

Employment Guarantee and its Welfare Effects in India

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Abstract

The Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) annually employs over 50 million households across rural India. Many studies point to substantial labor market effects, but little is known about the Act's welfare impact. This paper examines the MGNREGA's effect on money-metric measures of poverty and inequality of rural households. We combine data from several waves of India's National Sample Survey (NSS) on household consumption with information on the district-wise roll-out of the MGNREGA. We build a district-level panel to conduct difference in differences estimations. Controlling for heterogeneous treatment and time trends across districts we find significant treatment effects for extreme levels of poverty reducing the poverty gap by about one fifth. However, the MGNREGA does not succeed in eliminating poverty at large. We estimate significant poverty alleviating effects for Phase 2 districts, but falsification tests restrict us from interpreting effects for Phase 1 districts in a similar fashion.

1 Introduction

Despite annual growth rates of about 8 per cent India still has a large number of people living in poverty. Estimates range between 20 to 55 per cent of India's 1.2 billion strong population.¹ Ever since independence, efforts to reduce poverty have been plenty and diverse. The National Rural Employment Guarantee Act - or as it was later baptized Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) - is the latest and most comprehensive poverty reduction initiatives. Enacted in 2005, this workfare program guarantees 100 days of employment to every rural household whose members are willing to do unskilled manual labour at the statutory minimum wage. In the financial year of 2011-12 alone, more than 55 million households were employed across the Indian subcontinent. Worker are paid at least Rs. 100 in real prices (or about \$2) per workday, while the Indian government spends about \$10 billion each year on this program, which is about 0.04 per cent of its total expenditure in 2011-12.²

Since its first year of implementation researchers, activists and civil society organisations have been keen to find out how the MGNREGA is working. Of particular interest often is whether funds reach the workers, whether and how works are being taken up, who the beneficiaries are and to what extent participating households benefit. In an overview and compilation of the major studies since the birth of the Act Khera (2011) describes the process of implementing the Act "in letter and spirit" and the "realization of workers' entitlements" as "the battle for employment guarantee".

Regarding the Act's effect on labor market outcomes, three recent studies find that rural wages saw an upward shift (Azam, 2012; Berg, Bhattacharyya, Durgam, and Ramachandra, 2012; Imbert and Papp, 2012). According to these studies, between 2004-05 and 2007-08, the Act effected an increase in rural wages between 3 and 5 per cent with female workers and marginalised groups of the SC/ST population being the main beneficiaries. These studies also underline the fact that demand for labor is highly seasonal and that the MGNREGA serves as a safety net during the lean season when agricultural work opportunities are scarce. While these are large effects given that the program is India-wide and the rural work force comprising about 300 million people, critique of researchers has largely addressed implementation issues and not so much the idea as such.³

Drèze and Khera (2009), for instance, find that workers are often not paid on time, that worksites are not up to the prescribed standards, that workers are not aware of their entitlements under the Act, and that payment of unemployment allowance is still sensational news.⁴ Regional disparities are stark, such that there are states like Bihar, Orissa, or West Bengal, where poverty is wide spread but the number of work days abysmally low. On the other hand there are certain states like Rajasthan, Tamil Nadu and Andhra Pradesh which are leading the way in terms of employment generation, relatively smooth and transparent wage payment and social audits (Aakella and Kidambi, 2007a,b; Drèze and Oldiges, 2009; Khera and Muthiah, 2010). Recently, Zimmermann (2012) shows evidence that the MGNREGA is particularly attractive for women workers as it increases their private sector wages. She finds, however, that the impact on agricultural wages mainly occurs during the agricultural main season and much less during

¹According to the Indian Government poverty rates are between 20 and 30 percent depending on the poverty lines, whereas according to Multidimensional Poverty Index estimates about 55 per cent of households are deprived in at least 3 out of 10 indicators (Alkire and Santos, 2010). Also see: <http://www.ophi.org.uk/wp-content/uploads/Country-Brief-India.pdf>

²For the Indian Budget of 2011-12, visit <http://indiabudget.nic.in/budget2011-2012/budget.asp>.

³The media on the other hand has not been as benevolent to the idea of an employment guarantee as independent research has been. For many MGNREGA related articles see: www.righttofoodcampaign.org.

⁴Refer, for example, to Narayanan (2008) and Bhattu (2006) for analyses on female laborer and worksite facilities for mothers with young children.

agricultural off-seasons.

While agricultural wages and individual consumption might be positively correlated, especially for the rural poor, it is not clear from the just-cited studies to what extent the Act has had an effect on rural households' welfare. For example, has individual consumption increased due to higher wages? Have the rural poor, the main target group of the program, benefited disproportionately from the MGNREGA? Moreover, calculating money-metric impacts of the Act on individual welfare would allow to assess the effectiveness of a Rupee spent through the program. Without such knowledge one cannot argue against the statement - often heard by opponents of the Act -, that simple cash hand-outs to the poor would be a much easier, and more effective alternative (Economist, 2008). To our knowledge, there is merely one study addressing the welfare issue, albeit at a limited regional geographical scope. Ravi and Engler (2009) use a panel of 320 households in villages of Andhra Pradesh and show that both wages and consumption expenditure increase in response to the Act.

In this paper we combine data from several waves of India's nationally representative National Sample Survey (NSS) on household consumption with information on the district-wise roll-out of the MGNREGA. We utilize the phase wise roll-out of the Act according to which the MGNREGA was implemented first in 200 districts in the fiscal year 2006-07 (Phase 1), and in another 150 districts during the following year (Phase 2). The MGNREGA was extended to the entire country by the year 2008-09 (Phase 3). We build a district-level panel with NSS and program coverage data for the years 2004-05 to 2007-08 and conduct difference in differences estimations. In our basic econometric specifications, we consider several consumption-based measures of welfare at the household-level as dependent variables and concurrent program availability in the household's district of residence as the explanatory variable of interest to obtain estimates of the intent-to-treat effect of the MGNREGA on household consumption outcomes. In additional specifications, we employ two more data sources. First, a poverty ranking of India's districts by the National Planning Commission from 2003, which has served as the basis for program allocation to districts during the years 2006-07 and 2007-08. In this process, the declared intention of policy makers has been to prioritize poorer districts by granting earlier access to the program. We use this ranking to allow for heterogeneous time trends and treatment effects across districts. Second, we have collected official year-wise data on MGNREGA workdays per household at the district level. These data allow us to estimate heterogeneous treatment effects by local program intensity.

Using data from 2005 to 2008 for the sample of all rural households, we find no statistically significant effect of the program on individual consumption. The same obtains for poverty when we consider the headcount ratio measure. For the poverty gap measure, in contrast, we find significant poverty-alleviating effects. Accordingly, extreme poverty, which focuses on individuals below the poverty line advocated by the National Planning Commission, fell by roughly a fifth in the 130 districts of the second MGNREGA phase between the years 2006-07 and 2007-08, while we do not find a comparable effect for the 200 districts of the first wave. Similarly, moderate poverty, which focuses on individuals below the poverty line advocated by the Tendulkar Committee, fell by roughly one eighth in the 130 second-wave districts. Given that Tendulkar headcount poverty fell by less than five percent, we infer that the program improved the average situation of the poor considerably while it did not succeed in eliminating poverty at large.

For the subsample of SC/ST households, we find even stronger effects: here both the (extreme) National Planning Commission as well as the (moderate) Tendulkar poverty gap measure fell by about one fifth for all phase 1 and phase 2 districts. Given much higher initial levels of poverty for this group, our findings imply greater absolute average benefits for the poor for this group than for the average poor. Moreover, mean consumption among SC/ST households increased by 3.7% in phase 2 districts.

Besides poverty we analyse the effects on inequality, too. Measured as the variance of the

log of monthly per capita consumption expenditure (MPCE), inequality fell in Phase 1 districts by 18 per cent, while our estimates for Phase 2 districts peg the reduction at 11 per cent. For SC/ST households the decline is even greater. Inequality among SC/ST households declined by more than a third in Phase 1 districts and by 17 per cent in Phase 2 districts.

