

Evaluating the Impact of India's National Rural Employment Guarantee Scheme

By

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To Ma.

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CHAPTER I

INTRODUCTION

In this dissertation I study the impact of one of the largest anti-poverty programs in the world, the National Rural Employment Guarantee Act (NREGA), which was passed by the Indian Parliament in August 2005. The program has been highlighted by the United Nations Development Program (UNDP) as a way to achieve the Millennium Development Goal of tackling poverty and deprivation. Although many aspects of the study are specific to the program's timing, setting, and institutional details, the essential questions of whether and how such programs affect the wellbeing of the poor are of broad interest and importance.

Public works programs are increasingly used in low and middle-income countries to achieve the dual purposes of providing a safety net for the poor while improving infrastructure to promote long-term growth. Countries have used these programs to mitigate increases in unemployment due to macroeconomic shocks (Argentina and Latvia), drought-related poverty (Ethiopia), chronic poverty (Rwanda), and to meet the challenges of HIV/AIDS by linking employment to social services (South Africa). In the Indian context, rural public works programs designed to address poverty are highly relevant because nearly 72 percent of the Indian population live in rural areas, and World Bank calculations show that 40 percent of the rural population subsists on less than \$1.25 a day.

The National Rural Employment Guarantee Scheme (NREGS) is essentially a rural public works program aimed at providing a source of employment to the rural population, particularly when regular work from agriculture becomes scarce or inadequate. The budget for

the program was around 8.8 billion dollars (3.8 percent of the government budget) in 2009-10. Since 2009, around 50 million rural households in India (roughly 32 percent) participated in the program each year.¹In practice, the program provides up to 100 days of unskilled manual work at minimum wage to any rural household that demands work under the program. The NREGA specifically mentions that the program is designed to achieve three goals: reduced poverty, improved infrastructure, and a stronger democratic process at the local level.

As mentioned above, World Bank calculations show that 40 percent of India's rural population subsists on less than \$1.25 a day.² Therefore, the scope for poverty-alleviation efforts is very wide, and understanding whether and how programs such as the NREGS work is of paramount importance.³Although the program has been highlighted by UNDP, problems regarding transparency, under-utilization of funds, inadequate awareness, discrimination, and challenges in creating useful assets still exist (Dreze et al., 2008;Aiyar and Samji, 2009; Business Standard, 2012; Times of India, 2012). Also concerns that are common to economic studies of program effects are prominent in this setting, as well. Selection bias, measurement error, potential crowding out of private employment, and potential spillovers to local economic activity will all be important considerations.

¹Mahatma Gandhi National Rural Employment Guarantee Act 2005, Report to the People, 2013.

² Nearly 72 percent of the Indian population lives in rural areas, and nearly 30 percent the rural population is under the poverty line calculated by the Planning Commission of India, which is roughly 50 cents a day (Economic Survey of India, 2009).

³Zimmermann (2012) and Azam (2012) study the labor market impact of the program and finds positive effects on wages for women and increase in public sector employment. Niehaus and Sukhtankar (2009) study the rent extraction dynamics of officials who are in charge of executing the program. Dutta et al (2012) focus on the "self-targeting" mechanism of the program and find that poorer and marginalized caste households have more demand for work, although there is large unmet demand under the program.

I study the impact of NREGS on household wellbeing by focusing on household consumption. I also analyze the effect of an affirmative action policy carried out through political reservation for marginalized castes and the differential impact reservation has on marginalized caste households in terms of benefiting from NREGS. To provide relevant background information, I begin by discussing the institutional details of NREGS, the caste system, and the process of affirmative action through political reservation for Scheduled Castes (SCs) and Scheduled Tribes (STs) in Chapter II. In Chapter III, I review the various datasets I employ to conduct my analyses. I combine the detailed information on household consumption expenditure from the Consumption Expenditure Survey conducted by the National Sample Survey Organization with the information on the diffusion of the NREGS across rural districts from 2006 to 2008. I also use the Election Commission data on reserved electoral constituencies for minority candidates to understand the impact of NREGS in the context of political reservation.

In Chapter IV, I assess the impact of the public works program (NREGS) on household consumption using the National Sample Survey Organization (NSSO) data. In rural India, earnings do not provide a clear indicator of poverty because people get paid in both cash and kind, and there is home production of goods. Also, for the poor, any increase in household income will translate to increases in household consumption of goods and services. The consumption data will also reflect the increase in savings, if any, by the poor. This is because the inadequate savings opportunities lead the rural poor to purchase valuables with high resale value (for example, gold and silver) to save a portion of their income. I exploit the cross-district rollout of the program over a three-year period (2006 to 2008) to employ a difference-in-difference approach where the treatment group consists of households in the early implementation districts

while the control group consists of households in the late implementation districts. I find that the program increases average household consumption by over 10 percent and that households appear to use the program to increase and smooth consumption over the lean and non-lean agricultural seasons.

Individuals from the marginalized caste groups have faced a long history of discrimination, have lower socio-economic status than average, and have higher rates of poverty. More than 50 percent of these households were below the poverty line before the NREGS program was implemented. By 2008-09, over 50 percent of the workers under the program were from marginalized caste households even though they constitute less than 30 percent of the rural population. I find that program increases household consumption by around 12 percent for marginalized caste households. The high rate of participation in the program by these households was accompanied by gains in household wellbeing. Thus discrimination and other barriers to entry have not prevented this group from benefiting from the program.

In Chapter V, I assess the impact of NREGS in a political economy context. In India political reservation is one of the methods used to carry out affirmative action for minorities. Reservation involves setting aside a fraction of the electoral districts for Scheduled Caste (SC) and Scheduled Tribe (ST) candidates where political parties can only field candidates from these groups.⁴ Several previous studies show that political reservation at the State electoral district level and local government level has had an impact on the type and amount of expenditure on public

⁴ In India affirmative action is carried out through the process of “reservation,” whereby a percentage of seats are reserved in legislative bodies – Parliament and the State Legislative Assemblies, the Central and State Services, and in all public educational institutions. Reservation is in proportion to the population of SCs and STs.

goods.⁵I use household-level data from the National Sample Survey along with the data on reservation of State Assembly seats for SC and ST candidates to analyze the impact of the NREGS for minorities and how it varies with the prevalence of reservation. Specifically, I use a difference-in-difference-in-difference framework to study the differential impact of NREGS on minority household consumption for districts that have reservation relative to districts that have no reservation. I find that the NREGS caused marginalized caste households to increase consumption in the reserved districts relative to marginalized caste households in the non-reserved districts.

Chapter VI assesses household budget allocation by consumption categories. The Planning Commission of India calculates the rural poverty lines based on the nutritional norm of 2400 calories per day, and nearly 30 percent of the rural population were below this poverty line in 2004-05. This would lead one to assume that for the poor nutrition depends on income. The results in Chapter VI suggest that on average, households who are in districts with access to NREGS, move away from the less expensive and lower nutritional value food items like cereal toward the higher caloric and more nutritional items like meat, fish, and eggs. In terms of spending on durable goods, I find that households also increased spending on furniture, which has a high resale value. This is also true for marginalized caste households who are disproportionately poor. I further study the differential impact of NREGS on marginalized caste

⁵Munshi and Rosenzweig (2008) find that in the presence of a numerically dominant sub-caste and local leaders elected from the same sub-caste, there is a greater provision of public goods. Pande (2003) finds that political reservation for Scheduled Castes in the state assembly elections has resulted in a rise in the targeted transfers towards this group. Banerjee and Somanathan (2004) argue that access to public goods depends on group heterogeneity. The different groups have varying levels of power and influence, leading them to “secure different levels of public goods.” They also find that changes in political power can lead to greater access to previously marginalized groups. Besley et al. (2004) find that group identity of Panchayat leaders affects public provision of goods in Southern Indian villages.

households in reserved districts (relative to non-reserved districts) in terms of how they allocate their income. I find that reservation leads to SC/ST households (relative to SC/ST households in non-reserved districts) to spend more on furniture due to NREGS. I conclude my analysis in Chapter VII.

CHAPTER II

BACKGROUND

1. The National Rural Employment Guarantee Act

Since Independence in 1947, India has implemented several public works programs to address the issue of unemployment and underemployment, starting with the Rural Works Program in 1960. Over the years, several wage employment programs were introduced, and each of these programs tried to address the problems that plagued the previous ones, such as corruption, waste, lack of transparency in maintaining records of works, and failure to ensure that laborers received the wages that were due. These programs also had problems with targeting because only certain categories of households were eligible to participate in the program.⁶

In 1970, the State of Maharashtra introduced the Maharashtra Employment Guarantee Program, an important forerunner of the NREGS. The Maharashtra program guaranteed employment to all those who were willing to work for a fixed minimum wage in rural areas. The state government provided funding, and there was a top-down approach to allocating funds to the District Collectors. This created incentives for political parties to favor certain constituencies over others (Jadav, 2006; Ravallion, Dutt, and Chaudhuri, 1993). Thus the western region of

⁶Gaiha (2000), Gaiha, Imai, and Kaushik (2001), Dreze (1990). Previous programs such as the Jawahar Rozgar Yojana – a rural public works program – the wage payment was irregular and less than 2 percent of workers received daily wages. Part of the wages was paid in kind (grains) and was of poor quality. The wages were higher than local wages and this led to non-poor workers in the state taking up most of the work under the program. The Integrated Rural Development Program – a credit subsidy program – provided little assistance to the rural poor. With excess demand for credit and the government needed to ration credit. Therefore, the non-poor, who are less risky and can provide collateral, benefited from the program. Finally, the unspent balances to total allocation share was around 40 percent for the poor states in the period 1987-1994.

Maharashtra, where the political elites were concentrated, had greater access to funds and benefited more from the program than the other regions of the state.

NREGS tried to improve on the Maharashtra model by addressing the problems of transparency, complicated registration process, irrelevant construction, regional bias in access to funds, and long commutes from worksites. The NREGS is federally funded, but it is executed at the village level to ensure that the works undertaken are relevant to the rural community and that there is no regional bias in getting access to funds. The Panchayat is the democratically elected local self-government at the village level, and the head of the Panchayat is responsible for proper administration of the program.

As mentioned earlier, the NREGS rural public works program provides a statutory guarantee of 100 days of employment to each rural household in the district. Households need to show proof of residence to obtain a job card. Using the job card, members of the household can demand work at the local Panchayat level. The nature of the work is casual and unskilled manual labor, and the wage is set at the state minimum wage level. Depending on the work, workers are sometimes paid at a piece-rate. By working 7 hours, the average worker should be able to earn the state minimum wage. As this is a rights-based program, each household can demand work at the local level and should obtain work located within 5km distance. If the Panchayat is unable to provide employment within 15 days, then the household is entitled to an unemployment allowance, which is at least one-third of the state minimum wage.

Although the NREGS program was designed to mitigate problems associated with previous programs, there are still serious concerns about its implementation and

effectiveness.⁷Problems persist regarding transparency, under-utilization of funds, inadequate awareness, discrimination, and challenges in creating useful assets (Dreze et al., 2008; Aiyar and Samji, 2009; Times of India, 2012). The government has tried to address these problems and set certain guidelines to attempt to prevent them. To deal with issues of transparency and the fact that a large number of the NREGS participants are illiterate, details of wages paid to workers have to be made public at the worksite. Since 2009, payments are made directly to the person's bank account to reduce the risk of other individuals appropriating the money.

According to the Act, the 200 “most backward” districts in India were to receive the program in the first phase of the rollout. The next 130 backward districts were added in 2007-08 and the last 295 districts were added in 2008-09. By 2009-10, more than 52.8 million households were provided jobs under the program and 283 million person-days of employment were created.

Although the Act does not explicitly state the backwardness ranking to be used by the government, there is reason to believe that the government relied upon information in the 2004 Report by the Planning Commission of India, which identified districts in terms of backwardness for employment programs. In principle, their ranking was generated from an index based on the percentage of SC and ST populations and agricultural productivity for the district (which includes output per agricultural worker and agricultural wages per day) using data from the early and mid-1990s. Because the report was written specifically for the purpose of identifying backward districts for government employment programs (e.g., the National Food for Work Programme (2004)), it is likely that the government would rely on these measures. Among all the Planning Commission reports that focused on backward districts, this one was closest in time to

⁷Empowering Lives through Mahatma Gandhi NREGA, UNDP Support to Government of India, 2011.

the implementation of NREGS that focused on backward districts. Also, personal communications with people involved in the program suggest that the 2004 Report is appropriate to identify backward districts.⁸

Importantly and surprisingly, the report's backwardness ranking does not perfectly predict allotment of districts to the different phases of the NREGS rollout. Additional criteria must have been used in the assignment process, though there is no documentation of exactly what those criteria were. The only other explicit criterion mentioned in the report is that at least one district in each state was required to receive the employment program for which the report was originally created. Even accounting for this criterion, there are many districts where NREGS was implemented that cannot be explained by the methodology indicated in the document. In other words, observationally similar districts in terms of backwardness were often assigned to different phases of the rollout.

Figure 1 shows the assignment of districts to rollout phases on the vertical axis (1 being the earliest phase) and the 2004 report's rank of backwardness on the horizontal axis. While it is clear that on average the districts that were early implementers were more backward than the groups that implemented the program later, there is a considerable amount of overlap between the early and late implementers. Comparisons of trends across these groups are central to the identification strategy that I outline in Chapter IV.⁹

⁸ Communication with the Joint Director of the Computer Centre, Ministry of Statistics & Program Implementation revealed that there is no specific document (which reports the backwardness of districts) for the rollout of the NREGS program. The Planning Commission Report, 2004, which ranked backwardness of districts was the commonly used ranking for allocating districts to government programs.

⁹ Figure 1 shows districts that received the program in Phase 2 are spread across the backwardness ranking scale. Since there is no clear rule for allocating districts to the phase in which they receive the program, one cannot exploit an assignment rule to analyze the program. Therefore as there is no cutoff, a regression discontinuity design that analyzes the impact of the program by the jump in the household consumption expenditure is problematic.

Figure 1: Backwardness Rank and Allocation to Phase of Receiving NREGA for Districts



Note: The backwardness rank is from the Planning Commission Report, 2004. It is constructed using three measures: percentage of SC and ST population, output per agricultural worker, and agricultural wages per day at the district level.

The guidelines of the Act (2005) also focus on who should benefit from the program. The Act clearly states that benefits of the program should reach the entire rural population in an unbiased manner. No individual may be discriminated against with respect to gender or caste. The Act specifically mentions that information about the program needs to be disseminated in

Zimmermann (2012) uses the poverty measure in the Planning Commission Report in 2004 to construct a unique ranking system to conduct a RDD analysis which estimates the impact of the program for Phase 2 districts (relative to districts that received the program in Phase 3). She constructs a State specific ranking by starting with the least poor Phase 2 district in each State and assigns it rank zero. All the districts that are assigned a rank zero are pooled together. As a result the least poor district in West Bengal (for Phase 2) having a poverty ratio of 31.04 percent is pooled with the least poor district in Andhra Pradesh (for Phase 2) with a lower poverty ratio of 17.26 percent. In this way all the districts which share a similar rank are clubbed together. This construction leads to placing all the Phase 2 districts on one side of the cutoff while the Phase 3 districts are on the other side. Pooling leads to treating districts that have varying levels of poverty, and therefore backwardness, to be similar. The pooling is problematic since the RDD estimates the local treatment effect around the cutoff based on the fact that the observations on either side of the cutoff are similar. In this case observations around the cutoff are not similar since they are composed of districts with dissimilar levels of poverty.

areas with large SC/ST populations. Also, priority is to be given to projects that benefit the SC/ST population. Finally, the Act mentions that vigilance and monitoring committees need to have women and SC/ST representatives. According to the official NREGS website, since 2009, nearly 50 percent of the beneficiaries have been women, and 50 percent of the beneficiaries belong to the Scheduled Caste or Scheduled Tribe.¹⁰

The program provides security to the rural poor by providing them with work during the lean season and addresses the concern of distress migration from the villages to the urban areas (Jacob, 2008; Planning Commission, 2008). Migration of this type is costly and seasonal. Migrants usually get work in the informal sector with low probability of keeping the job and typically earn at less than minimum wage. The cost of migration is also high since individuals usually take loans or advances from contractors in the informal sector to meet the expenses of migration (such as finding a place to stay in the cities, travel costs, food expenses and also to meet expenses back home). Work is not available every day and most average three working days a week. Women coming to work alone, without a spouse or a brother, are extremely vulnerable to abuse.

Lower caste individuals usually have a stronger network in their villages than in urban areas, and they prefer seasonal migration to permanent migration. Also the minority groups do not have the necessary capital required for settling down in urban areas. The Planning Commission survey for 2006-07 of 20 districts in India indicated that 82 percent and 67 percent of the households surveyed in the Eastern and Northern regions preferred to get work in their native village. Munshi and Rosenzweig (2009) use panel data to show that active caste networks

¹⁰http://nrega.nic.in/netnrega/mpr_ht/nregampr.aspx (accessed on 05/12/2013).

can provide security and help in consumption smoothening, and this would be unavailable to those who migrate out of the community. Therefore, there is reason to expect that NREGS may be used to smooth consumption by working on public works when work from agriculture is insufficient. One of the other benefits of the program is the creation of rural infrastructure that that is geared to improve rural connectivity and increase agricultural productivity.

2. The Caste System in India

A breakdown of the population based on religion shows that Hindus form nearly 85 percent of the Indian population (National Sample Survey of India, 2004-05). The 2001 census has detailed information on the social groups to which individuals belong. The figures show that the two main groups of historically disadvantaged minorities, the Scheduled Castes (SCs) and Scheduled Tribes (STs), constitute 31.5 percent of the total rural population. The 1931 census identified SCs by their historically low social and ritual standing, whereas STs were distinguished by their tribal origin and habitation in remote areas.

Caste has historically determined an individual's occupation, access to institutions, and social exclusion based on the concept of untouchability.¹¹ As a result individuals from marginalized castes have faced discrimination in terms of access to employment, education, and social inclusion, which has affected their overall economic and social status for many generations. The organizational scheme of the caste system is based on the division of people into social groups (or castes) in which the civil, cultural and economic rights of each individual

¹¹ SCs were considered untouchable because they were restricted to occupations that involved skinning animals, removing human waste, and handling dead bodies.

caste are determined by birth. This status is hereditary. The assignment of civil, cultural and economic rights is unequal and hierarchical.

The Constitutional Orders of 1950 used the following criteria to select castes that were to be regarded as “Scheduled Castes.” Castes that cannot be served by clean Brahmans (priestly caste); cannot be served by water-carriers, tailors and other others who serve the higher caste Hindus; pollute the higher caste Hindus by their proximity; cannot provide water by hand to high caste Hindus; were debarred from using public services (roads, wells, schools, etc.); were debarred from use of temples. Individuals from these castes were also not treated as equal by high-caste men of the same educational qualification in ordinary social interaction. For Scheduled Tribes, the Ministry of Tribal Affairs uses the following criteria for specification of a community as STs: “indications of primitive traits, distinctive culture, geographical isolation, shyness of contact with the community at large, and backwardness.”¹²

Since caste is hereditary, individuals are trapped in narrow occupational categories that continue to influence their labor market decisions (Munshi and Rosenzweig, 2006). Individuals are not allowed by traditional custom to marry outside their sub-caste, and this restricts movement across caste lines. Even today, inter-caste marriage is extremely low and therefore social mobility continues to be very limited.

