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Role of landownership under guaranteed employment labor market

Abstract

Employment guarantee programs intend to provide employment to the unskilled rural population to tide over consumption shocks encountered during agricultural cycles. Though they benefit the target population by helping to maintain their consumption levels, they also crowd out agricultural labor and increase the cost of agriculture. We find that the positive welfare effects of the program are offset by negative consumption of landowning agricultural households. We find that this decrease in welfare is a function of the land size where the small farmers are affected more compared to the large farmers and is more pronounced during non-dry seasons and in agriculturally distressed districts cultivating low yield crops. Small landowning farmers maintain their consumption but reduce their discretionary spending in luxury food and durable goods and the effects is more pronounced in states where program intensity is higher.

1. Introduction

Safety net programs around the world act as social support for the poor and the underprivileged. Apart from benefiting the poorer section of the population they also affect others in more ways than one. We investigate the largest employment guarantee program that aims to improve the living standard of the rural poor and its impact on agricultural households. Though the program benefits the rural casual laborers it reduces the welfare of landowning agricultural households. We find that this negative effect is a function of the land size where the small farmers are affected more compared to the large farmers and is more pronounced during non-dry seasons and in agriculturally distressed districts. Understanding such negative externalities on the agricultural community can help to design better policy alternatives to mitigate such outcomes.

Workfare schemes are provided to improve the welfare of the poor and to act as an effective medium to use the excess labor force so that it can move away from subsistence work. Cash transfers, subsidies in procuring food items and such welfare measures directly benefit the rural poor and employment guarantee is one such measure which provides unskilled employment opportunities. Such casual labor can help to smoothen consumption by serving as an extra source of income in times of need. Apart from the insurance aspect, it acts like collateral, using which they can undertake future activities that are at a higher level of productivity.

The paper makes use of the National Rural Employment Guarantee program in India that is implemented in the year 2006 to improve the lives of rural poor. It was meant to accelerate the 'trickle down' effect of the GDP growth to the rural areas by providing a minimum of 100 days of guaranteed paid employment with no eligibility requirements. It aimed to provide additional employment to the prevailing agricultural work and other wage employment for the rural population. It also sought to develop natural resources through infrastructure development like roads, irrigation networks and other rural works to mitigate the causes of rural distress like drought, soil erosion and deforestation. The scheme was implemented in 3

phases across India covering all the rural areas starting from the year 2006 with first phase covering 200 districts, second phase covering 130 districts in 2007 and the rest in the year 2008. We use this staggered implementation of NREGA to understand its causal impact on welfare of landowning farmers using their overall consumption and other related variable using the Difference-in-Difference methodology.

Agriculture in India is labor intensive in all stages of farming starting with ploughing to harvesting. Introduction of employment guarantee programs attracts the casual laborers in those areas significantly crowding out the agricultural work by an increase in the public work wages (Imbert and Papp (2015)). This significantly increases the cost of labor for the farmers, increasing stress in their productivity. Bhargava (2012) shows that farmers under this condition increase their adaptability to labor saving technologies thereby reducing the labor component of input costs. This shock to the farmers can adversely affect their livelihood straining their consumption levels. We show that this effect is a function of the size of landownership where small farmers are affected more compared to large farmers. Farmers with marginal and small landholding experience a higher level of stress due to the increase in labor cost compared to others as they cannot achieve higher economies of scale and long terms work contracts to casual laborers. For the same reason and with limited endowment they cannot quickly shift to labor saving technology in the short run thereby experiencing stress in their consumption levels.

We use the staggered implementation of the NREGA program where the scheme was introduced in 3 phases across the districts in India by employing difference-in-difference design. Using four rounds of the National Sample Survey Organization's consumer expenditure survey, we find that the farmers experience a decrease in consumption after the program implementation with smaller farmers being more affected than others. We find that this effect is more pronounced in those states which generated most of the employment from the program and in the non-dry season of the year when the demand for agricultural labor increases. It significantly affects the smaller farmers from the backward communities compared to others indicating the underlying social conditions.

We find that landowning agricultural households experience a reduction in their monthly per capita consumption expenditure by 4 percent compared to the landless agricultural laborers in rural areas where NREGA is implemented. This effect is mainly driven by the marginal and small farmers who have their consumption levels reduced by 3.5 percent. This effect is significantly increased among those states which have implemented the NREGA effectively where the reduction in consumption reduces by 10 percent for farmers driven by small marginal and small farmers who experience a 9 percent drop in consumption. This effect is enhanced in the dry season of the year and in those districts which experienced rainfall shocks. We also observe the role of marginalized communities and observe that they are affected more by the scheme than others, underscoring their social conditions.

We subject our results to a series of falsification and robustness tests to rule out alternative explanations to our observations. First, we test for pre-trends as we use the difference-in-difference design to estimate the impact of the program on farmers' welfare. Secondly, we estimate the effects on non-agricultural households who work in construction, trade and other activities that are prevailing in rural areas.

2. Literature review

Agriculture and allied activities are the major employment providers in India indicating the nation's dependence on agriculture for rural employment. NREGA, which was implemented in a massive scale both in terms of area and financial outlay acted as a disruptor in the rural areas and agricultural economy.

Employment guarantee programs intend to increase the living standards of the poor. NREGA is specifically targeted towards rural poor and provides casual employment opportunities for unskilled workers. Many strands of literature have come up based on NREGA among which we focus on few. Most of the studies focus on the welfare implications of the program. Maity (2015) shows that NREGA increased the monthly real per capita household food expenditure. This increase was accompanied by an increase in expenditure towards high calorie food like dairy products, fish, meat and eggs. Bose (2017) show that NREGA increased the per capita consumption for households between 6.5 to 10 percent with marginalized group experiencing increase in consumption by around 12 percent. Klonner and Oldiges (2013), Liu and Deninger (2010) and Ravi and Engler (2015) also document similar effects where they find an increase in consumption and positive effects on poverty.

Our focus on NREGA stems from its effect on labor costs where it disrupts the rural labor market thereby affecting the agricultural cost for landowning farmers. Azam (2012) documents that NREGA led to an increase in female labor participation and increased their real wage. Imbert and Papp (2015) show that NREGA increased the wage for casual laborers which crowds our private sector labor. Occupations like agriculture which are labor-intensive are first to get affected due to the program. Other labor-intensive industries like manufacturing also get affected which is highlighted by Alok et al (2015) where they show that factories reduce their labor intake and invest more on automation leading to higher productivity. NREGA also led to a significant increase in the firms' cost of production, thereby leading to a decline in net profits and productivity.

Among the very studies which focus on the effect of NREGA on farmers, we have Bhargava (2014) showing that farmers adopt labor-saving technologies after the implementation of the scheme. He predicts that in the long-run, rural wages will remain high, and farmers will start to use labor-saving agricultural technology. In a similar way, Shah and Steinberg (2015) show that NREGA increases the opportunity cost of schooling thereby lowering human capital investment even though income increases. Recently, Taraz (2022) shows that NREGA makes crop yields more sensitive to low rainfall shocks. This effect manifests through the labor market channel where NREGA increases the non-farm labor supply and encourages riskier agricultural practices. Having observed the effects of NREGA on welfare of rural casual workers, we find that we are yet to completely understand its effect on the welfare of farmers.

3. National Rural Employment Guarantee Scheme (NREGS)

The National Rural Employment Guarantee Scheme (became an act, hence NREGA) was introduced in the year 2006 in a phased manner across India which guarantees employment for a period of 100 days in a year. It is administered at the local level with funds provided by both the Union and the State governments with the majority contributed by the Union government. NREGA is intended to give a legal guarantee of employment to anyone who is willing to do casual manual labor at the statutory minimum wage. Any

adult who applies for work under NREGA is entitled to employment in public works within 15 days; otherwise, it is a state responsibility to provide them unemployment benefit. NREGA is based on the principle of self-selection, and it is a step towards legal enforcement of the right to work, as an aspect of the fundamental right to live with dignity. NREGA also mandates 33 percent participation for women.