We also examine the composition of consumption expenditures and find that access to the program increased the share of non-food expenditures, at least initially for phase 1 districts, which is in line with anecdotal evidence.

Estimates of the program effects allow a rough cost-benefit analysis of the program. For example, our results for mean consumption among the SC/ST population imply additional consumption expenditures per SC/ST household of about Rs. 1,200 per year, which compares to program expenditures of Rs. 1,111 per rural household or roughly Rs. 4,500 per SC/ST household.

We also conduct several robustness checks. While our findings are robust to modifications of the estimating equations, placebo experiments (or falsification tests) with data from the years 2004-05 and 2005-06 suggest that development patterns of districts in the absence of MGNREGA differ systematically by the program phase a district gets assigned to - even when allowing for heterogeneous time trends by the Planning Commission's 2003 district poverty score. The criteria by which districts are allocated to phases on top of the Planning Commission's 2003 score hence appear to threaten the empirical identification of causal treatment effects in a non-negligible way. We argue consequently that particularly the results for the phase 1 districts should be taken with a grain of salt because they had already received substantial public spending through the National Food for Work Program and other anti-poverty initiatives right up to the enactment of the MGNREGA.

The structure of the paper is as follows. In Section 2, we give a brief overview of the poverty situation and poverty measurement in rural India and then highlight the key features of the MGNREGA. Section 3 describes our data and Section 4 explains variations of our econometric approach. We present our main results on the MGNREGA's effect on MPCE, inequality, and poverty for both all rural households and SC/ST households alone in Section 5. Then, in Section 6 we discuss further results regarding the effects on different expenditure shares. In Section 7 we examine several robustness checks before we draw our conclusions in Section 8.

2 Background on Poverty and the MGNREGA

Poverty in India has been declining over the last few decades. At the same time, however, economic progress came along with greater inequality. Deaton and Drèze (2002) explain that the decline in poverty is evident, but since poverty is still unavoidable for many while others enjoy income gains inequality is higher than before. The decline in poverty is largely uncontested, but its magnitude is a matter of debate. The Tendulkar Committee (T.C.), 2009 recommends reforms to poverty measurement in India. Following the Planning Commission's procedure of applying MPCE based poverty lines the T.C. calls for a re-adjustment of these poverty lines, not just via the CPI-AL but by applying Fisher price indices taking into account rural and urban price differences (see Tendulkar Committee and others (2009)). According to the T.C.'s now widely accepted poverty lines the negative trend in poverty rates over the decades is similar, albeit at different levels. Poverty headcount ratios for rural India fell from 40 to 30 per cent and not from 30 to 20 per cent between 2004-05 and 2009-10. Hereon we refer to the poverty figures defined by the P.C. as extreme poverty and those defined by the T.C. as moderate poverty.

A more holistic approach to measuring poverty or the quality of life is to apply the Alkire and Foster method (Alkire and Foster, 2011a) and calculate the number of households who are

Table 1: Phase-wise Means for Rural India between 2004-05 and 2007-08

	2004-05	2005-06	2006-07	2007-08
	Phase 1			
Log. of MPCE (Rs.)	6.11	6.14	6.15	6.19
Poverty Headcount Ratio (P.C.) (%)	29.70	27.92	26.29	22.00
Poverty Gap Ratio (P.C.) (%)	5.55	5.58	5.20	3.64
Poverty Headcount Ratio (T.C.) (%)	50.93	47.37	47.82	42.28
Poverty Gap Ratio (T.C.) (%)	12.18	11.57	11.11	8.83
Observations	26836	6522	11511	11518
	Phase 2			
Log. of MPCE (Rs.)	6.23	6.21	6.21	6.28
Poverty Headcount Ratio (P.C.) (%)	19.89	23.21	23.06	15.22
Poverty Gap Ratio (P.C.) (%)	3.32	4.14	4.04	2.40
Poverty Headcount Ratio (T.C.) (%)	39.88	41.81	42.17	34.54
Poverty Gap Ratio (T.C.) (%)	8.30	9.67	9.58	6.42
Observations	19086	4424	7688	7894
	Phase 3			
Log. of MPCE (Rs.)	6.35	6.39	6.42	6.46
Poverty Headcount Ratio (P.C.) (%)	15.08	13.01	13.31	9.71
Poverty Gap Ratio (P.C.) (%)	2.40	1.86	2.12	1.47
Poverty Headcount Ratio (T.C.) (%)	34.19	30.57	29.64	25.13
Poverty Gap Ratio (T.C.) (%)	6.96	5.75	6.04	4.58
Observations	31332	7502	13250	11618

Note: All measures are deflated to real prices of 2004-05 using the CPIAL, Poverty Headcount Ratio and Poverty Gap (P.C.) are based on 2004-05 poverty lines as set by the Planning Commission. Poverty and Poverty Gap (T.C.) are based on 2004-05 poverty lines as per the Tendulkar Committee.

The sample includes all major states, including Jammu & Kashmir and Assam excluding Union Territories and the remaining Northeastern States

Sources: Rounds 61, 62, 63, and 64 of NSSO Consumption Expenditure Surveys.

Table 2: MGNREGA Information on Sample Districts

	Phase 1		Phase 2
	2006-07	2007-08	2007-08
Total Expenditure (Rs. in crores)	8,685	11,744	3,471
Exp. per HH employed under the MGNREGA (Rs.)	1,626	2,199	1,112
Exp. per HH employed under the MGNREGA (Rs.)	4,187	5,241	3,425
Expenditure on Wages (Rs. in crores)	5,758	7,877	2,460
Wage Exp. per Rural HH (Rs.)	1,078	1,475	788
Wage Exp. per HH employed under the MGNREGA (Rs.)	2,776	3,515	2,427
Total Person-days (in crores)	89	106	33
Person-days per Rural HH	17	20	11
Person-days per HH employed under the MGNREGA	43	47	32
HHs employed under the MGNREGA (in millions)	21	22	10
Number of Sample Districts	188	188	103

Rounded figures. Calculated using Census 2001 data and MGNREGA data posted online at www.nrega.gov.in. Districts from the Northeastern states, except for Assam's, are not included.

deprived in multiple dimensions of well-being. The multidimensional poverty index (MPI) of 2010 is one such attempt (Alkire and Santos, 2010). According to the MPI, 53 per cent of India's rural population is deprived in at least three out of ten indicators of health, education, and living standard.⁵

Given this context of widespread poverty (irrespective of the method of measurement), the MGNREGA is a major social sector program. It was preceded by the National Food for Work Programme (NFFWP), which lasted from 2004-05 to 2005-06 and can be viewed as a kind of trial for the MGNREGA.^{6 7}

Initially implemented by the United Progressive Alliance (UPA) government in the 200 poorest districts of India, it is designed as a safety net for rural households.⁸ As presented in Table 2, under the MGNREGA about 20 million households were employed in its first year, amounting for a total government expenditure of Rs. 9,000 crores. Over the following years, the MGNREGA was rolled out in two additional phases, so that by 2007-08 130 additional districts were covered (Phase 2) and by 2008-09 all remaining districts of India (Phase 3) were covered. Under the Act every rural household is entitled to 100 days of work at the statutory minimum wage which is set by each state government. It is important to note, that the Act provides for universal entitlement as any rural resident who is willing to volunteer for work, irrespective of gender, caste, or religion, is entitled to the right to work within 14 days of application. According to the Act, any non-compliance would grant unemployment allowance. This, however, along with

⁵For a discussion of this technique, refer to Alkire and Foster (2011b); Ravallion (2011). And for further discussions on Indian poverty measurements refer for example to Deaton and Kozel (2005); Sen and Himanshu (2004a,b); Himanshu (2007).

⁶For more information regarding the NFFWP, consult the Right to Food Campaign's website, www.righttofoodcampaign.org.