The discrimination has led to lower levels of socioeconomic outcomes for individuals from the marginalized castes. In fact, Scheduled Castes were historically considered to be “landless.” Tables 2-1 and 2-2 clearly show that minorities perform worse than non-minorities in terms per capita consumption, mortality rates, and literacy. In 2004-05, 46 percent of SCs and 37

¹² <http://tribal.nic.in/Content/IntroductionScheduledTribes.aspx>, accessed 07/23/2014.

percent of STs were below the poverty line compared to 23 percent for the non-SC/ST population.¹³ Given their population share, SCs and STs constitute a disproportionate share of the poor.¹⁴ Using the infant mortality rate (age 0 to 5 years) as an indicator for health shows that SCs and STs have a 50 percent higher rate (around 120 deaths per 1,000 live births) than the non-SC/ST population (80 deaths per 1,000 live births). In terms of education, the literacy rate among SCs and STs are the lowest in both rural and urban India. Human capital is strongly transmitted inter-generationally (Black, Devereux, and Salvanes, 2005; Currie and Moretti, 2007; Emerson and Souza, 2003), and therefore past discrimination continues to matter for SCs and STs even if current discrimination is mitigated. Also, the school enrollment rate is low and the dropout rate is high for these groups. The low educational attainment among SCs and STs affect their ability to fill their quota of public sector jobs at the Center and State level.

Munshi and Rosenzweig (2006) use school enrollment data for Bombay to show that caste influences education and occupation choices. There is a large body of literature that studies caste identity and access to credit. Banerjee and Munshi (2004) use firm-level data of the knitted garment industry in Southern India to show that caste identity is an important factor in gaining access to capital. Mitra (2011) finds that cooperative banks discriminate against lower caste borrowers of agricultural credit. He finds negative discrimination in villages where the higher castes dominate.

¹³ Report No. 514, Household Consumer Expenditure among Socio-Economic Groups: 2004-05, National Sample Survey of India.

¹⁴ Based on calculations using the 61st round of the National Sample Survey for Household Consumer Expenditure. SCs account for 20 percent of the population but account for 27 percent of the poor. STs account for 8.6 percent of the population but account for 14 percent of the poor.

SC households also own less land than higher caste households, and a greater percentage of SCs are engaged as agricultural laborers. Therefore, during the lean season in agriculture, they are likely to need work that can help them smooth consumption. The NREGS website indicates that in 2009-10, the year after the program had been introduced in all the rural districts, 30 percent of the workers were SCs even though SCs are 20 percent of the total population. Table 2-3 shows that SCs spend a greater portion of their household budget than Non-SC/STs on the cereals, which are cheaper and have less nutritional value. They also spend a lower portion of their budget on the higher caloric but more expensive protein items like milk, fish, meat, and eggs. This holds true for expenditure on education and health – items that build human capital and lead to a higher standard of living.

3. Political Reservation - Institutional Background

The Constitution of India, which came into effect on January 26, 1950, regarded caste, race, and gender-based discrimination as a violation of one's fundamental rights to equality. A variety of measures have been introduced since the 1950s to promote affirmative action to remedy past injustices. One such measure is a constitutionally mandated political representation for Scheduled Castes and Scheduled Tribes. This requires certain constituencies to be reserved for candidates belonging to the SC or ST category.¹⁵In the reserved constituencies, political parties can only field candidates from these categories. This kind of political reservation is mandated at the Central and State level. From the first General Election (which elects members

¹⁵ Constituencies in India are drawn by an independent Delimitation Commission. These boundaries are drawn to ensure that the population of each constituency is approximately the same while maintaining the natural geographical structure of the region. The population in State Assembly constituencies vary between 250,000 and 350,000.

to the Lok Sabha, the lower house of parliament) and the first State Assembly Election in 1952, constituencies have been earmarked for SC and ST reservation. In 1993, the Constitution Amendment recognized the Panchayats (local government) as a governing body, and the 73rd and 74th Amendment mandated reservation for SCs and STs at the Panchayat level.

The Delimitation Commission of India determines the number of reserved seats at the Central and State government level. The Delimitation Commission is a committee formed of a Supreme Court judge, high court judge, and the chief election commissioner. The Commission has the power to readjust the allotted number of electoral seats in "the House of the People (Lok Sabha, the lower house of Parliament) to the States, the total number of seats in the State Legislative Assembly of each State, the division of each State and each Union territory having a Legislative Assembly into territorial constituencies for elections to the House of the People and Legislative Assemblies of the States and Union territories."¹⁶

The Commission has been constituted four times. The last two were in 1973 and 2002 after the census was conducted. Based on the recommendation of the Commission, the boundaries of the constituencies in a state are fixed to ensure that all constituencies in a state have roughly the same population. The Commission allows constituencies to have up to 10 percent plus or minus the state average population per constituency in order to contain geographical features within a constituency, maintain means of communication, and to avoid breaking up of administrative units. Therefore, all constituencies in a state have roughly the same population. However, across states, the average population of constituencies varies.

¹⁶ The Delimitation Act, 2002.

The total number of seats reserved for SC/STs in a state is based on the population share of that group in the state. For ST reservation, the constituencies in the state that have largest share of STs, are reserved for ST candidates. States such as Chattisgarh and Jharkhand with large tribal populations have around 35 percent of seats reserved for ST candidates. While Punjab and Haryana with almost no significant ST population has no ST reservation. However, Scheduled Castes are not characterized by their geographic isolation, and so the range of seats reserved for SC candidates is narrower. The largest number of SC seats is in Punjab (35 percent of total seats) while Gujarat has only 7 percent of total seats reserved for SC candidates. To reserve seats within a district, the Commission reserves constituencies with the largest share of SC population. However, if SC-reserved constituencies neighbor each other, then the Constitution mandates that the reserved seats within a district should be geographically dispersed. The number of SC seats in a district depends on the following formula.

$$\text{Seats for SCs in District} = \frac{\text{Number of SCs in a District}}{\text{Number of SCs in a State}} \times \text{Seats for SCs in the Assembly Constituency}$$

The number of seats reserved for SC and ST candidates can change over time. The Delimitation Commission may readjust the allocation of the number of constituencies in a particular state, which would affect the number of reserved seats. Any revision to the list of SCs and STs would cause a change in the number of SCs and STs in a district and, therefore, change the number of seats reserved for SC/ST candidates. A modification of state boundaries would alter the number of SC/STs in a state and cause a change in the reserved seats.

Since 1976, the list of SC/STs was made uniform across states. Also the number of seats allocated to each state has remained frozen since 1971, and the next change in the number of

seats will take place in 2026. Finally, there has been no change in state boundaries during the period 2001-2008. The reservation of new constituencies since the last Delimitation of 2002 was based on 2001 census and was carried out in 2008. Thus, the same places that were reserved in 1973 continued to be reserved until 2008.

In Chapter V and VI, I focus on reservation of seats for SC/ST candidates to address the question of whether reservation affects the way NREGS benefits the SC population.¹⁷ In districts with reserved seats for SC/ST candidates, candidates may try to capture the marginalized caste votes by ensuring that the SC/ST population benefits from the program. For the purpose of these chapters, I focus on the reservation of State Assembly constituencies. The State governments in India are responsible for development expenditures. Since the NREGS addresses developmental issues, the electorate is likely to attribute a large part of the success or failure of the program to the state government representative (Member of the Legislative Assembly, MLA). Also, the National Rural Employment Guarantee Act states that the state government is responsible for overseeing implementation of the program.¹⁸

From a practical point, the advantage of using the State Assembly constituency data is that the geographic boundaries of constituencies are contained within a single district. This is helpful because the National Sample Survey data is based on stratified random sampling where

¹⁷ In Chapter V and VI, to analyze the impact of NREGS on household consumption in the context of political reservation, I use the National Sample Survey data from 2001 to 2007-08 and the main focus of the chapter is on 2006-07 when the NREGS was introduced in the first implementation districts. When using the 2007-08 data, the States that had held elections by June 2008 under the new reservation have been excluded from the analysis. Therefore, the change in reservation status is unlikely to affect the impact of the program on consumption levels.

¹⁸ In case the State government cannot provide wage employment on time (within 15 days) then they have to bear the cost of paying unemployment allowance.

the lowest stratum is the district. The Parliamentary constituencies mostly straddle more than one district.

Tables

Table 2-1: Economic Characteristics of Scheduled Castes and Scheduled Tribes in 2004-05

	Scheduled Castes	Scheduled Tribes	Non SC/ST
Population Share (Rural)	20.9	10.6	68.5
Literacy Rate (age 6-14 years)	58.2	52.4	72
Enrollment Rate	65.7	56.3	81.3
Infant Mortality	118	121	80
Marginal Land Holding (less than 1 Hectare)	86.6	62.8	63.7
Percent Agricultural Laborers	41.1	33.6	14.1
Per Capita Consumption	474.72	426.19	685.31
Percent Below Poverty Line	37	46	23
Participation under NREGS by caste share	30	21	49

All numbers are calculated using National Sample Survey 2004-05 except estimates for NREGS program participation which is from the NREGA website.

Table 2-2: NREGA Performance for Phase 1 Districts by March 2007

Household provided employment <i>Persondays (as a % of total)</i>	21,016,099
SC	0.25
ST	0.36
Women	0.41
Household completed 100 days of Employment	2,142,718

Source - National Rural Employment Guarantee Act 2005, Report of the Second Year, April 2006 to March 2007

Table 2-3: Percentage Breakup of Average Household Per Capita Consumption over Item Groups by Caste

Items	Scheduled Castes	Scheduled Tribes	Non SC/ST
Cereal	15	15	12
Protein	5	7	8
Education	2	3	5
Medical Expenses	3	5	6
Other Non-Food Item	14	13	13

Source: Consumption Expenditure Survey Report, 2004-05, National Sample Survey Organization

CHAPTER III

MAIN DATA SOURCES

1. Consumption Expenditure Survey

To analyze the impact of NREGS on household wellbeing, I use the nationally representative household data from the Consumption Expenditure Survey conducted by the National Sample Survey Organization (NSSO) for 2001- 02, 2003, 2004-05, 2006-07 and 2007-08, to cover the years preceding and following the rollout of the program in Phase 1 districts (which started in February 2006). The NSSO collects information on consumption expenditure every year and covers nearly all the districts in India. These annual cross-sectional surveys are administered using a stratified multi-stage random sample where the lowest identifiable geographic unit for households in the sample is the district.¹⁹

I use the 19 major states of India and restrict the sample to rural households since the NREGS program has only been introduced in the rural areas. The States are: Andhra Pradesh, Assam, Bihar, Chhattisgarh, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttaranchal, Uttar Pradesh and West Bengal. They account for nearly 96 percent of India's population in the 2001 Census. Jammu and Kashmir and the Northeastern states have not been included since they have very different economic and political characteristics from the other states in the country. I exclude Delhi since the NREGS program was not implemented in the capital. I also exclude the

¹⁹ The appendix to this chapter discusses the sampling method and weights used by the NSSO.

Union Territories from the sample since politically and administratively they differ from the states in India.²⁰

I assess the impact of NREGS on household wellbeing by focusing on consumption expenditure data.²¹ The quantity of each good that the household consumes is obtained by the physical quantity consumed by the household or by using the expenditure data and then deflating it by the prices of the commodities. To arrive at the "caloric availability" of households a standard conversion table is used to convert quantities into the number of calories contained in the food purchased.²² The NSSO also contains information about household social groups: caste category, household size, head of the household, land possession, age of members, and education level.

In rural India manual laborers who work in agricultural and non-agricultural jobs get paid wages both in cash and kind. The NSSO recognizes the fact that households consume items that they received as payment in kind and imputes the value for goods and services that were not purchased by households to ensure that the consumption expenditure reflects the actual household consumption level.²³ If households purchase and consume certain goods or services, the value of consumption is used as purchase value. Depending on the recall period, the value of

²⁰ The Constitution under Article 239 to 241 in Part VIII, states that every Union Territory (UT) is administered by the President of India acting through an administrator appointed by him. The President may make regulations for the peace, progress and good government of the UT. Of the seven Union Territories, the Union Territories of Puducherry and Delhi are provided with a legislative assembly and a council of ministers headed by a chief minister. Remaining five union territories do not have such political institutions. Finally, the Central Government decides the High Court for UTs.

²¹ In developing countries like India consumption data are used to identify households that are below the poverty line. The Planning Commission of India uses the nutritional norm of 2400 calories per capita per day for rural India and 2100 per capita per day for urban India to estimate the level of poverty in the country.

²² Deaton, (1997). "The analysis of household surveys: A microeconomic approach to development policy."

²³ NSSO 61st Round, Employment and Unemployment Situation in India, 2004-05.

goods and services from free collection, loans, gifts, and items received in exchange of other goods and services are imputed at the rate of average local retail prices. Home production is imputed at the farm or factory rate. In the appendix to this chapter, I discuss in greater detail the various consumption categories surveyed along with their recall period.

2. National Rural Employment Guarantee Act

To identify the districts that received the program in each of the three implementation phases, I combined the NSSO data, which includes district-level identifiers, with data I obtained from the NREGS website, which reports the year in which districts received the program. The website provides information by each state on various measures of program implementation and performance.²⁴ For each state there is also information on the districts that were notified under the NREGS to receive the program in the first phase, second phase, and third phase of program implementation. The first phase districts received the program in February 2006. The second and third phase districts received the program in June 2007 and June 2008 respectively. I code the districts that received the program in the first phase as 1, the second phase as 2, and the third phase as 3. Then I use the same district identifiers that I created for the Consumption Expenditure Survey to combine the two datasets.

As mentioned in Chapter II, the Act does not specify the actual ranking used by the government to assign districts to the phase in which they received the program. There is reason to believe that the government used the information from the Planning Commission of India 2004 Report, which created a backwardness index based on the percentage of SC and ST

²⁴ http://nrega.nic.in/MNREGA_Dist.pdf, accessed 06/15/2014.

populations, and agricultural productivity of the district. I combine the NREGS phase-wise rollout data at the district-level with the backwardness rank data in the 2004 Report on Identification of Districts for Wage and Self Employment Programmes. This allowed me to show in Figure 1 that assignment of districts to a particular phase of program rollout cannot be perfectly predicted by the district's backwardness rank.

3. Election Commission of India

The Election Commission of India website has information about the State Assembly constituencies.²⁵ The website lists all the constituencies in a particular district and identifies the reserved constituencies. The Commission also provides Census data on total population and SC/ST population and uses it to show how the Delimitation Commission calculates the reserved seats for each district.

To study the effect of reservation of State Assembly constituencies on household wellbeing in the context of the NREGS, the district is an appropriate unit of analysis since State Assembly constituency boundaries are contained within a district and the district population is used to calculate reserved seats. Table 3-1 shows the number of reserved constituencies for each of the major states. I obtained data by adding up the reserved constituencies in each district and then aggregating it at the state level. The figures for the total population and for the SC and ST population in the table are from the 2001 Census. Table 3-1 also shows that even though the Northeastern states, which have large ST population, are excluded from the dataset, reservation

²⁵ <http://eci.nic.in/delim/index.asp>, accessed on 06/15/2014.

for both SC and ST candidates are present in all states. Bihar, Punjab, and Uttar Pradesh do not have any assembly constituency reserved for ST candidates.

Appendix to Chapter III

National Sample Survey

The National Sample Survey Organization (NSSO) uses a recall period of one month for consumer goods, rent and monthly medical expenditure items, and a 365-day recall period for durable goods, education and institutional medical expenditures. The main categories in the consumption expenditure survey are 'food', 'fuel and light', 'clothing and footwear', 'education and medicine' and 'durable goods'. The questionnaire used to collect the data is comparable across the various rounds since they use the same recall period for the different consumption categories. However, the 2004-05 round uses two recall periods (a 30-day and 365-day recall period) in the 'clothing and footwear' and 'durable goods' categories, whereas the other years use the 365-day reference period for the same broad categories. By relegating the 30 day reference period and only using the 365-day reference period for the 2004-05 round for these categories make it comparable to other years. Therefore, I am able to use the five survey rounds for all the analyses.

Apart from the 2003 survey, which started in January and ended in December of the same year, the NSSO surveys started in July and ended in June of the following year. The surveys collect information on consumption expenditure in every year and cover nearly all the districts in India.

Sampling Method

The 2004-05 round is part of the large sample survey that the NSSO administers every five years. Since the program was implemented across districts over the period 2006-2009, the

2004-05 survey is the only large sample survey used in this paper. Though the size of the samples vary, I can combine the large and small sample surveys because the NSSO provides weights for each household to ensure that datasets are representative of the entire population. I use these weights to analyze the impact of the program.

NSSO uses a stratified multi-stage sampling method to collect data. Each district of a State is stratified into a rural and urban stratum. The multi-stage sampling consists of the First Stage Unit (FSU) and the Ultimate Stage Unit (USU). The FSUs for the rural sector are the villages listed in the Census of 2001 and the USUs are the households in the villages. Sample size allocated to each stratum is in proportion to the population of 2001. The villages to be sampled are selected by probability proportional to size with replacement (PPSWR), size being the population of the village. Sampling of households from the selected villages is based on affluence and the nature of principal activity (agricultural or non-agricultural).

Agricultural (Non-lean) and Lean Season

The agricultural season in India is from July to November. The NSSO collects data in four sub-rounds, each with a duration of three months. An equal number of First Stage Units are sampled in these rounds to ensure uniform spread over the entire survey period. I have used the first two sub-rounds (July to December) as the agricultural (non-lean) season. Thus I have included December in the non-lean season when it should have been included in the lean season. It should also be noted that the non-lean season for 2007-08 does not overlap with the rollout of the program in the control districts (April 2008).

Tables

Table 3-1: Summary Statistics on Reservation of State Assembly Seats 2008

States	Reserved Seats till 2008		Reserved Seats after 2008		Total Seats	Population		
	SC	ST	SC	ST		Total	SC (%)	ST (%)
Andhra Pradesh	42	6	48	19	294	76210007	16.19	6.59
Assam								
Bihar	39	0	38	2	243	82998509	15.72	0.91
Chattisgarh	10	34	10	29	90	20833803	11.61	31.76
Gujarat	13	26	13	27	182	50671017	7.09	14.76
Haryana	17	0	17	0	90	21144564	19.34	0
Himachal Pradesh	16	3	17	3	68	6077900	24.71	4.02
Jharkhand	9	28	10	22	81	26945829	11.84	26.30
Karnataka	33	2	36	15	224	52850220	16.20	6.56
Kerala	13	1	14	2	140	31841374	9.81	1.14
Madhya Pradesh	34	41	35	47	230	60348023	15.17	20.27
Maharashtra	18	22	29	25	228	96878627	10.2	8.85
Orissa	22	34	24	33	147	36804660	16.52	22.13
Punjab	29	0	34	0	117	24358999	28.85	0
Rajasthan	33	24	34	25	200	56507188	17.17	12.56
Tamil Nadu	42	3	44	2	234	62405679	19	1.04
Uttar Pradesh	89	0	85	0	403	89587186	20.55	0.06
Uttarakhand	12	3	13	2	70	8489349	17.87	3.02
West Bengal	59	17	68	16	294	80176197	23.01	5.5

Source: Election Commission of India (<http://eci.nic.in> accessed on 05/12/2013)

CHAPTER IV

RAISING CONSUMPTION THROUGH INDIA'S NATIONAL RURAL EMPLOYMENT GUARANTEE SCHEME

1. Introduction

In this chapter, I analyze the impact of the National Rural Employment Guarantee Scheme (NREGS) on the level and timing of household consumption. As described earlier, the National Rural Employment Guarantee Act, passed by the Indian Parliament in August 2005, created one of the largest anti-poverty programs in the world. It is essentially a rural public works program aimed at providing a fallback source of employment to the rural population when work from agriculture becomes scarce or inadequate. By studying the NREGS, I analyze a program whose goals reflect the objectives of the welfare schemes that are being used increasingly since the last decade in low and middle-income countries. Understanding the potential benefits of such workfare programs can help to guide future policy making, not only in India, but other countries pursuing similar programs.

Over 60 percent of rural households in India are engaged in agriculture, and they employ various means to smooth consumption over the lean and non-lean agricultural seasons and over good and bad years. The lack of formal credit and insurance markets often forces households to buy real financial assets during good periods and sell them in the bad periods (Deaton, 1989; Rosenzweig and Wolpin, 1993). Poorer households sacrifice higher expected income for lower risk production methods to smooth consumption (Morduch, 1995). They also use their personal networks to smooth overall consumption (Rosenzweig, 1989). With the introduction of NREGS,

households know that they have the option of working under it for 100 days every year.