With a budget of almost 4 billion USD or 2.3 percent of total central government spending, the program is by far the best endowed anti-poverty program in India. During the first year of implementation (2006-07) in 200 districts, 21 million households were employed, and 905-million-person days of work were generated. In 2007-08, 33.9 million households were provided employment and 1.4 billion working days were generated in 330 districts. Given the scale, NREGA ranks among the major workfare initiatives worldwide.

The primary group targeted by the program are the casual laborers in rural areas and to improve their livelihood and consumption thereby providing a boost to the rural economy. It was also intended to make use of their labor potential to develop rural infrastructure like irrigation canals, desilting work, roads, and environmental initiatives like planting of trees and other activities. By providing one-third of the jobs provided for women and a major push towards marginalized communities, the scheme also seeks for overall social upliftment.

4. Conceptual framework

Employment guarantee programs like NREGA intend to improve the living standards for the underprivileged population where they can provide their manpower in exchange for wages. Considering the scale of their implementation, such schemes seek unskilled labor so that they can reach a vast population who self-identify to the program. NREGA being a rural scheme was specifically targeted at rural poor who seek casual employment thereby helping them to use their unskilled labor during non-agricultural seasons. Imbert and Papp (2015) observe that perennial availability of public sector casual work increases the reservation wage and crowds out private sector work that affects all industries in rural areas, with agriculture being the primary one.

Agricultural activities depend heavily on labor, hence an increase in wages negatively impacts agricultural households. Among all agricultural households, the small farmers are the ones who are most vulnerable to such shocks as they are low in productivity and cannot achieve economies of scale. Large farmers can afford to engage casual labor with increased wages or could adopt labor saving technologies to reduce labor dependence. Small farmers on the other hand could neither afford to engage in high-cost labor nor in capital-intensive labor-saving technology. Thus, they are caught in a precarious situation leading to a reduction in consumption and investment. Over the medium-term, they can liquidate their savings to deploy labor saving technology with consumption being hit in short-term to finance high-cost labor.

In the short run, some of the steps they undertake to smoothen consumption could be to reduce consumption of discretionary items like jewelry, luxury articles and others. From the disaggregated items of consumption under different heads, we can expect to see a drop in consumption of luxury foods, durable goods and other bad goods like intoxicants.

Based on the above framework, we can describe the following key testable implications,

Hypothesis 1: Landowning farmers experience a reduction in consumption

Landowning farmers who face higher costs of labor due to guarantee of public sector work experience a short-term negative shock in their consumption compared to casual laborers. This observation is straightforward as employment guarantee creates a permanent increase in casual wages leading to labor shortage, which in turn increases labor cost.

Hypothesis 2: Marginal and Small farmers experience a reduction in overall consumption

We posit that among all landowning farmers, it will be marginal and small farmers who experience an overall reduction in consumption compared to large farmers. This phenomenon can be observed from their per capita monthly consumption. This consumption reduction would not be observed for farmers who have higher landholdings as they can smoothen their consumption from their endowments, savings, and economies of scale. Cost of agricultural labor post-NREGA implementation creates a dent in the disposable income of small agricultural households leading to short-term shock in consumption.

Hypothesis 3: Marginal and Small landowning farmers experience a reduction in non-essential consumption

We posit that marginal and small farmers reduce their consumption of non-needy or non-essential items like luxury foods, durable goods, and other bad goods like intoxicants. Reducing expenditure on such non-essential items will help to maintain consumption of essential food items like grains, pulses, vegetables, fruits, and other items. Once the households adjust to the high costs of casual labor in agriculture in the medium term, they move back to previous levels of consumption.

Hypothesis 4: Non-dry season accentuates the drop in consumption

During non-dry seasons in India, agricultural activities which are labor intensive will be in full swing leading to more demand of casual labor. Hence, marginal and small farmers must engage with high-cost casual labor to complete the activities which are time-bound in nature. Hence, we can observe consumption reduction in non-dry seasons compared to other seasons. Also, during dry seasons NREGA employs many casual workers hence huge labor cost will be incurred to shift them away from public work to private agricultural work due to wage stickiness.

Hypothesis 5: Farmers in agriculturally distressed districts experience more reduction in consumption

Agricultural distress adds more stress to agricultural activities along with increased labor costs due to NREGA and leads to a higher drop in consumption. We can observe that farming households residing in districts that experience distress due to rainfall shocks find it tough to engage in agricultural activities due to the increased cost of inputs. Rainfall shocks drive up the costs of agriculture across various channels like credit opportunities and input material costs due to uncertainties associated with agricultural output both quantitatively and qualitatively. Also, NREGA attracts more casual workers during times of low rainfall as agriculture provides less opportunities for work.

Hypothesis 6: Farmers in low agricultural yield districts experience more reduction in consumption

Some districts traditionally have low yields compared to other districts due to several factors like weather conditions, irrigation facilities, soil conditions, land topography, fertilizer availability and others. In such situations, labor is the viable option to compensate for lack of other facilities to maintain cost-plus margins in agriculture. Hence, small landowning farmers in such low yield districts depend more on agricultural labor experience reduction in overall consumption.

5. Data

We use the NSSO data corresponding to rounds 61, 62, 63 and 64 corresponding to years 2004-05, 2005-06, 2006-07 and 2007-08 respectively covering both pre- and post-NREGA periods. Thus, using these four annual rounds of household survey data and staggered implementation of the scheme, we deploy the difference-in-difference design for our study.

We obtain the overall monthly per capital consumption data and other disaggregated data on various consumption items and activities. We club them under basic food consisting of grains, pulses, vegetables, fruits and others, luxury food consisting of meat, fish and other high calorie food, intoxicants consisting of liquor, pan, tobacco and similar items and durable goods consisting of capital equipment, vehicles, household equipment and similar items. We also consider jewelry as a separate category as spending in gold ornaments is the primary method of savings in India, especially in rural India. All the values are adjusted for CPI-AL values (Consumption Price Index for Agricultural Labor) benchmarked for round 61 corresponding to year 2004-05.

Also, we make use of land possession of rural households and their occupation classified according to National Industrial Classification standards of 2004 which provides a five-digit code for each category of occupation. We categorize the farmers based on their landholding using the government designated classification for various schemes into those owning 0-1 hectares as marginal, 1-2 hectares as small, 2-4 hectares as semi-medium, 4-8 hectares as medium and more than 8 hectares as large farmers. We obtain the list of phase 1, phase 2 and phase 3 districts from NREGA website and their implementation timeline starting from the year 2004-05 to 2007-08. The survey also provides other household information like community, location, date of survey which helps us to do a variety of heterogeneity analysis.

