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The effect of the Mahatma Gandhi National Rural Employment Guarantee Act on the size of outstanding debts in rural India

Sharvari Patwardhan[a] and Luca Tasciotti[b]

[a]Research Analyst, International Food Policy Research Institute (IFPRI), New Delhi, India; [b]Department of International Business and Economics, University of Greenwich, London, UK

ABSTRACT

MGNREGA was introduced in India in 2005 with the aim to improve the livelihood of rural Indian households. In 2012-13, around 156 million rural Indian households had an outstanding personal debt; 85% of the amount of credit being disbursed was given to those households in the bottom income decile for 'non-business' related purposes. This paper uses nationally representative household data from the NSS EUS collected in 2004-05 and 2009-10 to look at the impact MGNREGA has had on the rural households' ability to repay outstanding debt. Results suggests that MGNREGA reduced the size of the outstanding debts for vulnerable households.

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MGNREGA; India; household debt; household level data

1. Introduction

India has experienced significant and steady rates of economic growth since the 1990s, with an average yearly growth rate of 7% between 1990–2000; yet, this aggregate economic growth did not translate in better living conditions for those households in the lowest income quintiles and for vulnerable castes (Gupta, 2018). On the contrary, economic growth is considered to be the cause of a further increase in inter-state and intra-state inequalities and chronic poverty, with 33.3% of the rural population considered poor[1] in the 2009–10 period (Ghosh, and Chandrasekhar, 2007; Panagariya, 2014).

In a seminal move to address household level poverty and chronic unemployment issues in rural India, the Government of India introduced the 'National Rural Employment Guarantee Act' (NREGA) in 2005, which was later renamed the 'Mahatma Gandhi National Rural Employment Guarantee Act' (MGNREGA) (Dasgupta 2004). MGNREGA is a nation-wide intervention and guarantees 100 days of work per year, every year, to all the adult female and male members of rural households who are willing to engage in unskilled manual labour at the statutory minimum wage notified by the program (Khera 2011). The objectives of the act are to provide safety nets for vulnerable groups, provide an engine for the agricultural sustainable development, empower the rural poor and promote new ways of doing businesses by providing work for unskilled workers at the wage rate specified by the Central Government.[2]

Government interventions such as MGNREGA play a vital role for the welfare of rural India, where it is common for casual and unskilled workers to have limited job security and, as a consequence, negligible bargaining power with the employers to demand better working conditions (Nagaraj, 2014). MGNREGA aims at correcting such inefficient and inequitable market outcomes by providing year-round employment opportunities at a predetermined minimum wage. Thus, while

CONTACT Luca Tasciotti l.tasciotti@greenwich.ac.uk Department of International Business and Economics, University of Greenwich, London, UK

neoliberal economic theory firmly places the market in a superior position over state intervention and regulation (Turnbull, 1992), this backdrop of chronic poverty and unemployment in rural India provides a strong ground for rural market intervention on the basis of a perceived need.

It is essential to assess the magnitude and direction of the impacts MGNREGA has generated, as the act has the potential to have wide-ranging consequences, especially for poverty reduction and rural development. Drèze (2010) even heralded MGNREGA to have the ability to break 'the dictatorship of the private employer' by providing minimum wages, thus increasing the bargaining power of rural workers (Breitkreuz, 2017; Carswell, 2014; Reddy, 2014). There is consensus in the literature about how effective the act has proved over time in benefiting the poorest households, Dalits and women. Carswell and De Neve (Carswell and De Neve 2014) argue that the benefits created by MGNREGA 'are not only substantial but also transformative in that they affect rural relations of production and contribute to the empowerment of the rural labouring poor'. According to the Government of India, MGNREGA generated 2,350 million person days' work only in 2015–16 ('235 crore person days' work generated by MGNREGA: Government,' 2016).

This paper makes a critical contribution to the debate on the nature and effects of social protection policies through an empirically informed analysis of India's Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), a nationwide public works scheme that offers rural households 100 days of paid employment per year. The paper explores whether the scheme contributes to 'genuine transformative social protection' This paper makes a critical contribution to the debate on the nature and effects of social protection policies through an empirically informed analysis of India's Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), a nationwide public works scheme that offers rural households 100 days of paid employment per year. The paper explores whether the scheme contributes to 'genuine transformative social protection' This paper makes a critical contribution to the debate on the nature and effects of social protection policies through an empirically informed analysis of India's Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), a nationwide public works scheme that offers rural households 100 days of paid employment per year. The paper explores whether the scheme contributes to 'genuine transformative social protection' This paper makes a critical contribution to the debate on the nature and effects of social protection policies through an empirically informed analysis of India's Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), a nationwide public works scheme that offers rural households 100 days of paid employment per year. The paper explores whether the scheme contributes to 'genuine transformative social protection' This paper makes a contribution to the (mainly qualitative) existing body of literature that investigate the effects that MGNREGA has had on Indian households and assess -through an econometrically sound analysis- whether the act has reduced the debt position of rural dwellers. This is a unique attempt at a national-level analysis using publicly available data to examine the impact of MGNREGA on rural household debt. Rural indebtedness is one of the main causes of distress for those households engaged in in the agricultural sector (Sajjad, 2016). Around 52% of the agricultural households in India are in debt with an average debt of Indian Rupees (INR) 91,825 (Katyal, 2013) – approximately 1,252 US dollars (USD).[3] The extent and severity of rural indebtedness has forced many small-scale farmers out of the agricultural sector as it is not considered remunerative enough (Singh, 2009). While the results of this paper applaud the effectiveness of the act from the point of view of reducing the magnitude of debts, it should be reminded that the success of the act has been spoilt by corruption cases, irregularities and unsustainability of the assets being created (Jagannath 2014).

There are marked socio-economic differences between those having/not having an outstanding debts, with those households in the 'Other Backward Classes'[4] (OBC) showing a higher incidence of debt, while female-headed households particularly lagging in asset value if compared to male-headed households (Surendran Padmaja, 2019). By providing the opportunity for paid work in public works at equal wages, MGNREGA has especially benefited the socio-economically poorer households in rural India (Deininger, 2013; Sarkar, Kumar and Supriya, 2011).