Therefore, if they anticipate a permanent increase in income, then they may accordingly adjust consumption over the lean and non-lean agricultural season to raise and smooth consumption.

Rather than attempt to screen and identify poor workers according to strict eligibility criteria, which is a complicated and costly, NREGS is designed to attract the poor while deterring the non-poor by requiring individuals to do unskilled manual work in a public works program at the minimum wage. Under these conditions, the non-poor will have little or no incentive to participate in the program (Besley and Coate, 1992). Even though the program does not formally target the poor, the majority of the workers under the program have Below Poverty Line status.²⁶

I assess the program's impact by focusing on changes in household consumption expenditures using cross-sectional consumption data from the Consumption Expenditure Survey conducted by the National Sample Survey Organization (NSSO). Because the NSSO imputes the value for goods and services that were not purchased by households but received as in-kind payment, the consumption expenditure data reflect the actual household consumption level.²⁷ The consumption data are highly detailed and allow me to observe spending on basic food items, personal goods, durable goods, medical expenses, and education. I return to analyze detailed spending patterns in Chapter VI, whereas in this chapter I concentrate on total consumption and its timing.

²⁶ <http://nrega.nic.in/netnrega/home.aspx>. Under the Transparency and Accountability category on the website, one can access the details for each household that registered for the Program. Accessed on 9/6/2013.

²⁷ For poor households the increase in income from the Program would lead to increases in consumption expenditure which can either smooth consumption over the lean and non-lean agricultural season or lead to an overall increase for the entire year.

NREGS has the potential to increase the consumption level of participating households directly, but the program's overall effect on local economic outcomes may be more complex. In India, approximately 90 percent of the workers belong to the informal sector where they are not protected by labor laws and may work for less than the official minimum wage. Thus, even though NREGS does not exceed the minimum wage, the program increases the opportunity cost of working in the informal sector. Households now allocate their time between public and private sector jobs to maximize household utility, and they may reduce the number of days supplied in the informal sector. This might lead firms in the informal sector to increase wages to retain workers, and in this scenario, the program would benefit low-skilled workers even if they do not participate directly in NREGS.²⁸ Although the design of the program may lead to some crowding out of workers from the informal sector, it may also avoid the problem of dis-employment that is associated with extending the minimum wage to uncovered sectors. In addition, the program's investment in durable assets that improve rural infrastructure could have positive local spillovers.

To date, there has not been much work studying the impact of the program at the national level and, to my knowledge, there has been no work that studies household consumption expenditures. Given that the NREGS is an employment guarantee program, the main focus of previous work has been employment per se. For instance, Zimmermann (2012) estimates small but positive effects on wages for women, but not for men, and there seems to be no significant impact on labor force participation in the public or private sector for men or women. Azam (2012), on the other hand, finds that public sector labor force participation increases by 2.5 percentage points and wages for casual workers increase by nearly 5 percent. Both papers use the

²⁸ Recent studies focusing on Latin America find that raising minimum wages has a positive effect on wages (Alaniz, 2011; Lemos, 2009). This is explained by the presence of a dual labor market, where informal sector workers use their bargaining power to demand higher wages.

Employment Unemployment Survey from the National Sample Survey Organization (NSSO) and focus on the section of the survey that deals with wage data since information about household members who worked under NREGA can only be obtained from this section of the survey. However, this section only provides information on the wages earned by the households in the last seven days. Since payments in India are not made in a timely manner, the data might not capture the actual benefit from recently working under the program.²⁹For instance, the household also may have used the program at a different point in time and used the income from the program to smooth consumption over time. The consumption data allow me to observe household-level expenditure over a longer timeframe and are more likely to capture changes associated with program participation.

To identify the program's effects on consumption patterns, I employ a difference-in-difference framework that exploits the timing in the program's rollout across districts between 2006 and 2009. The program's early implementation districts are my treatment group, and the late implementation districts form my control group. I also use data from 2001 and 2003, before the Act was introduced, to conduct a simple falsification test. The results indicate that the trend in per capita consumption for the early implementation districts was similar to that for the late implementation districts during the pre-program period. The common pre-trend for the two groups suggests that the late implementation districts are a valid control group in the difference-in-difference framework, which lends credibility to the identification strategy.

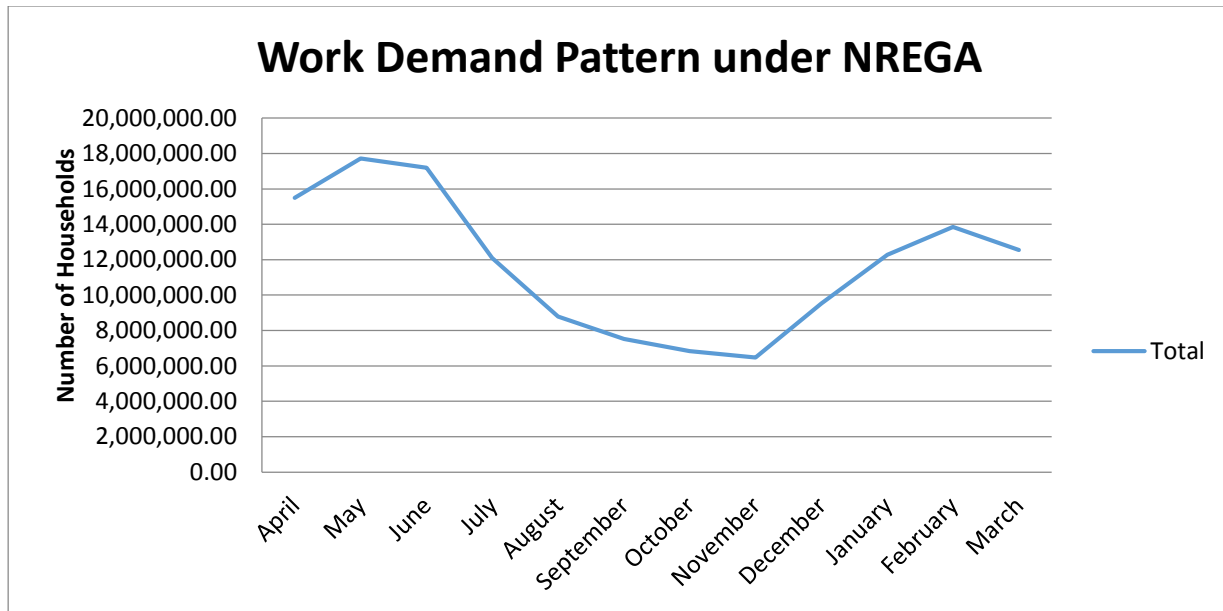
The dataset with consumption does not identify which households participated in the program. Therefore, I use all the households in a district and estimate the "intent to treat" effect

²⁹ Delay in Payment of Wages to NREGA Workers, 2009.

of access to the program. This allows me to assess the overall impact by capturing the direct effect and the indirect effects on consumption through local spillovers.

The chapter's main finding is that NREGS increased rural household per capita consumption expenditure by around 10 percent. Although Figure 2 shows that households predominantly use the program during the lean agricultural months, the gains from the program are not concentrated in the months that they work under the program. Consumption increases both during the lean season (by 10 percent) and the agricultural season (by over 7 percent), and thus I find that households are able to smooth consumption over the year.

Figure 2: Monthly Demand for Work under NREGS



Source: NREGA website.

http://164.100.129.6/netnrega/demand_emp_demand.aspx?lflag=eng&file1=dmd&fin=2010-2011&fin_year=2010-2011&page=S&Digest=cZN2IUULOPd8nLPfrWENfg. Accessed on 9/6/2013.

I also analyze the impact of the program specifically on marginalized-caste households.³⁰ More than 50 percent of these households were below the poverty line before the program was implemented (Table 2-1), and so one would expect members of these groups to benefit substantially if the program really did have positive effects, unless there was severe discrimination against marginalized castes in the program's operation. Because caste is hereditary, the introduction of the program cannot affect household caste status and strongly bias the results through selection into or out of certain castes. Ultimately, I find that NREGA increases household consumption by around 12 percent for marginalized-caste households. Thus, discrimination (Banerjee, et al. 2009) and other barriers to entry have not prevented this group from benefiting from the program.

2. Empirical Strategy and Data

Conceptual Framework

In evaluating an anti-poverty program like NREGS, comparisons between participants and non-participants will likely lead to a biased estimates of the program's effects. First, selection into the program should be limited to those with relatively poor labor market alternatives, even controlling for observable characteristics (Ashenfelter, 1978; Ravallion, 2008). Clearly, participation is not randomly assigned to the population. Second, the program could affect wages in local labor markets by reducing the supply of workers to the informal private sector, as

³⁰ Individuals from Scheduled Castes and Scheduled Tribes were historically regarded as untouchables and therefore marginalized in terms of access to work, education and social activities. At the time of Independence the Constitution recognized this fact and regarded caste based discrimination as a violation of one's fundamental right to equality. All government programs and institutions practice affirmative action by ensuring that minority caste groups have at least proportional representation.

described above. The increase in wages affects not only the individuals who opted to divide their time between NREGS and work in the informal sector, but also workers who continued to work only in the informal sector. Finally, the program builds rural infrastructure (roads, irrigation structures, and land development projects), which could have widely distributed local benefits. All these considerations would tend to lead to understatement of the program's effect on wellbeing from a comparison of local participants and non-participants.

Instead, the difference-in-difference analysis that I describe below considers all households in a district and makes comparison across "treated" and "untreated" districts to provide an overall, net estimate of the program's local effect. This is akin to estimating an "intent to treat" effect and is especially relevant in this setting where I am trying to capture the program's overall local impact. The direct effect consists of households using the program to address their unemployment or underemployment situation. The indirect effect consists of the positive and perhaps negative spillover effects. The positive channels were discussed above. The negative effect may stem from the increase in wages in the informal sector, which can lower the profits of individuals running these establishments as well as profits of larger landholders who may lose labor to NREGS in the short run. This in turn can affect their spending decisions.

In theory, NREGS might induce migration into the early adopting districts. But since households need to show proof of residence in the village to obtain job cards to work under the program, individuals cannot temporarily migrate to rural districts that currently have NREGS to gain work under the scheme. Also, workers in India are historically not very mobile geographically, and so it is unlikely that migration will bias the results. If such changes in migration do occur, then my results would likely be biased downwards due to the poorer section of the population moving out of the control districts and into the treatment districts. The NREGS

program may also cause individuals to decrease seasonal migration of the poor to urban areas during the lean agricultural season. To the extent such migrants are omitted from the control sample, this would bias my results downward.

Households, perhaps especially female members of households, may choose to supply work to the program rather than work in household production if returns from NREGS are relatively higher. This might not increase consumption to the same degree as the increase in formal household earnings, since household members move to a sector where there is wage payment, from one where there is no formal payment of wages. Thus studying the labor market impact of NREGS with focus on earnings may overestimate the effect of the program on household wellbeing. This problem can be avoided using consumption data. On the other hand, the formal contribution to household income by women may lead to certain distributional changes in expenditure, which is captured using the detailed household consumption expenditure data. Individuals may also choose to work during the lean season under the program rather than work for firms where the non-monetary workplace benefits like drinking water, shelter, crèche (through the Integrated Child Development Scheme), and closeness to home may not be available. Unfortunately, this non-monetary impact of the program is not captured in the difference-in-difference analysis.

Empirical Strategy

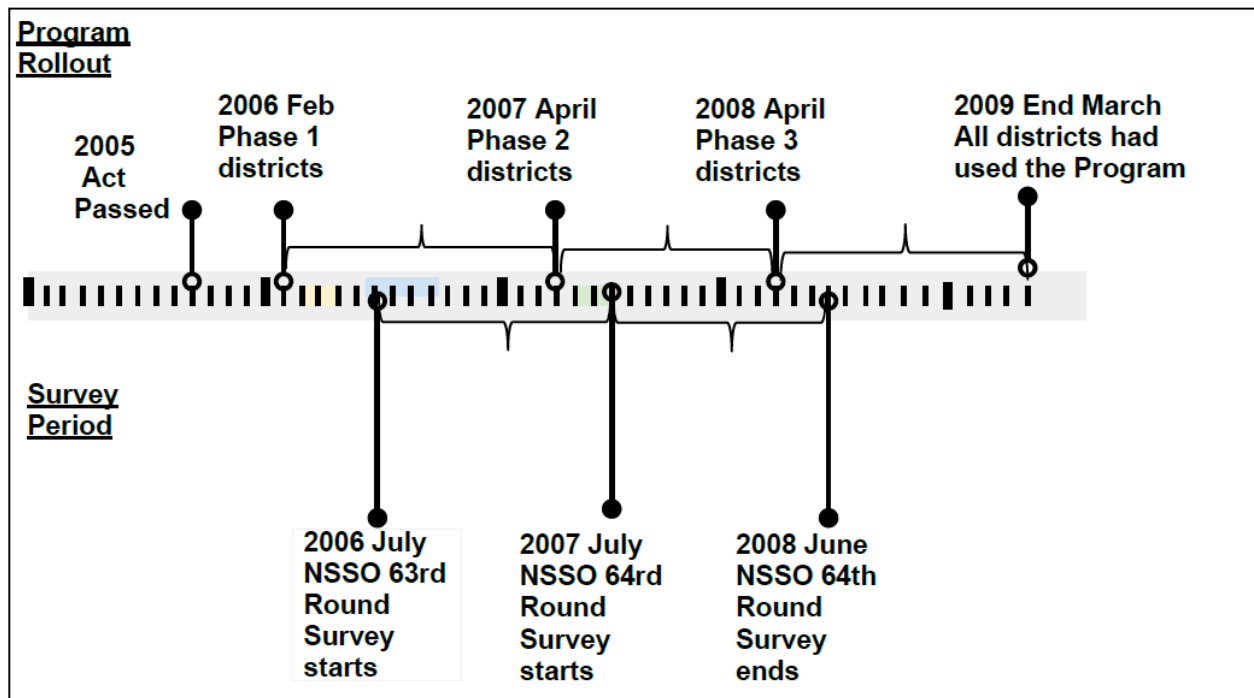
The analysis uses nationally representative household data from the Consumption Expenditure Survey conducted by the National Sample Survey Organization (NSSO) for 2001-02, 2003, 2004-05, 2006-07 and 2007-08, to cover the years preceding and following the rollout of the program in Phase 1 districts. The year 2003, before the program had been passed or

implemented, forms the base period for this analysis, and 2006-07 forms the post-program implementation period.³¹

As mentioned earlier, I exploit the phase-wise implementation of the program across rural districts from February 2006 to March 2008. In the baseline estimates, I compare changes in consumption of “early implementers” that received the program in Phase 1 (2006-07) to “late implementers” that received the program in Phase 3 (2008-09). Note that there is an intermediate group of districts that received the program in Phase 2, which unfortunately cannot serve as a clean comparison group. This is because they received the program during the last months of the 2006-07 data collection period, which corresponds to the lean season when public employment might be in high demand. I will attempt to bring this intermediate set of districts into the analysis later in the chapter, but the clearest baseline analysis is likely to come from the comparison of early with late implementers. These choices reflecting the timing of the program’s rollout and the timing of data collection as described in detail in the timeline shown in Figure 3.

³¹ However, it should be noted that a pre cursor public works program to the NREGS was introduced in the 150 of the most backward districts in 2004. This was the National Food for Work Programme and it was subsumed under the NREGS when it was rolled out in February 2006.

Figure 3: Timeline of Rollout of the NREGS Program and Survey Period of NSSO for Consumption Expenditure



Relying on the 2006-07 data does raise some concern because a report of survey teams that visited some of the most backward districts of the country from May to June 2006 suggested that there was little activity under NREGS in the villages they visited.³² However, the official reports from the end of March 2007 show that 21 million rural households had used the program

³² Report on Implementation of NREGA, Centre for Budget and Governance Accountability, New Delhi. The reports mention that there were initial "teething" problems, where districts and panchayats were learning how to set up and implement the program, and the villagers were learning how to use a program that is demand driven. The survey also points out that main agricultural season is from July to November, and states are aware of this fact. Because the number of days households can work under NREGA is fixed at 100, state governments can anticipate the requirement of public works in lean seasons when work from agriculture will be scarce or inadequate and accordingly plan for it.

by that time (Table 2-2).³³ This suggests that while the program may have started slowly, rural populations had learned how to implement and use the program by early 2007.

The base regression equation is as follows:

$$(1)y_{idt} = \beta_0 + \beta_1 \text{Early_Post}_{d,t} + \gamma X_{idt} + \eta_{st} + \delta_d + \lambda_t + e_{idt}$$

where y_{idt} measures the outcome variable (per capita consumption expenditure) of household i in district d and in year t . The dummy variable *Early_Post* takes on the value 1 if the household is in an early implementing district and the year is 2006-07. X_{idt} is a vector of household characteristics including caste, religion, maximum educational attainment among members of the household who are above the age of 14, number of children, land possession, average age and quadratic of average age of men and women.³⁴ The equation also includes district fixed effects, δ_d , and year fixed effects, λ_t . The district effects will account for fixed cross-place differences, whereas the time effects will account for shocks that affect all places at the same time and to the same extent. η_{st} is the state-specific linear time trend.

The coefficient β_1 measures differential changes in y in early implementing districts compared to late implementing districts, conditional on the control variables, fixed effects, and state trends. This will capture the causal effect of the program if variation in the program's timing is not related to unobserved shocks and trends that differentially affected households in early implementing districts.

³³ National Rural Employment Guarantee Act 2005 (NREGA), Report of the Second Year, April 2006 – March 2007

³⁴ The Indian Child Labor Act, 1986, prohibits children below the age of 14 to work in hazardous industries and perform certain agricultural works. The Act in conjunction with the Right to Free and Compulsory Education Act mandates that all children between 6 and 14 must attend school. The NSSO also defines child workers to be below age 14.

A major challenge for this approach is that the program was supposed to be assigned first to districts that were relatively “backward.” As discussed in Chapter II and shown in Figure 1, assignment to “early” status was clearly not random, but it also did not adhere closely to an assignment rule based on observable characteristics. Table 4-1 shows substantial differences in the average levels of several economic and social variables between the early and late implementing groups of districts in 2003. Notably, the early implementation districts had an average level of per capita monthly consumption of Rs. 566 whereas late implementation districts had an average level of Rs. 863. In equation 1, the district-level fixed effects should help narrow the scope for bias from pre-existing differences in characteristics, but it is useful to test the validity of the identification strategy directly by examining patterns in the pre-program data. Specifically, I estimate an equation analogous to equation 1 but with data from 2001-02 and 2003 (with *Early_Post* = 1 for early implementation districts in 2003) to see whether early and late implementers had different pre-trends in consumption.

Table 4-2 presents the results of this analysis where each cell provides estimates from a separate regression. The first column covers all households in the districts, the second column restricts the sample to households from the marginalized castes, and the third column includes districts that received the program in phase 2 and phase 3 in the “late implementation” group. The point estimates of β_1 are small and statistically insignificant, indicating a common pre-trend for the treatment and control groups, and providing some support for the identification strategy. Later in the chapter, I consider potential confounding factors at some length and conduct various robustness checks.

3. Results

3.1 Difference-in-difference analysis: Base line estimates

I start with a focus on all sampled households and, therefore, assess the overall effect of the program on local economic activity. Next, I restrict the sample to all the marginalized-caste households. Due to both historical and ongoing discrimination, marginalized-caste households tend to be among the poorest in India. Over 50 percent of SC/ST and 40 percent of OBC households were below the poverty line in 2004-05 (Table 2-1).³⁵ This has long been of special concern to policymakers seeking to improve access to opportunities and resources to the marginalized in India. If the regressions were to find evidence of positive program effects on local economic activity in the full sample but *not* in the marginalized caste sample, this would suggest that discrimination or other barriers have prevented SC/ST/OBC populations from gaining ground even while others gained.