6. Empirical Strategy

We make use of the staggered implementation of NREGA in 3 phases (across districts) with phase 1 districts in 2006, phase 2 districts in 2007-08 and phase 3 districts in 2008-09. This identification method is followed from many studies on NREGA, Azam (2012), Shah and Steinberg (2015), Imbert and Papp (2015), Alok et al (2019), and others. This provides us to employ difference-in-difference method whereby we incrementally compare early implementation districts to late implementation districts and compare landed to non-landed households. We make use of the following empirical specification to test hypothesis 1 explained in above conceptual framework section.

$$Y_{hit} = \alpha +$$
$$\beta_1 \times Phase1_t \times Landed_{hit} +$$
$$\beta_2 \times Phase2_t \times Landed_{hit} +$$

$$\beta_3 \times Phase3_t \times Landed_{hit} +$$
$$\beta_4 \times District1_i \times Landed_{hit} +$$
$$\beta_5 \times District2_i \times Landed_{hit} +$$
$$\beta_6 \times District3_i \times Landed_{hit} +$$
$$\beta_7 \times Post - NREGA_{it} +$$
$$\beta_8 \times Post - NREGA_{it} \times Landed_{hit} +$$
$$\gamma_i + \delta_t + \epsilon_{it} \quad -(1)$$

Y_{hit} is the outcome variable of interest which is a consumption item of household h in district i and year t. $Phase1_t$, $Phase2_t$ and $Phase3_t$ are binary variables referring to the years after NREGA implementation and $District1_i$, $District2_i$ and $District3_i$ refer to districts in phase 1, phase 2 and phase 3 respectively. $Landed_{hit}$[1] equals to 1 if the household h in district i and year t owns land. $Post - NREGA_{it}$ is the interaction between phase variables $Phase1_t$, $Phase2_t$ & $Phase3_t$ and district variables $District1_i$, $District2_i$ & $District3_i$. The coefficient of interest is β_8 which captures the triple interaction effect i.e., the effect of NREGA after its implementation in NREGA districts on landowning agricultural households compared to the landless households before NREGA implementation. The sign of the co-efficient indicates the comparative effect on landowning agricultural households vis-à-vis landless rural households. We estimate the above regression specification using data from NSSO survey which is a repeated cross-section panel from the rounds 61, 62, 63 and 64 which corresponds to the years 2004-05, 2005-06, 2006-07 and 2007-08 respectively during which NREGA was implemented. We restrict our sample to rural areas as NREGA was implemented only in rural areas. We cluster the standard errors at the district level and employ district fixed effects, γ_i, that absorb time-invariant differences across districts. δ_t are year fixed effects that absorb aggregate macroeconomic shocks and trends.

In the second estimation equation below, we categorize landowning agricultural households into four categories to understand their distributional effects. This specification helps to observe the effects to test hypothesis 2, where we posit that marginal and small farmers experience a dent in their consumption compared to other large farmers.

$$Y_{it} = \alpha +$$
$$\beta_1 \times Phase1_t \times Landed_{hit} +$$
$$\beta_2 \times Phase2_t \times Landed_{hit} +$$
$$\beta_3 \times Phase3_t \times Landed_{hit} +$$
$$\beta_4 \times District1_i \times Landed_{hit} +$$
$$\beta_5 \times District2_i \times Landed_{hit} +$$
$$\beta_6 \times District3_i \times Landed_{hit} +$$

[1] To remove land owned for house, we drop values of land ownership which are less than 2000 square feet.

$$\beta_7 \times Post - NREGA_{it} + \sum_{n=1}^{4} \beta_{8n} \times Land - category_{hitn} \times Post - NREGA_{it} + \gamma_i + \delta_t + \epsilon_{it} \quad -(2)$$

Our first estimation measures the effect of NREGA based on landownership (extensive margin) and the second estimation measures the effect of NREGA based on size of landholding (intensive margin). We classify farmers with land sizes based on the classification used by Ministry of Agriculture, Government of India where below 1 hectare are classified as Marginal, 1-2 hectares as Small, 2-4 hectares as Semi-medium, 4-10 hectares as Medium and more than 10 hectares as Large farmers[2]. We denote them using the variable $Land - category_{hitn}$ where n=1,2,3 and 4 refer to marginal & small[3], semi-medium, medium and large respectively. For both the estimation equations (1) and (2) above, the outcome variable Y_{it} takes various categories of consumption variables like monthly per capita income, expenditure on basic food, luxury food, intoxicants, and durable goods. We define expenditure on basic food as those spent on cereals, pulses, vegetables, sugar, salt, and spices. Similarly, expenditure on luxury food consists of the amount spent on milk & milk products, edible oil, egg, fish & meat, fruits (fresh & dry) and beverages. In the case of Intoxicants, it is the amount spent for pan, tobacco, and other intoxicants. For durable goods, we aggregate the expenses on furniture, household appliances, cookware, vehicles, and other personal items. We also consider savings made by household using the expenditure on gold jewelry as gold is a major savings instrument in rural India that can be collateralized for credit. We adjust all the expenditures to 2004-05 prices using Consumer Price Index for Agricultural Laborers[4].

The co-efficient of interest in equation (2) are the β_{8n} (n=1,2,3,4) which captures the triple interaction effect i.e., the effect of NREGA after its implementation in NREGA districts on landowning agricultural households varied by size compared to the landless households before NREGA implementation. We expect β_{81} to be negative as the marginal and small landholders will be more affected by an increase in labor costs due to NREGA compared to other large landholders who have larger landholdings. We expect an insignificant or positive values for β_{82}, β_{83} and β_{84} coefficients as the landholding goes up for different levels. We cluster the standard errors at the district level and employ district fixed effects that absorbs all time-invariant differences across districts using γ_i. δ_t refers to year fixed effects that control for aggregate macroeconomic shocks and trends.

7. Main Results

We used 4 rounds of repeated cross section data of nationally representative sample survey data to observe the short-run impact of employment guarantee program on small farmers. We use overall per

[2] We use the land categories in our specification as NSSO survey provides land possessed codes instead of land area owned.

[3] We club marginal and small farmers together as their land sizes are relatively smaller and most agricultural schemes are provided to both these categories.

[4] https://www.indiabudget.gov.in/budget_archive/es2009-10/chapt2010/tab53.pdf

capita consumption along with various heads of disaggregated consumption items to observe the impact on each of them. We observe these effects across 3 categories of states – all states, major states and star states. We consider all states in our specification where we take all states of India except the union territories which come under the union government. In case of major states, we exclude states like Jammu & Kashmir and north-eastern states which are significantly different politically, economically, and geographically compared to other states of India. Star states are those which had generated most of the employment in NREGA comprising of the states of Andhra Pradesh, Chhattisgarh, Himachal Pradesh, Madhya Pradesh, Tamil Nadu, Rajasthan, and Uttarakhand. These star states assume significance as they form the group of states where the treatment intensity (NREGA job generation) is high compared to other states. For the sake of brevity, we report results corresponding to major states in Appendix.

Our main results are reported in Tables 2 and 3, which show the reduction in basic food and luxury food consumption by landowning farmers. We observe a 7.5 and 10 percent reduction in basic food expenditure and luxury food expenditure compared to the landless laborers. This effect is accentuated in the case of star states where we observe a 12 and 15 percent drop respectively. Thus, landowning farmers are worse-off in terms of consumption in terms of basic food and luxury food like meat, fish and other which are high calorie protein foods and intoxicants like liquor.

8. Heterogeneity by landholding size

We then observe Tables 4 and 5 where we categorize landholdings based on their size into Marginal & Small, Semi-medium, Medium, and Large farmers. We find that a drop in overall monthly per capita expenditure reduces by 6.5 percent for marginal and small farmers when all other farmer categories experience an increase in their consumption. Apart from this, they also reduce their consumption in basic food (11 percent), luxury food (18 percent), intoxicants (13 percent), and durable goods (36 percent) expenditure compared to the landless workers. This shows that smaller farmers are affected by labor market disruption caused by NREGA than larger farmers. Similar effects can be observed in a bigger way when we take only star states into account. From Table 5, we can see that marginal and small farmers experience a drop in overall monthly per capita expenditure close to 8 percent compared to 6.5 percent when we consider all states. Also, basic food (17 percent) and luxury food (24 percent) expenditure also drops more compared to Table 4, showing that higher treatment intensity of NREGA in the form of star states led to higher drop in consumption of smaller farmers compared to landless laborers.

9. Seasonality of Agricultural Cycle

During non-dry season the demand for casual labor for agricultural activities shoots up which pushes the wages higher over and above the effect of NREGA induced higher wages. Hence, during such seasons marginal and small farmers reduce their consumption more to continue the time bound agricultural activities. We can observe from Table 6 where the overall monthly per capita consumption reduces by 7 percent. Other categories of consumption also reduce significantly – basic food (11 percent), luxury food (18 percent) and intoxicants (20 percent) compared to the landless laborers. This phenomenon is not observed for other larger farmers indicating that only marginal and small farmers are affected more during the agricultural season.