The rest of the paper is organised as follows. It starts by illustrating how the MGNREGA has been designed and conducted, and by reviewing the existing literature on the impact this scheme has had on several socio-economic indicators (section 2). Section 3 and 4 present the data and the methodology used, as well as preliminary results coming from descriptive statistics. The body of results stemming from the econometric analysis is presented in section 5 and conclusions follow.

2. Literature review

2.1 Mahatma Gandhi National Rural Employment Guarantee Act

The rural poor in India live on the threshold of subsistence with the majority of them depending on the meagre livelihood earned from unskilled and casual labour (National Rural Employment Guarantee Act (2005) Report of the Second Year, 2006–07). They are particularly vulnerable to shocks in the labour market arising from lack of labour demand, especially during the lean agricultural period. Considering the backdrop of poverty and unemployment in rural India, the 'National Rural Employment Guarantee Act' was introduced in 2005 (National Rural Employment Guarantee Act (2005) Report of the Second Year, 2006–*07)*, and later renamed as MGNREGA.

The Government of India has hailed MGNREGA as a 'rights-based, demand-driven, self-selecting, bottom-up scheme' (Mukundan 2009). The critical rationale behind implementing this scheme is to transfer income to poor households during lean agricultural periods which will enable them to smooth consumption over the year (Shome, 2012; Varman, 2020). The program aims at improving the rural livelihood of Indian households by reducing their vulnerability to unpredictable agricultural related shocks and to the seasonality of agricultural activities; with an expenditure of approximately 8 billion USD each year, MGNREGA is one of the largest social safety nets programs in the whole world.

There are several differences between the MGNREGA and other public employment programs. The most fundamental feature of the MGNREGA is the demand driven and rights-based approach above mentioned; the terms and conditions of employment are unique too as it is required that an unemployment allowance has to be paid if work is not provided within 15 days. Workers are further protected as they must be given compensation if wages are not paid within 15 days of work completion (Breitkreuz et al. 2017). Furthermore, the program looks at the durability of the assets created by the workers as they are intended to provide durable infrastructure in rural areas to ameliorate the livelihood of rural dwellers (*MGNREGA Operational Guidelines* 2005). The program has a focus on the management of natural resources and 65% of the MGNREGA funds must be spent on water related projects in order to decrease the occurrences of shocks such as droughts, floods and cyclones (Ghosh 2014).

MGNREGA has received special attention for providing women with an occupation and, to this regards, MGNREGA's success has already been agreed in several gender analysis studies (Khera and Nayak 2009; Dasgupta and Sudarshan, 2011). According to the Act, at least one-third of the workers employed through MGNREGA should be women.

A higher number of women (4 in 10 women) than men (1 in 10 men) work as an unpaid contributing family member. It is harder for rural women to find paid work than rural men, with the unemployment rate of rural women being more than double that of rural men in the last decade (Bárcia de Mattos 2017). In this way, MGNREGA has provided an opportunity for rural women to enter paid employment which empowers and strengthens the bargaining power of women in the household too (Kabeer 2008). To this regard, MGNREGA can be also thought as a way to reduce gender, classes and castes differences accentuated by the lack of social protection, persistent underemployment and the ambiguities of financial inclusion (Guérin, 2013). Dalits, women, landless and casual labourers do not have access to formal lending channels, pay more interest rates and borrow

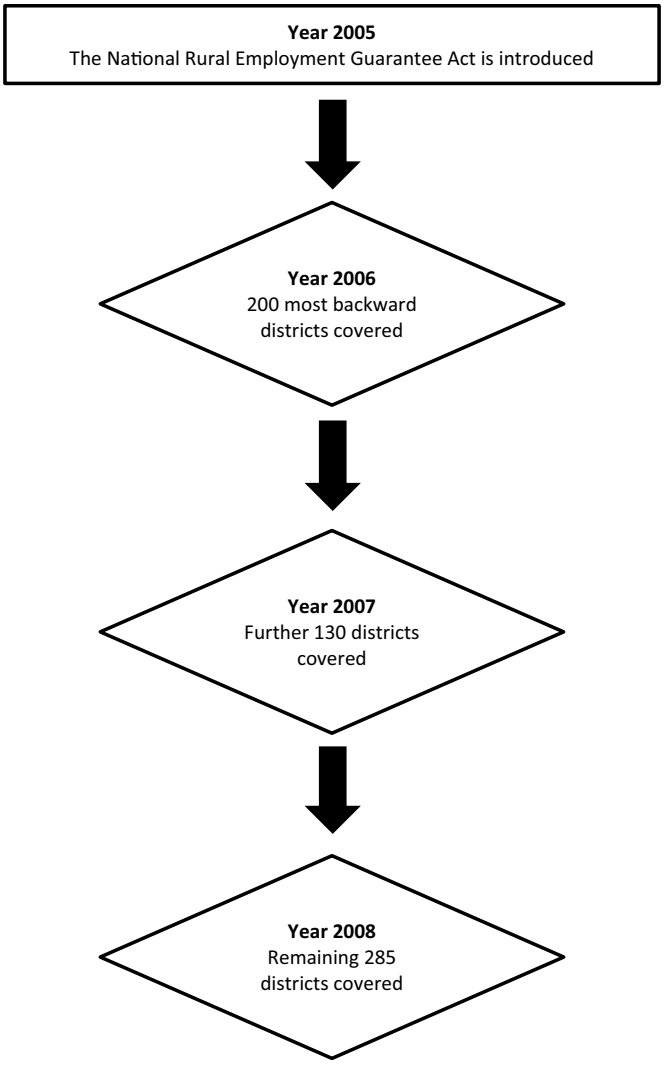

Figure 1. Phase-wise Implementation of MGNREGA. Source: Author's illustration based on MGNREGA Operational Guidelines (2005), Government of India.

primarily for consumption. The purpose of the credit differs too, with women borrowing in order to make ends meet while males borrowing for productive investment (Harriss-White 2004; Reboul, 2021).[5]

In the guidelines set out for MGNREGA, there is no mandate stating how the 100 days of work for each household should be shared among the members, giving ample opportunity for women to participate (Khera, and Nayak, 2009). The Act ensures equal wages for men and women, whereas in the private sector women generally receive lower wages (Srivastava, and Srivastava, R., 2010); to ease women' participation in the labour force, the Act ensures that child care facilities should be provided at worksites where more than five children under six years of age are present (Khera and Nayak 2009).