Tables 4-3 to 4-6 present the results of the analysis of the impact of NREGS on household consumption expenditure, based on comparisons of 184 early implementation districts and 209 late implementation districts. The per capita monthly consumption is based on the items for which the recall period was 30 days and five infrequently purchased items (clothing, footwear, durable goods, education and institutional medical expenses) whose recall period was 365 days. For items with a 365-day recall period, I divided by twelve to obtain the household monthly expenditure. All estimates are weighted using the NSSO weights, and the standard errors are clustered at the district level. The tables focus on the effect of the program on per capita monthly consumption expenditure.

³⁵ NSSO, Report No. 516, Employment and Unemployment Situation among Social Groups in India, 61st Round (July 2004- June 2005).

In Table 4-3, the first column shows the result of the program on household per capita consumption for the entire population. The next column concentrates on the lower caste households. Overall, the program appears to have had a positive and significant impact on consumption, by around 10 percentage points. The lower caste households did, in fact, see an improvement. These households saw a 12 percent increase in per capita consumption expenditure in early implementation districts relative to late implementation districts.³⁶

Assuming NREGS *only* affects those households who participate in it (i.e., 33 percent of the rural population), then the coefficient would imply that the program roughly increases their consumption by 30 percent. However, this is almost surely an upper-bound estimate because the presence of positive spillover effects would imply that the number of people who benefit is greater than the number of people who participate in the program.³⁷

3.2 Lags and Leads

The baseline estimates assess the immediate impact of the program but do not reveal the dynamics of NREGS. Allowing for a dynamic model, to the extent possible for such a recent program, will capture the immediate impact of the program following rollout, and in the following years see whether the impact stabilizes, accelerates, or reverts to the mean in the early implementation districts. In the years preceding NREGS, an anticipatory effect might lead households to raise their consumption levels if households are able. To capture these effects I

³⁶As discussed earlier, using the group of districts that implemented the program in “phase 2” is problematic because this group started rolling out the program late in the 2006-07 data collection period. Nonetheless, I have estimated equation 1 assigning this group to the late implementation control group. In this case, the point estimate is reduced to around 6 percent in 2006-07 and this is significant.

³⁷ For comparison, Azam (2012) finds the NREGS program causes wages for casual workers to increase by nearly 5 percent, and Berg *et al.* (2012) find the program increases agricultural wages by over 5 percent.

include lags and leads by using data from 2001-02 to 2007-08 in the difference-in-difference analysis.³⁸ I use five different years for the analysis (2001-02, 2003, 2004-05, 2006-07, and 2007-08) and introduce an indicator variable for each year.³⁹ These variables equal one for the early implementation districts for the relevant years. I estimate the impact of NREGS with 2003 forming the base year using the following model.

$$(2)y_{idt} = \beta_0 + \sum_{\tau=0}^3 \beta_{-\tau} \text{Early}1_{d,t-\tau} + \sum_{\tau=1} \beta_{+\tau} \text{Early}1_{d,t+\tau} + \gamma X_{idt} + \eta_{st} + \delta_d + \lambda_t + e_{idt}$$

The dataset has information from 2001-02, 2003, and 2004-05, which allows me to account for pre-trends in the treatment districts in the years leading up to the introduction of the program. The coefficient for 2007-08 gives the estimates for the lagged effect of the program in the early implementation districts. η_{st} is either a state-specific linear time trend or state-by-year fixed effects. The state time trend allows states to follow different trends whereas the state-by-year fixed effect captures any state specific shock to consumption (e.g., as a result of policies that may be passed by state governments). District fixed effects are also included, as before. Standard errors are again clustered at the district level.

Results for the analysis using data from 2001-02 to 2007-08 are presented in Table 4-4A. Similar to Table 4-2, the first two columns show the results for all households, the next two for marginalized caste households, and the last two include the districts that received the program in the second and third phase of the rollout in the "late implementation" group. The odd numbered

³⁸ I don't use the 2005-06 data because the NREGS was introduced in February 2006. The overlap between data collection and the rollout of NREGS makes it difficult to analyze its impact.

³⁹ Barring 2003, which had a data collection period from January to December, the data collection period for the other years is from July to June of the next year.

columns use the state linear time trend, and the even numbered columns use the state-by-year fixed effects. In this framework, I estimate that the introduction of NREGS increased consumption for all households by 10.9 percent. These results are significant at the 1 percent level. I also find that marginalized caste households increase their consumption by nearly 13.1 percent. This is consistent with the earlier baseline estimates that used only pre and post program information.

For 2004-05, the coefficient for early implementers is positive and significant even though the program had not been rolled out yet. Contrary to the earlier falsification test with data comparing 2001 and 2003, the positive results for 2004-05 suggest that households in the treatment group increased consumption as a result of some other program or shock that occurred in the treatment districts in 2004-05. In this context it is important to note that before NREGA was introduced, the government had started the short-lived National Food For Work Program (NFFWP) in November 2004. The NFFWP targeted 150 backward districts for public works employment in exchange for food grains and wage payment. This program was subsumed (and ended) under the NREGS when NREGS was rolled out from 2006, and the 150 backward districts were among the 200 early implementation districts. Therefore, is it not too surprising that there is an uptick in consumption in 2004-05, and the fact that the NFFWP ended when NREGS began should ensure that I am picking up an NREGS effect in the 2006-07 data.

To test the sensitivity of the results, I have run regressions that exclude the 150 districts that received the NFFWP.⁴⁰ The exclusion allows us to focus solely on treatment districts where the increase in consumption for the early implementation districts for NREGS cannot be

⁴⁰ The regression does not include district fixed effects. Instead I use an indicator variable for early implementation districts. I also trim the sample and reduce the number of late implementation districts by excluding the ones which are least backward (i.e., have a rank greater than 350).

associated with the pre-cursor NFFWP. The results are in Table 4-4B. The coefficient for 2004-05 is small and not significant while the NREGS coefficient for 2006-07 is 7.6 percent. The standard errors are large since the sample of treatment districts has been dramatically reduced. The table also shows that for the years preceding the program, the coefficient is small and not significantly different from zero, indicating that there is no effect of NREGS in these districts. I have also run the results and simply dropped 2004 from the analysis because it is, in a sense, contaminated by the precursor NFFWP program. The results are depicted in Table 4-4B. The coefficient of interest for 2006-07 is significant at 10.8 percent, and for marginalized-caste households the results are positive and significant at 12.8 percent.

Table 4-4A also shows that for the years following the program, the coefficient is positive but smaller than the coefficient for 2006-07. The point estimate for early NREGS implementation decreases by 3.4 percentage points in 2007-08. This may be explained by the overlap in the survey period, which continued until the end of June 2008 (Figure 1), and the introduction of NREGS in April 2008 in the control districts. The overlap corresponds to the lean agricultural season, and households in the control group were likely to work under NREGS. This may cause a downward bias to the estimated effect of the program. In any case, by conducting an F-test for equality of the β coefficients for 2006-07 and 2007-08, I find that I cannot reject the hypothesis that they are equal at any of the usual significance levels (since the p-value is 0.45).

3.3 Additional Robustness Checks

In Figure 1, one can see that there is a section where there is overlap in backwardness between the early and late implementers, but also ranges in which there is not an overlap. I restricted the sample to districts that belong in the overlapping section by excluding 102 early

implementation districts that had no overlap with districts that received the program in Phase 2 or Phase 3. I find that the estimated effect of the program is around 10.5 percent, which is very similar to when I had use the entire sample for my base line estimates.

I also trimmed the sample to exclude the top and bottom 10 percent of districts in terms of backwardness. In this case, I find that the estimated effect of NREGS is smaller at around 6.5 percent than when I used all the districts. The difference in results in the second and third column of Table 4-5 may be driven by the fact that the overlapping districts only excluded the 102 most backward districts and none of the least backward districts in my dataset. The less backward districts likely had better organizational capability and were able to benefit more from the anti-poverty program in terms of creating jobs and using the newly built rural infrastructure to increase local labor and agricultural productivity. Thus the inclusion of more backward districts may have lowered the effect of NREGS on household consumption.

Finally, I check the sensitivity of the results to sample weighting. The NSSO uses stratified random sampling to collect data and weights are used for each household to ensure that datasets are representative of the entire population. In this sense, the data analysis is highly dependent on the recommended weights. In Table 4-5, the first column focuses the effect of NREGS without weights for all households using 2003 as the base year. I find that without the recommended weights the effect of the NREGS is smaller at 7.4 percent.

3.4 Seasonal Variation and Consumption Smoothing

The NREGS was specifically designed to provide a fallback source of employment when work from agriculture is scarce or inadequate. If the effect of NREGS on consumption is similar during the lean and non-lean agricultural season, then it is likely that households use the

additional income earned from the program to smooth consumption over the two seasons. Figure 2 shows that households use the program primarily during the lean season (January to June)). Households also know that the program is not temporary and they have access to it every year. Given these facts, it is useful to analyze whether households smooth consumption or whether consumption is contemporaneously correlated with income. Poor households, due to liquidity constraints, might not be in a position to save during the lean season to smooth consumption over the entire year. Time preference may also play a role, whereby households' present discount value of future consumption can lead them to have higher levels of consumption during the lean agricultural season by working under NREGS.

First, I analyze whether NREGS separately increases consumption in the non-lean season and the lean season. The "late" districts continue to form my control group since they do not have access to the program to smooth consumption. I assume that the "late" districts continue with the same pattern of seasonal consumption in the absence of public programs. Table 4-6A shows the results of an equation similar to equation (2) where the first column focuses on lean season observations and the second column on non-lean season observations.⁴¹ The results indicate no pre-trends (except for 2004-05) implying that the early and late implementation districts had a similar pattern before the NFFWP or NREGS was introduced. NREGS increased consumption by around 7 percent in the non-lean season (July to December of 2006) and by nearly 10 percent in the lean season (January to June of 2007) relative to 2001. This suggests households used the program to increase consumption level in both the lean and non-lean season. The increase in the non-lean season (which is before the lean season) can be explained by

⁴¹ I use goods and services whose recall period is 30 days. This will better capture seasonal variation since I am focusing on household consumption made in the season of interest.

households working under NREGS in the agricultural season or by household increasing consumption in anticipation of higher income by working under NREGS during the lean season. For 2007-08, the increase is around 9 percent in the non-lean season. This may be a combination of anticipatory effect and households saving part of the increase in income in 2006-07 to increase future consumption.

I use a difference-in-difference-in-difference model (DDD) to analyze whether households in the "early" districts smooth consumption over the lean and non-lean season. I modify equation 1 to include a triple interaction term of $Early_{d,t} * Lean$. This allows me to capture the variation in consumption specific to the "early" districts (relative to the "late" districts) in the lean season (relative to the non-lean season) in 2006-07.⁴² The DDD estimate calculates the change in average consumption for the "early" districts during the lean season while netting out the change in consumption for lean season in the "late" districts and the change in the non-lean season in the "early" districts. This method helps to control for two of the potentially confounding elements. The changes in consumption during the lean season for the treatment districts is not a result of changes in consumption in the lean season for all districts, nor is it a result of changes in consumption for all households in "early" districts.

Table 4-6B, Panel A, shows that households had a similar level of per capita consumption in the lean and non-lean season before the program was implemented. Panel B, column 1, reports the results for the equation which uses data from 2001-02 and 2003. Here

⁴² I use the following equation where the variable $Early_{d,t}$ equals one for "early" districts for 2006-07.

$$(3)y_{idt} = \beta_0 + \beta_1 Early_{d,t} * Lean + \beta_2 Lean * Early_d + \beta_3 Lean * \lambda_t + \beta_4 Lean + \beta_5 Early_{d,t} + \gamma X_{idt} + \eta_{st} + \mu_d + \lambda_t + e_{idt}$$

The coefficient β_1 measures differential changes in y for the lean season compared to the non-lean season for the "early" districts in 2006-07, conditional on the control variables and fixed effects. β_2 captures the time invariant characteristics in consumption of the "early" districts during the lean season. β_3 capture the changes in consumption over time during the lean season.

$Early_{d,t} * Lean$ equals one for the lean season observation for year 2001 (with base year 2003) and the early implementation districts. The point estimate of the coefficient on the triple interaction term, β_1 , is small and statistically insignificant indicating that households were smoothing consumption over the lean and non-lean seasons in the pre-program period. This suggests that credit constraints or uncertainty about the benefits from NREGS did not cause households to have significantly different levels of consumption in the lean and non-lean seasons. Thus it appears that households were able to anticipate the benefit from the program and accordingly adjust their spending decisions to try to smooth consumption.

4. Conclusion

In the last decade low-income countries have commonly used public works programs to address issues of poverty and seasonal unemployment. Substantial research has demonstrated the effectiveness of such programs in improving household wellbeing. Ravallion et al. (2005) have documented large transfer benefits in terms of income to participants of the Trabajar workfare program in Argentina. Haddad and Adato (2002) find that jobs under the National Public Works Program in South Africa went to the poor and unemployed. Women also participated under the program despite existing gender bias. Azam (2013) finds that the Latvian public works which was designed to address the effect of the 2008-10 global economic crisis, was successful at targeting poor people and leakage of benefits to non-poor households was small. For the case of Ethiopia, Gilligan et al (2008) find that for households receiving at least half of their intended transfer from the Productive Safety Nets Programme, there was improvement in food security through increases in mean calorie availability. In this paper I find that the NREGS increases household consumption by nearly 10 percent and that these effects were spread across lean and

non-lean seasons. Thus by focusing on NREGS, I analyze a program whose objectives reflect worldwide commitment to reducing poverty to achieve the Millennium Development Goals.

In this chapter my purpose has been to estimate the intent-to-treat effect of the program and assess the overall effect of NREGS on household consumption for the treated districts. Although there have been concerns about the effectiveness of the program, the paper provides evidence that an anti-poverty workfare programs that is designed like the NREGS leads to an overall increase in consumption. The impact on the marginalized caste group, who constitute the relatively poorest section of the population, is positive and significant, indicating that discrimination and other barriers to entry did not prevent them from improving household wellbeing. The increase in consumption occurs both over the lean and non-lean agricultural seasons and rural households are able to anticipate the permanent increase in overall income and accordingly smooth consumption.

Public works programs can potentially crowd out labor from the private sector. Gilligan et al. (2009) find that the Productive Safety Net Programme in Ethiopia reduces the probability of households supply labor in the private labor market. The NREGS by guaranteeing minimum wage can impose a cost to the private sector from potential crowding out (of labor who were receiving below minimum wages). It is also necessary to focus on the rural area and the cost to urban businesses brought about by changes in seasonal rural-urban migration as a result of higher expected wage in the rural sector has not been examined. However, to analyze these above questions it is crucial to first understand the exact mechanism through which NREGS affects the various sections of the population.

Further work that focuses on the indirect benefits of the Rural Employment Guarantee Program would be of great value. The program can have indirect benefits for the rural poor

which impact household wellbeing. For instance, the majority of the public works under the program focus on water projects other than irrigation. Logically such works would increase water supply in villages and reduce the amount of time women devote to collecting water for household purposes which in turn may improve women's labor productivity. Access to clean water can also have a positive effect on health outcomes which can positively impact labor productivity. Therefore, apart from analyzing the overall benefits of the program in terms of household consumption and employment, evaluating the indirect benefits would be useful for policy makers and planners in India and in other developing countries with similar programs.

Appendix to Chapter IV

Further Discussion of Treatment and Control Districts

I use the districts that received the program in Phase 1, 2006-07, as my treatment group while the control group consists of the districts that received the Program in Phase 3, 2008-09. 2003 forms the base period for this analysis. The reason for using districts that received the program in Phase 3 as the comparison group rests on the timing of the rollout of the program and its overlap with the collection period of the NSSO data for consumption expenditure. Figure 3 shows the timeline of the above events. The top panel shows the rollout of the program and the bottom panel shows the survey collection period. The NSSO data used to analyze the program is collected from July 2006 to June 2007 (63rd Round) while the districts received the program in Phase 2 from April 2007. There is an overlap of three months in collection of the data and use of the program by districts that received the program in Phase 2. This makes these districts not a valid comparison group. Also, the months from April to June are the lean seasons of agriculture when household demand for work under the program is high. Therefore, the overlap would make it difficult to assess the impact of the program if districts receiving the program in Phase 2 form the control group. To avoid the problem of overlap I use the district which received the Program in April 2008, i.e. in Phase 3, since the rollout for these districts is after the survey was carried out for the 63rd Round. The timeline also shows that the cleanest data collection period on which to focus the analysis is July 2006 to end June 2007. This is the only year where one group of districts (all early implementation districts) had received the program while one group of districts (all the late implementation districts) had not received the program. If the analysis focuses on the

data collected from July 2007 to end June 2008 (64th Round), there would be a problem of overlap because the late implementation districts received the Program in April 2008.

Analyzing the Impact of NREGS with Phase 2 Districts as the Treatment Group

In Table 4-7, I conduct a similar difference-in-difference analysis and use districts that received NREGS in Phase 2 as my early implementation group while maintaining the same control group. The focus is now on the coefficient for 2007-08 since the Phase 2 districts received the program in April 2007 but the control districts had yet to receive the program. NREGS was introduced in the control districts in April 2008. I find no effect on consumption while Azam (2012) finds a significant impact on public sector employment for 2007-08 for districts that received the program in Phase 2. By looking at the consumption data it would seem that the impact does not translate to increases in household consumption. The overlap in the survey period and rollout of NREGS in the control districts, which coincides with the lean agricultural season, may have also played a role in seeing no effect of the program for Phase 2 districts.

Tables

Table 4-1: Descriptive Statistics, Rural Districts, 2003

	Early Implementation Districts	Late Implementation Districts
<i>Percentage of Rural Population</i>		
<i>Caste</i>		
Scheduled Caste	0.21	0.17
Scheduled Tribe	0.15	0.04
<i>Religion</i>		
Hindu	0.87	0.83
Muslim	0.1	0.1
<i>Activity</i>		
Self-employed in non-agriculture	16.34	21.79
Agricultural laborer	31.66	29.78
Other laborer	8.59	12.96
Self-employed in agriculture	33.26	23.94
Others	10.14	11.53
<i>Type of Farmer</i>		
Sub Marginal (less than 0.50 hectare)	58.53	68.85
Marginal (0.50 hectare to 1 hectare)	19.69	14.14
Small (between 1-2 hectares)	11.42	7.78
Semi-medium (between 2 - 4 hectares)	6.8	5.42
Medium (between 4 - 8 hectares)	2.68	2.62
Large (greater than 8 hectares)	0.88	1.19
<i>Education</i>		
Primary and Less	0.5	0.35
Secondary	0.34	0.4
Higher Secondary	0.16	0.25
Female Headed Household	0.11	0.12
Per capita Consumption	566.04	863.67
N	11094	15135

Source: National Sample Survey, 2003. The data is for the 19 major states.

Table 4-2: Falsification Test: Difference-in-Difference - Effect of NREGA on Household Per Capita Consumption

	All Households	Marginal Caste	Control Group -Phase 2 and 3
Early X 2003	0.002 (0.020)	0.003 (0.023)	0.015 (0.019)
District Fixed Effect	Yes	Yes	Yes
Time Fixed Effect	Yes	Yes	Yes
State Linear Time Trend	Yes	Yes	Yes
N	35377	24570	45543
R-sq	0.570	0.560	0.554

Notes: The dependent variables are the log value of total household consumption for the year divided by household size. The base year is 2001. The sample is restricted to non-female headed households. The regressions includes controls for individual level characteristics and household level characteristics such as caste, religion, education, age by gender, quadratic for age, number of children, old members and men in the household, household size. Standard errors are in parenthesis. Standard Errors are clustered at the district level.