10. Role of Agricultural Distress

We classify a district as a distressed district if the historical rainfall deviation in the district is in the bottom tercile among all the districts considered. From Table 7, we can observe that agricultural distress induced by rainfall shocks accentuates the distress of marginal & small landowning farmers in addition to the high labor costs created due to NREGA. They experience a reduction of 3.5, 8 and 10 percent in monthly per capita expenditure, luxury food and durable goods respectively. Note that farmers reduce their expenditure on discretionary items like luxury food and durable goods in order to smoothen their consumption.

11. Impact in Low Yield Districts

We classify a district as a low yield district if the historical average yield across all crops in the district is in the bottom tercile among all the districts considered. Low yield in agriculture is one of the major determinants of labor component in agriculture. Historically, cheaper crops require low amount of maintenance and other operations thus yielding less output compared to high maintenance crops which require higher capital for fertilizers, insecticides, weedicides, and others. Also, high yield crops involve huge cost outlay in the form of seeds and other inputs which are typically not affordable by smaller farmers. Thus, in areas where historically low yield agriculture is going on, smaller farmers are affected more due to NREGA compared to others. From Table 8, we can see that marginal and small farmers see a reduction in overall monthly per capita expenditure (1.4 percent), luxury food (8 percent) and durable goods (9 percent) compared to casual laborers.

12. Impact on Scheduled and Backward Castes

The scheduled and backward caste form part of the marginalized communities in India and it can lead to lower social mobility, network externalities and other growth opportunities. Thus, smaller farmers belonging to these communities may suffer a greater drop in consumption when compared to others. From Table 9, we can see that their monthly per capita expenditure and basic food reduce by 8.4 percent and 7 percent respectively. Also, their discretionary spending also reduces in the form of luxury food and intoxicants with 14 percent reduction in each of them.

13. Falsification tests

We rule out alternative explanations of our observed effects in landowning agricultural households by observing no effect on other non-agricultural households. First, we estimate the results for landowning households involved in the construction industry as it is the second largest employer in rural areas next to agriculture and find no significant effects due to NREGA implementation from Table 10.

14. Conclusion

Though it is understood that employment guarantees disrupt and distort the prevailing labor market, its unintended consequences on agriculture are understudied. NREGA, being one of the largest workfare programs in the world, has been studied in many ways with major focus on welfare outcomes for the casual workers towards whom it was targeted. Most of the impact of NREGA is observed via its disruption

in the labor market, on welfare, education, nutrition, violence, electoral performance, firm performance, and so on. In this scenario, our study observes its unintended consequences on farmers who are the most impacted community due to NREGA. We find that though casual workers benefit from the scheme, farmers are worse-off due to its impact on labor cost. This proves detrimental to them, especially for the smaller farmers who cannot achieve economies of scale in agriculture. Farmers, both small and big, will adjust to the new increased labor costs in the long run in more ways than one, either through increase in output prices or adopting labor-saving technologies. However, in the short term, smaller farmers experience a welfare loss induced by NREGA which may be difficult to cope with.

15. List of Tables

Table 1: Summary statistics

The following table shows the summary statistics of the variables used from the NSSO survey rounds 61, 62, 63 and 64. Panel A provides summary statistics of all the monthly expenditure variables in INR for households in the rural areas. Panel B provides the same for all agricultural households who own agricultural land in the rural areas.

Panel A: All Households in Rural Sector

Variable	Observations	Mean	SD	Minimum	Maximum
	Round 61				
Monthly Per Capita Expenditure	79,298	696.40	974.37	0	102267.6
Basic Food	78,800	990.18	567.58	3	27471.6
Luxury Food	79,249	760.02	686.28	1	33100
Intoxicants	56,442	126.76	175.04	1	8120
Jewelry	9,775	2514.38	11783.36	5	520000
Durable Goods	9,732	2855.76	11651.16	0	420950
	Round 62				
Monthly Per Capita Expenditure	18,992	846.76	827.45	25.08	52371.29
Basic Food	18,861	1131.29	650.67	5	23317
Luxury Food	18,982	930.72	1016.12	5	73655
Intoxicants	13,490	143.41	286.76	1	24480
Jewelry	3,068	3890.30	19441.93	10	450000
Durable Goods	3,068	2631.13	7321.27	0	219100
	Round 63				
Monthly Per Capita Expenditure	33,146	901.45	939.18	21	92486.26
Basic Food	32,874	1140.56	666.56	4	34542
Luxury Food	33,119	902.78	773.39	5	20195
Intoxicants	22,834	152.26	448.84	2	60042
Jewelry	4,466	4145.60	21806.76	4	970600
Durable Goods	4,466	3332.84	21207.60	0	1205350
	Round 64				
Monthly Per Capita Expenditure	31,673	1076.58	1015.82	56.44	56072.82
Basic Food	31,528	1350.56	792.54	5	52020
Luxury Food	31,670	1164.66	943.30	8	22536
Intoxicants	22,225	171.05	317.53	1	32280
Jewelry	5,146	4028.01	22360.99	10	1100000
Durable Goods	5,146	4400.56	18741.21	0	688350

Panel B: Landowning Agricultural Households in the Rural Sector

Variable	Observations	Mean	SD	Minimum	Maximum
	Round 61				
Monthly Per Capita Expenditure	31,344	678.53	920.49	73.55	88473.33

Basic Food	31,335	1095.51	607.50	14	13969
Luxury Food	31,341	839.84	772.70	5	33100
Intoxicants	24,043	126.95	164.12	1	3800
Jewelry	4,509	2387.33	12953.53	10	520000
Durable Goods	4,488	2824.17	11950.66	0	420950
	Round 62				
Monthly Per Capita Expenditure	10,572	821.04	776.27	112.88	23621.66
Basic Food	10,570	1219.88	667.33	20	11851
Luxury Food	10,572	978.68	839.16	12	13001
Intoxicants	7,963	138.12	191.16	1	3500
Jewelry	1,907	4103.68	21744.81	10	450000
Durable Goods	1,907	2411.80	6039.82	0	72400
	Round 63				
Monthly Per Capita Expenditure	15,814	890.55	1094.61	125.82	92486.26
Basic Food	15,809	1241.74	682.96	4	13737
Luxury Food	15,810	967.58	808.76	5	20195
Intoxicants	11,392	152.43	599.06	2	60042
Jewelry	2,408	3812.11	22841.18	4	970600
Durable Goods	2,408	3626.99	27696.94	0	1205350
	Round 64				
Monthly Per Capita Expenditure	17,512	1008.08	940.76	182.2	56072.82
Basic Food	17,510	1428.43	861.47	143	52020
Luxury Food	17,512	1195.80	961.92	25	18311
Intoxicants	13,037	156.66	210.21	1	4500
Jewelry	3,148	3972.28	24146.39	10	1100000
Durable Goods	3,148	4151.72	17326.16	0	512400

Table 2: Impact of NREGA on consumption of landowning agricultural households: All states

The following table shows the results for the landowning farmers in India across all states except union territories. We observe the effects of NREGA on different types of outcome variables under various categories. We report only the co-efficient of the triple interaction which is of interest and do not report dual interactions and other variables involved. Robust standard errors are reported in the parentheses and ***, ** and * represent the significance at the 1%, 5% and 10% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Log Monthly Per Capita Expenditure	Log Basic Food	Log Luxury Food	Log Intoxicants	Log Jewelry	Log Durables
Post x NREGA x Landed	-0.027	-0.074**	-0.107***	-0.108	0.385*	-0.258
	(0.022)	(0.033)	(0.041)	(0.068)	(0.211)	(0.164)
Observations	89,261	89,229	89,251	66,455	13,138	12,814
R-squared	0.301	0.211	0.370	0.287	0.496	0.364