The related identification problems shall be discussed in the sections below.

⁷Also, workfare programmes are not new in Indian history as the Maharashtra Employment Guarantee Scheme (MEGS) from the 1970s is a famous and well researched example of its kind (see for example (Basu, 1981; Drèze, 1990; Ravallion, Datt, and Chaudhuri, 1993)).

⁸And for a comprehensive account of the Act's history consult the book by Khera (2011).

several other provisions of the Act such as sufficient worksite facilities for young mothers and children, a recommended employment quota of 33 per cent for women, timely wage payments and full transparency are often not met across all districts (Drèze and Khera, 2009).

Despite the shortfalls in the implementation of all the provisions of the Act, in 2007-08, over 50 per cent of all MGNREGA workers had an SC/ST background and more than a third of all workers were female (see Table 2). From Table 2, it is also clear that the MGNREGA differs across the two phases, Phase 1 and 2. Person-days per rural household, for instance, increased from 17 to 20 between 2006-07 and 2007-08, whereas the number of person-days generated in Phase 2 districts - 11 per rural household - are much lower right from the beginning. For Phase 1 districts we also observe an increase in total expenditure and wages between the two years of interest.

Looking at Table 1 we observe that the targeting of poor districts was successful in as much as the average household of a Phase 1 district is indeed poorer than households from districts chosen for the latter phases. For instance, according to our extreme measure of the poverty headcount ratio in 2004-05, about 30 per cent of all rural households in Phase 1 districts are poor, about 20 per cent in Phase 2 districts, and 15 per cent in Phase 3 districts. Similarly, we see such a trend for our measure of moderate poverty, albeit at higher levels, and for the poverty gap measure. At the same time, with NSS data of the rounds 61, 62, 63, and 64 for the years between 2004-05 and 2007-08 we see a more or less linear trend in falling poverty levels for both Phase 1 and Phase 3 districts. For Phase 2 districts, on the other hand, we notice a hump shaped trend, where poverty first increases between 2004-05, 2005-06 and 2006-07, and then drastically plummets by more than a 30 per cent in 2007-08.

From Tables 1 and 2 we conclude that there has been a negative trend in both moderate and the extreme poverty between 2004-05 and 2007-08, during the time MGNREGA started and grew in intensity. These rather broad observations do not allow us to infer any causal effects of the MGNREGA. In the following sections we therefore undertake a more complex but standard approach (differences-in-differences) to answer whether the poor, the target group, benefit from the Act disproportionately more than non-poor households.

3 Data and Measures of Poverty and Inequality

3.1 Data

In the subsequent analysis we make use of the following NSS rounds: 61, 62, 63, and 64 for the years 2004-05, 2005-06, 2006-07, and 2007-08, respectively. We use NSS sampling weights to estimate effects on MPCE, inequality, expenditure shares and all our poverty measures across all rural households. We do not aggregate at the district-level. Similarly we calculate all household controls regarding household size and social group of household from these data sets. We deflate all prices to 2004-05 prices using the *Consumer Price Index for Agricultural Labourers (CPI-AL)*, based on 1986-87.⁹ Throughout, we rely on MPCE collected with the mixed recall period¹⁰, and we measure MPCE in logs and multiply the log by a factor of 100. Our sample consists of 504 districts of all major Indian states, including Jammu and Kashmir and Assam, excluding all other Northeastern states and Union territories. From the 504 districts 188 are Phase 1 districts, 103 Phase 2 districts and the remaining 213 are Phase 3 districts. Sample

⁹Source: India Budget 2010. <http://indiabudget.nic.in/es2009-10/chapt2010/tab53.pdf>

¹⁰The Mixed Recall Period (MRS) allows more durable items like clothing, bedding, and investments in education and health to be recalled on a yearly basis, while all other items, all food items, are based on a 30-day recall period.

Table 3: Sample Summary Statistics

Full Sample	Mean	SD	Max	Min	Nonmissing
Log. MPCE * 100	626.27	48.18	1132.31	264.69	143502
Poverty Headcount Ratio (P.C.) (%)	19.92	39.94	100.00	0.00	143502
Poverty Headcount Ratio (T.C.) (%)	38.88	48.75	100.00	0.00	143502
Poverty Gap (P.C.) (%)	3.51	9.17	95.67	0.00	143502
Poverty Gap (T.C.) (%)	8.45	13.98	96.54	0.00	143502
SC/ST population (%)	32.19	46.72	100.00	0.00	143466
HH-size	6.04	2.88	43.00	1.00	143502
HH-size ²	44.78	55.96	1849.00	1.00	143502
Person-days per rural HH (PdHH)	4.20	12.11	264.10	0.00	142540
Number of Districts					504
SC/ST Sample					
MPCE	485.48	265.03	17955.42	14.11	39933
Log. MPCE * 100	608.55	42.81	979.56	264.69	39933
Poverty Headcount Ratio (P.C.) (%)	31.08	46.28	100.00	0.00	39933
Poverty Headcount Ratio (T.C.) (%)	54.25	49.82	100.00	0.00	39933
Poverty Gap (P.C.) (%)	5.93	11.76	95.67	0.00	39933
Poverty Gap (T.C.) (%)	13.18	16.54	96.54	0.00	39933
HH-size	5.83	2.54	38.00	1.00	39933
HH-size ²	40.45	40.99	1444.00	1.00	39933
Full Sample: Total Food Share and Selected Food Items					
Total Food Share	58.89	11.05	100.00	0.00	143502
Vegetable-Fruit Share	8.48	3.18	52.21	0.00	143502
Protein Share	15.26	7.40	68.92	0.00	143502
Cereals Share	23.48	9.55	86.01	0.00	143502
Full Sample: Total Non-Food Share and Selected Non-Food Items					
Total Non-Food Share	41.11	11.05	100.01	0.00	143502
Education Share	2.45	3.97	93.31	0.00	143502
Medical Share	5.45	8.40	94.02	0.00	143502
Fuel & Light Share	10.45	4.31	93.19	0.00	143502
Clothes Share	7.73	3.24	100.00	0.00	143502

Calculated using NSS Consumption Expenditure Surveys, Rounds 61, 62, 63, 64.

MPCE is Monthly per Capita Consumption. Poverty Headcount Ratio (P.C.) and Poverty Gap Ratio (P.C.) are calculated using 2004-05 Poverty Lines as per the Planning Commission.

Poverty Headcount Ratio (T. C.) and Poverty Gap Ratio (T.C.) are calculated using 2004-05 Poverty Lines as per the Tendulkar Committee. All measures are deflated to 2004-05 prices using the CPIAL-index.

Score is a composite index of backwardness, ranking 447 districts in ascending order from 0.078 (most backward) to 2.159 (Source:Planning Commission (2003)).