* p<.10 ** p<.05 *** p<.01

Table 4-3: Difference-in-Difference - Effect of NREGA on Monthly Per Capita Consumption

	All Households	Marginal Caste	Control Group -Phase 2 and 3
Early X 2006	0.106*** (0.027)	0.123*** (0.033)	0.065*** (0.021)
District Fixed Effect	Yes	Yes	Yes
Time Fixed Effect	Yes	Yes	Yes
State Linear Time Trend	Yes	Yes	Yes
N	41619	27999	53624
R-sq	0.526	0.497	0.516

Notes: The dependent variables are the log value of total household consumption for the year divided by household size. The base year is 2003. The sample is restricted to non-female headed households. The regressions includes controls for individual level characteristics and household level characteristics such as caste, religion, education, age by gender, quadratic for age, number of children, old members and men in the household, household size. Standard errors are in parenthesis. Standard Errors are clustered at the district level.

* p<.10 ** p<.05 *** p<.01

Table 4-4A: Difference-in-Difference - Effect of NREGA on Monthly Per Capita Consumption

	All Households		Marginal Caste		Control Group -Phase 2 and 3	
Early X 2001	0.006 (0.023)	0.015 (0.022)	0.010 (0.024)	0.006 (0.023)	0.002 (0.020)	0.001 (0.020)
Early X 2004	0.067*** (0.022)	0.058** (0.025)	0.082*** (0.023)	0.069** (0.028)	0.041* (0.021)	0.029 (0.023)
Early X 2006	0.087*** (0.022)	0.109*** (0.027)	0.113*** (0.026)	0.131*** (0.033)	0.068*** (0.020)	0.072*** (0.021)
Early X 2007	0.075*** (0.019)	0.075*** (0.019)	0.097*** (0.020)	0.088*** (0.020)	0.053*** (0.017)	0.051*** (0.017)
Year and District FE	Yes	Yes	yes	yes	Yes	Yes
State linear time trend	Yes	No	yes	no	Yes	No
state X year FE	No	Yes	no	yes	No	Yes
N	118760	118760	82577	82577	153325	153325
R-sq	0.542	0.545	0.509	0.512	0.529	0.531

Notes: The dependent variables are the log value of total household consumption for the year divided by household size. The sample is restricted to non-female headed households. The regressions includes controls for individual level characteristics and household level characteristics such as caste, religion, education, age by gender, quadratic for age, number of children, old members and men in the household, household size. Standard errors are in parenthesis. Standard Errors are clustered at the district level.

* p<.10 ** p<.05 *** p<.01

Table 4-4B: Difference-in-Difference - Explaining Lags and Leads

	Without 150 NFFWP Districts		Without 2004 Data	
	All Households	Marginal Caste	All Households	Marginal Caste
Early X 2001	0.023 (0.043)	0.046 (0.048)	0.012 (0.022)	0.004 (0.023)
Early X 2004	0.016 (0.040)	0.038 (0.042)		
Early X 2006	0.076** (0.032)	0.096** (0.037)	0.108*** (0.027)	0.128*** (0.033)
Early X 2007	-0.010 (0.033)	-0.003 (0.034)	0.074*** (0.019)	0.086*** (0.020)
District Fixed Effect	No	No	Yes	Yes
Time Fixed Effect	Yes	Yes	Yes	Yes
State X Year FE	Yes	Yes	Yes	Yes
N	40605	28802	73983	50727
R-sq	0.440	0.394	0.560	0.531

Notes: The dependent variables are the log value of total household consumption for the year divided by household size. The base year is 2003. The first two columns excludes the 150 districts that received NFFWP. The regression does not include district fixed effects. Instead I use an indicator variable for early implementation districts and use the backwardness measures in the 2004 Planning Commission Report to control for district level. I also reduce the number of late implementation districts by excluding the ones which are least backward (i.e., have a rank greater than 350). The last two columns exclude data from 2004-05 survey. All the regressions includes controls for individual level characteristics and household level characteristics such as caste, religion, education, age by gender, quadratic for age, number of children, old members and men in the household, primary occupation of the household, household size. Standard errors are in parenthesis. Standard Errors are clustered at the district level.

* p<.10 ** p<.05 *** p<.01

Table 4-5: Robustness Checks

Coefficient for Early X 2006 with Base Period 2003

	No Weights	Trim Top and Bottom 10% Districts	Using Overlapped Districts
Early X 2006	0.074*** (0.015)	0.065** (0.026)	0.103*** (0.034)
District Fixed Effect	Yes	Yes	Yes
Time Fixed Effect	Yes	Yes	Yes
State Linear Time Trend	Yes	Yes	Yes
N	38835	26832	32027
R-sq	0.486	0.452	0.475

Notes: The dependent variables are the log values of total household consumption for the year divided by household size. The sample excludes female headed households. The regressions includes controls for individual level characteristics and household level characteristics such as caste, religion, education, age by gender, quadratic for age, number of children, old members and men in the household, and household size. Standard errors are in parenthesis. Standard Errors are clustered at the district level.

* p<.10 ** p<.05 *** p<.01

Table 4-6A: Difference-in-Difference - Effect of NREGA on Monthly Per Capita Consumption for Lean and Non-Lean Agricultural Season

	Lean Season January-June	Non-Lean Season July-December
Early X 2003	-0.004 (0.025)	0.002 (0.032)
Early X 2004	0.071** (0.033)	0.089** (0.040)
Early X 2006	0.105*** (0.034)	0.072** (0.036)
Early X 2007	0.064** (0.032)	0.089*** (0.031)
District Fixed Effect	Yes	Yes
Time Fixed Effect	Yes	Yes
State Linear Time Trend	Yes	Yes
N	59397	59360
R-sq	0.665	0.623

Notes: The dependent variable is the log value of total household consumption for items that have a recall period of 30 days. The base year is 2001. Household consumption expenditure for the year is divided by household size. The sample is restricted to non-female headed households. The first column only uses lean season data and the second column used non-lean season data. The regressions includes controls for individual level characteristics and household level characteristics such as caste, religion, education, age by gender, quadratic for age, number of children, old members and men in the household, primary occupation of the household, household size. Standard errors are in parenthesis. Standard Errors are clustered at the district level.

* p<.10 ** p<.05 *** p<.01

Table 4-6B: DDD Estimates of NREGA on Early Implementation Districts for the Lean Season

Panel A

Average Household Per Capita Consumption in Early Districts

Year	2003	2006-07
Lean Season	474.1448	579.4609
Non-Lean Season	482.1359	557.9899

Panel B

Coefficient for Early X Lean X Year with Base Period 2003

	Early X Lean X 2001	Early X Lean X 2006
	-0.008 (0.036)	0.037 (0.028)
District Fixed Effect	Yes	Yes
Time Fixed Effect	Yes	Yes
State Linear Time Trend	Yes	Yes
N	37519	36890
R-sq	0.659	0.621

Notes: Panel A provides the mean household per capita consumption expenditure for items that have a recall period of 30 days in early implementation districts for the lean and non-lean seasons. In Panel B The β_1 coefficients from equation 3 are reported in the table. The dependent variables are the log values of total household consumption for the year divided by household size. The sample excludes female headed households. The regressions includes controls for individual level characteristics and household level characteristics such as caste, religion, education, age by gender, quadratic for age, number of children, old members and men in the household, and household size. Standard errors are in parenthesis. Standard Errors are clustered at the district level.

* p<.10 ** p<.05 *** p<.01

Table 4-7: Effect of NREGA on Phase 2 Districts

	All Households
Early X 2001	0.026 (0.026)
Early X 2004	0.064*** (0.024)
Early X 2006	0.042 (0.030)
Early X 2007	0.038 (0.026)
District Fixed Effect	Yes
Time Fixed Effect	Yes
State Linear Time Trend	Yes
N	95542
R-sq	0.498

Notes: The dependent variable is the log value of total household consumption for the year divided by household size. The base year is 2001. The treatment group consists of households that received NREGS in Phase 2. The sample is restricted to non-female headed households. The regression include controls for individual level characteristics and household level characteristics such as caste, religion, education, age by gender, quadratic for age, number of children, old members and men in the household, and household size. Standard errors are in parenthesis. Standard Errors are clustered at the district level.

* p<.10 ** p<.05 *** p<.01

CHAPTER V

CASTE, POLITICAL RESERVATION, AND INDIA'S NATIONAL RURAL EMPLOYMENT GUARANTEE SCHEME

1. Introduction

Affirmative action programs have been introduced in many countries around the world to provide preferential treatment to disadvantaged groups. One concern is that minorities do not have adequate political representation, which may affect their ability to influence public policy and budgetary decisions. To address this issue, several countries, such as Uganda, Argentina, South Africa, Norway, and India have adopted a wide range of affirmative action policies in employment, education, or political representation.

In India, individuals from the lower castes have been marginalized for centuries, and they have lower levels of income, education and asset holding compared to higher caste individuals. At the time of Independence, India pursued affirmative action by introducing caste-based quotas in political representation, public sector jobs and institutions for higher education. The political system was designed so that individuals belonging to the historically marginalized groups, the Scheduled Castes (SCs) and Scheduled Tribes (STs), have a voice in the decision-making processes of the country. To ensure that SCs and STs have representation in parliament that is proportional to the share of SC/ST population to the total population, the Constitution mandates that certain electoral districts are reserved for the marginalized groups. Since the first elections in 1951, seats have been reserved for members of SCs and STs, and only candidates belonging to

these groups can contest in the elections. However, the entire electorate votes over the entire set of candidates.

Despite the long history of affirmative action for minorities in India, there is still caste-based discrimination in labor markets, health services, credit markets and schooling (Munshi and Rosenzweig, 2006; Banerjee and Munshi, 2004; Mitra, 2011). There have been several studies (discussed later) that show that political reservation at the local government level has had an impact on the type and level of public goods provision. In this chapter, I study how political representation has interacted with the NREGS program in affecting the wellbeing of SCs and STs.

The National Rural Employment Guarantee Act, passed by the Indian Parliament in August 2005, created one of the largest anti-poverty programs in the world. It is essentially a public works program which provides a “social safety net for the vulnerable groups by providing a fallback employment source, when other employment alternatives are scarce or inadequate.”⁴³ As discussed in previous chapters, the Act specifically mentions that the National Rural Employment Guarantee Scheme (NREGS) is designed to achieve three goals: reduced poverty, improved infrastructure, and a stronger democratic process at the local level. Like all government programs in India, the NREGS is designed to benefit the poor population without discrimination against marginalized-caste households.⁴⁴

The NREGS is demand driven, and access to the program is universal. Only households that ask for work are provided employment under the program. This allows individuals to decide

⁴³ National Rural Employment Guarantee Act, 2005.

⁴⁴ Scheduled Castes and Scheduled Tribes were historically regarded as untouchables and therefore marginalized in terms of access to work, education and social activities. People from Scheduled Castes (SC) and Scheduled Tribes (ST) on average still have lower levels of income, land, and education

whether and when they would like to participate in the program and avoids the problem of trying to screen who is eligible to participate in the program. Those who are willing to do manual labor at minimum wage may choose to work under NREGS. The non-poor will generally be unwilling to do the work and, therefore, will not pursue or receive the benefits. The NREGS website's figures for employment show that many families that have the status "Above Poverty Line" work in the program, thus the program allows households to assess their costs and benefits of participation.⁴⁵

This chapter contributes to the broad empirical literature that studies political reservation, caste, and economic outcomes in India. Several studies analyze the impact of reservation of seats at the local government level. Besley et al. (2004) find that the group identity of Panchayat leaders affects public provision of goods in Southern Indian villages. Political reservation of the village chief changes the identity of the politically dominant group which in turn affects the allocation of Below Poverty Line cards which are used by household to access subsidized food through the Indian Public Distribution System. Chattopadhyay and Duflo (2004) study political reservation for women in West Bengal and find that reservation affects the type of public good provided. Women leaders invest more in public works, such as, drinking water and roads that are directly relevant to the needs of their own gender. Munshi and Rosenzweig (2008) find that in the presence of a numerically dominant sub-caste and local leaders elected from the same sub-caste, there is a greater provision of public goods. Pande (2003) focuses on political reservation for Scheduled Castes in the State Assembly elections. She finds that political reservation of State

⁴⁵ The following website allows one to access individual job cards in Arariadistrict for the state of Bihar. The job card mentions poverty status of the household and in some cases notes if a household has "Above Poverty Line" status.http://164.100.128.68/netnrega/IndexFrame.aspx?lflag=local&District_Code=0541&district_name=ARARIA&state_name=BIHAR&state_Code=05&block_name=ARARIA&block_code=0541006&fin_year=2014-2015&check=1&Panchayat_name=Araria+Basti+Panchayat&Panchayat_Code=0541006001.

Assembly constituencies for SC and STs increases their influence over policy making which leads to the rise in targeted redistribution (job quotas and welfare spending) for these groups. Banerjee and Somanathan (2004) argue that access to public goods depends on group heterogeneity. The different groups have varying levels of power and influence, leading them to secure different levels of public goods. They also find that changes in political power can lead to greater access to previously marginalized groups.

In terms of poverty, 46 percent of STs and 37 percent of SCs are below the poverty line, while 23 percent of Non-SC/ST caste individuals are below the poverty line recommended by Planning Commission (calculations based on National Sample Survey 2004-05). If the NREGS program really did have positive effects, one would expect members of these groups to increase their overall wellbeing. In this chapter I analyze whether reservation of seats in the state legislature has a differential impact for minority households in terms of benefiting from NREGS. Given the recent literature on political reservation and caste, it is important to see whether political reservation causes the targeted group to benefit substantially more under NREGS than in non-reserved areas.⁴⁶

I focus on reservation of the state legislature for the following reasons. One, although the funds for implementing the NREGS is provided by the central government, it is the responsibility of the state government to ensure that the program is being implemented correctly. Two, India is a federal union of states where the center and the state are mostly independent of each other. The Constitution clearly defines the responsibilities of the states and the central government such that some areas are directly under the purview of the state government while

⁴⁶ Calculations are based on the Planning Commission recommended poverty line for India using data from the National Sample Survey, 2009-10.

some are the sole responsibility of the central government. The state government is responsible for internal security, public health, roads, land, agriculture, industry and implementing development policies. Although education, labor and social security are the joint responsibility of the center and state, the state governments assume the bulk of the responsibility. Over 60 percent of the state expenditure is on development, which includes welfare of Scheduled Castes and Scheduled Tribes (Reserve Bank of India, 2013). Therefore, if people are dissatisfied with the way the NREGS is being carried out in their area, they are likely to hold the local Member of the State Legislative Assembly (MLA) responsible.

I study the impact of the NREGS on household consumption expenditures for the 18 major states in India.⁴⁷ I use consumption expenditure data because households can work under NREGS at any point of the year up to 100 days to improve household wellbeing. If households see an increase in overall income, it would translate for poor households to increases in expenditure. The consumption data are from the National Sample Survey Organization (NSSO), which determines household consumption of goods and services by collecting information on household expenditure on goods and services, home production, and goods received in exchange of goods and services. Thus, the consumption data permit us to see the effect of NREGS on overall household consumption. I obtained the political reservation data for electoral seats that are reserved for minority candidates from the Election Commission of India website.⁴⁸

⁴⁷ Jammu and Kashmir and the Northeastern states have not been included since they have different economic and political characteristics from the other states in the country. In this chapter, the state of Assam is not included since I do not have reservation data for SC/ST constituencies from the Election Commission of India website. Thus the total number of states decreased from 19 to 18 for purpose of data analysis. These states account for nearly 94 percent of India's population from the 2001 Census.

⁴⁸ <http://eci.nic.in/delim/index.asp>, accessed on 06/15/2014

I exploit the rollout of the NREGS across rural districts over the three-year period (2006-07 to 2008-09) to employ a difference-in-difference-in-difference (DDD) analysis to identify the differential effect on household consumption for marginalized caste households when political reservation is present in their district. The DDD estimate captures the change in household consumption for low-caste households in the early-implementing NREGS districts *with* reservation while netting out the change in consumption in early-implementing districts *without* reservation and also netting out the differential change in consumption in late-implementing districts with and without reservation. These differential changes in the late-implementing districts should capture effects of reservation on consumption that work through channels other than participation in NREGS. I find that marginalized-caste households increased consumption by 23 percent in 2006-07 in the reserved early implementation districts relative to the non-reserved early implementation districts while netting out changes to late implementation control districts.

2. Data and Empirical Specification

To analyze the differential impact of reservation for SC/ST candidates on marginalized-caste household wellbeing as a result of NREGS, I first collect information on the reserved constituencies for the 18 states that I use for my analysis. The Election Commission website organizes the data on reservation by state. For each state, constituency level information on population, SC and ST population, and reservation status is provided. I use that to find the number of constituencies that were reserved in each district. I used the district codes that I had generated earlier to combine the reservation data with the consumption and the NREGS program rollout data. However, this integration process was complicated by the fact that in India some

districts have more than one official name. Also many district names are spelled phonetically and so different sources use different spellings for the same district.

To analyze the impact on marginalized caste household consumption, I use the nationally representative household data from the Consumption Expenditure Survey conducted by the National Sample Survey Organization (NSSO). In this chapter I only use data for marginalized caste households since my objective is to analyze the differential impact NREGS has on these households in the context of reservation. To cover the years preceding and following the rollout of the program in the initial implementation districts (which received the program in February 2006), I include data from 2001-02, 2003, 2004-05, 2006-07 and 2007-08.

Conceptual Framework

Studies find that reservation has an impact on the type and level of provision of public goods. The reasoning behind such an outcome can be explained by the model developed by Pande (2003), which assumes a two-party system where each party selects a candidate to stand for election. The model assumes that citizens expect candidates to implement the party policy. The rational voter will cast her vote based on the information provided by the political party. If parties can commit their candidates to implement the party policy, then the caste identity of the candidate does not affect outcomes. In this situation, caste-based reservation will not affect policies that directly impact households belonging to that caste. However, if parties cannot commit their candidates to implement party policy, then political reservation will increase the likelihood of the elected leader implementing policies that benefit the targeted group.

In the absence of reservation it is unlikely that there will be proportional representation of lower-caste individuals in positions where they have a voice in policy making. This is because

higher-caste individuals historically have occupied positions of power and, therefore, have established their ability to undertake these jobs. For individuals belonging to lower castes, entry is costly since they have to put in more effort to prove their ability to lead and implement policies. This would lead to an underrepresentation of lower-caste individuals in political parties. Under the assumption that parties cannot commit their candidates to implement party policies, political reservation may have a differential impact on lower-caste households in reserved districts in the context of the NREGS program. However, this benefit for the marginalized castes may come from 'elite capture' where the better off among the SC/ST benefit from the reservation. Chin and Prakash (2011) point out that after election in a reserved constituency, the minority leader may favor the minority group, but they note that this is not "synonymous with reducing poverty."⁴⁹ The benefits may accrue to the SC/ST households who are above the poverty line, and resources may even be diverted from the poor to the non-poor.

Empirical Strategy

I again exploit the phase-wise implementation of the program across rural districts from 2006 to 2008, but this time I am interested in identifying the differential effects of NREGS for marginalized-caste households in districts that had reservation. I use data from 2003 for the rural districts, (i.e., before the NREGS was either conceived of or implemented) and data from 2006-07 (after the NREGS was introduced in the first set of districts) for the baseline estimate. The basic idea for the DDD estimate is illustrated below:

⁴⁹ Chin and Prakash (2011, p. 268).