Notwithstanding the general scepticism that a program of its size may generate, the numbers that MGNREGA can boast are impressive and hint at the soundness and potential that the program has established over the years. Since its inception in 2006, approximately 25 billion USD has been

paid in form of salaries to rural households for the 12 billion person-days of employment. This is the result of the provision of employment to 50 million households, every year since 2008. The program has helped the contractual power of workers, with the average person-day wage going up by 81% since 2006, even though differences across districts still persist (from a minimum of 1.76 USD in Bihar to a maximum of 2.76 USD in Haryana). The program has helped disadvantaged households in the SC which have accounted for 51% of the total person-days generated as well as women (47% have benefitted of the program, above the mandatory 33 per cent as required by the Act (MGNREGA Sameeksha 2012).

The flowchart in Figure 1 provides a quick overview of the phases of implementing MGNREGA; phase I was introduced in February 2006 in 200 of the 'most backward' districts of the country (Das, 2016). A further 130 districts were included in 2007 as part of following phase. In April 2008, phase III introduced the program in the remaining 285 districts, out of a total of 718 districts, making the entire country of India being under the MGNREGA's umbrella (Ramesh 2017); the program -which has generated 16,790 million person days of employment since its inception (Ranjan 2015) – is still operational.

2.2 A review of studies on MGNREGA

MGNREGA is the only rights-based program in the world and takes inspiration from its precursor, the Maharashtra Employment Guarantee Scheme in terms of the right to demand work from the state (Holmes, 2011). The central government had previously introduced the Jawahar Rojgar Yojana (JRY) in 1989 with the objective to provide employment to the poor (Bhatia, 2016), releasing 80% of the funds to the village panchayats.[6] The program was unable to effectively reach the target population, with only 22% of the funds reaching the less wealthy strata of the population (Radhakrishna, 1997; Srivastava 2004). The inefficiency prevailed even after the JRY was modified in 1995 to focus on 120 of the most backward districts.

Although MGNREGA also suffers from systemic corruption, including wage skimming by administrators, over-reporting the number of job-days required and caste bias (Anderson, 2013; Breitkreuz et al. 2017; Kapur 2010; Niehaus and Sukhtankar 2013), 67.5% of the funds allocated for MGNREGA were spent on wages in 2009–10. Thus, involving the village-level governance bodies, while maintaining central authority, has helped MGNREGA funds to better reach the intended target (Breitkreuz et al. 2017).

MGNREGA has proved to be superior in terms of allocation of fund even to the Employment Assurance Scheme (EAS), introduced in 1993, which aimed to provide employment to poorer households during the lean agricultural season. The EAS suffered from low uptake, inefficient targeting and improper utilisation of funds. The EAS was later merged with the 'National Food for Work' program to form the 'Sampoorna Grameen Rozgar Yojana' (SGRY) program and decided that wages would be paid in food grains which created further difficulties with respect to timely and quality payments (Holmes, Morgan, and Hagen-Zanker 2011).

Previous literature has assessed the impact of MGNREGA on several socio-economic factors (Azam 2012; Harish, 2011; R. Khera 2011; Reddy, Reddy, and Bantilan 2014). MGNREGA has been deemed to be somewhat of a victory for the Indian democracy as the scheme is a proof of how the underprivileged are not completely marginalised in the country (Drèze 2010; Reddy, Reddy, and Bantilan 2014). Reddy, Reddy, and Bantilan (2014) (Reddy, Reddy, and Bantilan 2014), using data from Census of India as well as from NREGA reports, find that the share of Scheduled Caste[7] (SC) households in the total person-days of employment increased from 25% in 2006–07 to 30% in 2009–10. Ahuja et al. (2011) (Ahuja, 2011), found that small and marginal farmers were more inclined to seek MGNREGA work than the farmers with abundant resources to have a sufficing self-employment.

MGNREGA places special emphasis on women empowerment through its provisions which are favourable for women, as previously discussed. Out of the total MGNREGA person-days, women workers demonstrated a national average share of 40.65% in 2006–07 which increased to 47.88% in 2008–09, exceeding the minimum stipulated 33% share (Pankaj 2010).

There are prominent regional differences -especially North-South variations- in the impact of MGNREGA (Khera and Nayak 2009). MGNREGA has been more successful in Rajasthan and Himachal Pradesh in terms of number of days of employment generated, with less significant impact in Bihar and Maharashtra (Khera 2011). On the other hand, women participation was higher in southern states with better gender and human development indices (Pankaj 2010).

Other studies have reported the scheme to have a beneficial impact on the incidence of poverty, especially due to its effect on food security, income, savings and health outcomes (Ambasta, 2008). Considering five districts in the state of Andhra Pradesh, Liu and Deininger (2013) found that MGNREGA has boosted consumption expenditure and asset accumulation, especially for households depending on casual employment and those belonging to scheduled castes and tribes. Moreover, the scheme has significantly increased monthly per capita expenditure on food and non-food commodities, reducing the number of foregone weekly meals per household (Deininger and Liu 2013). Emad (2013) reports that MGNREGA has helped rural households smooth their consumption across the year (Emad 2013).

Existing literature seems to suggest that the additional income from MGNREGA related jobs is primarily spent on consumption -mainly to purchase food, durable and non-durable goods (Harish et al. 2011); part of this additional income is also spent on debt repayment (Ramesh, and Krishnakumar, 2009). Due to the choice of the time periods, the study will help examine the impact of MGNREGA on the districts exposed to the program for two years against those exposed for a year. This will help ascertain the longer-term effects of MGNREGA on rural household debt, in order to tackle the broader consideration of rural poverty.

3. Data and methodology

This paper uses secondary data from two rounds of the National Sample Survey Office (NSSO), a wing of the Ministry of Statistics and Program Implementation, Government of India. The NSSO collects nation-wide household level data by conducting yearly as well as quinquennial surveys. Those surveys are conducted 'using a methodology based on multi-stage, multi-subject and multi-purpose cross-sectional surveys' (Mitra 2018). The households are selected randomly after a two-stage sample design (Katyal et al. 2013).