Table 4: Phase-wise Differences in Means, 2004-05

	Phase 1 - Phase 2			Phase 1 - Phase 3		
	P1	P2	P1-P2	P1	P3	P1-P3
MPCE	600.52	699.88	-99.36***	600.52	802.08	-201.56***
Log. MPCE * 100	624.83	640.82	-15.99***	624.83	651.41	-26.57***
HCR (P.C.) (%)	21.24	12.18	9.06***	21.24	10.23	11.01***
HCR (T.C.) (%)	39.31	27.41	11.90***	39.31	24.79	14.51***
PGR (P.C.) (%)	3.91	1.99	1.92***	3.91	1.61	2.30***
PGR (T.C.) (%)	8.87	5.29	3.58***	8.87	4.78	4.09***
SC/ST (%)	35.19	28.48	6.71***	35.19	23.49	11.70***
HH-size	5.09	5.12	-0.03	5.09	5.07	0.02
HH-size ²	32.94	33.17	-0.23	32.94	32.43	0.50
Score	0.89	1.07	-0.17***	0.89	1.32	-0.43***
Number of Districts	188	103	85	188	213	-25
	Phase 2 - Phase 3			Phase 1&2 - Phase 3		
	P2	P3	P2-P3	P1&2	P3	P1&2-P3
MPCE	699.88	802.08	-102.20***	637.24	802.08	-164.84***
Log. MPCE * 100	640.82	651.41	-10.58***	630.74	651.41	-20.66***
HCR (P.C.) (%)	12.18	10.23	1.95***	17.89	10.23	7.66***
HCR (T.C.) (%)	27.41	24.79	2.61***	34.91	24.79	10.12***
PGR (P.C.) (%)	1.99	1.61	0.38***	3.20	1.61	1.59***
PGR (T.C.) (%)	5.29	4.78	0.51***	7.55	4.78	2.76***
SC/ST (%)	28.48	23.49	4.99***	32.71	23.49	9.22***
HH-size	5.12	5.07	0.05**	5.10	5.07	0.03*
HH-size ²	33.17	32.43	0.74*	33.02	32.43	0.59*
Score	1.07	1.32	-0.25***	0.95	1.32	-0.37***
Number of Districts	103	213	-110.00	291	213	78

* p<0.1, ** p<0.05, *** p<0.01

Sources: Same as in Table 3.

Summary Statistics are given in Table 3 and Phase wise differences in means are given in Table 4.

For measuring the intensity of the MGNREGA we use data on generated person-days and total expenditure provided by the Ministry of Rural Development (MORD)¹¹, and Census 2001 data for the number of rural households per district Government of India (2001)

To control for district-wise heterogeneous time trends we employ a score-interaction term. This score is based on a district ranking by the Planning Commission (2003) which ranks 445 districts on a score of "backwardness" and is calculated as the mean of three subindices: "percentage of SC/ST population", "Agricultural Output per worker", and "Agricultural Wages". The final composite score ranks districts from a score of 0.078 (most backward) to a score of 2.159 (least backward).

3.2 Measures of Poverty and Inequality

Our measure of inequality is straight forward as we simply have to calculate the variance of the log. of MPCE.

As mentioned in Section 2 there are at least two consumption based poverty measures in India. First, there is the what we call extreme headcount ratio which is based on the poverty lines as set by the Planning Commission (P.C.). And second, there is the what we call moderate headcount ratio of poverty as per poverty lines set by the Tendulkar Committee (T.C.). State-wise poverty lines as per the P.C. are extreme in the sense that they are much lower than those set by the T.C.. Therefore, according to the T.C.'s poverty lines poverty is more prevalent than under poverty lines of the P.C. In our subsequent analyses we use both the measures to test the effects on moderate and extreme poverty.

Regarding poverty across phases, Table 4 highlights that on average households in Phase 1 are poorer than in Phase 2 districts, which in turn are substantially poorer than households in Phase 3 districts. This speaks for a targeted roll-out of the MGNREGA and underlines the planner's reliance on a poverty ranking.

From Table 3 it is apparent that the subsample of SC/ST households is much poorer than rural households from the entire sample. According to all poverty measures (HCR and PGR), extreme and moderate, the SC/ST population is disadvantaged. The HCR (P.C.) for the SC/ST sample is 50 per cent higher than the corresponding one for the whole sample.

4 Approach: Difference in Differences (DID)

In this section we explain our estimation technique. As the MGNREGA was rolled out in phases over the course of three years our difference in differences (DID) estimation model is standard and straight forward. For the initial year, 2006-07 for example, when the MGNREGA was rolled out to 200 districts (Phase 1) our sample consists of 188 treatment districts and 316 control districts with the year 2005-06 being our reference year.¹²

4.1 Model for two years of data

Our model for two years of data is as follows:

¹¹ For MGNREGA data visit www.nrega.gov.in, and for a discussion on the authenticity of the data see, for example, Imbert and Papp (2011).

¹²Keep in mind that the same 200 districts saw other programmes implemented since 2003 as well. Hence we do not use 2004-05 as the reference year, but rather 2005-06.

$$Y_{idt} = \mu_d + \gamma D07_t + \beta Treat_d * D07_t + \gamma X_{idt} + \epsilon_{idt}, \quad (1)$$

where Y_{idt} represents the dependent variable for household i in district d and time t . We use data from the years 2007-08 and 2005-06 in our main specifications.¹³

X_{idt} captures control variables for household i , in district d and year t .

μ_d is a fixed effect unique to district d and ϵ_{idt} is a random error term capturing all disturbances per household, district and year.

The binary variable $D07$ is a dummy equal to one for observations from the year 2007-08 and zero otherwise. The variable $Treat$ is a dummy equal to one for districts in which the MGNREGA was active in 2007-08 and zero otherwise. Our coefficient of interest is β .

The following is the same specification but now identification relies only on intra-state variation across districts over time:

$$Y_{idst} = \mu_{ds} + \gamma_s D07_t + \beta Treat_{ds} * D07_t + \gamma X_{idst} + \epsilon_{idst}, \quad (2)$$

where the subscript s denotes the state in which district d is located. So instead of one dummy for the year 2007-08, there are S state-specific year 2007-08 dummies, where S denotes the number of states in our sample.

A variation of the previous model is

$$Y_{idt} = \mu_d + \gamma D07_t + \beta_1 Phase1_d * D07_t + \beta_2 Phase2_d * D07_t + \gamma X_{idt} + \epsilon_{idt}, \quad (3)$$

which allows to estimate separate treatment effects for Phase 1 and Phase 2 districts. Notice that in 2007-08 Phase 1 districts are in their second year of implementing the Act while Phase 2 districts are in their first year. If the MGNREGA's effect involves a lag of one year, the corresponding coefficient restriction is $\beta_2 = 0$.

4.2 Model for more years of data

Here we present variations of the specifications described above which include data of several years.

Regression equation with data for three years (2004-05, 2005-06 and 2006-07):

$$Y_{idt} = \mu_d + \gamma_1 D05_t + \gamma_2 D06_t + \beta Phase1_d * D06_t + \gamma X_{idt} + \epsilon_{idt}, \quad (4)$$

Regression with data for four years (2004-05, 2005-06, 2006-07, and 2007-08):

$$Y_{idt} = \mu_d + \gamma_1 D05_t + \gamma_2 D06_t + \gamma_3 D07_t + \beta_1 Phase1_d * D06_t + \beta_2 Phase1_d * D07_t + \beta_3 Phase2_d * D07_t + \gamma X_{idt} + \epsilon_{idt}, \quad (5)$$

Same specification but now identification relies on only intra-state variation across districts over time:

$$Y_{idst} = \mu_{ds} + \gamma_{1s} D05_t + \gamma_{2s} D06_t + \gamma_{3s} D07_t + \beta_1 Phase1_{ds} * D06_t + \beta_2 Phase1_{ds} * D07_t + \beta_3 Phase2_{ds} * D07_t + \gamma X_{idst} + \epsilon_{idst}, \quad (6)$$

¹³One robustness check uses the year 2004-05 as the reference year.

4.3 Interaction terms

A concern is the lack of randomness of program placement. For example, Phase 1 districts may have evolved more slowly in the absence of the program. We exploit the Planning Commission's program placement rule according to which 150 of the 200 districts of Phase 1 were chosen from the ranking of "Backwardness". This ranking assigns to each district a score which is calculated as the mean value of three subindices which are separate indices on SC/ST population, agricultural wages and agriculture output per worker. The score then ranks all districts from the most backward to the least backward (from 0.027 to 2.159).

At the same time MGNREGA's effect on welfare may substantially depend on its level of implementation, which we call intensity. One way to measure the intensity is to calculate person-days per rural household, as practiced in this paper. The following estimating equation holds for the data scenario "Data for 3 years, 2004-05 to 2006-07":

$$Y_{idt} = \mu_d + \gamma_1 D05_t + \gamma_2 D06_t + \beta_1 Phase1_d * D06_t + \beta_2 I_d * D06_t + \eta_1 I_d * D06_t + \gamma X_{idt} + \epsilon_{idt}, \quad (7)$$

where I_d is the interaction term of choice.