Calculation for difference-in-difference-in-difference

	t=1 (2003)	t=2 (2006-07)	Difference
Early, Reserved	\bar{y}_{111}	\bar{y}_{112}	D_{11}
Early, Non-Reserved	\bar{y}_{101}	\bar{y}_{101}	D_{10}
			$DD_1 = D_{11} - D_{10}$
Late, Reserved	\bar{y}_{011}	\bar{y}_{012}	D_{01}
Late, Non-Reserved	\bar{y}_{001}	\bar{y}_{002}	D_{00}
			$DD_0 = D_{01} - D_{00}$

Difference-in-difference-in-difference: $DDD = DD_1 - DD_0$

Here \bar{y}_{xrt} is mean household consumption. The subscript x equals 1 if a household belongs to districts which received NREGS in 2006-07, and zero otherwise. Subscript r equals 1 if a household belongs to districts which is reserved for minority candidates, and zero otherwise. The last subscript t equals 1 if data is from 2003, and t equals 2 if data is from 2006-07.

The DDD estimate calculates the change in average consumption for the "early" districts under reservation relative to "early" non-reserved districts, while netting out the change in consumption for "late" reserved districts relative to "late" non-reserved districts. The first DD (DD1) simply compares changes in consumption in early implementing NREGS districts with and without reservation. Clearly, all trends associated with reservation are embedded in this difference even though they may be completely independent of the NREGS program. By subtracting off the second DD (DD0), the DDD estimate is purged of the differential trends in

reserved areas relative to non-reserved areas that are due to forces outside the NREGS program. Thus the DDD strategy allows me to compare the NREGS effect across reserved and non-reserved districts.

This DDD estimate is implemented in a regression to facilitate the inclusion of several control variables. The base regression equation is as follows

$$(1)y_{idt} = \beta_0 + \beta_1 \text{Early_Post}_{d,t} * \text{Reserved}_d + \beta_2 \text{Reserved}_d * \lambda_t + \beta_3 \text{Early_Post}_{d,t} + \gamma X_{idt} + \eta_{st} + \delta_d + \lambda_t + e_{idt}$$

where y_{idt} measures the outcome variable (household per capita consumption expenditure and expenditure on the various item categories) of household i in district d and in year t . The dummy variable Early_Post takes on the value 1 if the household is in an early implementing district and the year is 2006-07. The dummy variable Reserved takes on the value 1 if the household is in a district that has at least one constituency reserved for marginalized caste candidates. X_{idt} is a vector of household characteristics including maximum educational attainment among members of the household who are above the age of 14, number of children, land possession, average age and quadratic of average age of men and women.⁵⁰

The equation also includes district fixed effects, δ_d , and year fixed effects, λ_t . η_{st} is the state-specific linear time trend. The district effects, δ_d , account for secular differences in household consumption in districts. For example, certain districts may discriminate against the marginalized caste population less than others, which may impact their economic outcomes.

The district fixed effects also account for receiving the NREGS in Phase1, having reservation for

⁵⁰ The Indian Child Labor Act, 1986, prohibits children below the age of 14 to work in hazardous industries and perform certain agricultural works. The Act in conjunction with the Right to Free and Compulsory Education Act mandates that all children between 6 and 14 must attend school. The NSSO also defines child workers to be below age 14.

SC/ST candidates, and for districts that were both early implementers and had reservation for SC/ST candidates. Accounting for these variables are necessary to arrive at the causal effect of the program in the context of reservation. λ_t accounts for year effects to capture any trends in consumption that affect all areas at the same time and to the same extent. η_{st} is the state-specific linear time trend which allows states to follow different trends.

The coefficient β_1 is associated with the triple interaction term of $Early_Post_{d,t} * Reserved_d$. This coefficient measures differential changes in y for the treatment group (early implementing and reserved districts), as outlined above, conditional on the control variables and fixed effects. This will capture the causal effect if unobserved shocks and trends are correlated with the rollout of the NREGS, but are not a result of NREGS. β_2 captures the changes in consumption over time in districts with reservation. β_3 captures the changes in consumption of the early implementation districts over time.

3. Results

3.1 Difference-in-difference analysis: Baseline estimates

Since districts were not assigned to NREGS in a random manner there is concern that my results may be due to early and late implementation districts having different pre-trends based on their reservation status. I conduct a falsification test using an equation analogous to equation 1 using pre-program data. By using data from 2001 and 2003 (i.e., data from before the program was even conceived), I can verify whether early and late implementers had different pre-trends in consumption depending on their reservation status. Table 5-3 presents the results where each cell is an estimate from separate regressions. The point estimates of β_1 are around 5 percent but not statistically significant. This would suggest that there is an upward trend in consumption for

marginalized caste household in early reserved districts. Therefore the DDD result that I obtain using data from 2003 and 2007-07 may partly be explained by this rising trend in consumption.

Reservation is one of the ways affirmative action is carried out in India to give voice to the minority group in policymaking in the hope that it will improve their access to opportunities and resources. To analyze the impact of NREGS on the marginalized caste population in the context of reservation, I estimate the model described in equation 1. I restrict the sample to all the marginalized caste households to assess the overall effect of the program on local economic activity. In Table 5-4A, I find that household consumption increases by 23 percent in the reserved districts (relative to the non-reserved districts) in the early implementation districts (relative to late implementation districts) in 2006-07. Since the Consumption Expenditure Survey data do not allow me to identify households who participated under the program, the DDD analysis estimates the “intent to treat” effect for all marginalized caste households in a district. Thus the result captures the direct effect of working under the program as well indirect effects of NREGS. Under NREGS, certain public works are categorized as "Irrigation Facilities to SC/ST Households" and in reserved districts there may be greater emphasis on such works that benefit the SC/ST households. The benefits would accrue to the targeted marginalized caste households and may increase their productivity which in turn can lead to higher levels of household consumption. However, these households are not required to work under NREGS to obtain the benefit. This indirect effect is also captured by the DDD estimate.

3.2 Sensitivity Checks

To understand if this effect is driven by the extremely backward districts which are characterized by the size of the minority population (using the Planning Commission definition

to define backwardness), I also trimmed the sample to exclude the top and bottom 10 percent of districts in terms of backwardness. In Table 5-4B, I find that the estimated effect of NREGS is around 21 percent, which is not significantly smaller than when I used all the districts.

I also omit districts in the section where there is no overlap in backwardness between the early and late implementers. I restricted the sample to districts that belong in this overlapping section by excluding 102 early implementation districts that had no overlap with districts that received the program in Phase 2 or Phase 3. The second column of Table 5-4B shows that the effect of the program is around 20 percent, which is very similar to when I had used the entire sample for my base line estimates.

In the third column, I check the sensitivity of the results to sample weighting. The NSSO uses stratified random sampling to collect data and weights are used for each household to ensure that datasets are representative of the entire population. In this sense, the data analysis is highly dependent on the recommended weights. I find that without the recommended weights the effect of the NREGS is larger at 28 percent.

In the fourth column of Table 5-4B, I use the non-marginalized caste sample to see if there was something special in reserved districts that led these household to well in these districts. However, I find that for non-minorities the effect is small (around 2 percent) and not significant.

To check if the results are driven by the richer households among the minority caste population, I restrict the sample to households which possess less than 3 hectares, 2 hectares, and 1 hectare of land in columns 5, 6, and 7, respectively. I find that the effect of NREGS under political reservation increases as land possession decreases. This gives some confidence that the

results are driven not driven by the richer group among the minority caste capturing the benefits of the program.

Studies and reports have shown that there is evidence of discrimination against minorities and this may have prevented them from benefitting fully under the program in non-reserved districts. In reserved districts minority households are likely to be able to benefit more under the NREGS and this is captured by the 23 percent increase in consumption for these households in the reserved districts (relative to the non-reserved districts) in the early implementation districts (relative to late implementation districts) in 2006-07. Also, the upward trend in marginalized caste household consumption in early reserved districts may contribute to part of the increase in consumption captured by the DDD estimate. Finally, marginalized caste households are disproportionately poor and the increase in consumption spending as a result of working under the NREGS forms a larger percentage of their income than other better-off groups.⁵¹ The average monthly per capita consumption (MPCE) for SC/ST households in the early implementation districts in 2004-05 was Rs. 550.67. For non-marginalized households, who could be classified as sub-marginal (less than 0.5 hectare) or marginal (between 0.5 to 1 hectare) land holders, the MPCE was Rs. 640. Assuming that lower caste households were able to increase consumption to the level of non-marginalized caste households, then their consumption would have increased by around 16.5 percent. Therefore, even though a part of the result may be explained by the rising trend in consumption by lower caste households in early reserved districts, a large part of the result is driven by the percentage increase in consumption as a result of having greater access to work under NREGS which guarantees minimum wages.

⁵¹ Minority households in reserved "early" districts had an average monthly per capita consumption of Rs. 505.66 while in the non-reserved "early" districts minority households had an average monthly per capita consumption of Rs. 461.71 in 2004-05.

3.3 Lags and Leads

I next use a model with lags and leads to capture the dynamics of NREGS. This allows me to see the immediate impact of the program following rollout, and in the following years see whether the impact stabilizes, accelerates, or whether there is a mean reversion in the early implementation districts. In the years preceding NREGS, an anticipatory effect might lead districts to raise their consumption levels. To capture these effects I include lags and leads by using data from 2001-02 to 2007-08 in the difference-in-difference-in-difference analysis.⁵² I use an indicator variable for each year and introduce interaction terms similar to those in equation 1. The variable $Early_{d,t-\tau} * Reserved$ equal one for the reserved early implementation districts for the relevant years. I also include another set of indicator variables which equals one for the reserved districts for the relevant years. I estimate the impact of NREGS with 2003 forming the base year using the following model.

$$\begin{aligned}
 y_{idt} = & \beta_0 + \sum_{\tau=0}^3 \beta_{-\tau} Early_{d,t-\tau} * Reserved_d + \sum_{\tau=1} \beta_{+\tau} Early_{d,t+\tau} * Reserved_d \\
 & + \sum_{\tau=0}^3 \beta_{-\tau} Reserved_d * \lambda_{t-\tau} + \sum_{\tau=1} \beta_{+\tau} Reserved_d * \lambda_{t+\tau} \\
 & + \sum_{\tau=0}^3 \beta_{-\tau} Early1_{d,t-\tau} + \sum_{\tau=1} \beta_{+\tau} Early1_{d,t+\tau} + \gamma X_{idt} + \eta_{st} + \delta_d + \lambda_t \\
 & + e_{idt} (2)
 \end{aligned}$$

The dataset has information from 2001-02, which allows me to account for pre-trends and therefore estimate whether there is an anticipatory effect for marginalized caste households in the

⁵² I do not use the 2005-06 data because the NFFWP was in place till end January and the NREGS was introduced in February. The overlap between data collection and the rollout of NREGS makes it difficult to analyze its impact.

in the treatment group in the years leading up to the introduction of the NREGS program. The coefficient for 2007-08 gives the estimates for the lagged effect of the NREGS program. η_{st} is the state linear time trend.

Results for the analysis using data from 2001-02 to 2007-08 are presented in Table 5-5A. The first column show the results for all marginalized caste households. I find the introduction of NREGS increased consumption for all minority households by 24.6 percent in 2006-07. These results are significant at the 1 percent level. In the years preceding the rollout of NREGS, there is no significant increase in minority household consumption for the reserved "early" districts. Thus households did not increase their consumption in anticipation of obtaining employment at the minimum wage under NREGS.

As discussed in Chapter IV, the government had started the pre-cursor program, the National Food For Work Program (NFFWP) in 2004. The 150 most backward districts (identified using the Planning Commission Report of 2003) were to receive work in public works in exchange for food grains and wage payment. This program was subsumed under the National Rural Employment Guarantee Program and the 150 backward districts were among the 200 early implementation districts.⁵³ The introduction of the NFFWP in the 150 backward districts (which coincides with the 200 early implementation) has a positive but not significant effect in the "early" districts for 2004-05 (Table 5-5A).

The coefficient for 2006-07 suggest that the impact of NREGS in the context of reservation is positive for marginalized caste households. This impact cannot be completely

⁵³ The NFFWP was discontinued in the districts before the NREGA was introduced in 2006.

attributed to having had the NFFWP since this program was discontinued before the NREGS was implemented in the early implementation districts.

To ensure that the National Food For Work Program, introduced in 2004, does not influence the estimate of NREGS on household consumption, I omit the 150 districts that received NFFWP to focus on districts which is not associated with the pre-cursor program. The results in Table 5-5B indicate that the coefficient for 2004-05 for *Early*Reserved* is still not significantly different from zero while the coefficient for 2006-07 continues to be positive and significant. In the second column of Table 5-5B, I omit the data from 2004-05 to avoid the using the observations from a year that may be considered to be contaminated. The coefficient for 2006-07 is significant and similar to that obtained in Table 5-4A. These results suggest that the impact of NREGS in reserved districts for marginalized castes is not due to the earlier Food for Work program.

The effect of NREGS instead of increasing or flattening out in 2007-08, decreases by 6.3 percentage points. This can be explained by the overlap in the survey period which continued until end June 2008 and the introduction of NREGS in April 2008 in the control districts. The overlap corresponds to the lean agricultural season when households in the control group were likely to work under NREGS. This may cause a downward bias to the effect of the program. To account for the overlap, I omit the months from April to June in 2008.⁵⁴ The estimates show that when I exclude the overlapping period the difference in the coefficients reduces to 1.6 percentage points. Thus in the latter years the effect of NREGS remains relatively stable.

⁵⁴ NSSO collects data in four sub-rounds. In each sub-round an equal number of First Stage Units are surveyed to ensure uniform spread of the sample over the entire survey period.

5. Conclusion

NREGS is one of the largest anti-poverty programs in the world and to analyze whether the program benefits the poor for whom the program was designed, I specifically focus on marginalized caste households in this paper. By concentrating on SC/ST households I study a group where approximately 80 percent live on \$1.25 or less a day. Also, since caste is hereditary the introduction of NREGS cannot affect household caste status and bias the results. I find that despite discrimination, marginalized caste households benefit under the program. Recent literature on political reservation for minorities in India has found that reservation does lead to an increase in transfers to members of the targeted group. To understand the impact of political reservation on the minority population in the context of NREGS, I use a DDD strategy to find that political representation for marginalized caste candidates leads SC/ST households to benefit significantly more under NREGS than SC/ST households in non-reserved districts.

In this paper I calculate the "intent-to-treat" effect of NREGS which gives the overall impact of the program on all marginalized caste households in the rural districts. The results reflect the direct impact on SC/ST households that participated under the program as well the indirect effect on SC/ST households that did not participate under NREGS. During the lean agricultural season households use seasonal migration to smooth consumption and rely on caste networks to carry out this form of migration. However, this migration is expensive and therefore migration rates among SC/ST households are lowest in rural India.⁵⁵ They mostly rely on caste networks in their villages to find work in the lean season. Since reservation leads to greater benefits for the targeted group, the SC/ST households in reserved districts now have access to the

⁵⁵ National Sample Survey Report No. 533. Migration in India, 2007-08.

NREGS, which provides them with an alternative and guaranteed source of income during the lean season. In order to stem crowding out of SC/ST workers from the informal private sector during the lean season, employers would likely have to increase wages. This indirect effect along with the increase in labor productivity due to improvement in rural infrastructure is captured in the intent-to-treat effect estimates presented in the paper.

Under the NREGS, state and local government can propose and execute works that provide irrigation to land owned by SC/ST households that benefit SC/ST households. By allowing works that specifically benefit the minority population, the NREGS makes it possible for public works to differentially benefit SC/ST population. Recent literature on public goods provision at the local and state government level (Duflo and Chattopadhyay, 2004; Pande, 2003; Banerjee and Somanathan, 2001) find that that political representation for marginalized castes increases expenditure in works that specifically benefit the targeted group. Therefore a more careful analysis is required to examine the role of mandated political representation in providing SC/ST influence over decision-making in spending for the various public works under NREGS that benefit the local marginalized caste population.

Tables

Table 5-1: Employment under NREGS from April 2009-March 2010

States	Household Demand	Households provided employment	Total	Persondays in Millions			
				SC	% SC	ST	% ST
Andhra Pradesh	2161495	2161395	67.88	20.24	29.82	8.83	13.01
Assam	798179	792270	57.29	4.96	8.65	26.51	46.26
Bihar	1709345	1688899	59.69	28.10	47.08	1.91	3.20
Chattisgarh	1412643	1375802	70.02	8.41	12.01	31.90	45.55
Gujarat	226269	226269	10.05	0.71	7.04	6.46	64.26
Haryana	50765	50765	2.41	1.45	60.03	0.00	0.00
Himachal Pradesh	67187	63514	2.99	0.91	30.40	0.67	22.41
Jharkhand	1394108	1394108	52.05	12.22	23.48	20.97	40.29
Karnataka	548532	545185	22.20	7.34	33.05	4.52	20.35
Kerala	104927	99107	2.05	0.41	20.12	0.25	12.40
Madhya Pradesh	2868762	2866349	197.18	31.30	15.87	95.91	48.64
Maharashtra	384944	384944	15.93	2.58	16.19	6.51	40.88
Orissa	1407251	1394169	79.93	18.91	23.65	39.39	49.27
Punjab	31788	31648	1.56	1.08	69.36	0.00	0.00
Rajasthan	1175172	1175172	99.89	15.95	15.97	64.29	64.36
Tamil Nadu	683708	683481	18.28	10.25	56.06	0.43	2.38
Uttar Pradesh	2678700	2573245	82.29	46.78	56.85	2.56	3.11
Uttarakhand	134363	134312	4.06	1.08	26.70	0.06	1.41
West Bengal	3242594	3083757	44.01	15.88	36.08	8.19	18.61

Source: NREGA website. <http://nrega.nic.in/netnrega/home.aspx> accessed on 06/15/2014

Table 5-2: Performance of NREGS

	2006-07	2007-08	2008-09
Total Available Fund (in Rs billion)	120.73	193.06	373.97
Expenditure (in Rs billion)	88.23	158.57	272.5
(% against available funds)	73%	82%	73%
Expenditure on wages (in Rs billion)	58.42	107.38	182
(% of total expenditure)	66%	68%	67%
Average Wages per persondays	65	75	84
Total Works Taken Up (in Rs million)	83	1.79	2.77
Works Completed (in Rs million)	0.39	0.82	1.21
<i>Take Up (in million)</i>			
Water Conservation	0.45	0.87	1.28
(% of total expenditure)	54%	49%	46%
Rural Connectivity	0.18	0.31	0.5
(% of total expenditure)	21%	17%	18%
Land Development	0.09	0.29	0.4
(% of total expenditure)	11%	16%	15%
Provision of Irrigation to Land Owned by SC/ST/Below Poverty Line and IAY	0.08	0.26	0.57
(% of total expenditure)	10%	15%	20%

Source: Mahatma Gandhi National Rural Employment Guarantee Act 2005. Report to the People, 2nd Feb. 2006 - 2nd Feb. 2010

Table 5-3: Falsification Check: Difference-in-Difference-in-Difference - Effect of NREGS on Monthly Per Capita Consumption for SC/ST Households

	Marginal Caste	With Control Group -Phase 2 and 3
Reserved X Early X 2003 (with base year 2001)	0.055 (0.078)	0.019 (0.076)
District Fixed Effect	Yes	Yes
Time Fixed Effect	Yes	Yes
State Linear Time Trend	Yes	Yes
N	27999	24570
R-sq	0.497	0.56

Notes: Source of the data is from NSSO, Election Commission of India, and NREGS website. The dependent variables are the log value of total household consumption for the year divided by household size. The base year is 2001. The sample is restricted to marginalized caste households which are non-female headed households. The regressions includes controls for individual level characteristics and household level characteristics such as caste, religion, education, age by gender, quadratic for age, number of children, old members and men in the household, household size. Standard errors are in parenthesis. Standard Errors are clustered at the district level.