This paper will employ the quinquennial 'Employment and Unemployment Surveys' (EUS), since they have a wider coverage and sample size than the annual surveys (Emad 2013). The EUS Rounds are the primary sources of data on various socio-economic indicators of the Indian labour force at the National and the State level. The paper uses data from NSS Employment and Unemployment Survey (EUS) 61st Round (2004–05) which covered 459 districts and the NSS EUS 66th Round (2009–10) which covered 435 districts.[8] Phase I, II and III districts were not exposed to MGNREGA when the 61st Round was conducted. Phase I and II districts were exposed to MGNREGA in 2007, two years before the NSS EUS 66th round, and Phase III districts were exposed to MGNREGA in 2008, 1 year before the NSS EUS 66th round.

This paper employs an ordinary least squares model (OLS) with state-level fixed effects to look at the impacts of MGNREGA, where the independent variable indicates the length of exposure to MGNREGA, either 1 or 2 years. The analysis looks at the difference in the impact MGNREGA has had on the ability to repay debts of households who have been exposed 2 years versus those who have benefited from MGNREGA for only a year.

Urban households have been excluded from the analysis as well as those living in the State of Maharashtra, as the State's Employment Guarantee Scheme (EGS) is still operative there -since 1972–73- and it may pollute the effect of the MGNREGA. Furthermore, the analysis does not include the Leh and Kargil districts of Jammu and Kashmir and interior villages of Nagaland as the NSS EUS Rounds did not collect data there.

The model expressed in (1) has been employed for the OLS analysis:

$$Y_{it} = \beta_0 + \beta_1 \, EXPOSURE_{it} + \beta_2 X_{it} + \mu_i + \varepsilon_{it} \quad (1)$$

where

'Y_{it}' represents the dependent variable of interest and indicates the amount of outstanding debt for household *i* in year *t* -i.e. the total amount due including the outstanding principal and the interest- on the date of the survey. The debt itself can be accrued from various sources -the government, co-operative society, bank, employer/landlord, agricultural/professional money lender, shopkeeper/trader, relatives/friends.

The variable '$EXPOSURE_{it}$' indicates the exposure dummy variable indicating whether the household has been the beneficiary of MGNREGA for two (value 1) rather than a year (value zero). 'X_{it}' is a vector of individual household characteristics for household *i* in period *t* -including age of household member, age squared, total wages/salary earned in the last week, binary variable denoting the gender of the household member (male/female), household size, categorical variable for education level of household members (not literate/below primary level/primary and above), land owned (in hectares), categorical variable denoting the social group (Scheduled Castes, Scheduled Tribes, Other Backward Classes)- and μ_i state-level fixed effects. The term 'ε_{it}' identifies the error term.

The coefficient 'β_1' indicates changes in the outcome variable as a consequence of being exposed to MGNREGA for two years versus one year. Since we are aware that more backward districts were initially selected for the initial implementation of MGNREGA, this selection bias may lead to an underestimation of the true effect of MGNREGA (Emad 2013); it is importance, hence, to examine the results in light of this bias.

The analysis will be done using the pooled sample and different sub-samples (for households in different caste's group, male and female headed households, those in the bottom and top 25% income distribution, those with land owned below/above the median). As a further robustness check, we test whether the OLS results hold up by using a variation of a discontinuity design. We run the analysis by only including the 10% least-poor of the first phase and 10% of most-poor of the second phase to see if similar results hold (and repeat the analysis using the 20% threshold). This robustness test aims at determining how important the non-random assignment into phases one and two is.

4. Descriptive statistics

The full dataset derived from both the NSS EUS 61st Round (2004–05) and the NSS EUS 66th Round (2009–10) consists of 111,643 rural households, observed in the period 2004–05 and 2009–10. This section will provide a description of the socio-economic characteristics of rural households.

Table 1 shows the variable averages for the Phase I and II and compared it to the Phase III districts, both in 2004–05 and 2009–10. A t-test was conducted to investigate whether the differences in the averages reported for the households pre and post exposure to MGNREGA are significant. The variable 'Amount of outstanding debt including interest rate' refers to the total amount due (including the outstanding principal and the interest) on the date of the survey.

The same statistics were computed using the the NSS Employment and Unemployment 55th Round (July 1999 – June 2000) and 60th Round (January 2004 – June 2004); this last survey had been completed before the NSS Employment and Unemployment Survey (EUS) 61st Round (2004–05) -the

Table 1. Descriptive Statistics of Districts in the Pre-Treatment and Post-Treatment Period.

	Pre-MGNREGA exposure (2004–05)			Post-MGNREGA exposure (2009–10)		
Variables	Phase I & II districts (A)	Phase III districts (B)	Difference (A – B)	Phase I & II districts (A)	Phase III districts (B)	Difference (A – B)
Total wages and salary (monthly)	283	379	−96***	604	716	−112***
Amount outstanding debt including interest rate	6351	12,681	−6330***	13,120	24,307	−11,187***
Consumption expenditure (monthly)	319	386	−67***	508	627	−119***
Average age of the household' members	27	28	−1***	29	30	−1***
Household size	5	5	0***	4	5	−1***
Land owned (in hectares)	0.23	0.21	0.02***	0.22	0.18	0.04***
% of males in the sample	56.95%	43.05%	13.9***	56.07%	43.93%	12.14
Caste						
% of household members in the scheduled tribe	15.57%	5.79%	9.78***	14.59%	4.36%	10.23***
% scheduled caste	31.26%	34.83%	−3.57***	31.92%	35.18%	−3.26***
% other backward classes	33.52%	43.74%	−10.22***	35.61%	44.39%	−8.78***
% other classes	19.65%	15.65%	4***	17.88%	15.96%	1.92***
Education level of household members in schooling age						
%not literate	41.82%	29.18%	12.64***	39.44%	24.56%	14.88***
%below primary level	14.12%	12.88%	1.24**	19.09%	10.91%	8.18***
%primary and above	44.06%	57.94%	−13.88***	41.47%	64.53%	−23.06***

Source: Author's calculations based on NSS EUS 61st Round (2004–05) and NSS EUS 66th Round (2009–10).

Note: Variables are expressed in INR. For Phase III Districts in 2009–10, the statistics on the castes do not add up to 100 as 0.11% of the responses were not recorded. ***, ** and * indicate the significance level respectively at the 1, 5 and 10% level.

one used in the paper as a baseline survey- had started. Those additionals two rounds of household level surveys were employed to show that the average of the covariates between groups is constant over time (Zeldow, 2021).

