59)	(1.46)	(1.95)	(1.34)	(3.05)
Post-treatment	393.46*	204.32*	438.73*	244.22*	460.07*	305.31*
	(3.65)	(5.00)	(4.74)	(6.33)	(4.49)	(10.23)
Post-treatment to	15.46*	35.53*	-6.98	26.89*	-10.11*	26.02*
pre-treatment	(3.46)	(4.74)	(4.51)	(6.02)	(4.28)	(9.76)
Pre-control	378.00	168.79	445.71*	217.33*	470.18*	279.29*
	(1.16)	(1.59)	(1.46)	(1.95)	(1.34)	(3.05)
Post-control	439.38	304.11	478.12*	348.21*	538.57*	473.89*
	(2.18)	(3.00)	(2.87)	(3.83)	(2.57)	(5.85)
Post-control to pre-	61.38	135.32	32.41*	130.88*	68.39*	194.60*
control	(1.85)	(2.54)	(2.47)	(3.30)	(2.19)	(4.99)
Double difference (DID)	-45.92	-99.79	-39.39*	-103.99*	-78.50*	-168.58*
	(2.92)	(4.00)	(3.77)	(5.04)	(3.68)	(8.39)

+Figures in parentheses are standard errors.
*Significant at 1% level.

4. CONCLUSION

Present study aims to assess the impact of MGNREGA on livelihood security of rural people across different regions of the country, where regions are classified by phases of implementation of the scheme, and, livelihood security has been captured in terms of accessibility to food and non-food items for consumption purposes. Our findings suggest that impact of MGNREGA vary across the regions. The scheme has immediate impact on raising consumption expenditure (including both food and non-food spending), but our results show that the extent and pattern vary across different phases. From this viewpoint the study has enormous policy implications in terms of locating the areas that are still lagging behind and hence call for special attention of the policy makers.

Consumption expenditure of beneficiary households increased over the rounds, but it led increase in food expenditure of households of only phase 1 districts. In districts of other two phases it seems that the spending pattern of beneficiary households has been changed in such a manner that they have spent more on non-food items reducing spending on food items. The scheme consistently raised non-food spending across all districts of three phases. It may also be noted that increase in non-food spending is utmost for beneficiary households of phase 1 districts. It is good news for the policy makers that the scheme led to increase in spending on both food and non-food items of at least households of phase 1 districts, since these districts have been identified as most backward, economically, as well as socially. These features can only be captured by carrying out region based analysis.

Our regression results show that in districts of all three phases who did not avail the treatment were better-off in terms of both food and non-food expenditure compared to those who undertook the treatment. More importantly, time trend shows that overall growth impact is stronger than the true program impact. The program could improve the consumption expenditure not even of beneficiary households compared to non-beneficiary households of phase 1 districts.

One of the goals of the program is to empower the socially disadvantageous groups like ST and SC. Our results confirm noteworthy participation to the program by these households. As the mandate of the Act is to provide guaranteed wage employment to every rural household whose adult members volunteer to do unskilled manual work, it is expected that households of labourer category (Htpe3) would have larger participation in the program. Unfortunately, participation of this category varies only between about 30 to 40 percent across the regions. This indicates that the program is not self-targeting. It is not self targeting from another perspective also.

Our results show that as little as 6 to 9 percent treatment households of phase 2 and phase 3 districts were poor, even respective figure for households of phase 1 districts was only 18 percent.

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NOTES

1. NREGA was renamed as Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) in 2009.
2. In some states 100 days have been increased to 150 days. Example may be given of Rajasthan, where state government has announced to provide financial support for additional 50 days.
3. List of districts under three different phases can be seen from its website (https://nrega.nic.in/MNREGA_Dist.pdf).
4. Expenditure data are more reliable than income data and is expected to be more stable and directly related to the permanent level of living.
5. Only interior villages of Nagaland situated more than 5 km from the bus route, and villages in Andaman and Nicobar Islands which remained inaccessible throughout the year were excluded from 61st round survey. In addition, 61st round survey did not cover Leh (Ladakh) and Kargil districts of Jammu and Kashmir.
6. Das (2016) considered only people willing to do manual unskilled work, as the scheme targets to guarantee wage employment to them, but the existing literature shows that other types of households, like self-employed in agriculture and non-agriculture also participated in the program. Hence, in the present study we deviate a little and include the complete sample of job holding households.
7. It might be mentioned that we calculate propensity score of each household for 68th round with normalized values of the independent variables. We normalize by dividing the observed values by their respective maximum values.
8. It may be remembered that phase 1 districts are most economically backward, followed by phase 2 districts. Phase 3 districts are richer compared to phase 1 and phase 2 districts.
9. It might be explained by the fact that MGNREGA has increased savings, decreased number of borrowers and amount of borrowings among the beneficiaries shifting the overall expenditure pattern (Vasanthakumari and Sreela, 2012), this very particular feature get revealed while we disaggregate the all-India data by three different phases of implementation.

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