* p<.10 ** p<.05 *** p<.01

Table 5-4A: Difference-in-Difference-in-Difference - Effect on Monthly Per Capita Consumption Under Reservation

	Marginal Caste	With Control Group -Phase 2 and 3
Reserved X Early X 2003	0.238*** (0.071)	0.249*** (0.067)
District Fixed Effect	Yes	Yes
Time Fixed Effect	Yes	Yes
State Linear Time Trend	Yes	Yes

Notes: Source of the data is from NSSO, Election Commission of India, and NREGS website. The dependent variables are the log value of total household consumption for the year divided by household size. The base year is 2003. The sample is restricted to marginalized caste households which are non-female headed households. The regressions includes controls for individual level characteristics and household level characteristics such as caste, religion, education, age by gender, quadratic for age, number of children, old members and men in the household, household size. Standard errors are in parenthesis. Standard Errors are clustered at the district level.

* p<.10 ** p<.05 *** p<.01

Table 5-4B: Robustness Checks

<i>Coefficient for Early X Reserved X 2006 with Base Period 2003</i>							
	Trim Top and Bottom 10% Districts	Using Overlapped Districts	No Weights	Non- Marginalized Caste Households	Land Possession n <= 3 Hectares	Land Possession n <= 2 Hectares	Land Possession n <= 1 Hectare
Early X 2006	0.216*** (0.080)	0.200*** (0.066)	0.29*** (0.051)	0.019 (0.085)	0.241*** (0.073)	0.244*** (0.075)	0.273*** (0.080)
District Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Linear Time Trend	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	18524	21845	26996	12760	24442	22602	18660
R-sq	0.446	0.463	0.487	0.547	0.489	0.488	0.489

Notes: Source of the data is from NSSO, Election Commission of India, and NREGS website. The dependent variables are the log value of total household consumption for the year divided by household size. The base year is 2003. The sample is restricted to marginalized caste households which are non-female headed households. The regressions includes controls for individual level characteristics and household level characteristics such as caste, religion, education, age by gender, quadratic for age, number of children, old members and men in the household, household size. Standard errors are in parenthesis. Standard Errors are clustered at the district level.

* p<.10 ** p<.05 *** p<.01

Table 5-5A: Difference-in-Difference-in-Difference - Effect on Monthly Per Capita Consumption Under Reservation

	All Marginalized Caste Households
Reserved X Early X 2001	0.013 (0.118)
Reserved X Early X 2004	0.071 (0.063)
Reserved X Early X 2006	0.246*** (0.082)
Reserved X Early X 2007	0.183*** (0.067)
District Fixed Effect	Yes
Time Fixed Effect	Yes
State Linear Time Trend	Yes
N	79441
R-sq	0.527

Notes: The dependent variables are the log value of total household consumption for the year divided by household size. The sample is restricted to non-female headed households. The regressions includes controls for individual level characteristics and household level characteristics such as caste, religion, education, age by gender, quadratic for age, number of children, old members and men in the household, household size. Standard errors are in parenthesis. Standard Errors are clustered at the district level.

* p<.10 ** p<.05 *** p<.01

Table 5-5B: DDD - Explaining Lags and Leads

	Without 150 NFFWP Districts	Without 2004 Data
Reserved X Early X 2001	-0.050 (0.075)	-0.068 (0.094)
Reserved X Early X 2004	0.095 (0.145)	
Reserved X Early X 2006	0.423*** (0.085)	0.243*** (0.074)
Reserved X Early X 2007	0.176** (0.080)	0.200*** (0.062)
District Fixed Effect	Yes	Yes
Time Fixed Effect	Yes	Yes
State Linear Time Trend	Yes	Yes
N	50050	48789
R-sq	0.461	0.544

Notes: The dependent variables are the log value of total household consumption for the year divided by household size. The first column excludes the 150 districts that received NFFWP. The regression does not include district fixed effects. Instead I use an indicator variable for early implementation districts and use the backwardness measures in the 2004 Planning Commission Report to control for district level I also reduce the number of late implementation districts by excluding the ones which are least backward (i.e., have a rank greater than 350). The second column excludes the overlap period for the 2007-08 sample. Both sets of regressions restrict the sample to non-female headed households. The regressions includes controls for individual level characteristics and household level characteristics such as caste, religion, education, age by gender, quadratic for age, number of children, old members and men in the household, primary occupation of the household, household size. Standard errors are in parenthesis. Standard Errors are clustered at the district level.

* p<.10 ** p<.05 *** p<.01

Table 5-6: Difference-in-Difference-in-Difference - Effect on Monthly Per Capita Consumption Under Reservation

	Excluding the Overlap period in 2008
Reserved X Early X 2001	-0.064 (0.093)
Reserved X Early X 2004	0.086 (0.063)
Reserved X Early X 2006	0.256*** (0.075)
Reserved X Early X 2007	0.240*** (0.067)
District Fixed Effect	Yes
Time Fixed Effect	Yes
State Linear Time Trend	Yes
N	76465
R-sq	0.521

Notes: The dependent variables are the log value of total household consumption for the year divided by household size. The sample is restricted to non-female headed households. The regressions includes controls for individual level characteristics and household level characteristics such as caste, religion, education, age by gender, quadratic for age, number of children, old members and men in the household, household size. Standard errors are in parenthesis. Standard Errors are clustered at the district level.

* p<.10 ** p<.05 *** p<.01

CHAPTER VI

IMPACT OF INDIA'S NATIONAL RURAL EMPLOYMENT GUARANTEE SCHEME ON HOUSEHOLD SPENDING BY CONSUMPTION CATEGORY

1. Introduction: Household Spending by Consumption Category

This chapter shifts focus from looking at the overall impact of NREGS on monthly per capita household consumption to concentrate on how households allocate the income among the various consumption categories. In India the Planning Commission calculates poverty lines based on the nutritional norm of 2400 calories per day for the rural population and nearly 30 percent of the rural population were below this poverty line in 2004-05. This would lead one to assume that for a large percentage of the poor, an increase in income would lead to an increase in demand for food. Since the NREGS is an anti-poverty program and the intended beneficiaries are the poor, the program may lead to an overall improvement in food security.

Deaton and Subramanian (1996) use the Consumption Expenditure Survey data collected by the National Sample Survey Organization to find that the total expenditure (net of expenditure on durable goods) elasticity for calories is around 0.55 for poor households and around 0.4 for richer households. Richer households pay more for obtaining a similar level of calories by substituting away from cheaper and lower nutrition items. However, Behrman and Deolalikar (1987), Ravallion (1990), and Bouis and Haddad (1992) estimate elasticity for calories to be close to zero. They argue that even poor households use the increase in income to substitute for non-calorie nutrients with better taste. Given that there is no consensus about the magnitude of demand elasticity, it is important to analyze whether the NREGS, by increasing income, impacts

the overall food consumption of the rural population as well as see if households substitute quality for quantity (for example, they may move away from cereal consumption to protein consumption). Thus analyzing the impact of the public program on food consumption categories is required to understand whether the increase in income also leads households to move to better nutrition items. I find that households move away from the less expensive and lower nutritional value food items, like cereal, toward the higher caloric and more nutritional items like meat and fish.

In terms of household spending on non-food items, I find that the rise in disposable income from the program leads to households increasing spending on fuel and light. Households can anticipate using NREGS every year to permanently increase income and this may explain the increase in expenditure on larger purchase items that have no resale value, such as bedding. Finally, the program increases expenditure on durable goods like furniture which is either from an increase in income or from increases in access to credit as a result of being able to work under NREGS.

The NREGS guarantees minimum wage irrespective of gender. This has led a large number of women to join the program since the minimum wage in 2004-05 was greater than the average payment women could expect to receive in the informal sector. Since 2008-09 more than 50 percent of the workers in NREGS are women. The greater labor force participation by women may increase her contribution to earned income and this increase in her contribution can lead to more weight being given to her preferences in household resource allocation decisions. If mothers prefer to invest more in their children's health and education relative to fathers (Blumberg, 1988; Thomas, 1990; Hoddinott and Haddad, 1995; Thomas et al., 2002; Quisumbing and Maluccio, 2003), then one should see an improvement in child outcomes. In

this chapter I also look at the effect of NREGS on spending that impacts wellbeing in terms of health and children's outcome. To do this I focus on spending on alcohol, tobacco, education, medical expenditures. For households without children, it appears that the program significantly increases consumption of "adult" goods like alcohol by nearly 30 percent, and for households with children, milk consumption increases by 15 percent. In terms of education, there is no strong evidence of the program impacting spending or increasing the number of years in school for children.

Since marginalized caste households are disproportionately poor, I analyze the impact of NREGS on household spending for this group for the different consumption categories. This allows me to focus on whether the poor use the rise in income from NREGS to increase purchase of food (and improve total nutrition), and whether there is any evidence of a quantity-quality tradeoff. As discussed in Chapter V, political reservation for marginalized castes improves the situation of the disadvantaged group relative to their counterparts in non-reserved districts. Therefore, I assess if there is a differential change in how marginalized caste households allocate their income due to NREGS in reserved districts relative to non-reserved districts. Although I find NREGS causes marginalized caste households to increase spending on protein, I do not find any evidence of reservation having a differential impact for these households for the higher nutrition item.

The rural poor have low and unpredictable income along with limited access to reliable savings accounts and formal insurance (Banerjee, 2009). Given this situation, I study whether NREGS leads SC/ST households in reserved districts to increase purchase of assets with high resale value (for example, furniture, jewelry, etc.) in order to protect themselves against future

economic shocks. I find that reservation leads to minority households to spend more on furniture due to NREGS.

2. Data and Empirical Strategy

I use the nationally representative household data from the Consumption Expenditure Survey conducted by the National Sample Survey Organization (NSSO) for the years 2001-02, 2003, 2004-05, 2006-07 and 2007-08. This data set provides the highly detailed information on household expenditure for the various consumption categories from the NSSO. I have also collected information about the reserved State Assembly constituencies for minority candidates from the Election Commission website.

In the Consumption Expenditure survey, households were asked to recall the amount they had consumed in last 30 days for more than 300 items. A recall period of one month for consumer goods, rent and monthly medical expenditure items, and a 365-day recall period for durable goods, education and institutional medical expenditures was used. They were not only asked about their expenditure on each of the items but also about the physical quantities of the goods consumed since there is home production as well goods received in exchange of goods and services. Consumption out of home produce is evaluated at farm or factory rate. Goods received in exchange of goods and services is imputed at the rate of average local retail prices prevailing during the reference period. Also, data was collected on the number of meals given to guests at ceremonies and other occasions, as well as the number of meals received as payment in kind. Information on the number of meals eaten at home and the number of meals purchased was recorded.

In this chapter, I use data on basic food categories (cereals, pulses (lentils), protein, milk, oils and fats), fuel, education, intoxicants (alcohol, stimulants, etc.), tobacco, and beverages. To assess the impact on health, I include information on institutional and non-institutional medical expenditure. The distinction between institutional and non-institutional medical expenses lies in whether the expenses were incurred on medical treatment as a patient of a medical institution (institutional), or otherwise (non-institutional). In rural India the lack of savings opportunities leads people to purchase real financial assets during good periods and sell them in the bad periods. To understand household spending on these goods, I use information on items that have high resale value - furniture and jewelry, and items that have low resale value - clothing, bedding, and footwear.

As in chapter IV and chapter V, I exploit the fact that the program was rolled out in three phases across all the rural districts over a period of three years (2006 to 2008) to conduct a difference-in-difference analysis where the treatment group consists of households in the districts where the program was initially implemented. The control group of districts which were to receive the program in 2008-09 but had not received it at the time the survey was conducted.

$$(1)y_{idt} = \beta_0 + \sum_{\tau=0}^3 \beta_{-\tau} \text{Early}1_{d,t-\tau} + \sum_{\tau=1} \beta_{+\tau} \text{Early}1_{d,t+\tau} + \gamma X_{idt} + \eta_{st} + \delta_d + \lambda_t + e_{idt}$$

where y_{idt} measures the outcome variable (household per capita expenditure on the various item categories) of household i in district d and in year t . The coefficient $\beta_{t=2006-07}$ measures differential changes in y in early implementing districts compared to late implementing districts, conditional on the control variables and fixed effects. This will capture the causal effect of the

program if variation in the program's timing is not related to unobserved shocks and trends that differentially affected households in early implementing districts.

Similarly, to analyze the differential impact of NREGS for marginalized caste households in reserved districts relative to non-reserved districts I use the setup from Chapter V.

$$\begin{aligned}
 (2)y_{idt} = & \beta_0 + \sum_{\tau=0}^3 \beta_{-\tau} \text{Early}_{d,t-\tau} * \text{Reserved}_d + \sum_{\tau=1} \beta_{+\tau} \text{Early}_{d,t+\tau} * \text{Reserved}_d \\
 & + \sum_{\tau=0}^3 \beta_{-\tau} \text{Reserved}_d * \lambda_{t-\tau} + \sum_{\tau=1} \beta_{+\tau} \text{Reserved}_d * \lambda_{t+\tau} \\
 & + \sum_{\tau=0}^3 \beta_{-\tau} \text{Early}1_{d,t-\tau} + \sum_{\tau=1} \beta_{+\tau} \text{Early}1_{d,t+\tau} + \gamma X_{idt} + \eta_{st} + \delta_d + \lambda_t \\
 & + e_{idt}
 \end{aligned}$$

The variable $\text{Early}_{d,t-\tau} * \text{Reserved}_d$ equal one for the reserved early implementation districts for the relevant years and therefore the coefficient $\beta_{t=2006-07}$ captures the differential changes in household per capita expenditure on the various item categories for the reserved "early" districts in 2006-07, conditional on the control variables and fixed effects.

The control variables used in the above equations are the same as those discussed in Chapter IV, equation (2) and Chapter V, equation (2). The equations also includes district fixed effects, δ_d , and year fixed effects, λ_t . η_{st} is the state-specific linear time trend which allows states to follow different trends.

3. Results

3.1 Results for Household Spending by Consumption Categories

In Tables 6-1 through 6-4, I focus on household spending decisions on the various consumption categories. Each column provides estimates from separate regressions using

equation 1 with state linear time trend specification. The top panel focuses on all households while the lower panel concentrates on marginalized caste households.

Apart from increasing consumption, the program may have led households to change the way they allocate income among the different categories. Table 6-1 presents the results for essential food items. The program does not have an economic or statistically significant effect on cereals or 'cereal substitutes' (like tapioca) which are cheaply available high starch items and have very low nutritional content. The impact on pulses is not significantly different from zero.⁵⁶ Households instead used the program to increase consumption of protein by around 12 percent to incorporate more nutrition and higher caloric items in their diet. Marginalized caste households followed the same pattern and raised protein consumption by nearly 14 percent. Milk consumption also increased by nearly 13 percent. It would seem that in terms of the major food items, households raised consumption of items that have a higher nutritional value. There has been a trend of increasing calorie from fat (Deaton and Dreze, 2009). In keeping with this trend, consumption of oil and other cooking fats increased by 7 percent. The program also increased fuel and light consumption by 7.7 percent.

Since women are responsible for majority of the housework and child care, work that takes them far from the house is not feasible. The Act makes it easier for women to participate under NREGS by ensuring that women are provided work within 5 kilometers of their home. The minimum wage guarantee under NREGS has attracted women because women typically receive less wages than men in casual works. As a result women constitute more than half of the workforce under NREGS. The formal payment for work also allows women to know their

⁵⁶ For 2004-05 there is almost a 14 percent increase in pulse consumption. This may be a result of the National Food for Work Program being used in the 150 backward districts (which was later subsumed in the "early" districts under NREGS).

contribution to the total household budget. This may increase their bargaining power in household decision making as seen in Qian (2005) and Jensen and Miller (2010). In the literature, increase in women's income is associated with increases in household well-being, especially for children.

Table 6-2 focuses on household medical and educational expenditure, and expenditure on intoxicants, beverages and tobacco. For institutional medical expenditures, the effect of NREGS is not significantly different from zero. This is not surprising since the program pays minimum wage and is unlikely to affect spending on big expenditure items.⁵⁷ The program has a small positive effect on educational spending but this is not statistically significant. The NREGS may have improved the working of the Mid Day Meal Program, which provides school children with food during the middle of the school day, and lowered overall education costs.⁵⁸ The program increased consumption of beverages (example tea, coffee, bottled drinks, refreshments) which falls under the luxury consumption item category. Overall, the expenditure on intoxicants and tobacco did not increase significantly in 2006-07. In order to analyze whether the presence of children affect consumption patterns, I run separate regression on households with children and households without children. The results are in Table 6-3. For households without children,

⁵⁷ Institutional medical expenditures refer to goods and services received as an in-patient in private as well as Government medical institutions like nursing homes, and hospitals. These goods and services include payments for medicine, doctor's and surgeon's fee, medical tests and X-rays, and hospital and nursing charges.

⁵⁸ I also conduct an ordered logit on education categories (not-literate, literate but without formal education, literate but below primary, primary, middle, secondary, and higher secondary and above) to analyze if the program has an effect on the number of years people attend school. I restrict the sample to individuals with who are between the age of 5 and 18 and use data from 2003 and 2006-07. I include an interaction term $Early_{d,t}$ which equals one for individuals in "early" districts and the year is 2006-07. I also include the same individual and household level characteristics as in equation (1). District and time fixed effects are used along with state time trends. I find the program has no significant impact in increasing the log odds of moving to a higher education category. I also use a smaller number of categories (primary and less, middle, and high school and above) and find no significant impact of the program.

NREGS increases alcohol consumption by around 30 percent. For households with children the effect is negative but insignificant. The opposite pattern is seen for milk consumption. For households with children, NREGS significantly increases milk consumption by nearly 15 percent while there is no effect for households without children. In terms of health, spending on non-institutional medical items is positive and significant for households with children and there is no effect on households without children. Therefore, increase in women's contribution to household income by participating in NREGS impacts household wellbeing only when there are children present in the household.

Expenditure on household durable goods are discussed in Table 6-4. NREGS has a positive effect on spending on furniture. This may be a result of the increase in income from the program or an increase in access to credit by working in a program that guarantees employment for 100 days of the year. The increase in disposable income also increased spending on bedding which, unlike furniture, has limited resale value. There is no effect on clothing and footwear. This pattern is true for marginalized caste households and the population in general. Indian households purchase jewelry, especially gold, as an instrument for savings. In rural India, where financial instruments for saving are limited, households buy gold since it is a liquid asset which can be sold easily for cash in times of need. Nearly 70 percent of the gold sold in India is purchased in rural India in the form of jewelry (Reserve Bank of India, 2013). Therefore, if the program increases household income and thereby the ability to save, it will be reflected through increased purchase of jewelry. However, the effect of NREGS for jewelry consumption is positive but not significant. This may be because the program increases income for poor households but it is not sufficient to lead to savings for the poor households who work in NREGS.

3.2 Household Spending by Consumption Categories in the Context of Political Reservation for Marginalized Castes

In Tables 6-5 through 6-8, I focus on household spending decisions on the various consumption categories. Each column provides estimates from separate regressions using equation 2 with state linear time trend specification. The data is restricted to marginalized caste households since the focus is now on analyzing the differential impact of reservation on minority households in benefitting from the NREGS.

To probe into how reservation leads marginalized caste households to allocate the income among the different categories, I look at similar consumption categories as in the earlier section. For marginalized caste households, NREGS leads to a significant increase in consumption of cereals in reserved districts (relative to non-reserved districts). Though these items have low nutritional content, they can be used to cheaply boost caloric intake. The impact on pulses is positive and significant by around 38 percent. This would suggest that in terms of the major food items, households are additionally raising their consumption of pulses, the item that has higher nutritional value than cereals but a lower value when compared to meat, fish and eggs. Also, protein costs more than pulses and there is no differential impact of NREGS on expenditure on meat, fish, and eggs in reserved districts. For oil and fuel consumption, there is no significant difference in the reserved versus non reserved districts. Milk consumption however decreased significantly in the reserved districts. When the focus shifts to the impact of reservation, it appears that for marginalized caste households who have lower levels of income, households spend more assertively on items that will increase their caloric intake as well as improve their overall nutrition.

Table 6-6 shows that for both institutional and non-institutional medical expenditures, the effect of NREGS for reserved districts is not significantly different from zero. I also find there is no differential impact on tobacco or alcohol consumption. However, the program increases consumption of beverage by around 68 percent.