The comparison of Table 1 with Table 2 shows substantial differences in the average level of per capita monthly consumption between districts in Phase I and II compared to those in the Phase III, with this difference being consistent and significant across time. This is in line with the original idea of rolling out the MGNREGA program firstly to households living in more disadvantaged districts. Likewise, MGNREGA was supposed to include districts with households in marginalised caste (other backward classes (OBC), scheduled caste (SC) and scheduled tribes (ST)) (Table 1).

Tables 1 and 2 show that households residing in Phase I and II districts are statistically different in the observables compared to those residing in Phase III districts, with those differences being constant across time (differences are in terms of disposable income, average age, caste composition and educational levels).

Before proceeding to the econometric work, we investigate whether the participation in the MGNREGA is determined by shocks in the rainfall.

Following Sarsons' study, we measure whether deviation from previous years rainfall played a role in the uptake of the MGNREGA program (Sarsons 2015). We computed the yearly average rainfall at the state level from 2000 to 2010 and compared it with the rainfall data for treated and non-treated districts in 2006. The resulting variable (the difference between the average district rainfall in 2006 and the average state rainfall 2000–2010) is referred to as 'Shock in rainfall' (Table 7). We chose the 2006 as a benchmark year as the MGNREGA started to be rolled out in treated districts a year later.

A negative (positive) value of the shock variable indicates that the rainfall in given treated/non-treated districts in 2006 is lower (higher) than the 10 years average. Summary statistics do not indicate a clear pattern; only in 10 out of 25 states, treated districts in 2006 displayed a worse 'shock' profile if compared to non-treated districts. Main differences relate to the shock in rainfall in treated district Jammu & Kashmir and Jharkhand, whose rainfall level is 200 and 140 millimetres less than those non-treated districts. Overall, treated districts in 2006 do not consistently show drought episode when compared to non-treated district.

Those statistics confirm the insight that participation in the MGNREGA program is not driven by drought shocks; rather, those are long-term investment decisions made by the Central Government over several years.

Furthermore, to examine whether there is a significant selection bias, a probit model is included as a sensitivity check (Table 8 in the Appendix). Results shows that hhouseholds with higher earnings were less likely to be firstly exposed to MGNREGA. However, this coefficient is relatively small, albeit significant. Likewise, households belonging to marginalised social groups were also more likely to be exposed to MGNREGA for two years. Those results could be considered in-line with the remit of the MGNREGA, whose aim is to guarantee 100 days of wage employment per year to marginalised rural households. The other household characteristics related variables included in the probit regression do not significantly affect the participation in the program.

Descriptive statistics for the covariates in the OLS regression are included in the Appendix (see Tables 9 and 10). The average age of household members (28.1 years in 2004 and 29.7 years in 2009) as well as the average household size (an average of 4.8 members in 2004 and 4.5 members in 2009) are fairly comparable over 2004 and 2009. There is a natural increase in the average age of households and a subsequent slight decline in the average household size. The mean of total wages and salary of sample households increased from INR 324.4 in 2004 to INR 650.1 in 2009.

There is consistency in the share of households headed by male –52.9% in 2004 and 50.8% in 2009- in the percentage of ST members –11.3% and 10.1% in 2009- that of SC members –32.8% and 33.4%- and in that of OBC members –37.9% and in 39.5%. The percentage of household members not literate (49.4% in 2004 and 39.9% in 2009) and with below primary level education (22.4% in 2004 and 18.1% in 2009) declined from 2004 to 2009. Consequently, the percentage of household members educated at the primary level and above increased from 28.2% in 2004 to 41.9% in 2009.

Table 2. Descriptive Statistics of households in two surveys in the Pre-Treatment Period.

	Pre-MGNREGA exposure (1999–2000)			Pre-MGNREGA exposure (2004)		
Variables	Phase I & II districts (A)	Phase III districts (B)	Difference (A – B)	Phase I & II districts (A)	Phase III districts (B)	Difference (A – B)
Total wages and salary (weekly)	471.59	599.79	−128.20***	806.12	816.31	−10.18***
Amount outstanding debt including interest rate	n/a	n/a		n/a	n/a	
Consumption expenditure (monthly)	n/a	n/a		579.82	634.01	−54.19***
Average age of the household' members	25.44	26.58	−1.14***	27.21	26.35	0.86***
Household size				5.00	5.19	0.19***
Land owned (in hectares)	0.25	0.19	0.06***			
% of males in the sample	52.47%	51.59%	0.88	52.67%	52.42%	0.25
Caste						
% of household members in the scheduled tribe	15.25%	7.77%	7.48***	15.13%	7.19%	7.94***
% scheduled caste	17.31%	21.28%	−3.97***	17.49%	20.06%	−2.57**
% other backward classes	26.79%	32.75%	−5.96***	25.78%	32.85%	−7.02***
% other castes	40.65%	38.20%	2.45***	41.60%	39.90%	1.7***
Education level of household members in schooling age						
%not literate	44.84%	35.63%	9.21***	41.19%	32.81%	8.38***
%below primary level	18.25%	17.08%	1.17	14.21%	16.41%	−2.2
%primary and above	36.91%	47.29%	−10.38***	44.61%	50.78%	−6.17***

Note: Author's calculations based on the surveys NSS Employment and Unemployment 55th Round (July 1999 – June 2000) and 60th Round (January 2004 – June 2004). This last survey had been completed before the NSS Employment and Unemployment Survey (EUS) 61st Round (2004–05) -the one used in the paper- had started. ***, ** and * indicate the significance level respectively at the 1, 5 and 10% level.

There are differences in terms of land distribution and amount of outstanding debts among different castes, even if those differences are not significant (Table 10 in the Appendix). The amount of land owned remains constant across years for all but the SC, whereas the amount of outstanding debts doubles in 2009–10.

5. Econometric results

Table 3 reports the OLS estimates for the impact of MGNREGA on the size of outstanding debt for those households who have benefited the program for two years versus one.

For the entire sample under consideration, the exposure variable suggests that the impact of MGNREGA over time here considered, from 2004–05 to 2009–10, has helped reducing the level of debt by an average of INR 4349.