5 Hypothesis and Main Results

As the MGNREGA is designed as a poverty alleviating programme by providing guaranteed employment at the statutory minimum wage, and as many studies already point at the positive labor market effects, we hypothesize that the MGNREGA also has a welfare effect by raising households' consumption expenditure (MPCE). And since conventional money-metric poverty measures as the poverty headcount ratio and poverty gap ratio are based on MPCE we reckon that the MGNREGA is eventually lowering poverty according to these two measures.

In this section, we present our main results of estimating the MGNREGA's effects on the three measures of welfare, MPCE, inequality, and poverty. For poverty we are using two measures, the headcount ratio (HCR) and the poverty gap ratio (PGR), and we employ both the extreme poverty lines as per the Planning Commission (P.C.) and moderate poverty lines as per the Tendulkar Committee (T.C.). Tables 5, 6 and 7 present our estimation results for each of the six dependent variables of interest: MPCE, Variance of log. of MPCE (inequality), HCR (P.C., T.C.), and PGR (P.C., T.C.). We estimate the effects on each measure of welfare thrice. First, in our basic regression we include the usual phase-wise treatment dummies, indicated with "P1*Y06", "P1*07", "P2*07", controls (SC/ST, household size and squared household size) and year-state interaction terms (column (1)). Then, as shown in every second column, we additionally include intensity interaction terms labelled with "P1*Y06*PdHH", "P1*Y07*PdHH", "P2*Y07*PdHH". Finally, as in every third column instead of intensity interaction terms we include year-wise score interaction terms to control for heterogeneous year effects, labelled with "Y06*Score", "Y07*Score". For all estimations the reference year is 2005-06 and standard errors are clustered at the district-year level.

5.1 MPCE, Headcount Ratio, Poverty Gap Ratio and Inequality

None of the estimation results presented in Tables 5 and 6 indicate any significant effects on two measures of welfare, MPCE and the poverty headcount ratio.

However, when it comes to the poverty gap ratio (P.C.) in Table 7 we see that the PGR (P.C.) does decrease significantly for Phase 1 and Phase 2 districts in 2007-08. The coefficient for the

Table 5: Average Effect on: Log. of MPCE and Variance of Log. of MPCE

	Log. of MPCE*100			Variance of Log. MPCE		
	(1)	(2)	(3)	(4)	(5)	(6)
P1 * Y06	-0.736 (1.224)	-1.858 (1.495)	-2.290 (1.436)	-123.373 (105.290)	-77.369 (131.670)	-41.922 (111.065)
P1 * Y07	-2.405* (1.454)	-2.680 (1.881)	-2.724 (1.845)	-269.073*** (87.092)	-231.934** (108.256)	-132.475 (85.592)
P2 * Y07	1.068 (1.393)	0.533 (1.468)	1.390 (1.620)	-162.047** (65.831)	-154.151 (118.220)	-109.818** (52.409)
P1 * Y06 * PdHH		0.068* (0.040)			-2.788 (2.428)	
P1 * Y07 * PdHH		0.010 (0.041)			-2.060 (2.270)	
P2 * Y07 * PdHH		0.012 (0.105)			1.149 (4.926)	
Year 06 * Score			-7.974** (3.367)			174.248 (237.871)
Year 07 * Score			-2.416 (3.502)			289.300 (231.841)
Year 07	2.456 (1.629)	2.419 (1.635)	5.361 (4.978)	155.351** (74.446)	165.475** (78.018)	-280.686 (287.755)
Year 06	2.551* (1.480)	2.474 (1.506)	11.738*** (4.273)	319.365** (126.764)	315.034** (127.581)	29.345 (339.939)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
State-Year Inter.	Yes	Yes	Yes	Yes	Yes	Yes
Mean DV	627.37	627.37	625.43	1464.26	1466.54	1463.64
R-squared	0.133	0.133	0.131	0.013	0.013	0.012
N	74348	73386	63153	74348	73386	63153

Robust standard errors in parentheses, clustered at district-year level. * p<0.1, ** p<0.05, *** p<0.01
The reference year is 2005-06. Sources: as given in Table 3.

Table 6: Average Effect on: Poverty Headcount Ratio

	Sample: All Rural Households					
	Poverty Headcount Ratio (P.C.)			Poverty Headcount Ratio (T. C.)		
	(1)	(2)	(3)	(4)	(5)	(6)
P1 * Y06	-2.159 (1.317)	-0.803 (1.671)	1.228 (1.746)	0.961 (1.597)	3.223* (1.925)	2.608 (1.966)
P1 * Y07	-1.629 (1.494)	-0.153 (1.952)	1.918 (1.968)	1.729 (1.600)	2.442 (2.016)	3.284 (2.044)
P2 * Y07	-3.602* (2.121)	-2.583 (2.430)	-2.792 (1.712)	-1.922 (1.718)	-2.527 (1.874)	-1.513 (1.859)
P1 * Y06 * PdHH		-0.090 (0.057)			-0.132*** (0.045)	
P1 * Y07 * PdHH		-0.077 (0.051)			-0.040 (0.050)	
P1 * Y07 * PdHH		-0.038 (0.050)			0.094 (0.107)	
Year 06 * Score			16.030*** (4.190)			6.922 (4.448)
Year 07 * Score			13.672*** (3.819)			4.702 (4.050)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
State-Year Inter.	Yes	Yes	Yes	Yes	Yes	Yes
Mean DV	19.29	19.29	20.01	37.88	37.90	39.03
R-squared	0.064	0.065	0.065	0.085	0.086	0.084
N	74348	73386	63153	74348	73386	63153

Robust standard errors in parentheses, clustered at district-year level. * p<0.1, ** p<0.05, *** p<0.01
The reference year is 2005-06. All abbreviations as in Table 5. Sources: as given in Table 3.

Table 7: Average Effect on: Poverty Gap Ratio

	Sample: All Rural Households					
	Poverty Gap Ratio (P.C.)			Poverty Gap Ratio (T. C.)		
	(1)	(2)	(3)	(4)	(5)	(6)
P1 * Y06	-0.463 (0.364)	-0.456 (0.482)	0.215 (0.521)	-0.592 (0.500)	-0.240 (0.637)	0.281 (0.673)
P1 * Y07	-0.966*** (0.368)	-0.857* (0.511)	-0.589 (0.456)	-0.938* (0.553)	-0.565 (0.736)	-0.007 (0.715)
P2 * Y07	-0.724* (0.384)	-0.436 (0.372)	-0.703** (0.300)	-1.428** (0.715)	-1.287* (0.699)	-1.137* (0.623)
P1 * Y06 * PdHH		-0.004 (0.015)			-0.025 (0.020)	
P1 * Y07 * PdHH		-0.008 (0.013)			-0.021 (0.018)	
P1 * Y07 * PdHH		-0.015 (0.012)			0.004 (0.022)	
Y06 * Score			3.026*** (1.137)			3.517** (1.560)
Y07 * Score			1.815** (0.919)			3.312** (1.407)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
State-Year Inter.	Yes	Yes	Yes	Yes	Yes	Yes
Mean DV	3.40	3.41	3.58	8.18	8.19	8.53
R-squared	0.050	0.051	0.051	0.089	0.090	0.090
N	74348	73386	63153	74348	73386	63153

Robust standard errors in parentheses, clustered at district-year level. * p<0.1, ** p<0.05, *** p<0.01
The reference year is 2005-06. All abbreviations as in Table 5. Sources: as given in Table 3.

treatment dummy is 0.966 and statistically significant at the one per cent level. It means that the average rural household in a Phase 1 district sees its poverty gap declining by about 30 per cent in 2007-08. While the coefficient for the Phase 2 dummy remains statistically insignificant in this specification (column (1)), it is significant once year-wise score interaction terms are included (see column (3)).