The program has a significantly negative effect on education by nearly 64 percent. This may be due to the fact that poorer households who have a lower expected return from education in rural areas may view the program as an opportunity to enter the labor force at an earlier age. Since in reserved districts marginalized caste households benefit more under the program, they may maximize their income from NREGS by sending currently unemployed adult members to work under the scheme. In order to carry out household work and care for younger children in the absence of adult members, households may use the older children by either taking them out of school or reducing the time they spend in school. This may lead to the decrease in education spending. Again when I look at households without children in Table 6-7, I find that for households with children (under 14 years), spending on education reduces significantly while for households without children, there is no impact on education spending. This would indicate that the reduction in spending on education is for children who are most likely being made to work in the house or provide some other form of support to their parents who are trying to take advantage of the NREGS.

In Table 6-8, I focus on household durable goods are discussed. Similar to results for the entire population, reservation leads to SC/ST households to spend more on furniture due to NREGS. Given the potential to resell furniture in times of distress, this spending may be regarded as an insurance against future income shock. Thus it would seem that with the lack of formal credit and insurance markets, households use the increase in income to buy real financial

assets during good periods in order to be able to sell them in the bad periods. Marginalized caste households do not increase spending on bedding which has limited resale value.

4. Conclusion

The empirical analysis in this chapter shows that the NREGS not only increased overall consumption but households also increased consumption of the more nutrition rich food items. However, households without children increased consumption of "adult goods" such as alcohol, while households with children increased spending on milk. Also a large number of studies focusing on India (Lancaster, Maitra and Ray, 2008; Rose, 2000; Subramanian and Deaton, 1991) have found evidence of discrimination against female members and the girl child in terms of allocation of goods within the household. Given this situation, it is necessary to further look at how the change in spending with increase in income from NREGS is allocated among the different members of the household. This will help in analyzing whether the anti-poverty program has an impact on intra-household allocation of goods within the household with respect to gender.

Compared to other sectors, participation of women is disproportionately high under NREGS. The program also ensures that the payments are deposited in the worker's bank account. This may give women more power over their share of household income. The studies on intrahousehold resource allocation find that with increase in women's income expenditure on food increases. Hoddinott and Haddad (1991) find that with doubling women's share of household cash income decreases expenditure on alcohol and cigarettes. However, Udry and Duflo (2003) find that increase in income from female controlled crops increases expenditure on prestige goods. Therefore, further work needs to be done that focuses on whether the increase in

household consumption due to women's participation (rather than men's participation) under NREGS leads to differential allocation of household spending on goods that affect household wellbeing in terms of nutrition, health, and education.

Overall the results in this chapter show that households increase their calorie consumption as a result of the program and households also increase the quality of food consumption. This also holds true for marginalized caste households. With political representation for SC/ST households, marginalized caste households with children below the age of 14 significantly decrease spending on education. This would suggest that when they are able to confidently secure benefits from the program, they prefer to trade-off future returns from education to maximize current gains from NREGS.

Tables

Table 6-1: Difference-in-Difference - Effect of NREGA on Food Consumption

	Cereal	Pulse	Protein	Milk	Oils	Fuel
<u>All Households</u>						
Early X 2003	-0.015 (0.020)	0.053 (0.035)	0.068 (0.061)	-0.007 (0.058)	0.010 (0.031)	-0.026 (0.033)
Early X 2004	0.015 (0.024)	0.148*** (0.044)	0.192** (0.079)	0.059 (0.062)	0.099*** (0.037)	0.075** (0.038)
Early X 2006	0.015 (0.025)	0.006 (0.050)	0.120* (0.070)	0.086 (0.061)	0.072** (0.035)	0.075** (0.035)
Early X 2007	0.025 (0.025)	0.036 (0.048)	0.157** (0.069)	-0.043 (0.055)	0.059* (0.035)	0.064* (0.036)
<u>Marginal Caste Households</u>						
Early X 2003	-0.058*** (0.022)	0.005 (0.038)	0.068 (0.064)	-0.035 (0.061)	-0.039 (0.031)	-0.022 (0.033)
Early X 2004	-0.030 (0.025)	0.130*** (0.047)	0.200** (0.083)	0.079 (0.068)	0.070* (0.038)	0.081** (0.036)
Early X 2006	-0.012 (0.027)	-0.012 (0.052)	0.138* (0.072)	0.133* (0.068)	0.051 (0.037)	0.106*** (0.037)
Early X 2007	-0.012 (0.027)	0.005 (0.049)	0.160** (0.074)	-0.002 (0.060)	0.015 (0.035)	0.069* (0.037)

Notes: The dependent variables are the log values of total household consumption for above items divided by household size. The sample is restricted to non-female headed households. The regressions includes controls for individual level characteristics and household level characteristics such as caste, religion, education, age by gender, quadratic for age, number of children, old members and men in the household, and household size. District and year fixed effects are used with state linear time trends. Standard errors are in parenthesis. Standard Errors are clustered at the district level.

* p<.10 ** p<.05 *** p<.01

Table 6-2: Difference-in-Difference - Effect of NREGA on Education and Health

	Education	Intoxicants	Tobacco	Beverage	Medical	Medical (Institutional)
<u>All Households</u>						
Early X 2003	-0.098 (0.089)	-0.100 (0.096)	0.072 (0.056)	-0.013 (0.057)	-0.025 (0.082)	-0.097 (0.156)
Early X 2004	-0.020 (0.091)	0.021 (0.112)	0.079 (0.070)	0.154** (0.063)	-0.028 (0.102)	0.008 (0.185)
Early X 2006	0.028 (0.097)	0.137 (0.123)	0.107 (0.077)	0.160** (0.068)	0.049 (0.084)	0.123 (0.198)
Early X 2007	0.021 (0.092)	0.208* (0.124)	0.118 (0.079)	0.132* (0.068)	0.044 (0.094)	0.120 (0.202)
<u>Marginal Caste Households</u>						
Early X 2003	-0.122 (0.095)	-0.117 (0.103)	0.058 (0.061)	-0.094 (0.058)	0.037 (0.095)	-0.094 (0.170)
Early X 2004	-0.008 (0.102)	0.035 (0.122)	0.106 (0.069)	0.124* (0.065)	0.057 (0.104)	0.023 (0.195)
Early X 2006	0.026 (0.111)	0.090 (0.128)	0.099 (0.084)	0.120* (0.071)	0.159 (0.104)	0.114 (0.222)
Early X 2007	0.028 (0.107)	0.152 (0.125)	0.103 (0.084)	0.094 (0.073)	0.148 (0.106)	0.078 (0.231)

Notes: The dependent variables are the log values of total household consumption for above items divided by household size. The sample is restricted to non-female headed households. The regressions includes controls for individual level characteristics and household level characteristics such as caste, religion, education, age by gender, quadratic for age, number of children, old members and men in the household, and household size. District and year fixed effects are used with state linear time trends. Standard errors are in parenthesis. Standard Errors are clustered at the district level.

* p<.10 ** p<.05 *** p<.01

Table 6-3: Difference-in-Difference - Effect of NREGA on Consumption based on Household Composition

	Protein	Milk	Alcohol	Education	Medicine
<u>Households with Children</u>					
Early X 2003	0.026 (0.070)	-0.041 (0.065)	-0.147 (0.112)	-0.108 (0.098)	0.065 (0.101)
Early X 2004	0.175* (0.090)	0.100 (0.072)	-0.003 (0.137)	0.005 (0.105)	0.127 (0.114)
Early X 2006	0.089 (0.081)	0.152** (0.074)	-0.007 (0.134)	0.016 (0.116)	0.224** (0.111)
Early X 2007	0.127 (0.082)	0.021 (0.065)	0.149 (0.127)	0.050 (0.111)	0.197* (0.118)
<u>Households without Children</u>					
Early X 2003	0.166** (0.083)	-0.089 (0.094)	-0.057 (0.161)	-0.045 (0.276)	-0.174 (0.124)
Early X 2004	0.225** (0.095)	-0.113 (0.087)	0.045 (0.192)	0.116 (0.269)	-0.303** (0.144)
Early X 2006	0.225** (0.096)	-0.028 (0.097)	0.308* (0.183)	0.241 (0.281)	-0.120 (0.136)
Early X 2007	0.232** (0.097)	-0.167* (0.093)	0.084 (0.192)	0.286 (0.285)	-0.112 (0.142)

Notes: The dependent variables are the log values of total household consumption for above items divided by household size. The sample is restricted to non-female headed households. The regressions includes controls for individual level characteristics and household level characteristics such as caste, religion, education, age by gender, quadratic for age, number of children, old members and men in the household, household size. District and year fixed effects are used with state linear time trends. Standard errors are in parenthesis. Standard Errors are clustered at the district level.

* p<.10 ** p<.05 *** p<.01

Table 6-4: Difference-in-Difference - Effect of NREGA on Durable Goods

	Furniture	Jewelry	Durable	Clothing	Bedding	Footwear
<u>All Households</u>						
Early X 2003	0.059 (0.211)	0.184 (0.155)	-0.093 (0.085)	-0.029 (0.042)	0.058 (0.067)	-0.061 (0.048)
Early X 2004	0.143 (0.206)	0.051 (0.191)	-0.040 (0.109)	0.020 (0.047)	0.142* (0.084)	-0.017 (0.054)
Early X 2006	0.464** (0.226)	0.133 (0.188)	-0.028 (0.093)	-0.003 (0.050)	0.136* (0.082)	-0.013 (0.055)
Early X 2007	0.241 (0.212)	0.315 (0.192)	0.051 (0.084)	0.020 (0.050)	0.126 (0.079)	0.008 (0.054)
<u>Marginal Caste Households</u>						
Early X 2003	0.096 (0.229)	0.299* (0.177)	-0.119 (0.102)	-0.028 (0.038)	0.039 (0.084)	-0.068 (0.048)
Early X 2004	0.236 (0.218)	0.196 (0.208)	-0.032 (0.122)	0.024 (0.045)	0.078 (0.113)	-0.006 (0.058)
Early X 2006	0.520** (0.254)	0.279 (0.194)	-0.002 (0.107)	0.031 (0.050)	0.142 (0.096)	-0.003 (0.062)
Early X 2007	0.407* (0.232)	0.369* (0.204)	0.090 (0.100)	0.034 (0.048)	0.118 (0.097)	0.025 (0.061)

Notes: The dependent variables are the log values of total household consumption for above items divided by household size. The sample is restricted to non-female headed households. The regressions includes controls for individual level characteristics and household level characteristics such as caste, religion, education, age by gender, quadratic for age, number of children, old members and men in the household, household size. District and year fixed effects are used with state linear time trends. Standard errors are in parenthesis. Standard Errors are clustered at the district level.

* p<.10 ** p<.05 *** p<.01

Table 6-5: Difference-in-Difference-in-Difference - Effect of NREGA on Food Consumption

	Cereal	Pulse	Protein	Milk	Oils	Fuel
<u>Marginalized Caste Households</u>						
Early X 2003X Reserved	0.167** (0.08)	-0.068 (0.13)	0.264 (0.22)	-0.777*** (0.24)	0.006 (0.14)	-0.121 (0.18)
Early X 2004X Reserved	0.228** (0.10)	0.046 (0.15)	0.261 (0.29)	-0.846*** (0.21)	0.012 (0.14)	0.003 (0.15)
Early X 2006X Reserved	0.248*** (0.09)	0.380** (0.18)	0.138 (0.21)	-0.492* (0.28)	0.034 (0.18)	0.033 (0.18)
Early X 2007X Reserved	0.172* (0.10)	0.267* (0.15)	0.306 (0.27)	-0.618** (0.25)	0.185 (0.15)	0.063 (0.17)

Notes: The dependent variables are the log values of total household consumption for above items divided by household size. The sample is restricted to non-female headed households. The regressions includes controls for individual level characteristics and household level characteristics such as caste, religion, education, age by gender, quadratic for age, number of children, old members and men in the household, household size. District and year fixed effects are used with state linear time trends. Standard errors are in parenthesis. Standard Errors are clustered at the district level.

* p<.10 ** p<.05 *** p<.01

Table 6-6: Difference-in-Difference-in-Difference - Effect of NREGA on Education and Health

	Education	Intoxicants	Tobacco	Beverage	Medical	Medical (Institutional)
<u>Marginal Caste Households</u>						
Early X 2003X Reserved	-0.785** (0.34)	0.798* (0.44)	0.618** (0.27)	0.228 (0.27)	0.146 (0.55)	0.627 (0.77)
Early X 2004X Reserved	-0.472 (0.30)	0.447 (0.44)	0.274 (0.20)	0.726*** (0.27)	0.095 (0.55)	0.542 (0.64)
Early X 2006X Reserved	-0.639* (0.33)	0.462 (0.45)	0.080 (0.33)	0.686** (0.27)	0.454 (0.53)	1.272 (0.83)
Early X 2007X Reserved	-0.411 (0.35)	0.782 (0.59)	0.447* (0.27)	0.782*** (0.30)	0.442 (0.57)	-0.186 (0.91)

Notes: The dependent variables are the log values of total household consumption for above items divided by household size. The sample is restricted to non-female headed households. The regressions includes controls for individual level characteristics and household level characteristics such as caste, religion, education, age by gender, quadratic for age, number of children, old members and men in the household, household size. District and year fixed effects are used with state linear time trends. Standard errors are in parenthesis. Standard Errors are clustered at the district level.

* p<.10 ** p<.05 *** p<.01

Table 6-7: Difference-in-Difference-in-Difference - Effect of NREGA on Consumption based on Household Composition

	Protein	Milk	Beverage	Education	Medicine
<u>Households with Children</u>					
Early X 2003X Reserved	0.196 (0.24)	-0.757*** (0.29)	0.205 (0.29)	-0.865** (0.33)	0.128 (0.55)
Early X 2004X Reserved	0.184 (0.32)	-0.939*** (0.25)	0.756** (0.30)	-0.525* (0.30)	0.044 (0.57)
Early X 2006X Reserved	0.226 (0.22)	-0.555* (0.32)	0.731** (0.31)	-0.808** (0.33)	0.458 (0.53)
Early X 2007X Reserved	0.330 (0.30)	-0.638** (0.27)	0.701** (0.34)	-0.412 (0.35)	0.523 (0.58)
<u>Households without Children</u>					
Early X 2003X Reserved	-0.037 (0.45)	-0.470 (0.30)	0.569 (0.53)	-0.405 (2.11)	-0.034 (0.43)
Early X 2004X Reserved	0.329 (0.41)	-0.157 (0.24)	0.813** (0.41)	0.261 (1.66)	0.139 (0.43)
Early X 2006X Reserved	-0.212 (0.43)	0.391 (0.36)	0.956* (0.50)	0.623 (1.71)	0.363 (0.51)
Early X 2007X Reserved	-0.112 (0.46)	0.001 (0.29)	1.181** (0.48)	-0.875 (1.98)	0.172 (0.65)

Notes: The dependent variables are the log values of total household consumption for above items divided by household size. The sample is restricted to non-female headed households. The regressions includes controls for individual level characteristics and household level characteristics such as caste, religion, education, age by gender, quadratic for age, number of children, old members and men in the household, household size. District and year fixed effects are used with state linear time trends. Standard errors are in parenthesis. Standard Errors are clustered at the district level.

* p<.10 ** p<.05 *** p<.01

Table 6-8: Difference-in-Difference-in-Difference - Effect of NREGA on Durable Goods

	Furniture	Jewelry	Durable	Clothing	Bedding	Footwear
<u>Marginal Caste Households</u>						
Early X 2003X Reserved	2.872*** (1.01)	0.624 (0.87)	-0.454 (0.31)	0.302*** (0.11)	0.252 (0.38)	-0.110 (0.15)
Early X 2004X Reserved	1.180* (0.69)	-1.343* (0.81)	-0.422 (0.33)	0.495*** (0.10)	0.081 (0.49)	-0.068 (0.16)
Early X 2006X Reserved	2.615*** (0.85)	-1.413 (0.98)	0.065 (0.33)	0.582*** (0.14)	0.201 (0.43)	-0.063 (0.22)
Early X 2007X Reserved	2.315*** (0.74)	-1.862** (0.94)	0.077 (0.32)	0.626*** (0.11)	0.481 (0.34)	0.250 (0.19)

Notes: The dependent variables are the log values of total household consumption for above items divided by household size. The sample is restricted to non-female headed households. The regressions includes controls for individual level characteristics and household level characteristics such as caste, religion, education, age by gender, quadratic for age, number of children, old members and men in the household, household size. District and year fixed effects are used with state linear time trends. Standard errors are in parenthesis. Standard Errors are clustered at the district level.

* p<.10 ** p<.05 *** p<.01

CHAPTER VII

CONCLUSION

The NREGS is a highly ambitious rural public works program to address the issues of unemployment, underemployment, and poverty in rural India. The National Rural Employment Guarantee Act, 2005, envisioned the program to be more than a public employment scheme by recognizing employment as a legal right. The program guarantees up to a 100 days of employment each year to households in works that improve rural infrastructure, for example, rural connectivity, land development, water harvestation and water conservation. The nature of the work is unskilled manual labor at minimum wage. Since 2009, over 30 percent of the rural population have been engaged under NREGS. In terms of persondays by gender and caste, women and marginalized caste individuals constitute nearly 50 percent of the workforce respectively.

This dissertation is the first study that analyzes the impact of NREGS on household wellbeing by concentrating on household consumption using the National Sample Survey Organization (NSS) data. In rural India, earnings do not provide a clear indicator of poverty as people get paid in both cash and kind, and there is home production of goods. Also, the inadequate savings opportunities leads the rural poor to purchase valuables like gold and silver in order to save a portion of their income. Any increase in household income will translate to increases in household consumption of goods and services. I exploit the cross-district rollout of the program over a three year period (2006 to 2008) to employ a difference-in difference approach where the treatment group consists of households in the early implementation districts

while the control group consists of households in the late implementation districts. I find the program increases consumption by over 10 percent and households use the program to increase and smooth consumption over the lean and non-lean agricultural seasons.

Individuals from the marginalized caste groups have faced a long history of discrimination, have lower socio-economic status, and have higher levels of poverty. By 2008-09 over 50 percent of the workers under the program were from marginalized caste households although they constitute less than 30 percent of the rural population. I find that program increases household consumption by around 12 percent for marginalized caste households. The high rate of participation in the program by these households was accompanied by gains in household wellbeing. Thus discrimination and other barriers to entry have not prevented this group from benefiting from the program.

In my dissertation I have focused on whether and how anti-poverty programs affect the wellbeing of the poor. To do this I have also investigated other complementary programs, which can generate positive externalities, and therefore have the potential to improve the overall impact of poverty programs. I analyze the effect of an affirmative action policy carried out through political reservation for marginalized castes and the differential impact reservation has on marginalized caste households in terms of benefiting from NREGS. I conduct a difference-in-difference-in-difference analysis to find that household consumption increases by 23 percent in the reserved districts (relative to the non-reserved districts) in the treatment districts (relative to the control districts) in 2006-07.

I further assess household budget allocation by consumption categories. I find that households move away from the less expensive and lower nutritional value food items toward the higher caloric and more nutritional items. Households also increased expenditure on durable

goods like furniture which has high resale value. This expenditure is a result being able to work under NREGS which increases their income as well as increasing opportunities to access greater credit.

While this dissertation finds that NREGS leads to improvements in household wellbeing for the overall rural population as well as for marginalized caste households, further research is necessary to better understand the channels through which anti-poverty programs using public works affect the targeted population. To arrive at the right mix of policies, existing datasets on the various government programs need to be carefully analyzed to understand the factors and the interrelatedness of these factors that keep large sections trapped in poverty and lead to intergenerational transmission of poverty. This will reveal duplicate programs, improve understanding of the linkage effects of the various schemes, and indicate which areas need immediate attention to improve program delivery and reduce inequality.

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