Table 3 also shows the impact of MGNREGA on the level of indebtedness of various social groups in India. The largest reduction in debt, an average of INR 4352, is observed for the Scheduled Castes. For the Other Backward Class households, average debt decreased by INR 2631. However, the average debt for Scheduled Tribe households increased by INR 1980.

The debt for male members in the households has reduced by an average of INR 4102 and by INR 4088 for female members in the households in the districts exposed to MGNREGA for two years, with those two results being significant at the 1% level (Table 4).

Table 5 examines the impact of MGNREGA on income groups, categorised based on the 25^{th} and 75^{th} percentile respectively. For those households earning wages and salary less than INR 210 per month, being exposed to MGNREGA for two years has reduced overall debt by INR 2369.

Table 6 shows the estimates of the OLS model when the sample is divided based on the size of land-owned (above and below the median size); again, the model indicates a reduction in the amount of debt and the results are significant at the 1% level.

The paper further examines the effect of MGNREGA on the amount of outstanding debts in a regression discontinuity setting (Table 11) by looking at two sub-samples; the first sub-sample consists of the 10% richest households having benefitted from MGNREGA for 2 years with the 10% least rich having benefitted from MGNREGA for only 1 year. This exercise is then repeated using the threshold of 20%; the results of the OLS regressions do show that a longer exposure to the program does decrease the amount of outstanding debt. The coefficient is larger when using the sample defined by the 20% threshold, even if only significant at 10% level.

6. Discussion and Conclusions

In India, 44% of the population lives below the poverty line of USD 1 per day and 86% of the population earns less than USD 2 per day (Saxena, 2003). Poverty is predominantly -although not limited- in rural areas and the inequality permeates regions and social groups (marginalised classes including SCs, STs, and OBCs being relatively more deprived) and women headed household being significantly more disadvantaged than men in terms of making household decisions, literacy rates and control over household assets (Saxena and Farrington 2003).

Under such circumstances, the introduction of MGNREGA -with its rights-based approach and provisions favourable for the marginalised groups- sounded as a promising tool to reduce poverty indicators and households' inequality which permeates the whole India. MGNREGA has served as a vital source of livelihood for the poorer rural households and has increased rural incomes, especially for those households in the bottom quintile. The minimum wages offered has strengthened the bargaining power of rural workers, resulting in higher wage rates, improved work conditions and protection from exploitation (Reddy, Reddy, and Bantilan 2014). Thus, there has been a radical change in the way rural households perceive their rights as a citizen, and this has the potential to transform power relations in rural India (Breitkreuz et al. 2017).

Table 3. OLS estimates for Amount Outstanding including Interest Rate (in INR).

	(1) Overall	(2) Scheduled Castes	(3) Scheduled Tribes	(4) Other Backward Classes
Exposure to the treatment	−4348.57***	−4351.52***	1979.72***	−2630.57***
	(308.69)	(308.58)	(524.06)	(666.89)
Age of each individual in a household	−38.10	216.68***	21.89	−360.60***
	(51.09)	(52.18)	(78.41)	(116.32)
Age squared	0.13	−2.29***	−1.36	4.34***
	(0.65)	(0.67)	(1.01)	(1.48)
Total wage and salary earnings per week	20.66***	9.33***	6.84***	40.76***
	(0.36)	(0.36)	(0.59)	(0.79)
Male-headed households	1565.14***	1489.65***	558.41	3846.79***
	(262.50)	(267.24)	(374.31)	(564.20)
Household size	907.57***	964.13***	247.75**	956.78***
	(68.67)	(68.81)	(101.29)	(149.98)
Education level of household members in schooling age	802.62***	267.05*	520.39**	1029.21***
	(146.99)	(147.30)	(230.91)	(318.35)
Land owned (in hectares)	0.45***	0.26***	1.01***	0.28***
	(0.29)	(0.38)	(0.35)	(0.54)
Constant	−1.8e+04***	−1.1e+04***	−1500.18	−4.9e+04***
	(1803.39)	(1984.00)	(2659.47)	(9922.18)
Observations	84,311	28,928	10,024	31,711
R2	0.10	0.10	0.14	0.13

Source: Author's calculations based on NSS EUS 61st Round (2004–05) and NSS EUS 66th Round (2009–10).
Note: Control variables include state-level fixed effects. Standard errors in parentheses. ***, ** and * indicate the significance level respectively at the 1, 5 and 10% level.

Table 4. OLS estimates for Amount Outstanding including Interest Rate (in INR), by sex of individual.

	(1) Male headed household	(2) Female Headed households
Exposure to the treatment	−4101.64***	−4088.22***
	(312.30)	(643.84)
Age of each individual in a household	67.08	−38.28
	(52.16)	(106.66)
Age squared	−1.31*	0.41
	(0.67)	(1.34)
Total wage and salary earnings per week	14.03***	29.93***
	(0.38)	(0.71)
Male-headed households	0.00	0.00
	(.)	(.)
Household size	865.13***	936.98***
	(68.47)	(147.10)
Education level of household members in schooling age	1669.24***	−286.74
	(145.92)	(320.93)
Land owned (in hectares)	0.52***	0.35***
	(0.27)	(0.66)
Constant	−1.5e+04***	−2.3e+04***
	(1704.05)	(4112.42)
Observations	54,017	30,294
R2	0.12	0.09

Source: Author's calculations based on NSS EUS 61st Round (2004–05) and NSS EUS 66th Round (2009–10).
Note: Control variables include state-level fixed effects. Standard errors in parentheses. ***, ** and * indicate the significance level respectively at the 1, 5 and 10% level.

Table 5. OLS estimates for Amount Outstanding including Interest Rate (in INR), by wages and salary per week.

	(1) W/S less than 210 INR	(2) W/S higher than 570 INR
Exposure to the treatment	−2369.33***	−2927.88***
	(608.13)	(938.71)
Age of each individual in a household	138.16	−129.69
	(88.62)	(175.76)
Age squared	−1.34	1.65
	(1.15)	(2.17)
Total wage and salary earnings per week	−7.27	32.35***
	(4.77)	(0.94)
Male-headed households	12.92	1776.13**
	(492.62)	(820.29)
Household size	685.32***	1140.55***
	(132.19)	(223.93)
Education level of household members in schooling age	1058.68***	2376.42***
	(281.24)	(453.03)
Land owned (in hectares)	0.26***	0.30***
	(0.58)	(0.88)
Constant	2914.12	−3.6e+04***
	(5542.82)	(4893.55)
Observations	23,607	21,008
R2	0.02	0.12

Source: Author's calculations based on NSS EUS 61st Round (2004–05) and NSS EUS 66th Round (2009–10).
Note: W/S indicates the amount of monthly wages/salary. Control variables include state-level fixed effects. ***, ** and * indicate the significance level respectively at the 1, 5 and 10% level.