With PGR (T.C.) as the dependent variable (columns (4) to (6)) it is the other way round as we estimate a significant treatment effect for Phase 2 districts - implying a 17 per cent decrease in the poverty gap (column (4)). However, as soon as we control for heterogeneous treatment effects much of the effect is reduced (column (6)). Also, controlling for MGNREGA's intensity by including intensity interaction terms as in columns (2) and (3) lessens the effects substantially.

For inequality, measured as the variance of the log of MPCE (*100), we find that it decreases substantially for both Phase 1 and Phase 2 districts in 2007-08 (see Table 5, columns (4) to (6)). Especially the results for Phase 2 districts are in line with our results for the PGR. The treatment effect for our measure of inequality amounts to 11 per cent.

Hence, although there is neither a significant effect on MPCE nor on moderate or extreme poverty headcount ratios, the MGNREGA does seem to have an impact on the poorest section of rural households thereby decreasing the poverty gap and inequality.

5.2 Sample of SC/ST Households

Delving deeper into an analysis of the poorest households we now examine consumption levels solely among SC/ST households. As pointed out in the sample statistics (Table 3) it is a well known fact that SC/ST households are considerable poorer than the average rural household. In our sample every fifth rural household is poor (P.C.), whereas in the much smaller SC/ST sample it is every third. Therefore, it is not surprising to examine whether the MGNREGA does have an impact on the welfare of the most marginalised households. After all, the majority of workers employed under the MGNREGA belong to SC/ST communities, 62 per cent in 2006-07 and 56 per cent in 2007-08 (see Drèze and Oldiges (2009)).

Table 8: Average Effect on: Welfare of SCST Households

Sample: SCST Population of Rural Households						
	Log. of MPCE (*100)	Var. of Log. MPCE	HCR (P.C.)	HCR (T. C.)	PGR (P.C.)	PGR (T. C.)
	(1)	(2)	(3)	(4)	(5)	(6)
P1 * Y06	3.953* (2.255)	-118.941 (153.162)	-7.547*** (2.789)	-1.880 (2.777)	-1.896*** (0.713)	-2.112** (1.025)
P1 * Y07	2.665 (2.471)	-401.274*** (148.300)	-2.386 (2.520)	-2.970 (2.948)	-1.692** (0.694)	-1.914* (1.008)
P2 * Y07	3.688** (1.760)	-188.627** (89.973)	-2.620 (2.175)	-5.057** (2.452)	-1.294*** (0.463)	-2.254*** (0.706)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
State* Year	Yes	Yes	Yes	Yes	Yes	Yes
Mean	609.34	1113.83	30.48	53.34	5.81	12.91
R-squared	0.100	0.030	0.064	0.077	0.049	0.083
N	20072	20072	20072	20072	20072	20072

Robust standard errors in parentheses, clustered at district-year level. * p<0.1, ** p<0.05, *** p<0.01

The reference year is 2005-06. All abbreviations as in Table 5. Sources: as given in Table 3.

Table 8 presents our findings of the basic regressions with the previous basic specifications and dependent variables, but this time for just the subsample of SC/ST households in rural India. According to column (1), MPCE increases significantly for Phase 2 districts by 3.7 per cent. As per column (4), this corresponds to a decline in the poverty headcount ratio (T.C.) of nearly 10 per cent for Phase 2 districts. Furthermore, we notice that the poverty gap ratio decreases irrespective of the chosen poverty line. Phase 2 districts see a decline in the poverty gap ratio of about 22 per cent under extreme poverty lines (P.C.), while the moderate poverty gap ratio (T.C.) declines by 17 per cent.

A similar but starker trend is visible for Phase 1 districts, where the headcount ratio (P.C.) declines by almost 25 per cent, the correspondent poverty gap ratio by 33 per cent (column (5)), and the moderate poverty gap ratio by 16 per cent (column (6)).

Regarding treatment effects on inequality among SC/ST households both Phase 1 and Phase 2 districts experience a decline in inequality, with the effect for Phase 1 districts being more than twice as high (compare 36 per cent with 17 per cent, column (2) in Table 8).

To sum up, we do see large treatment effects among the poorest and most marginalised households of rural India. Our measures for inequality and extreme poverty decline across treatment districts.

6 Further Results: Consumption Baskets

Table 9: Average Effect on: Shares of Food and Non-Food Items (in % of Total MPCE)

	Food			Non-Food		
	(1)	(2)	(3)	(4)	(5)	(6)
P1 * Y06	-0.780** (0.365)	-0.218 (0.451)	-0.370 (0.454)	0.774** (0.365)	0.215 (0.451)	0.363 (0.454)
P1 * Y07	-0.615 (0.461)	-0.243 (0.577)	0.027 (0.715)	0.617 (0.461)	0.241 (0.577)	-0.023 (0.715)
P2 * Y07	-0.406 (0.619)	-0.345 (0.455)	-0.137 (0.756)	0.412 (0.620)	0.349 (0.455)	0.146 (0.757)
P1 * Y06 * PdHH		-0.032** (0.015)			0.032** (0.015)	
P1 * Y07 * PdHH		-0.020* (0.012)			0.020* (0.012)	
P2 * Y07 * PdHH		-0.002 (0.030)			0.002 (0.030)	
Y06 * Score			1.560 (1.185)			-1.562 (1.185)
Y07 * Score			1.546 (1.269)			-1.545 (1.269)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
State-Year Inter.	Yes	Yes	Yes	Yes	Yes	Yes
Mean DV	58.77	58.79	59.02	41.15	41.13	40.99
R-squared	0.028	0.028	0.026	0.028	0.028	0.026
N	74562	73600	63153	74562	73600	63153

Robust standard errors in parentheses, clustered at district-year level. * p<0.1, ** p<0.05, *** p<0.01
The reference year is 2005-06, all abbreviations as in Table 5. Sources: as given in Table 3.

Table 10: Average Effect on: Selected Food Items (in % of Total MPCE)

	Veg. & Fruits		Proteins		Cereals	
	(1)	(2)	(3)	(4)	(5)	(6)
P1 * Y06	-0.208 (0.129)	-0.330** (0.165)	-0.412 (0.304)	-0.995*** (0.334)	-0.011 (0.334)	0.617 (0.412)
P1 * Y07	-0.433*** (0.105)	-0.462** (0.179)	-0.411 (0.250)	-0.237 (0.351)	-0.042 (0.313)	0.324 (0.405)
P2 * Y07	-0.262** (0.125)	-0.183 (0.195)	0.067 (0.153)	0.342 (0.295)	-0.558* (0.320)	-0.629** (0.311)
Year 07 * Score		-0.638 (0.388)		0.291 (0.372)		1.345* (0.772)
Year 06 * Score		-0.655* (0.359)		-2.304* (1.325)		2.769** (1.106)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
State-Year Inter.	Yes	Yes	Yes	Yes	Yes	Yes
Mean DV	8.47	8.50	15.24	15.09	23.30	23.64
R-squared	0.024	0.023	0.023	0.024	0.084	0.082
N	74562	63153	74562	63153	74562	63153

Robust standard errors in parentheses, clustered at district-year level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
The reference year is 2004-05, all abbreviations as in Table 5. Sources: as given in Table 3.