Control mean	6.130	6.483	5.814	4.073	5.226	6.170
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 3: Impact of NREGA on consumption of landowning agricultural households: Star states

The following table shows the results for the landowning farmers in India across 7 star states of India. These star states account for most of the employment generated from the NREGA program (Imbert and Papp (2015). The star states are Andhra Pradesh, Chhattisgarh, Himachal Pradesh, Madhya Pradesh, Tamil Nadu, Rajasthan and Uttarakhand. We observe the effects of NREGA on different types of outcome variables under various categories. We report only the co-efficient of the triple interaction which is of interest and do not report dual interactions and other variables involved. Robust standard errors are reported in the parentheses and ***, ** and * represent the significance at the 1%, 5% and 10% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Log Monthly Per Capita Expenditure	Log Basic Food	Log Luxury Food	Log Intoxicants	Log Jewelry	Log Durables
Post x NREGA x Landed	-0.030	-0.120**	-0.151**	-0.119	-0.112	0.105
	(0.036)	(0.051)	(0.065)	(0.115)	(0.300)	(0.240)
Observations	26,897	26,877	26,894	18,187	3,471	3,372
R-squared	0.257	0.203	0.390	0.249	0.456	0.442
Control mean	6.135	6.356	5.756	4.288	5.570	6.178
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 4: Impact of NREGA on consumption of landowning agricultural households by landholding size: All States

The following table shows the results for the landowning farmers in India across all states except union territories. We observe the effects of NREGA on different types of outcome variables under various categories. We report only the co-efficient of the triple interaction which is of interest and do not report dual interactions and other variables involved. Robust standard errors are reported in the parentheses and ***, ** and * represent the significance at the 1%, 5% and 10% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Log Monthly Per Capita Expenditure	Log Basic Food	Log Luxury Food	Log Intoxicants	Log Jewelry	Log Durables
Post x NREGA x Marginal & Small	-0.065***	-0.112***	-0.182***	-0.133*	0.250	-0.367**
	(0.022)	(0.033)	(0.041)	(0.069)	(0.221)	(0.167)
Post x NREGA x Semi-medium	0.162***	0.120***	0.303***	0.049	0.707***	0.065
	(0.037)	(0.041)	(0.059)	(0.071)	(0.253)	(0.173)

Post x NREGA x Medium	0.307***	0.273***	0.471***	-0.026	1.326***	0.222
	(0.042)	(0.038)	(0.050)	(0.110)	(0.308)	(0.242)
Post x NREGA x Large	0.421***	0.345***	0.605***	0.271	1.785***	0.840***
	(0.063)	(0.093)	(0.106)	(0.168)	(0.239)	(0.221)
Observations	89,261	89,229	89,251	66,455	13,138	12,814
R-squared	0.310	0.218	0.380	0.288	0.503	0.370
Control mean	6.130	6.483	5.814	4.073	5.226	6.170
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 5: Impact of NREGA on consumption of landowning agricultural households by landholding size: Star States

The following table shows the results for the landowning farmers in India across 7 star states of India. These star states account for most of the employment generated from the NREGA program (Imbert and Papp (2015). The star states are Andhra Pradesh, Chhattisgarh, Himachal Pradesh, Madhya Pradesh, Tamil Nadu, Rajasthan, and Uttarakhand. We observe the effects of NREGA on different types of outcome variables under various categories. We report only the co-efficient of the triple interaction which is of interest and do not report dual interactions and other variables involved. Robust standard errors are reported in the parentheses and ***, ** and * represent the significance at the 1%, 5% and 10% levels respectively.

VARIABLES	(1) Log Monthly Per Capita Expenditure	(2) Log Basic Food	(3) Log Luxury Food	(4) Log Intoxicants	(5) Log Jewelry	(6) Log Durables
Post x NREGA x Marginal & Small	-0.080**	-0.177***	-0.245***	-0.143	-0.317	-0.085
	(0.036)	(0.050)	(0.064)	(0.118)	(0.326)	(0.256)
Post x NREGA x Semi-medium	0.116**	0.053	0.137	-0.047	-0.137	0.256
	(0.058)	(0.071)	(0.104)	(0.127)	(0.342)	(0.246)
Post x NREGA x Medium	0.320***	0.255***	0.455***	0.013	0.918**	0.650*
	(0.061)	(0.054)	(0.069)	(0.188)	(0.440)	(0.357)
Post x NREGA x Large	0.284***	0.191	0.357**	0.106	1.143***	0.909***
	(0.104)	(0.184)	(0.170)	(0.162)	(0.309)	(0.291)
Observations	26,897	26,877	26,894	18,187	3,471	3,372
R-squared	0.266	0.213	0.400	0.249	0.470	0.452
Control mean	6.135	6.356	5.756	4.288	5.570	6.178
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 6: Impact on NREGA on consumption of landowning agricultural households during non-dry season: All states

The following table shows the results for the landowning farmers in India across all states except union territories. We observe the effects of NREGA on different types of outcome variables under various categories during the dry season. We report only the co-efficient of the triple interaction which is of interest and do not report dual interactions and other variables involved. Robust standard errors are reported in the parentheses and ***, ** and * represent the significance at the 1%, 5% and 10% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Log Monthly Per Capita Expenditure	Log Basic Food	Log Luxury Food	Log Intoxicants	Log Jewelry	Log Durables
Post x NREGA x Marginal & Small	-0.068**	-0.109***	-0.180***	-0.203**	0.495	-0.216
	(0.028)	(0.037)	(0.051)	(0.100)	(0.341)	(0.225)
Post x NREGA x Semi-medium	0.177***	0.144***	0.329***	0.001	1.039***	0.299
	(0.045)	(0.042)	(0.070)	(0.105)	(0.349)	(0.232)
Post x NREGA x Medium	0.254***	0.272***	0.442***	-0.011	1.748***	0.288
	(0.056)	(0.047)	(0.062)	(0.139)	(0.489)	(0.396)
Post x NREGA x Large	0.441***	0.298***	0.553***	0.435*	1.640***	1.153***
	(0.078)	(0.112)	(0.126)	(0.235)	(0.370)	(0.302)
Observations	44,578	44,561	44,576	33,107	6,691	6,515
R-squared	0.343	0.257	0.401	0.329	0.594	0.498
Control mean	6.114	6.479	5.780	4.067	5.350	6.244
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 7: Impact on NREGA on consumption of landowning agricultural households in distress districts: All States

The following table shows the results for the landowning farmers in India across all states except union territories. We observe the effects of NREGA on different types of outcome variables under various categories in distressed districts. We classify a district as a distressed district if the historical rainfall deviation in the district is in the bottom tercile among all the districts considered. We report only the co-efficient of the triple interaction which is of interest and do not report dual interactions and other variables involved. Robust standard errors are reported in the parentheses and ***, ** and * represent the significance at the 1%, 5% and 10% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)

VARIABLES	Log Monthly Per Capita Expenditure	Log Basic Food	Log Luxury Food	Log Intoxicants	Log Jewelry	Log Durables
Post x NREGA x Marginal & Small	-0.034**	-0.032	-0.081**	-0.032	0.015	-0.101*
	(0.024)	(0.032)	(0.049)	(0.061)	(0.201)	(0.200)
Post x NREGA x Semi-medium	0.012	-0.039	-0.006	-0.024	-0.233	-0.411**
	(0.043)	(0.049)	(0.071)	(0.084)	(0.238)	(0.204)
Post x NREGA x Medium	0.059	-0.044	-0.092	-0.328*	0.053	-0.300
	(0.075)	(0.057)	(0.078)	(0.183)	(0.345)	(0.320)
Post x NREGA x Large	0.028	0.079	0.038	-0.394*	0.427	-0.417
	(0.116)	(0.120)	(0.127)	(0.223)	(0.259)	(0.308)
Observations	80,767	80,500	80,500	80,250	70,232	51,121
R-squared	0.288	0.260	0.432	0.305	0.571	0.422
Control mean	6.104	6.114	5.454	4.163	5.126	6.141
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 8: Impact on NREGA on consumption of landowning agricultural households in low yield districts: All States