Table 6. OLS estimates for Amount Outstanding including Interest Rate (in INR), by land owned (in hectares).

	(1) Land owned less than 0.22 ha.	(2) Land owned more than 0.22 ha.
Exposure to MGNREGA	−4526.72***	−4331.93***
	(431.43)	(440.08)
Age of each individual in a household	−217.85***	58.62
	(72.19)	(71.32)
Age squared	2.81***	−1.81**
	(0.93)	(0.91)
Total wage and salary earnings per week	26.12***	15.37***
	(0.54)	(0.47)
Male-headed households	2500.88***	374.51
	(361.32)	(378.20)
Household size	1209.66***	479.09***
	(99.05)	(95.61)
Education level of household members	−115.21	1819.21***
	(204.41)	(210.01)
Constant	−2.0e+04	−1.3e+04***
	(16,665.13)	(2084.34)
Observations	47,296	37,015
R2	0.07	0.15

Source: Author's calculations based on NSS EUS 61st Round (2004–05) and NSS EUS 66th Round (2009–10).
Note: Control variables include state-level fixed effects. ***, ** and * indicate the significance level respectively at the 1, 5 and 10% level.

The analysis conducted in the paper shows that MGNREGA has contributed to the reduction of the overall debt, with this result being consistent and significant for those households in the SC and OBC caste and which have been exposed to MGNREGA for two years as compared with those exposed to only a year. These results are in line with findings that MGNREGA has gradually helped to improve recipients households in poor socio-economic conditions (Bhattarai, 2014; Sarkar, Kumar, and Supriya 2011). A reduction in the level of debt of those in the poorer strata of the population could imply that additional household funds can now be released for more productive purposes and for strengthening the economic situation of the households. However, the analysis also shows that

the overall debt increased for ST households which have been exposed to MGNREGA for two years as compared with those exposed to MGNREGA for a year. This result highlights that MGNREGA has had a heterogeneous impact on vulnerable households and further improvements in program implementation are required to reach all households at the bottom of the pyramid (Parida 2016; Sarkar, and Islary, 2017; Solinski 2012).

OLS results show that the overall debt has decreased for both male and female headed household; this is rather surprising given the fact that male headed households are more likely to hold debt, both institutional and non-institutional, than their female counterpart in rural India (Grown, 2015; Kaur, 2020). This reflects MGNREGA's objective of strengthening the bargaining power of women. Further, the OLS results show that being exposed to MGNREGA for two years has reduced the overall debt for those households who are earning wages and salary less than INR 210 per month. This underscores MGNREGA's efforts to improve the livelihoods of the bottom quintile by providing employment during lean agricultural periods.

However, MGNREGA has not reached its full potential due to several considerations like structural deficiencies and procedural lapses (Chakraborty and Anjula Gurtoo 2014). There have been regional variances in the implementation of MGNREGA, thus, affecting its outcome. No state except those of Tripura, Mizoram and Manipur could provide even one-third of the 100 days of employment assured for every household (Reddy, Reddy, and Bantilan 2014). Hence, states like Tripura and Mizoram have displayed significant improvement with MGNREGA earnings being a little over 20% of the poverty threshold. However, states with a higher incidence of inequality -such as Bihar- still lag behind in terms of rural poverty (as high as 55% of the rural population in 2009–10) (Reddy, Reddy, and Bantilan 2014). Thus, although local government bodies are strongly involved in implementing MGNREGA programs, more central authority is required to improve the effectiveness of its implementation.

Encouraging capital expenditure in public investments for social, economic and physical infrastructure through the income-generating opportunities that MGNREGA creates for rural households could help tackle long-term poverty. For this to happen, the state and intra-state variances and structural deficiencies in the implementation of MGNREGA must be tackled head-on. It is, therefore, essential that MGNREGA remains in operation to provide a rights-based source of livelihood to the poorer rural population; as only with a persistent rise in rural income, can the livelihoods be strengthened.

Notes

1. Based on the Tendulkar Committee, the Poverty Line is set at INR 27.2 in rural areas in India.
2. For more information on the MGNREGA, refer to the website https://www.nrega.nic.in/netnrega/mgnrega_new/Nrega_home.aspx lastly accessed on 21/10/2020.
3. The conversion from INR to USD relates to the exchange rate on 21/10/2020. For a more up-to-date conversion refer to the website www.oanda.com.
4. A group of historically disadvantaged castes, in both educational and social terms, recognised by the Government of India.
5. For a comprehensive literature review on how women and lower income population are unable to access credit, and on the dyad 'poor women have too much debt/not enough access to credit' please refer to Reboul, Guérin, and Nordman (2021).
6. A village panchayat (or a village council) is the basic governing institute in Indian villages.
7. Socially disadvantaged groups of people officially designated by the Constitution of India.
8. The NSS 64th EUS Round data -done in 2007–08- has not been used as data on the level of indebtedness of rural households had not been collected that year. On the other hand, the level of comparability between the 61st and the 66th Round is very high.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Notes on contributors

Sharvari Patwardhan is a research analyst at the International Food Policy Research Institute in New Delhi, India. She was previously a research fellow at the University of Manchester. She holds a master in Economics from the School of Oriental and African Studies , London.

Luca Tasciotti holds a Ph.D. in Economics from the University of Tor Vergata, Rome.He has previously worked for the Food and Agriculture Organization (FAO) of United Nations (Rome), for the International Institute of Social Studies (The Hague) and for the School of Oriental and African Studies (London). He is a heterodox development applied economist with interests ranging from nutrition to health, from fertility to agricultural practices; he is mainly interested in the economics of sub-Saharan Africa and other less developed areas.

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Appendix

Table 7. Shock in the rainfall in treated/non treated districts.