Table 11: Average Effect on: Selected Non-Food Items (in % of Total MPCE)

	Fuel &light		Clothes		Durable		Education		Health	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
P1 * Y06	0.133 (0.153)	-0.166 (0.183)	0.224 (0.143)	0.243 (0.186)	-0.332** (0.129)	-0.442** (0.189)	0.081 (0.095)	0.005 (0.122)	0.310 (0.280)	0.403 (0.365)
P1 * Y07	0.236 (0.145)	0.091 (0.210)	0.398*** (0.137)	0.230 (0.170)	0.198 (0.151)	0.105 (0.237)	-0.009 (0.110)	0.031 (0.139)	-0.386 (0.275)	-0.843** (0.416)
P2 * Y07	0.045 (0.137)	-0.005 (0.170)	0.136 (0.118)	0.083 (0.160)	-0.062 (0.180)	-0.135 (0.225)	-0.110 (0.105)	-0.135 (0.126)	0.270 (0.380)	0.197 (0.517)
Y07 * Score		-0.434 (0.467)		-0.937** (0.372)		0.380 (0.423)		0.028 (0.279)		-2.165*** (0.663)
Y06 * Score		-1.447*** (0.342)		-0.296 (0.400)		-0.050 (0.421)		-0.409 (0.311)		0.397 (0.742)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-Year Inter.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean DV	10.42	10.45	7.59	7.59	2.62	2.61	2.45	2.37	5.57	5.63
R-squared	0.082	0.081	0.011	0.011	0.006	0.006	0.018	0.019	0.007	0.009
N	74348	63153	74562	63153	74348	63153	74562	63153	74562	63153

Robust standard errors in parentheses, clustered at district-year level. * p<0.1, ** p<0.05, *** p<0.01
The reference year is 2005-06, all abbreviations as in Table 5. Sources: as given in Table 3.

In this section we examine whether the MGNREGA has any impact on changes in MPCE-expenditure shares of food and non-food items. At least two scenarios are possible. On the one hand one may expect the share of food items, and especially non-staple food items to increase substantially as earlier impoverished households are now able to purchase more expensive food items of higher quality. So, ideally one would think of a more nutritious diet as income goes up. But this does not necessarily have to happen and very often it does not.¹⁴ On the other hand anecdotal evidence suggests that investments in non-food items such as bullock carts or bicycles often occur, or that old debts can finally be paid off (Khera, 2011). One can also think of investments in education or health. At the same, it is obvious from our very own every day experience that extra earnings do not always and immediately translate into a healthier diet but rather into investments of consumer items which we considered not affordable earlier (say, a TV or computer). Our daily diet would remain the same. So, unless households are severely malnourished it may be unlikely to see any positive effects on food items.

Table 9 portrays our basic results, with the same specifications as in the tables above, only that this time our dependent variables are: share of food items in total MPCE (columns (1-3)), and share of non-food items in total MPCE (columns (4-6)). We find that the share of food items decreases by 0.8 percentage points in the first year of 2006-07 for Phase 1 districts, which is directly met by a 0.8 percentage points increase in non-food items for the same districts (column (1) and (4)). Both effects are weakened substantially when either heterogeneous treatment effects via intensity interaction terms or heterogeneous time trends via year-wise score interactions are controlled for (column (2) and (3), and (5) and (6)). In this scenario, we do not observe statistically significant effects for Phase 2 districts.

In Table 10, we show estimation results for particular food shares. It turns out that expenditure shares of vegetables and fruits decrease for both Phase 1 and Phase 2 districts in 2007-08 by 5 and 3 per cent, respectively (columns (1) and (2)). We also find significant negative effects on changes in the share of cereals for Phase 2 districts.

Furthermore, we are interested which non-food items increase to compensate the dwindling shares of food items. Table 11 sheds some more light on this. Here we find that there is only a statistically significant effect on the share of clothes which includes clothes, footwear and bedding as it increases by 0.4 percentage points or 5 per cent for Phase 2 districts.

To sum up, our estimations tend to predict that most of the additional consumption due to the MGNREGA goes into non-food items instead of food products.

7 Robustness and Falsification tests

In this section we examine several robustness checks. The main threat to our results is that we are not measuring the effect of the MGNREGA as such but a bundle of poverty and other social programmes which are being implemented as well in our treatment districts. For example, the MGNREGA had a precursor programme, the National Food for Work Programme (NFFWP), which was initiated in some 150 districts of the 200 MGNREGA districts of Phase 1 in 2004-05. Most of the person-days were generated and most of the NFFWP expenditure was spent in 2004-05 although the programme lasted until the early months of 2006-7 before the MGNREGA begun. For this reason, we have not used the thick NSS round of 2004-05 as our reference year but rather 2005-06 to weaken the potential of measuring NFFWP effects.

In our first robustness test, Table 12 we take 2004-05 as the reference year, so that the year wise intra-state variation dummies also include the year 2005-06 and, of course, all treatment

¹⁴See, for example Deaton and Subramanian (1996); Banerjee and Duflo (2011).

Table 12: Robustness Test: Reference Year 2004-05, Intra-State Variation includes Year 2005–06

	Sample: Rural Households				
	Log. of MPCE (*100)	HCR (P.C.)	HCR T. C.)	PGR (P.C.)	PGR (T. C.)
	(2)	(3)	(4)	(5)	(6)
P1 * Y06	1.756 (1.833)	-3.759*** (1.426)	-1.452 (2.020)	-0.676** (0.274)	-1.211** (0.543)
P1 * Y07	-0.986 (1.249)	-2.491*** (0.845)	0.064 (1.336)	-1.046*** (0.190)	-1.258*** (0.308)
P2 * Y07	-0.517 (1.474)	-2.465 (1.786)	-0.586 (1.676)	-0.531* (0.310)	-0.944 (0.652)
Controls	Yes	Yes	Yes	Yes	Yes
State-Year Inter.	Yes	Yes	Yes	Yes	Yes
Mean	626.16	19.98	38.97	3.52	8.47
R-squared	0.135	0.066	0.088	0.052	0.092
N	141252	141252	141252	141252	141252

Robust standard errors in parentheses, clustered at district-year level. * p<0.1, ** p<0.05, *** p<0.01
The reference year is 2004-05, all abbreviations as in Table 5. Sources: as given in Table 3.

dummies have the year 2004-05 as the reference year. Doing so, we find that the headcount ratio of poverty (P.C.) decreases substantially in Phase 1 districts, by almost 20 per cent in 2006-07 and by 13 per cent in 2007-08 (see column (3)). Similarly stark are the effects on the poverty gap ratio, both the moderate and extreme case. Effects on the extreme PGR (column (5)) for Phase 1 districts are between 20 and 30 per cent, while those for the moderate PGR are around 15 per cent. Here, most of the effects occur for Phase 1 districts, contrasting our main results where most of effects are statistically significant for Phase 2 districts. This makes us believe that causal effects on Phase 1 districts are not easy to decipher. At least a considerable amount of caution is needed to interpret any coefficients for Phase 1 districts.

To investigate further, we now run a placebo test in which we take the same Phase 1 districts as our treatment group but with the year 2005-06 as our treatment year (placebo, one year before the MGNREGA actually started) and 2004-05 as the reference year. This is a standard placebo test. Table 13 shows the results for our usual dependent variables, with two estimations for each, one without and one with control variables. The results confirm our belief that prior to the MGNREGA some poverty alleviating mechanism were at place. This is clear from the regressions on MPCE (columns (1) and (2)) and on the moderate HCR (columns (5) and (6)).

In a further step we include NFFWP interaction terms to our basic placebo test. From the 188 Phase 1 districts in our sample 150 of them also implemented the NFFWP. Therefore, by interacting our MGNREGA treatment dummies with NFFWP dummies we test whether having the NFFWP prior to the MGNREGA has had its own welfare effects. Table 14 shows our results for such estimations with controls included. We infer from these results that the initially statistically significant effect is taken away by including the NFFWP interaction term. Now, in a last step, we include score interaction terms to control for heterogeneous district effects. One can think of the score as an index for initial growth potential or initial poverty levels. Tables 15, 16, and 17 present our estimation results for this kind of robustness check. It turns out that not even heterogeneous growth patterns can reduce the pre-treatment effect.