The following table shows the results for the landowning farmers in India across all states except union territories. We observe the effects of NREGA on different types of outcome variables under various categories in low yield districts. We classify a district as a low yield district if the historical average yield across all crops in the district is in the bottom tercile among all the districts considered. We report only the co-efficient of the triple interaction which is of interest and do not report dual interactions and other variables involved. Robust standard errors are reported in the parentheses and ***, ** and * represent the significance at the 1%, 5% and 10% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Log Monthly Per Capita Expenditure	Log Basic Food	Log Luxury Food	Log Intoxicants	Log Jewelry	Log Durables
Post x NREGA x Marginal & Small	-0.014**	-0.015	-0.080**	-0.032	0.017	-0.0901*
	(0.020)	(0.032)	(0.049)	(0.061)	(0.201)	(0.200)
Post x NREGA x Semi-medium	0.011	-0.016	-0.004	-0.014	-0.203	-0.311
	(0.013)	(0.049)	(0.071)	(0.084)	(0.238)	(0.084)
Post x NREGA x Medium	0.031	-0.044	-0.092	-0.328*	0.053	-0.120
	(0.035)	(0.057)	(0.078)	(0.183)	(0.345)	(0.320)

Post x NREGA x Large	0.076	0.063	0.061	-0.481	0.117	-0.307
	(0.121)	(0.120)	(0.127)	(0.223)	(0.259)	(0.308)
Observations	80,767	80,500	80,500	80,250	70,232	51,121
R-squared	0.288	0.260	0.432	0.305	0.571	0.422
Control mean	6.481	6.332	5.621	4.186	5.128	6.117
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 9: Impact on NREGA on consumption of landowning agricultural households belonging to both scheduled and backward caste

The following table shows the results for the landowning farmers belonging to both scheduled and backward castes in India across all states except union territories. We observe the effects of NREGA on different types of outcome variables under various categories. We report only the co-efficient of the triple interaction which is of interest and do not report dual interactions and other variables involved. Robust standard errors are reported in the parentheses and ***, ** and * represent the significance at the 1%, 5% and 10% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Log Monthly Per Capita Expenditure	Log Basic Food	Log Luxury Food	Log Intoxicants	Log Jewelry	Log Durables
Post x NREGA x Marginal & Small	-0.084***	-0.070*	-0.140***	-0.146*	0.248	-0.383
	(0.027)	(0.040)	(0.050)	(0.087)	(0.266)	(0.233)
Post x NREGA x Semi-medium	0.153***	0.233***	0.446***	0.106	0.795**	0.143
	(0.040)	(0.049)	(0.063)	(0.094)	(0.323)	(0.228)
Post x NREGA x Medium	0.314***	0.354***	0.525***	-0.061	1.493***	0.340
	(0.055)	(0.061)	(0.071)	(0.163)	(0.380)	(0.342)
Post x NREGA x Large	0.455***	0.605***	0.944***	0.426*	1.688***	0.999***
	(0.086)	(0.127)	(0.150)	(0.246)	(0.420)	(0.317)
Observations	47,598	47,579	47,596	34,989	6,859	6,691
R-squared	0.272	0.223	0.358	0.315	0.511	0.412
Control mean	6.149	6.528	5.841	4.064	5.112	6.286
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 10: Impact of NREGA on consumption of landowning non-agricultural households: Construction industry

The following table shows the results for the landowning non-agricultural households belonging to construction industry in India across all states except union territories. We observe the effects of NREGA

on different types of outcome variables under various categories. We report only the co-efficient of the triple interaction which is of interest and do not report dual interactions and other variables involved. Robust standard errors are reported in the parentheses and ***, ** and * represent the significance at the 1%, 5% and 10% levels respectively.

VARIABLES	(1) Log Monthly Per Capita Expenditure	(2) Log Basic Food	(3) Log Luxury Food	(4) Log Intoxicants	(5) Log Jewelry	(6) Log Durables
Post x NREGA x Landed	-0.087	0.123*	0.013	0.145	0.566	-0.110
	(0.062)	(0.073)	(0.115)	(0.154)	(0.477)	(0.579)
Observations	9,673	9,637	9,668	7,538	984	938
R-squared	0.409	0.287	0.492	0.420	0.783	0.577
Control mean	6.250	6.612	6.077	4.330	5.544	6.448
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes

Appendix

Table 1A: Impact of NREGA on consumption of landowning households: All States

The following table shows the results for the landowning households in India across all states except union territories. We observe the effects of NREGA on different types of outcome variables under various categories. We report only the co-efficient of the triple interaction which is of interest and do not report dual interactions and other variables involved. Robust standard errors are reported in the parentheses and ***, ** and * represent the significance at the 1%, 5% and 10% levels respectively.

VARIABLES	(1) Log Monthly Per Capita Expenditure	(2) Log Basic Food	(3) Log Luxury Food	(4) Log Intoxicants	(5) Log Jewelry	(6) Log Durables
Post x NREGA x Landed	-0.023	-0.073**	-0.078**	-0.053	0.289*	-0.088
	(0.022)	(0.033)	(0.039)	(0.061)	(0.169)	(0.148)
Observations	160,987	160,033	160,900	113,640	22,255	21,594
R-squared	0.247	0.171	0.303	0.252	0.474	0.317
Control mean	6.345	6.547	6.086	4.190	5.770	6.566

Year FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 2A: Impact of NREGA on consumption of landowning households: Major states

The following table shows the results for the landowning households in India across 19 major states of India except union territories. We exclude Jammu and Kashmir and 7 north eastern states as they differ from other states economically, politically and geographically as followed by Berg, Bhattacharya, Durgam and Ramachandra (2012) and Bose (2017). We report only the co-efficient of the triple interaction which is of interest and do not report dual interactions and other variables involved. Robust standard errors are reported in the parentheses and ***, ** and * represent the significance at the 1%, 5% and 10% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Log Monthly Per Capita Expenditure	Log Basic Food	Log Luxury Food	Log Intoxicants	Log Jewelry	Log Durables
Post x NREGA x Landed	-0.024	-0.074**	-0.078**	-0.047	0.293*	-0.094
	(0.022)	(0.033)	(0.039)	(0.062)	(0.173)	(0.151)
Observations	140,060	139,154	139,986	96,024	19,259	18,699
R-squared	0.243	0.167	0.298	0.247	0.476	0.315
Control mean	6.320	6.527	6.040	4.143	5.763	6.522
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 3A: Impact of NREGA on consumption of landowning households: Star States

The following table shows the results for the landowning households in India across 7 star states of India. These star states account for the majority of the employment generated from the NREGA program (Imbert and Papp (2015). The star states are Andhra Pradesh, Chhattisgarh, Himachal Pradesh, Madhya Pradesh, Tamil Nadu, Rajasthan and Uttarakhand. We observe the effects of NREGA on different types of outcome variables under various categories. We report only the co-efficient of the triple interaction which is of interest and do not report dual interactions and other variables involved. Robust standard errors are reported in the parentheses and ***, ** and * represent the significance at the 1%, 5% and 10% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Log Monthly Per Capita Expenditure	Log Basic Food	Log Luxury Food	Log Intoxicants	Log Jewelry	Log Durables
Post x NREGA x Landed	-0.056	-0.133**	-0.148*	-0.067	-0.234	-0.205
	(0.042)	(0.057)	(0.076)	(0.135)	(0.264)	(0.315)
Observations	47,666	47,239	47,627	30,045	5,433	5,245
R-squared	0.188	0.158	0.281	0.202	0.441	0.385