State name	Treated/non treated districts	Shock in rainfall (in mm)
Andhra Pradesh	Treated	−21.96
Andhra Pradesh	Non treated	−117.40
Arunachal Pradesh	Treated	324.27
Arunachal Pradesh	Non treated	186.03
Assam	Treated	425.58
Assam	Non treated	378.21
Bihar	Treated	−17.26
Bihar	Non treated	−16.85
Chhattisgarh	Treated	45.49
Chhattisgarh	Non treated	53.27
Gujarat	Treated	−94.1
Gujarat	Non treated	9.97
Haryana	Treated	−10.29
Haryana	Non treated	28.91
Himachal Pradesh	Treated	−33.26
Himachal Pradesh	Non treated	−72.23
Jammu & Kashmir	Treated	−219.61
Jammu & Kashmir	Non treated	−20.31
Jharkhand	Treated	−0.22
Jharkhand	Non treated	140.92
Karnataka	Treated	−107.72
Karnataka	Non treated	−130.66
Kerala	Treated	−12.41
Kerala	Non treated	−45.35
Madhya Pradesh	Treated	5.78
Madhya Pradesh	Non treated	−7.32
Maharashtra	Treated	−12.98
Maharashtra	Non treated	−6.17
Manipur	Treated	21.36
Manipur	Non treated	14.56
Meghalaya	Treated	37.54
Meghalaya	Non treated	32.18
Mizoram	Treated	2.36
Mizoram	Non treated	−3.64
Nagaland	Treated	−13.89
Nagaland	Non treated	2.15
Orissa	Treated	36.71
Orissa	Non treated	15.23
Punjab	Treated	−6.34
Punjab	Non treated	−8.45
Rajasthan	Treated	3.34
Rajasthan	Non treated	−2.15
Sikkim	Treated	−24.12
Sikkim	Non treated	−36.27
Tamil Nadu	Treated	3.69
Tamil Nadu	Non treated	5.84
Tripura	Treated	−14.25
Tripura	Non treated	−26.1
Uttar Pradesh	Treated	3.89
Uttar Pradesh	Non treated	−2.45

Source: Data on rainfall come from the 'Indian Water Portal'.

Notes: the variable 'Shock in rainfall' -third column- is computed for treated/non-treated districts, as the difference between the rainfall data for treated/non-treated districts in 2006 and the yearly average rainfall at the state level from 2000 to 2010. A negative (positive) value of the variable indicates that the rainfall in given treated/non-treated districts in 2006 is lower (higher) than the 10 years average rainfall in the state. Numbers indicate millimetre of rain.

Table 8. Probit estimates for being exposed to MGNREGA for one versus two years.

	Exposure to MGNREGA (1 versus 2 years)
Total wage and salary earnings per week (INR)	−.00004***
	(.00001)
Education level of household members	.0013
	(.00581)
Social Group of Household	
Scheduled Castes	0.215***
	(0.0167)
Scheduled Tribes	0.910***
	(0.0221)
Other Backward Classes	0.0968***
	(0.0164)
Observations	77,987

Source: Author's calculations based on NSS EUS 61st Round (2004–05) and NSS EUS 66th Round (2009–10).

Note: Control variables also include age of household member, age squared, total wages/salary earned in the last week, share of male member in the household, household size, average education of the household members, land owned (in hectares), and state-level fixed effects. Standard errors in parentheses. ***, ** and * indicate the significance level respectively at the 1, 5 and 10% level.

Table 9. Descriptive statistics.

	2004		2009	
Variables	*Mean (SE)*	*(Min, Max)*	*Mean (SE)*	*(Min, Max)*
Average age of the household' members	28.05 (17.46)	(1,100)	29.68 (17.64)	(1,92)
Total wages and salary (monthly)	324.38 (258.14)	(0,3906)	650.11 (426.55)	(0,5800)
Household size	4.78 (1.94)	(1,20)	4.52 (1.81)	(1,18)
Land owned (in hectares)	0.22 (0.51)	(0,14)	0.20 (0.53)	(0,8)
	Percentages			
	2004		*2009*	
% of males in the sample	52.99%		50.84%	
Caste				
% of household members in the scheduled tribe	11.30%		10.08%	
%scheduled caste	32.84%		33.36%	
%other backward classes	37.96%		39.49%	
Education level of household members i				
%not literate	35.38%		33.93%	
%below primary level	13.44%		16.11%	
%primary and above	52.18%		59.96%	

Note: Author's calculations based on NSS EUS 61st Round (2004–05) and NSS EUS 66th Round (2009–10).

Table 10. Average land owned, disaggregated by year and caste.

	Average land owned (in hectares)		Amount of outstanding debt	
Social group	2004–05	2009–10	2004–05	2009–10
Scheduled tribe	0.34	0.37	4,266	8,567
Scheduled caste	0.16	0.12	7,062	15,802
Other backward classes	0.24	0.23	12,700	21,790
Others	0.23	0.22	8,278	19,467
Total	0.22	0.20	9,102	18,056

Source: Author's calculations based on NSS EUS 61st Round (2004–05) and NSS EUS 66th Round (2009–10).

Table 11. OLS estimates for the amount of outstanding debts including Interest Rate (in INR) for the 10% (20% in the third column) least poor households exposed to MGNREGA for 2 year and 10% (20% in the third column) least rich households exposed to MGNREGA for 1 year.

	Amount Outstanding including Interest Rate (INR)	Amount Outstanding including Interest Rate (INR)
Exposure	−1,279***	−1,940*
	(299.8)	(856.1)
Age of each individual in a household	−257.89*	−281.14
	(159.8)	(174.7)
Age squared	2.57	3.41*
	(2.03)	(2.08)
Total wage and salary earnings per week	6.32***	9.97***
	(.99)	(1.19)
Male-headed households	−3,807***	436
	(7,333)	(754)
Household size	1,124***	1,188***
	(204)	(206)
Education level of household members	−1,141***	−605
	(409)	(417)
Land owned	−2.25***	−1.16
	(.78)	(1.37)
Constant	−1,171***	−5,072
	(4,176)	(4,603)
Observations	8,401	16,989
R2	0.115	0.041

Source: Author's calculations based on NSS EUS 61st Round (2004–05) and NSS EUS 66th Round (2009–10).
Note: Control variables include state-level fixed effects. Standard errors in parentheses. ***, ** and * indicate the significance level respectively at the 1, 5 and 10% level.