Table 13: PlaceboTest: Year 2005-06 as Treatment Year, Phase 1

Sample: Rural Households										
	Log of MPCE (*100)		HCR (P. C.)		HCR (T. C.)		PGR (P. C.)		PGR (T. C.)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
P1 * Y05	3.582**	4.459***	-2.361	-2.876*	-3.863**	-4.590***	-0.163	-0.298	-0.802	-1.051*
	(1.504)	(1.428)	(1.552)	(1.489)	(1.667)	(1.576)	(0.398)	(0.388)	(0.579)	(0.552)
Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
State-Year Inter.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean	623.79	623.79	21.59	21.59	40.90	40.89	3.86	3.86	9.14	9.13
R-squared	0.005	0.129	0.003	0.066	0.003	0.087	0.002	0.051	0.003	0.090
N	86099	86072	86099	86072	86099	86072	86099	86072	86099	86072

Robust standard errors in parentheses, clustered at district-year level. * p<0.1, ** p<0.05, *** p<0.01
The reference year is 2004-05, all abbreviations as in Table 5. Sources: as given in Table 3.

Table 14: PlaceboTest: Year 2005-06 as Treatment Year, Phase 1, NFFWP Interaction

Sample: Rural Households										
	Log of MPCFE (*100)		HCR (P. C.)		HCR (T. C.)		PGR (P. C.)		PGR (T. C.)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
P1 * Y05	4.459*** (1.428)	7.622 (6.184)	-2.876* (1.489)	-3.969 (4.738)	-4.590*** (1.576)	-6.024 (5.920)	-0.298 (0.388)	-1.784 (1.262)	-1.051* (0.552)	-2.547 (1.762)
P1*Y05*NFFWP		-3.226 (6.174)		1.115 (4.648)		1.463 (5.855)		1.516 (1.257)		1.525 (1.741)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State-Year Inter.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean	623.79	623.79	21.59	21.59	40.89	40.89	3.86	3.86	9.13	9.13
R-squared	0.129	0.129	0.066	0.066	0.087	0.087	0.051	0.051	0.090	0.090
N	86072	86072	86072	86072	86072	86072	86072	86072	86072	86072

Robust standard errors in parentheses, clustered at district-year level. * p<0.1, ** p<0.05, *** p<0.01
The reference year is 2004-05, all other abbreviations as in Table 5. Sources: as given in Table 3.

Table 15: PlaceboTest: Year 2005-06 as Treatment Year, Phase 1, with Score and Score Squared

	Sample: Rural Households					
	Log of MPCE (*100)			HCR (P. C.)		
	(1)	(2)	(3)	(4)	(5)	(6)
P1 * Y05	6.381*** (1.823)	6.240*** (1.833)	19.484* (10.670)	-5.749*** (1.978)	-5.711*** (1.992)	-15.163 (9.636)
P1 * Y05 * Score			-12.831 (9.953)			9.158 (9.029)
Y05 * Score	11.594*** (4.444)	-3.074 (11.170)	19.313 (21.781)	-14.642*** (4.093)	-10.664 (9.560)	-26.642 (17.890)
Y05 * Score * Score ²		6.972 (4.754)	-0.733 (7.848)		-1.891 (3.375)	3.608 (6.055)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
State-Year Inter.	Yes	Yes	Yes	Yes	Yes	Yes
Mean	621.74	621.74	621.74	22.54	22.54	22.54
R-squared	0.129	0.129	0.129	0.067	0.067	0.067
N	71397	71397	71397	71397	71397	71397

Robust standard errors in parentheses, clustered at district-year level. * p<0.1, ** p<0.05, *** p<0.01

The reference year is 2004-05, all abbreviations as in Table 5. Sources: as given in Table 3.

8 Concluding Remarks

We started our analysis of welfare impacts of the MGNREGA arguing that a pure labor market perspective is certainly important in its own right but not a sufficient basis to judge the MGNREGA's effect on rural households quality of life. Considering that higher wages are only a means to an end we explored whether the MGNREGA does translate into higher levels of living.

From survey reports, anecdotal evidence, and personal experience we know that many workers employed under the MGNREGA do use their public works' wages for earlier unaffordable goods like bicycles (see Khera (2011)) or the education of their children.

In this paper, the difference in differences analysis of rural households relies largely on NSS consumption expenditure survey data from 2005-06 to 2007-08. It allows us to draw conclusions on causal effects during the first two years of the Act.

We find that several measures of welfare do improve with the MGNREGA in place and that the MGNREGA especially impacts extreme poverty. For example, we estimate that the poverty gap measure falls by about 20 per cent in Phase 2 districts, while MPCE inequality declines by 11 per cent. Bearing in mind that the MGNREGA is especially attractive to otherwise marginalised and impoverished groups, we examine the subsample of SC/ST households separately and find similarly high welfare effects for both moderate and extreme poverty for Phase 2 districts. Our analyses of changes in MPCE-shares indicates a shifts towards non-food items, which is in line with field reports and regional studies as those by Ravi and Engler (2009) .

While we are able to identify treatment effects for Phase 2 districts, and while several robustness checks strengthen our results, placebo experiments with data for the years 2004-05 and 2005-06 require us to interpret the results for Phase 1 with caution. This may be due to other poverty programs like the NFFWP which were implemented right up to the start of the MGNREGA in the Phase 1 districts. Hence, further research in identifying treatment effects for Phase

Table 16: PlaceboTest: Year 2005-06 as Treatment Year, Phase 1, with Score and Score Squared

	Sample: Rural Households					
	HCR (T.C.)			PGR (P.C.)		
	(1)	(2)	(3)	(4)	(5)	(6)
P1 * Y05	-7.681*** (2.115)	-7.579*** (2.124)	-16.319 (10.815)	-0.551 (0.527)	-0.525 (0.534)	-5.397 (3.587)
P1 * Y05 * Score			8.468 (10.405)			4.720 (3.306)
Y05 * Score	-15.010*** (4.973)	-4.448 (11.112)	-19.221 (20.547)	-1.362 (1.096)	1.371 (2.958)	-6.864 (6.979)
Y05 * Score * Score ²		-5.020 (4.519)	0.064 (7.462)		-1.299 (1.036)	1.535 (2.340)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
State-Year Inter.	Yes	Yes	Yes	Yes	Yes	Yes
Mean	42.29	42.29	42.29	4.06	4.06	4.06
R-squared	0.087	0.087	0.087	0.053	0.053	0.053
N	71397	71397	71397	71397	71397	71397

Robust standard errors in parentheses, clustered at district-year level. * p<0.1, ** p<0.05, *** p<0.01
The reference year is 2004-05, all abbreviations as in Table 5. Sources: as given in Table 3.

Table 17: PlaceboTest: Year 2005-06 as Treatment Year, Phase 1, with Score and Score Squared

	Sample: Rural Households		
	PGR (TC)		
	(1)	(2)	(3)
P1 * Y05	-1.804** (0.743)	-1.766** (0.750)	-8.712* (4.777)
P1 * Y05 * Score			6.730 (4.418)
Y05 * Score	-3.678** (1.620)	0.248 (3.877)	-11.494 (9.122)
Y05 * Score * Score ²		-1.866 (1.354)	2.175 (3.042)
Controls	Yes	Yes	Yes
State-Year Inter.	Yes	Yes	Yes
Mean	9.54	9.54	9.54
R-squared	0.092	0.092	0.092
N	71397	71397	71397

Robust standard errors in parentheses clustered at district-year level. * p<0.1, ** p<0.05, *** p<0.01
The reference year is 2004-05, all other abbreviations as in Table 5. Sources: as given in Table 3.

1 districts is needed.

Also, money metric welfare measures may not be sufficient in capturing the entire effect of a workfare programme like the MGNREGA. Being employed under the MGNREGA may not only increase wages or consumption but may also improve the status of women and marginalised groups. The entitlements under the Act have the potential to empower marginalised groups in many ways, which a multi-dimensional welfare analysis might capture much better.

Finally, this paper examines to the first two years of the Act. Since then, the MGNREGA has grown not only in scale but also in its design, for instance bank payments have become the norm, laborers have become more aware of their entitlements, and administrative processes have become a routine. Hence, a thorough welfare analysis of the latter years' impact is certainly worth further research.

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