Control mean	6.352	6.425	5.992	4.370	6.191	6.583
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 4A: Impact of NREGA on consumption of landowning agricultural households: Major states

The following table shows the results for the landowning farmers in India across 19 major states of India except union territories. We exclude states like Jammu and Kashmir and 7 north eastern states as they different from other states economically, politically and geographically as followed by Berg, Bhattacharya, Durgam and Ramachandra (2012) and Bose (2017). We observe the effects of NREGA on different types of outcome variables under various categories. We report only the co-efficient of the triple interaction which is of interest and do not report dual interactions and other variables involved. Robust standard errors are reported in the parentheses and ***, ** and * represent the significance at the 1%, 5% and 10% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Log Monthly Per Capita Expenditure	Log Basic Food	Log Luxury Food	Log Intoxicants	Log Jewelry	Log Durables
Post x NREGA x Landed	-0.028	-0.074**	-0.109***	-0.101	0.392*	-0.267
	(0.022)	(0.033)	(0.042)	(0.068)	(0.215)	(0.166)
Observations	78,772	78,741	78,767	57,276	11,623	11,350
R-squared	0.297	0.206	0.366	0.282	0.497	0.361
Control mean	6.118	6.473	5.799	4.051	5.200	6.136
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 5A: Impact of NREGA on consumption of landowning agricultural households by landholding size: Major States

The following table shows the results for the landowning farmers in India across 19 major states of India except union territories. We exclude states like Jammu and Kashmir and 7 north eastern states as they different from other states economically, politically and geographically as followed by Berg, Bhattacharya, Durgam and Ramachandra (2012) and Bose (2017). We observe the effects of NREGA on different types of outcome variables under various categories. We report only the co-efficient of the triple interaction which is of interest and do not report dual interactions and other variables involved. Robust standard errors are reported in the parentheses and ***, ** and * represent the significance at the 1%, 5% and 10% levels respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Log Monthly Per Capita Expenditure	Log Basic Food	Log Luxury Food	Log Intoxicants	Log Jewelry	Log Durables

Post x NREGA x Marginal & Small	-0.066***	-0.113***	-0.183***	-0.126*	0.255	-0.379**
	(0.022)	(0.034)	(0.042)	(0.070)	(0.225)	(0.169)
Post x NREGA x Semi-medium	0.162***	0.121***	0.303***	0.055	0.716***	0.060
	(0.037)	(0.041)	(0.059)	(0.072)	(0.256)	(0.175)
Post x NREGA x Medium	0.308***	0.272***	0.469***	-0.022	1.342***	0.208
	(0.042)	(0.039)	(0.050)	(0.111)	(0.311)	(0.245)
Post x NREGA x Large	0.422***	0.343***	0.601***	0.273	1.804***	0.858***
	(0.083)	(0.096)	(0.123)	(0.161)	(0.345)	(0.283)
Observations	78,772	78,741	78,767	57,276	11,623	11,350
R-squared	0.306	0.213	0.376	0.282	0.503	0.367
Control mean	6.118	6.473	5.799	4.051	5.200	6.136
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 6A: Impact on NREGA on consumption of landowning agricultural households during dry season

The following table shows the results for the landowning farmers in India across all 3 categories of states except union territories. We observe the effects of NREGA on different types of outcome variables under various categories during the dry season. We report only the co-efficient of the triple interaction which is of interest and do not report dual interactions and other variables involved. Robust standard errors are reported in the parentheses and ***, ** and * represent the significance at the 1%, 5% and 10% levels respectively.

	(1)	(2)	(3)
	All states	Main states	Star states
VARIABLES	Log Monthly Per Capita Expenditure	Log Monthly Per Capita Expenditure	Log Monthly Per Capita Expenditure
Post x NREGA x Marginal & Small	-0.068**	-0.069**	-0.088*
	(0.028)	(0.029)	(0.047)
Post x NREGA x Semi-medium	0.177***	0.178***	0.092
	(0.045)	(0.045)	(0.077)
Post x NREGA x Medium	0.254***	0.255***	0.302***
	(0.056)	(0.057)	(0.085)
Post x NREGA x Large	0.441***	0.441***	0.230**
	(0.078)	(0.078)	(0.114)
Observations	44,578	39,222	13,347
R-squared	0.343	0.339	0.310
Control mean	6.114	6.103	6.128
Year FE	Yes	Yes	Yes
District FE	Yes	Yes	Yes

Table 7A: Impact on NREGA on consumption of landowning agricultural households in distress districts

The following table shows the results for the landowning farmers in India across all 3 categories of states except union territories. We observe the effects of NREGA on different types of outcome variables under various categories in distressed districts. We classify a district as a distressed district if the historical rainfall deviation in the district is in the bottom tercile among all the districts considered. We report only the co-efficient of the triple interaction which is of interest and do not report dual interactions and other variables involved. Robust standard errors are reported in the parentheses and ***, ** and * represent the significance at the 1%, 5% and 10% levels respectively.

	(1)	(2)	(3)
	All states	Main states	Star states
VARIABLES	Log Monthly Per Capita Expenditure	Log Monthly Per Capita Expenditure	Log Monthly Per Capita Expenditure
Post x NREGA x Marginal & Small	-0.034**	-0.043**	-0.075*
	(0.024)	(0.094)	(0.058)
Post x NREGA x Semi-medium	0.012	0.033	-0.069
	(0.043)	(0.014)	(0.104)
Post x NREGA x Medium	0.059	0.003	-0.016
	(0.075)	(0.055)	(0.082)
Post x NREGA x Large	0.028	0.001	-0.267
	(0.116)	(0.116)	(0.205)
Observations	80,767	70,231	23,854
R-squared	0.288	0.284	0.237
Control mean	6.101	6.446	6.201
Year FE	Yes	Yes	Yes
District FE	Yes	Yes	Yes

Table 8A: Impact on NREGA on consumption of landowning agricultural households in low yield districts

The following table shows the results for the landowning farmers in India across all 3 categories of states except union territories. We observe the effects of NREGA on different types of outcome variables under various categories in low yield districts. We classify a district as a low yield district if the historical average yield across all crops in the district is in the bottom tercile among all the districts considered. We report only the co-efficient of the triple interaction which is of interest and do not report dual interactions and other variables involved. Robust standard errors are reported in the parentheses and ***, ** and * represent the significance at the 1%, 5% and 10% levels respectively.

	(1)	(2)	(3)
	All states	Main states	Star states
VARIABLES	Log Monthly Per Capita Expenditure	Log Monthly Per Capita Expenditure	Log Monthly Per Capita Expenditure
Post x NREGA x Marginal & Small	-0.014**	-0.023**	-0.031*
	(0.020)	(0.094)	(0.058)
Post x NREGA x Semi-medium	0.016	0.012	-0.043
	(0.013)	(0.011)	(0.101)

Post x NREGA x Medium	0.054	0.001	-0.013
	(0.035)	(0.055)	(0.071)
Post x NREGA x Large	0.015	0.001	-0.133
	(0.121)	(0.103)	(0.225)
Observations	80,767	70,231	23,854
R-squared	0.288	0.284	0.237
Control mean	6.117	6.421	6.111
Year FE	Yes	Yes	Yes
District FE	Yes	Yes	Yes

Table 9A: Impact on NREGA on consumption of landowning agricultural households belonging to scheduled caste

The following table shows the results for the landowning farmers belonging to scheduled castes in India across all 3 categories of states except union territories. We observe the effects of NREGA on different types of outcome variables under various categories. We report only the co-efficient of the triple interaction which is of interest and do not report dual interactions and other variables involved. Robust standard errors are reported in the parentheses and ***, ** and * represent the significance at the 1%, 5% and 10% levels respectively.

	(1)	(2)	(3)
	All states	Main states	Star states
VARIABLES	Log Monthly Per Capita Expenditure	Log Monthly Per Capita Expenditure	Log Monthly Per Capita Expenditure
Post x NREGA x Marginal & Small	-0.103**	-0.104**	-0.136*
	(0.042)	(0.043)	(0.077)
Post x NREGA x Semi-medium	0.159*	0.160*	0.026
	(0.088)	(0.089)	(0.088)
Post x NREGA x Medium	0.079	0.079	0.101
	(0.098)	(0.098)	(0.123)
Post x NREGA x Large	0.127	0.127	0.128
	(0.201)	(0.201)	(0.278)
Observations	13,838	13,298	4,614
R-squared	0.300	0.297	0.241
Control mean	6.145	6.131	6.145
Year FE	Yes	Yes	Yes
District FE	Yes	Yes	Yes

Table 10A: Impact on NREGA on consumption of landowning agricultural households belonging to scheduled caste

The following table shows the results for the landowning farmers belonging to scheduled castes in India across all states except union territories. We observe the effects of NREGA on different types of outcome variables under various categories. We report only the co-efficient of the triple interaction which is of interest and do not report dual interactions and other variables involved. Robust standard errors are

reported in the parentheses and ***, ** and * represent the significance at the 1%, 5% and 10% levels respectively.

VARIABLES	(1) Log Monthly Per Capita Expenditure	(2) Log Basic Food	(3) Log Luxury Food	(4) Log Intoxicants	(5) Log Jewelry	(6) Log Durables
Post x NREGA x Marginal & Small	-0.103**	-0.016	-0.065	-0.064	0.572	-0.208
	(0.042)	(0.054)	(0.080)	(0.119)	(0.656)	(0.447)
Post x NREGA x Semi-medium	0.159*	0.294**	0.417***	0.138	0.821	0.268
	(0.088)	(0.124)	(0.156)	(0.250)	(0.936)	(0.378)
Post x NREGA x Medium	0.079	0.566***	0.723***	0.251	1.464**	0.817*
	(0.098)	(0.109)	(0.165)	(0.254)	(0.655)	(0.491)
Post x NREGA x Large	0.127	0.817***	0.958***	0.647***	2.413**	0.501
	(0.201)	(0.155)	(0.118)	(0.212)	(1.136)	(0.376)
Observations	13,838	13,832	13,836	10,522	1,468	1,422
R-squared	0.300	0.286	0.379	0.366	0.622	0.545
Control mean	6.149	6.485	5.835	4.069	5.332	6.217
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 11A: Impact on NREGA on consumption of landowning agricultural households belonging to backward caste

The following table shows the results for the landowning farmers belonging to backward castes in India across all 3 categories of states except union territories. We observe the effects of NREGA on different types of outcome variables under various categories. We report only the co-efficient of the triple interaction which is of interest and do not report dual interactions and other variables involved. Robust standard errors are reported in the parentheses and ***, ** and * represent the significance at the 1%, 5% and 10% levels respectively.

VARIABLES	(1) All states Log Monthly Per Capita Expenditure	(2) Main states Log Monthly Per Capita Expenditure	(3) Star states Log Monthly Per Capita Expenditure
Post x NREGA x Marginal & Small	-0.085***	-0.084***	-0.001
	(0.032)	(0.032)	(0.047)
Post x NREGA x Semi-medium	0.128***	0.129***	0.219***
	(0.043)	(0.043)	(0.052)
Post x NREGA x Medium	0.298***	0.299***	0.415***
	(0.057)	(0.057)	(0.085)
Post x NREGA x Large	0.462***	0.463***	0.563***

	(0.085)	(0.085)	(0.090)
Observations	33,760	32,097	12,280
R-squared	0.301	0.301	0.253
Control mean	6.120	6.103	6.110
Year FE	Yes	Yes	Yes
District FE	Yes	Yes	Yes

Table 12A: Impact on NREGA on consumption of landowning agricultural households belonging to backward caste

The following table shows the results for the landowning farmers belonging to backward castes in India across all states except union territories. We observe the effects of NREGA on different types of outcome variables under various categories. We report only the co-efficient of the triple interaction which is of interest and do not report dual interactions and other variables involved. Robust standard errors are reported in the parentheses and ***, ** and * represent the significance at the 1%, 5% and 10% levels respectively.

VARIABLES	(1) Log Monthly Per Capita Expenditure	(2) Log Basic Food	(3) Log Luxury Food	(4) Log Intoxicants	(5) Log Jewelry	(6) Log Durables
Post x NREGA x Marginal & Small	-0.085***	-0.135***	-0.199***	-0.263**	-0.019	-0.713*
	(0.032)	(0.045)	(0.067)	(0.125)	(0.356)	(0.385)
Post x NREGA x Semi-medium	0.128***	0.144***	0.354***	-0.014	0.592	-0.191
	(0.043)	(0.053)	(0.075)	(0.133)	(0.388)	(0.374)
Post x NREGA x Medium	0.298***	0.265***	0.429***	-0.202	1.301**	-0.023
	(0.057)	(0.067)	(0.088)	(0.189)	(0.515)	(0.503)
Post x NREGA x Large	0.462***	0.512***	0.891***	0.338	1.269**	0.624
	(0.085)	(0.140)	(0.170)	(0.288)	(0.578)	(0.414)
Observations	33,760	33,747	33,760	24,467	5,391	5,269
R-squared	0.301	0.231	0.382	0.345	0.527	0.439
Control mean	6.120	6.500	5.805	4.071	5.052	6.182
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes

Table 13A: Impact on NREGA on consumption of landowning agricultural households belonging to both scheduled and backward caste

The following table shows the results for the landowning farmers belonging to both scheduled and backward castes in India across all 3 categories of states except union territories. We observe the effects of NREGA on different types of outcome variables under various categories. We report only the co-efficient of the triple interaction which is of interest and do not report dual interactions and other

variables involved. Robust standard errors are reported in the parentheses and ***, ** and * represent the significance at the 1%, 5% and 10% levels respectively.

	(1) All states	(2) Main states	(3) Star states
VARIABLES	Log Monthly Per Capita Expenditure	Log Monthly Per Capita Expenditure	Log Monthly Per Capita Expenditure
Post x NREGA x Marginal & Small	-0.084***	-0.083***	-0.050
	(0.027)	(0.027)	(0.042)
Post x NREGA x Semi-medium	0.153***	0.153***	0.182***
	(0.040)	(0.040)	(0.049)
Post x NREGA x Medium	0.314***	0.314***	0.396***
	(0.055)	(0.055)	(0.087)
Post x NREGA x Large	0.455***	0.455***	0.451***
	(0.086)	(0.086)	(0.129)
Observations	47,598	45,395	16,894
R-squared	0.272	0.271	0.222
Control mean	6.149	6.112	6.097
Year FE	Yes	Yes	Yes
District FE	Yes	Yes	Yes

Table 14A: Impact of NREGA on consumption of landowning non-agricultural households: Retail Trade

The following table shows the results for the landowning non-agricultural households belonging to retail industry in India across all states except union territories. We observe the effects of NREGA on different types of outcome variables under various categories. We report only the co-efficient of the triple interaction which is of interest and do not report dual interactions and other variables involved. Robust standard errors are reported in the parentheses and ***, ** and * represent the significance at the 1%, 5% and 10% levels respectively.

	(1) Log Monthly Per Capita	(2)	(3)	(4)	(5)	(6)
VARIABLES	Expenditure	Log Basic Food	Log Luxury Food	Log Intoxicants	Log Jewelry	Log Durables
Post x NREGA x Landed	0.077	-0.095	0.029	-0.453	0.319	-0.495
	(0.094)	(0.097)	(0.121)	(0.282)	(0.637)	(0.543)
Observations	8,411	8,381	8,411	5,644	1,345	1,309
R-squared	0.430	0.364	0.436	0.434	0.756	0.657
Control mean	6.444	6.722	6.343	4.181	5.910	6.785
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes