Effect of employment guarantee on access to credit: Evidence from rural India

Saraswat, Deepak

University of Essex, UK

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Evidence from Rural India[1]

Deepak Saraswat

saraswat.d@gmail.com

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Abstract

Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) is the largest and most ambitious public works program for poverty alleviation, adopted by Government of India since independence. It was implemented in year 2006, starting with the first phase of 200 most backward districts in India. Two more consecutive phases were implemented to cover all rural regions in India but, even after almost 6 years of its implementation, it has not been adequately analyzed for its effect on various development indicators. This paper aims to study, whether participating in a typical employment guarantee program like MGNREGA, increases access to financial services and in particular, credit. Results provide evidence that, MGNREGA has been successful in self-selecting rural poor into participation and households participating longer in the program have been able to borrow more from formal sources. This paper also provides evidence that, increase in productivity of economic activities for participants, due to work in MGNREGA acts as a link between longer participation and increased access to formal credit.

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1. INTRODUCTION

Employment guarantee schemes (EGS) as a form of Public Work Programs (PWP) have been one of the crucial poverty alleviation policies in India, since independence. Role of PWP in times of economic distress and shocks have been widely advocated in academic literature see (Draze and Sen 1989) EGS in form of PWP have been looked upon as a policy, which ensures participation of poor population and helps them in stabilizing economic shocks by providing a guaranteed minimum level of livelihood security. Maharashtra Employment Guarantee Scheme (MEGS) has been one of the most successful EGS in India. In 2005, National Rural Employment Guarantee Act (NREGA)[2] was passed by parliament, which provides rural households, a guarantee of 100 days of employment in rural public works. MGNREGA adopted the model of MEGS in Maharashtra and is seen as one of the most ambitious EGS around the world.[3]

This program has been a part of various policy discussions for poverty alleviation in India and elsewhere but even after completing almost 6 years of its implementation; it has not been adequately analyzed in terms of its impact on various development indicators. The goal of this paper is to provide a rigorous analysis of the 'Effect of participating in MGNREGA on access to financial services (credit in particular) in rural India'. Some recent studies by (Johnson 2009) and (Uppal 2009) have attempted to analyze the role of MGNREGA in stabilizing weather-induced shocks and in providing better outcomes for children. However, to the best of my knowledge, no work has attempted to look at the potential positive impact of participating in an EGS on access to finance[4] for rural poor. This paper aims at filling the knowledge gap about potential effects of having a guaranteed source of livelihood on access to better financial services.

This paper has three main objectives. First objective is to understand the potential link between employment security (and hence, income security) and increase in productivity that increases the demand for financial services. I have done a vast

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[2] Was renamed as Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), 2005.
[3] Section (2) discusses MGNREGA in detail.
[4] Particularly, access to formal credit.

literature survey to understand the role of access to financial services in fostering economic development, which in turn is endogenously determined by access to productive work opportunities. Second objective is to analyze the success of providing employment guarantee in ensuring work availability to 'only poor'[5], at the time of need. To provide evidence for this objective, I have used extensive survey based literature and my own analysis for the sample of data under this study. Third and most important objective is to find evidence for potentially positive impact of a longer participation in EGS, on access to credit.

Rest of the paper is organized as follows: Section (2) outlines the structure of MGNREGA. Section (3) discusses the relevant literature. Section (4) discusses the data and preliminary analysis on it, forms hypothesis and discusses econometric issues related to estimation and finally provides the estimation strategy and results. Section (5) presents some limitations of this study and section (6) concludes.

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[5] Will analyze the economic status of the participating households.

2. ABOUT THE PROGRAM: MGNREGA

United Progressive Alliance (UPA) government in 2005 passed the National Rural Employment Guarantee Act (NREGA), which was later renamed as Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA). In terms of outreach and budget layout, this program is the largest anti-poverty scheme launched by Indian government since independence. Under this act, every rural household in India is provided with a legal guarantee of 100 days of work in rural public work programs, at a minimum wage level (Government of India 2008). MGNREGA was launched in three different rollout phases. First phase commenced in year 2006 with 200 most backward districts in India. All other districts in country were covered under the scheme over two consecutive phases in year 2007 and 2008.

Under MGNREGA, all rural households who are willing to take up unskilled labor are required to register with their respective village council (called *gram panchayas*) and are issued with a Job card. After receiving the job card, a household can demand work anytime and will be provided employment within 15 days of expressing demand, else will be compensated with a daily unemployment allowance (Government of India 2008). Most of the rural public works conducted under MGNREGA fall under the category of developing and maintaining community assets like water bodies, community land, basic infrastructure etc (Government of India 2008). In some cases (See section 3), rural households belonging to backward castes are allowed to perform work on their own fields. This work includes improving irrigation facilities, water harvesting, land cleaning etc.

Looking at some national level figures of MGNREGA implementation for 2009-10 (MGNREGA Outcomes for 2009 - 2010, 2011), It is observed that 52.5 million households were provided employment with an aggregate of 2828 million person days generated. Average person days per household were little above 50.

This study uses a sample of districts from the state of Andhra Pradesh in southern India (see section 4). Looking at the performance of Andhra Pradesh in terms of MGNREGA implementation (MGNREGS outcomes for AP, 2011), It is observed that, in fiscal year 2009-10, around 6.2 million households were provided

employment under MGNREGA with 404.4 million person days of employment generated[6]. Andhra Pradesh has been frontrunner in its performance in terms of MGNREGA implementation (Mehrotra 2008) and is also leading in terms of providing all wage payments data for public access on its website (MGNREGA Outcomes for 2009 - 2010, 2011). It has also been commended for adopting efficient strategies to conduct local audits on MGNREGA implementation (Johnson 2009).

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[6] All figures are cumulative till the latest month reported in 2009-10

3. BACKGROUND RESEARCH AND LITERATURE REVIEW

This section deals with literature review and background research on issues of interest, which creates the groundwork for my hypothesis in following sections. Section 3.1 discusses theoretical models relating to vulnerability and consumption smoothing for poor population in developing nations. Section 3.2 discusses empirical literature regarding employment guarantee schemes and poverty in developing nations. In section 3.2.1 I will discuss the employment guarantee schemes (EGS) and their potential for screening the poor from non-poor and self-selection of poor in participation. Section 3.2.2 relates to the issue of employment generation in EGS and their direct/indirect effects on productivity of economic activities of rural poor. Section 3.3.3 discusses the importance of 'access to finance' for economic development and conditions which provide a conducive environment for financial development. Finally, section 3.3.4 provides a summary of findings in these sub-sections and develops a potential link between 'participation in EGS' and 'access to finance'.

3.1 Theoretical Literature

This section will focus on utility maximizing strategies of poor households under different constraints. I will discuss the theoretical literature relating to how a typical poor household depends on transitory income for maximizing its welfare and the issue of credit constraints in this regard. The ability to smooth one's consumption allows households to deal with risks overtime and with adverse income shocks. According to (Friedman 1957), fluctuation in household consumption caused by shocks to income can be stabilized over time by borrowing against future. Households can borrow when they are faced with 'transitory low income' (negative income shock) and can repay the borrowings when they have 'transitory high income' (positive income shock). Borrowing against future assumes perfect capital markets, where there are no information asymmetries and agents can perfectly borrow or lend at market determined interest rates. Theory also says that temporary changes in income (transitory income) are uncorrelated with permanent income and permanent consumption.

However, in most developing economies around the world, capital markets are not perfect due to heavy distortions caused by asymmetric information problems and thus, these economies tend to be characterized by credit constraints and credit rationing [(Morduch 1995) and (Conning and Udry 2007)]. Borrowings are dependent on future earning capabilities of households and under imperfect financial markets, they 'may not' be able to signal their earning ability and hence borrow enough to stabilize their consumption. Therefore, faced with income shocks and the inability to signal a 'positive income capability' in future, households cannot borrow and are credit constrained. (Doan, Gibson & Mark 2010; Morduch 1995); (Doan and Mark 2011) and (Morduch 1995) identify that, dependency of household consumption on not only the permanent but also transitory income and the inability to borrow, makes them credit-constrained.

Looking at the role of access to credit in utility maximization of poor (and risk-averse) households; (Binswanger 1980) in his experimental studies finds that, difference in investment behavior of similarly endowed (technology) poor households cannot be entirely attributed to the difference in risk-aversion. These differences can only be explained when various household characteristics like access to credit, marketing, transfer benefit programs and other institutional arrangements are taken into account. (Eswaran and Kotwal 1986) use an expected utility framework and find that risk preferences (and in turn the investment behavior) are determined by resource constraints and capital market imperfections. Difference in risk behaviors may not just be the outcome of difference in preferences but may be due to access to different resources, institutions and external assistance.

In this discussion of theoretical literature, it is observed that access to credit is a key determinant of household investment behavior and credit constraints are determined by access to earning opportunities in future. Income from these opportunities might be income from employment, transfer benefits etc., which are not transitory and would sustain through time to signal a better earning capability, which allows households to borrow against their future. In light of these arguments, next sub-section will discuss a potential relationship between employment guarantee schemes (EGS) and access to credit; showing how they can provide better economic status to poor households.

3.2 Empirical Literature

3.2.1 Employment Guarantee Schemes (EGSs) and targeting of poor population

This sub-section will discuss the literature on benefits of an EGS another transfer schemes aimed at tackling poverty. It will focus on the importance of ensuring self-selection of poor in EGSs so that transfer benefits are not leaked out to non-poor. It will also discuss the welfare effects of employment generation in an EGS.

Rural Public Work (RPW) programs are one of the crucial policy instruments for poverty alleviation in India (Ninno, Subbarao and Milazzo 2009) and have been used extensively in various forms since independence. EGS are special form of RPW programs, which provides guaranteed minimum level of employment in RPW and participants are paid according to a minimum wage threshold (Murgai and Ravallion 2005). RPW are advocated because they overcome some of the limitations of a straightforward cash transfer program or an asset redistribution program (land in particular). Programs like unconditional cash transfers, land redistributions etc. might not be successful in targeting the benefits exclusively to poor population (Gaiha and Imai 2006). (Ravallion 1991) elaborates on the issue of 'imperfect coverage of the poor' and 'leakage to non-poor' in transfer schemes and finds that 'self-selection' of poor into these schemes is the most effective measure to overcome these limitations.

With perfect information on individual earning abilities, policymakers can identify poor and target the benefits accordingly. However, it is unlikely and costly to gauge this information. At best, it is possible to identify some indicators of poverty like lower landholdings, standard of living etc, see (Ravaillon 1989) and (Datt and Ravallion 1994) for survey of evidence. This '*Information Asymmetry*' prevents screening of poor from non-poor and therefore, provides constraints on targeting the benefits to poor. Targeting can be improved by imposing costs on participants, which are increasing in their incomes (unobserved). These costs should be equal to the 'value of forgone alternative' and this will ensure participation of people with 'value of foregone alternative' less than the benefits from participation. In case of poor people (for whom one would expect the value of foregone alternative to be lower), a level of benefit can be designed which ensures participation of only poor. In non-agricultural seasons when there is a shortage of alternative employment for poor

peasants, a work requirement in RPW with benefits close to a minimum wage level (to exclude non-poor) would self-select poor into participation [(Datt and Ravallion 1994); (Ninno, Subbarao and Milazzo 2009)]. Guaranteeing a level of work will help poor make informed decisions on their expected income from participation. This way an EGS not only transfers benefits to poor but also ensures the concentration of benefits to poor only.

Looking at the employment generation; it is argued that employment generated in EGS might compete with existing work opportunities, which might distort market allocations (Song and Philip 2010). A careful investigation by [(Dandekar, 1983); (Binswanger, et al. 1984); (Subbarao 1989)] suggests that distortions will take place when existing labor markets are functioning efficiently before the EGS is implemented. But these efficiency conditions are not present in backward sections of a developing economy that are characterized by exploitative labor relations, discriminatory wage differentials and gender biases in labor market. EGS helps in breaking down the non-efficient nature of labor markets and when enforced by law, ensures guaranteed employment and wages, better working conditions, no gender discrimination and non-exploitative nature of work relations.

There are empirical evidences about self-selection of poor in the EGS from one of the Indian schemes called 'Maharashtra Employment Guarantee Scheme' (MEGS), launched in 1970-73 [(Dandekar and Sathe 1980); (Datt and Ravallion 1994); (Acharya and Panwalkar 1988); (Walker and James 1990); (Bhende, et al. 1992)]. They find that, majority of participants (around 90 percent) were below poverty line (BPL)[7] and participation decreased rapidly with increase in household wealth. It is evident from recent surveys of MGNREGA and in government reports that large proportion of participants in MGNEGA belongs to lower castes, which are economically backward (Mehrotra 2008). In a recent study, (Uppal 2009) finds that probability of registering for participation in MGNREGA has a negative relation (statistically significant) with household wealth. These evidences suggest that EGS in India have been successful in targeting the program towards poor through their efficient system of self-selection.

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[7] BPL is a classification of households surviving on less than an income threshold of $ 1 (45 Indian National Rupee-INR) per day.

These studies [(Dandekar and Manju, Employment Guarantee Scheme and Food for Work Programme 1980); (Datt and Ravallion 1994); (Acharya and Panwalkar 1988); (Wallker and James 1990); (Bhende, et al. 1992)] find that most of the employment was generated in agricultural slack season (from april-june) for a decade of 1980-1990. (Johnson 2009) in his study of NREGA's affect on weather related shocks in Andhra Pradesh provides evidence that flexible workfare programs help poor households cope better with weather related instabilities in income. These evidences suggest that employment was taken up in periods when there were less alternative work opportunities (expected value of forgone alternative was very low) and therefore, poor were self-selected in these schemes.

Section (4.2.2) of the paper will further analyze MGNREGA on ground of self-selection in the scheme.

3.2.2 Effect of EGS on employment generation and productivity growth

This sub-section will discuss survey evidences from EGS in India and Bangladesh, and will elaborate on positive effects of participating in EGS on aggregate productivity.

EGS in India have been designed to provide transfer benefits to poor people, for which they are required to work in RPW. This work involves development and management of assets in village communities (Mehrotra 2008) and various surveys from past sections). Work for development of community assets in villages has indirect benefits on productivity apart from direct wage benefits. Assets such as better irrigation facilities, water conservation avenues, and rural infrastructure have positive effects on aggregate productivity of agriculture (which is source of income for majority of population in rural areas). It is evident from various surveys of EGS in Indian (MEGS) and Bangladesh (Food for Work Program, FFWP) that, improvement in agricultural productivity due to improved irrigation sources and land productivity brought sizable gains in farm output [(Dandekar & Sathe 1980); (Ahmed and Hossain 1987); (Chowdhury and Asaduzzaman 1983)].

Talking about MGNREGA, let us first see the nature of work being conducted. (nrega.net 2009) provides useful insight into work patterns in India. Work in MGNREGA is divided into two broad categories of: 1). Work on community land and 2). Work on private land. Second category of work is only allowed for Scheduled castes (SC), Scheduled Tribes (ST), other backward castes (OBC), BPL farmers and beneficiaries of various land reform programs by government[8]. Works on community land involve water conservation, water harvesting, irrigation, drought proofing, maintenance of tanks and canals and other works to develop rural infrastructure. Work on private land involves developing irrigation facilities in own farms, cleaning of land and horticulture plantation. Looking at the data provided by (MGNREGA Outcomes for 2009 - 2010, 2011) it can be seen that water conservation has accounted for around 50% of total works in MGNREGA in fiscal years 2006-2011. Also, work on private land has increased from 10% of the total works in 2006-07 to 20% in 2009-10.

Looking at increases in agricultural productivity, The Centre for Science and Environment (NREGA: Opportunities and Challenges 2008) conducted a survey in two MGNREGA participating states in India and found that, around 55% of its respondents reported an increase of 150 hectares of land under crops. Also, 80% of respondents agree that MGNREGA has led to increased water availability. Study by(ISWSD 2006) reports increased ground water level and stabilization of crop cycles through timely provision of water, in eight different states participating in MGNREGA.

Efforts to incorporate steps towards achieving convergence in MGNREGA and various other programs of Ministry of Agriculture (MOA) have been a part of the implementation policy since the inception of MGNREGA (Notifications RBI/2005-06/204 2005). Under the plans of convergence, MGNREGA works are focused on specific targets outlined by the previous schemes of MOA. Hence, we can see that productivity-augmenting affects of work in MGNREGA are not exogenous to the

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[8] Small and marginal farmers account for 80% of land-holdings and operate 40% of cultivated land in India, of which SC/ST/OBS form a major proportion and majority of small and marginal farmers fall under BPL category and SC and ST have accounted for around 50% of total participation in MGNREGA from 2006-2011

implementation, whereas they serve as an evidence of indirect effects of participating in the program.

3.3.3 Access to Finance: Benefits and Issues

Access to good financial resources (services) is an important ingredient for economic development. Access to financial services not only enables poor households to improve their socio-economic well-being by investing more in health, education and productive assets, but also provides them ability to make best use of economic opportunities. Lack of access to financial services for low-income households reinforces the vicious circle of poverty; making it difficult for households to borrow against their future. As a result, they are not able to engage in productive economic opportunities and at the same time are not able to invest in health and education of the household members. (Rutherford 2000) argues that poor need access to financial services on a larger scale than rich because they have no access to these services. Providing the poor with access to finance might have larger returns than that of non-poor because starting from low or no access to credit, the poor will have increasing marginal utility from credit.

[World Savings Bank Institute(WSBI) 2004)] reports that only 20% of the population in developing economies has access to formal financial services. In Indian context, where Reserve Bank of India (RBI) has been involved in various schemes of providing access to finance to rural regions (Notifications RBI/2005-06/204 2005) the concept of financial exclusion (no access to formal financial services) does not seem to be that of complete financial exclusion. It fits better in the category of 'partial access to finance', where people (mostly poor) have access to some basic financial product/s (like savings account in a bank) but lack access to formal credit services. This class of financially excluded sections largely comprises of marginal farmers, landless laborers, and ethnic minorities (Promote No-frills Accounts 2006).

Credit constraints have a direct relation with lower productivity and therefore lower income. Due to lack of credit, small and marginal farmers are not able to invest in farm productivity and they largely depend on self-finance and informal credit, which has inefficiencies of its own (McKinnon 1973). Lack of access to formal credit

services leads to limited investment that in turn results in low scale of existing economic activities. Caps on limit of self-financing and informal sources prevent the poor households from taking advantage of potentially high return investment opportunities (Fernando 2007). India compares favorably with other developing countries in terms of average population served per bank branch, owing to increased outreach of rural bank branches in 1970-2003 (Basu 2006). Despite its favorable position, India suffers from large-scale exclusion of poor households and marginal farmers from formal financial loop. As observed in surveys by World Bank (RFAS 2003), large fraction of marginal (87%) and small farmers (70%) does not have access to formal bank credit and around 45% of the surveyed households reported informal borrowings for at least once in preceding year. Average interest rate on such informal borrowings is as high as 48% per year.

(Rosenzweig and Wolpin 1993) and (Fafchamps and Pender 1997) analyze household investment decision in profitable agricultural technologies and importance of this behavior for poverty dynamics. They find that non-convex nature of production technology and presence of credit constraints result in a poverty trap. (Dercon 1998) studies investment in cattle in rural Africa and finds that poor households do not invest in risky (but profitable) productive assets as they are unable to finance their investment by lump-sum borrowings. (Carter and Ikegami 2009) and (Barrett, Carter and Ikegami 2008) extend this model by allowing for heterogeneous nature of ability and productivity of households. They find that less productive (lower ability) households will remain in poverty regardless of the level of initial assets. These studies establish the importance of financial development for coming out of poverty trap and for economic development.

But, is the level of financial development in an economy, independent of existing economic opportunities?

(Bianchi 2009) analyzes the complementarily between labour and financial markets by looking at endogeniety of financial development on imperfect information and availability of economic opportunities, which in turn depend on the level of financial development. Their results emphasize that financial development fosters economic development but it is difficult for the process of financial development to occur

exogenously. Process of financial development is contingent on availability of productive economic opportunities for efficient investment of capital.

Looking at findings from these studies and the data on state of financial inclusion in India; we can see that exclusion of small and marginal farmers from formal financial loop (credit in particular) suggests that, keeping aside the supply side constraints, poor households do not have access to productive economic opportunities that can generate high returns and foster their demand for formal credit. They demand flexible credit for consumption and contingency purposes, the need for which are more frequent and are better served by informal moneylenders (Bardhan and Rudra 1978). Access to formal credit for poor households is potentially constrained by lack of productive economic activities, which can generate returns, well enough to finance their consumption expenditures and repay loans. As noted by (Zingales and Rajan 2004), "finance cannot create opportunities, it only makes it easier to exploit them."

3.2.4 Conclusion

In first two sub-sections, we have seen that EGS (if implemented perfectly), will self-select poor into participation and will provide employment, which has direct welfare benefit of cash transfer and indirect benefit of productivity gains from work conducted in EGS. In third sub-section, we saw the importance of access to financial services in fostering economic development in an economy. It was evident from the literature that, financial development fosters economic development but financial development cannot come up on its own; it needs supportive environment of productive economic opportunities. Economic opportunities like EGS, which provides monetary benefits along with indirect benefits of productivity gains can be looked upon as those opportunities. With more productive land holdings and increase in cropped area, farmers can revise their investment decisions in favor of more productive farm inputs. Increased demand for formal credit and introduction of more avenues for financial inclusion by central bank would result in an increase in take-up of formal credit by poor households. This potential link of 'participation in EGS' and 'access to financial services' forms the groundwork for my hypothesis in following sections.

4. DATA AND METHODLOLGY

4.1 Data

This paper uses two data sets; first the 'Access to Finance (ATF) survey in Andhra Pradesh (AP)', conducted by Centre for Microfinance, India and second, data on aggregate wage payments in MGNREGA for Andhra Pradesh in period 2006-2009.

The data on ATF survey in AP comes from CMF and BIRD (Bankers institute for Rural Development, NABARD)'s initiative in year 2009 to measure access to financial services in Andhra Pradesh. This data contains various variables relating to access to financial services (formal loans, informal loans, loans from microcredit organizations, chit-funds etc.) and detailed information on assets and characteristics of households. Under this survey, 1920 households were randomly selected for surveying using a three stage sampling design in which first 8 districts, then 64 villages, and then 1920 households were randomly selected.

The wage payments data of MGNREGA was collected and compiled by Centre for Microfinance-IFMR Research (India) from official MGNREGA website (mention website) using automated software scripts. This data captures information on each weekly payroll released for work completed by each participant (belonging to a single job card issues to a household) over the period 2006-2009[9]. I have selected the districts included in ATF survey and compiled them to generate averages of days worked and amount received by year, months and rollout phases.

Both datasets used in this paper are available for public access on CMF website[10].

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[9] Only first half of fiscal year 2009.
[10] See <http://www.ifmr.ac.in/cmf/resources.html>

4.2 Preliminary Analysis

In this section I will present some basic analysis from 'Aggregate MGNREGA data' and from 'Access to Finance survey data (ATF)'. First, I will discuss some participation statistics from aggregate MGNREGA data and next, will move on to some selected statistics from ATF data related to participation in MGNREGA and loan usage of households.

4.2.1 Aggregate MGNREGA data for AP

Starting with 'Aggregate MGNREGA' data, (Table 1) represents the districts in Andhra Pradesh (AP) classified by their inclusion in different phases of MGNREGA implementation. (13) out of a total (22) districts in AP were included in first phase of MGNREGA implementation followed by inclusion of (6) and (3) districts in second and third phases respectively. Districts, which were the part of surveyed sample in ATF data, are highlighted in red; six out of total eight districts were in first phase and one each in second and third phase. I have selected the districts and villages included in ATF data from aggregate MGNREGA data and will be referring to only this selected part as 'MGNREGA data'.

- Participation in MGNREGA

It will be interesting to analyze the year-wise pattern of employment generated in program for each set of districts included in three consecutive phases and see if employment has increased for years after the program was first implemented. (Figure 1) depicts a bar chart, which plots average number of employment days for districts included in different phases, over the period 2006-2008.[11] It shows that average number of days have increased for phase-1 districts (in 2006) over the period 2006-2008. Same pattern is observed for phase-2 districts (in 2007) over the period 2007-2008. Average days for phase-3 districts (in 2008) have also increased from 2008 to

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[11] Fiscal year 2009-10 was in progress when this data was aggregated; hence year 2009 has not been included due to unavailability of full data for year 2009-10.

halfway in 2009 and would have increased more in next half of 2009[12]. This figure shows that average days of employment in MGNREGA have been increasing over the years for each set of districts in different implementation phases. To see if employment days are statistically different between phases of implementation, I have tested the significance of difference in average days for different phases using t-statistic for year 2007 (one year after the implementation of first phase) and year 2008. Table-2 reports the results of test. It is observed that, phase-1 districts generated more employment in comparison to phase-2 and phase-3 districts. Also phase-2 districts generated more employment days in comparison to phase-3 districts. All differences are statistically significant at 0.1% significance level (p<0.001).

I have performed similar analysis for average aggregate income from participation for each set of districts included in three consecutive phases. Figure 2 depicts the trend, which shows that average aggregate wages from participation increased for phase-1 and phase-2 districts and phase-3 districts show an increase from 2008 to half way 2009 (not shown in figure).

Table 3 reports the significance test for difference in aggregate income from participation between different phases. Phase-1 districts generated more income compared to phase-2 and phase-3 districts, while phase-2 generated more income compared to phase-3 districts. All differences are significant at 0.01% significance level (p<0.001).

- MGNREGA as a flexible scheme in providing employment guarantee

Next step is to see how the participation varies by months in a year. By law, any household registered in MGNREGA can demand work at any time of the year. (Johnson 2009) identifies the importance of this flexibility in providing employment guarantee to ensure that poor participants can compensate for income shocks as and when they face them. Looking at previous studies (see Section 3), we have seen that most of the employment is generated in agricultural slack season. Figure 3 shows the bar chart of average total MGNREGA wages (as a proxy of average employment

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[12] Not shown in graph.

generated) for phase-1 districts in 2008 (when they have completed three years of implementation) over months in a year. Figure 4 shows the average total rainfall in AP by months for phase-1 districts over the period of eight years (2001-2008). These figures show that most of the employment is generated in period from January to May (Figure 3) and that time is marked by lower average rainfall in a year (Figure 4). (Johnson 2009) call this period from December-May as 'lean season' because outside this period (June-Nov), farmers are busy in their fields growing paddy (which requires high level of rainfall). It is observed that most of the employment generated in MGNREGA is during the agricultural lean season when farmers are not occupied in their fields and might be looking for alternative employment options. Flexibility in MGNREGA ensures that participants get work when they demand and the highest demand is in agricultural slack season.

From these sets of analysis, it is observed that firstly, aggregate participation (measured by days and income) in MGNREGA has increased over the years. These results indicate that there is increasing demand for work as time progresses and more districts are included. Also, this demand for work remains higher for districts included in initial phases. Secondly, most of the employment is generated in agricultural slack season when farmers are looking for alternative employment opportunities. It shows that MGNREGA in AP as an act of law has been successful in providing flexibility of choosing days of employment and aggregate participation has increased in districts, which have spent more time under the implementation. Thus, the program created jobs when there were less or no alternative work opportunities. It provided work and income that otherwise would not have been available and hence, represents an exogenous increase in income.

4.2.2 Access to Finance survey in AP

- Self-Selection of poor in MGNREGA

As seen in Section 3, majority of participants in EGS belong to lower castes (like SC, ST and OBC). One should expect the similar pattern in the ATF data. Table 4 reports the percentage of population belonging to different castes for both aggregate ATF data and for households participating in MGNREGA. It can be seen that majority of population participating in MGNREGA belongs to SC, ST or OBS caste and their percentage in total sample increases when compared to aggregate data. This indicates that participation in MGNREGA is mainly driven by lower castes, which are reported to be amongst the poorest (see Section 3).

(Uppal 2009) analyzes the participation in MGNREGA for a different sample of districts in AP and finds that households who are economically backward and belong to lower castes are more likely to register for participation in MGNREGA. Because of lack of a baseline data of ATF sample before the implementation of MGNREGA, comparing participation on basis of observable economic variables will be biased, as value of these variables will be endogenously determined by prior period of participation and income earned in MGNREGA.

However, some variables like caste of household, literacy level of household head and religion are not likely to change overtime. Caste and religion of a household are time invariant variables, while literacy level might change overtime. Figure 5 plots the density graph of the age of household (mean age is 46), it can be seen from the graph that majority of household heads are middle-aged or older. Literacy level of people in their middle age or older is less likely to change over time hence; it would not be biased to include literacy level of household head as independent variable in the analysis. As per previous discussion in section (3.2.1) and table 4, household belonging to lower castes and households whose head are ranked lower on literacy rating are more likely to be economically worse and hence, more likely to participate in MGNREGA.

I will use a probit-estimation of participation in MGREGA (a dummy of participation) as dependent variable and caste of household, religion of household and literacy level of household head as regressors; controlling for implementation phases and district fixed effects (Model 1). Districts included in phase-1 were selected on being amongst 200 most backward districts in 2006; hence similar analysis is being done for districts included in phase-1 using interaction of Phase-1 dummy and dummy of participation. The models to be estimated are as follows:

$$(D_{NREGA})_i = \alpha_i + \beta_1(C_{BC})_i + \beta_2(L)_i + \beta_3(R)_i + \beta_4(P_1) + \beta_4(P_2) + \beta_4(D_{FE}) + \varepsilon_i \quad (1)$$

$$(D_{NREGA} \times P_1)_i = \alpha_i + \beta_1(C_{BC})_i + \beta_2(L)_i + \beta_3(R)_i + \beta_4(P_1) + \beta_4(P_2) + \beta_4(D_{FE}) + \varepsilon_i \quad (2)$$

Where, D_{NREGA} is the Dummy for participation in MGNREGA with value 1 if household participates in MGNREGA and 0 if household does not participate in MGNREGA; $(D_{NREGA} \times P_1)$ is the interaction dummy for participation in MGNREGA and being in Phase-1 districts; (C_{BC}) is the dummy variable with value 1 if household belongs to SC, ST or OBC caste; $(L)_i$ is the literacy level of household head (dummies for different literacy level); $(R)_i$ is the religion of household (dummies for different religion); (P_1) & (P_2) are dummies for, if household belongs to phase-1 or phase-2 districts, respectively; (D_{FE}) are district fixed effects and ε_i is the random (IID) error term.

Table 5 reports the result of probit-estimation. For aggregate data (column 1); coefficient on caste dummy (C_{BC}) is positive and significant at 0.1% significance level ($p < 0.001$). For literacy level, coefficient on category 'signature only' and 'can not read or write' are positive and significant at 0.1% significance level ($p < 0.001$). Similar results are observed for phase-1 participants (Model 2). These results are robust to inclusion of district fixed effects.[13]

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[13] District fixed effects not shown in estimation table.

These results suggests that probability for participating in MGNREGA increases if household belongs to a lower caste (SC/ST/OBC) with respect to base category of 'General' (higher caste) and this probability increases if household is in one of the phase-1 districts. Similarly, probability of participating in MGNREGA increases for households whose head do 'signature only' or 'can not read or write at all' with respect to base category of 'Can read and Write'. This probability increases for households in phase-1 districts.

Households who belong to a lower caste or those whose head is less literate/illiterate have higher probability of choosing to participate in MGNREGA. It is evident that economically backward households are more likely to participate in MGNREGA and hence, MGNREGA has been successful in implementing self-selection of poor by putting a work requirement for getting transfer benefits. This endogeneity of MGNREGA implementation is discussed in detail in next section.

-State of financial inclusion in survey districts

The ATF survey provides information on usage of loans taken from formal (Bank and other registered financial institutions) or informal sources (friends, relatives, neighbors, village moneylender etc.). Four most common usages of loans for both formal and informal categories are: 'buying agricultural machinery or input', 'repaying old debt', 'health expenditures' and 'household consumption'. Table 6 reports the percentage of loans from formal/informal category, falling in each usage category.

Some interesting facts can be observed, which reveal the credit demand for households participating in MGNREGA, for both formal and informal sources. For loans from formal sources, the most common usage is 'For buying agricultural machinery or input' (59% of total). For loans from informal sources, the most common usages are 'For household consumption' (27%), the second most common being 'For health expenditures' (25%).

Comparing both categories of loan sources, we can see that formal loans are mainly used to finance agricultural investment, while informal loans are financing household consumption expenditures and health expenses. Investment in farm requires a large

amount, which cannot usually be financed by loan from an informal source. Hence, households prefer to depend more on formal sources for their agricultural investment needs. Whereas, uses like 'household consumption' and 'health expenditures' represent economic shock in a household, which are not periodic in nature and facing these shocks, household is in need of immediate credit. Hence, they rely more on informal sources, which, though costly but depend on personal relations with the lender and therefore ensures immediate availability of credit (Bardhan and Rudra 1978).

The ATF survey also provides information on a nearly exhaustive list of reasons for not taking/receiving a loan from formal and informal sources. The categories of reasons vary between formal and informal sources. Three most common reasons for not receiving a loan from formal sources are: 'Loan application rejected', 'No information about loan products from formal source' and 'Already have or could get a loan from other source/s'. Similarly, three most common reasons for not receiving a loan from informal sources are: 'High interest rates', 'Irregular income flow/low repayment capability' and 'Already have or could get a loan from other source/s'.

Table 7 reports percentage of most common responses for not taking a loan from formal sources. The most common reason for not receiving a loan from formal source is 'No information about loan products from formal source' (20%). It shows that, it is due to lack of information about the loan product that households are not able to avail loans from formal sources. Table 8 reports percentage of most common responses for not taking a loan from informal sources.

The most common reason for not receiving a loan from an informal source is 'Irregular income flow/low repayment capability' (41%). It shows that, majority of households do not have regular income and good repayment capability, due to which they are not able to get an informal loan.

ATF survey contains information on why a household has not taken a formal bank account. It is interesting to analyze the response of all surveyed households in aggregate and compare it with households participating in MGNREGA. Most common reasons for not taking a formal bank account are: 'Not enough money to save in bank', 'Do not want/need a bank account', 'No information about formal bank account', 'Do not have proper documentation'. Table 9 reports the percentage of most

common reasons for not taking a formal bank account for aggregate data and for households participating in MGNREGA.

The most common reason for not taking a bank account is 'Not enough money to save in bank' (10%), while the same percentage for MGNREGA participants is (4%). For MGNREGA participants, a very few percentage of respondents report a reason for not having a bank account (13%) while the corresponding percentage for aggregate data is (28%). MGNREGA participants are paid their wages through a formal bank/post office account hence; they are already under the basic level of financial inclusion.

- Effect of basic financial inclusion on formal borrowings

It might happen that by holding a bank account and transacting in it, a household becomes aware of government credit schemes or feel confident about working with bank systems. So, there are reasons to believe that holding an account to receive government transfer benefits might increase their chances of getting a formal credit from bank.

The ATF data asks respondents if they have any loans outstanding from any formal source. I will use this variable as proxy for, whether a household has taken out any formal credit. The data includes information on whether a household has a bank account to receive government benefits. I will use a probit-estimation to find out if 'having a formal loan' is determined by household 'having an account to receive government benefits'. I will control for aggregate amount of informal savings by a household (savings at home, with friends and neighbors etc.) and for a breadth of household control variables like, assets (landholdings, jewelry and other small assets like pressure cooker, fan, cooking energy source, mobile phone, sewing machine, almirah etc.) and also for various household characteristics like caste, religion, level of education and gender of household head. The model is as follows:

$$(D_{FORMAL})_i = \alpha_i + \beta_1 (A_{GOVT.})_i + \beta_2 (Exp)_i + \beta_3 (Save_{Infor})_i + \beta_4 (C)_i + \beta_5 (L)_i + \beta_6 (R)_i +$$

$$\beta_7 (G)_i + \beta_8 [HH]_i + \varepsilon_i \qquad\qquad (3)$$

Where, (D_{FORMAL}) is the dummy for having a formal loan outstanding with value 1 if household has a loan outstanding from a formal source and 0 if they do not have any formal loan outstanding; $(A_{GOVT.})$ is the dummy for having a formal bank account for receiving government transfer benefits with value 1 if household has a formal bank account for receiving government benefits and 0 if they do not have; $(Exp)_i$ is household consumption expenditure in past 30 days of survey; $(Save_{Infor})_i$ records the amount of informal savings a household has; $(C)_i$ is the dummy variable for caste of household; $(L)_i$ is the literacy level of household head (dummies for different literacy level); $(R)_i$ is the religion of household (dummies for different religion); $[HH]_i$ is the vector of household level control variables described above.

Table 10 reports the result of this probit estimation. It is observed that coefficient on (A_{GOVT}) is positive and significant at 5% significance level; Coefficient on (Exp) is positive and significant (though very small in magnitude); Coefficient on landholdings is positive and significant at 0.01% significance level; Coefficient on caste variable (C) is positive and significant at 1% significance level for 'Other Backward Caste (OBC)' and 'General' with 'Scheduled Caste (SC) as base category'. Coefficient on gender (G) is negative and significant at 0.01% significance level with 'Male' as a base category.

These results suggest that a household having a formal bank account for receiving government transfer benefits is more likely to receive a loan from formal source. It provides evidence for my hypothesis that having a formal bank account for receiving government benefits might have positive effect on chances of getting a loan from a formal source. This might work from various channels like positive effect of transacting in a formal bank account on awareness about loan products, confidence about banking procedures or they might be offered some credit product by bank through their already existing account in bank. But it is not possible for me to analyze them in detail because of the lack of data on formal bank accounts. There are some other interesting observations like households belonging to upper caste are more likely to receive a loan from a formal source and households with a female head are less likely to receive a formal loan. These results are robust to inclusion of district fixed effects.

4.2.3 Summary

It is observed in this section that participation in MGNREGA has increased overtime since its inception and participation remains significantly higher in districts, which were included in initial phases. This analysis also provides evidence that MGNREGA has been flexible in providing employment to households when they are in need of it; participation increases during agricultural slack season when households are looking for alternative employment opportunities. Analysis on ATF data reports some important data on financial inclusion in surveyed districts. It provides evidence that MGNREGA has been successful in implementing policies for self-selecting poor households in the scheme. It also provides evidence that basic financial inclusion brought about by opening bank accounts (to a large extent for MGNREGA benefits) helps households in increasing their chances of receiving a loan from formal source/s.

4.3 Hypothesis

In this section, I will look back at previous discussions and form my hypothesis.

In Section (3.2.2 and 4.2.2), we have seen that EGS increases agricultural productivity and most of the loans from formal source are used for agricultural purposes; hence a link between participation in MGNREGA and access to credit is plausible. Households participating in MGNREGA and working to enhance the agricultural productivity earn wages, which along with increased agricultural productivity should increase the demand for credit.

It was observed in a t-test of land currently under agricultural production that households included in phase-1 districts had significantly more area under cultivation compared to phase-2 and phase-3 districts (significant at 5% significance level)[14]. Also as seen in section (4.2.2), having basic financial inclusion i.e. a formal bank account increases the chances of having a loan from formal source. All these factors indicate that it would be interesting to see if having longer access to guaranteed employment have a positive effect on access to formal credit? This will be my first hypothesis.

Talking about loans from informal sources, we can observe from section (4.2.2) that informal loans are mainly used to stabilize expenditure shocks (for health and household consumption). With increase in household income from participating in MGNREGA, the expenditure shocks are likely to be less severe and could be financed out of increased income. This indicates that with longer participation in MGNREGA a household should depend less on informal sources of credit and hence should borrow less. There is another side of dynamics of informal credit market. It is often argued that informal lending depends on screening of borrower's repayment capability by moneylender on the basis of observable economic variables in a household (Aleem 1993). Increased income of a participating household should signal a better repayment capability to moneylender and she may be willing to ration more credit in favor of that household (lend more money at similar interest rates as before). In this case,

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[14] T-test not reported.

increased income from longer participation might result in more borrowings from informal sources.

To determine which effect dominates, one needs information on density of informal lenders in a village (signaling competition between informal lenders) and various variables capturing their screening procedures, which are not present in ATF data. Absence of detailed data on penetration of informal lenders and indicators of their screening does not allow me to do a detailed analysis on effect of longer participation on informal borrowings. My second hypothesis would be to see how does longer access to employment guarantee effects borrowings from informal sources?

The sample of data is restricted to only households participating in MGNREGA so that I can segregate households those who are not participating in MGNREGA and are likely to be relatively economically well off (see analysis of section 4.2.2), and can analyze the effect of longer access to MGNREGA. I will estimate a reduced form regression model separately for loans from formal and informal sources and will analyze the effect of longer access to program.

4.4 Econometric Issues

In this section, I will discuss potential econometric issues and how I have attempted to deal with them in my analysis. Also I will discuss methods and specifications used in analysis to ensure robustness of the results.

The first issue is of cross-section nature of data and examining results, which focus on dynamic nature of MGNREGA. The selection of districts in the scheme was not random. As seen in section 2, 200 most economically backward districts were chosen to participate in first phase of the program. Apart from the non-random geographical selection at the first stage, self-selection into the scheme is contingent on economic status of a household. Economically well off households are likely to have higher opportunity cost of participating in MGNREGA whereas poor households might have lower or no opportunity cost of participating, hence they will participate. Therefore, phase-wise implementation of MGNREGA, in some ways is determined by the outcome of interest (number and amount of loans), which itself signifies the economic status of a household.

Given this endogenous nature of the participation; it was not possible to conduct Instrumental-Variable (IV) estimation, using phase-wise implementation as instruments. However, controlling for a large set of household level control variables relating to economic status of household[15] in a reduced form regression equation will be a productive step towards controlling for the endogeneity. Controlling for a range of time variant (economic) and invariant (characteristics like caste, education etc.) observables will ensure that phase-wise implementation is exogenous to the outcome of interest. Also, to account for differences in districts, based on which they were included in various phases of implementation; I have separately estimated each regression specification, controlling for these district fixed effects.

Omitted variable bias is another issue that is common for most cross-section studies. However, controlling for a large set of household level control variables will ensure that all deterministic variables are included in the model. To test and control for non-

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[15] Assets like landholdings, savings and other assets within the premises of household.

linear relation between dependent and independent variables, I have also controlled for squared values of continuous independent variables measuring the asset holdings

of a household. There might be heterogeneous impact of MGNREGA participation for groups of different caste and religion participating in different phases. To control for it, I have also included various interactions of caste and religion dummies with various continuous variables[16]. Estimation results were found to be unaffected by squared continuous variables and other dummy interactions, which were not reported in tables due to space constraint.

Another important issue is about value of dependent variable in the specifications[17] I have analyzed. Various households in sample have not taken any loans; therefore significant numbers of observations in dependent variable are zero. In this case, a linear reduced form model would not fit the data well. Instead I have used Poisson based Pseudo-Maximum-Likelihood (PPML), suggested by (Silva and Tenreyo 2006). PPML is developed for achieving consistency in constant-elasticity models in presence of heteroscedasticity but is also relevant for cases where dependant variable has significant number of zeros [see, (Silva and Tenreyo 2006)].

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[16] These interactions included, caste/religion*landholdings, caste/religion*savings, caste/religion*monthly consumption expenditure etc.
[17] For the case of loans from formal sources.

4.5 Estimation and Results

I will use reduced form regression to estimate the effect of longer participation in MGNREGA on access to formal and informal credit in AP. The idea is that, the longer one has been participating in the program the more secure and higher her/his income is. Data is restricted to participants in program and for the loans taken in period 2006-2009. I will regress 'amount of formal/informal loans' received on dummy for phase-1 and phase-2 (with phase-3 as base category). Considering the issue of 'endogeneity' as discussed in section (4.4), I will control for aggregate amount of informal savings by a household (savings at home, with friends and neighbors etc.), formal savings in various bank accounts and for a breadth of household control variables like, assets (landholdings, jewelry and other small assets like pressure cooker, fan, cooking energy source, mobile phone, sewing machine, almirah etc.) and also for various household characteristics like caste, religion, level of education and gender of household head. I will also control for consumption expenditure of a household in past 30 days of survey, number of non-routine expenditure they had to incur (for festivals, marriage and other expenditure shocks which are not periodic in nature) and size of these non-routine expenditures.

In another specification, I will look at amount of formal/informal borrowings only in year 2009, when three years have passed since the implementation of MGNREGA and all phases have been implemented. It will allow me to see the effect of the length of access to program on formal/informal credit when all households have had at least some period of access to employment guarantee. Apart from all other controls mentioned in first specification, I will control for amount of loans outstanding before 2009. This will allow me to control for already existing liabilities, which might have an effect on borrowings in year 2009.

In case of informal borrowings, the number of times a household borrows indicates their need of informal loans for stabilizing their expenditure needs. To analyze this factor, I will have also estimate the same specification as explained above, with 'number of informal loans taken loans took in past 6 months' before survey, as variable of outcome of interest.

These specifications are estimated separately with and without district fixed effects. Including district fixed effects will control for fundamental differences between economic status of a district, depending on which a household might or might not get longer access to the program[18]. If longer access to MGNREGA had a positive effect on income stability and agricultural productivity then coefficient on dummy for first phase should be positive for the case of formal loans. In case of informal loans, if longer access to MGNREGA helped in stabilizing consumption shocks, then coefficient on dummy for initial phase should be negative. The models to be estimated for both specifications and for both formal and informal sources of borrowings are as follows:

$$(AMT_{FOR/INFOR})_i = \alpha_i + \beta_1 (P_1) + \beta_2 (P_2) + \beta_3 (Exp)_i + \beta_4 (NR\text{-}EXP_N)_i + \beta_5 (NR\text{-}EXP_S)_i$$

$$+ \beta_6 (Save_{Infor})_i + \beta_7 (Save_{For})_i + \beta_8 (C)_i + \beta_9 (L)_i + \beta_{10} (R)_i + \beta_{11}(G)_i$$

$$+ \beta_{12}[HH]_i + \beta_{13}[D_{FE}] + \varepsilon_i \qquad (4)$$

Where, $(AMT_{FOR/INFOR})$ is the amount of formal/informal loans received in period 2006-2009; $(NR\text{-}EXP_N)$ is the number of non-routine expenditures incurred by household in past 6 months before the survey; $(NR\text{-}EXP_S)$ is the amount of corresponding non-routine expenditures by household and $(Save_{For})$ is the amount of savings in formal savings accounts.

$$(AMT_{F\text{-}2009})_i = \alpha_i + \beta_1 (P_1) + \beta_2 (P_2)) + \beta_3 (AMT_{B\text{-}2009})_i + \beta_4 (Exp)_i + \beta_5 (NR\text{-}EXP_N)_i$$

$$+ \beta_6 (NR\text{-}EXP_S)_i + \beta_8 (Save_{Infor})_i + \beta_9 (Save_{For})_i + \beta_{10} (C)_i + \beta_{11} (L)_i$$

$$+ \beta_{12}(R)_i + \beta_{13}(G)_I + \beta_{14}[HH]_i + \beta_{15} [D_{FE}] + \varepsilon_i \qquad (5)$$

Where, $(AMT_{F\text{-}2009})$ is amount of formal loans received in year 2009 and $(AMT_{B\text{-}2009})$ is the amount of formal loan outstanding before 2009.

$$(NUM_{INFOR})_i = \alpha_i + \beta_1 (P_1) + \beta_2 (P_2) + \beta_3 (Exp)_i + \beta_4 (NR\text{-}EXP_N)_i + \beta_5 (NR\text{-}EXP_S)_i$$

$$+ \beta_6 (Save_{Infor})_i + \beta_7 (Save_{For})_i + \beta_8 (C)_i + \beta_9 (L)_i + \beta_{10} (R)_i + \beta_{11}(G)_i$$

$$+ \beta_{12}[HH]_i + \beta_{13}[D_{FE}] + \varepsilon_i \qquad (6)$$

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[18] 200 most economically vulnerable districts in India were selected for first phase.

Where, (NUM_{INFOR}) is the number of informal loans taken in past 6 months before the survey.

Model (4) & (5) are estimated separately for formal and informal borrowings, with and without district fixed effects. Model (6) is estimated only for the case of informal borrowings, with and without district fixed effects. All other variables, which are not explained above, are same as those used in estimation of models (1), (2) and (3) in previous section.

All specifications for the case of loans from formal sources are estimated using Poisson based pseudo-maximum-likelihood (PPML), for which all the continuous (containing non-zero observations) independent variables are logged and dependant variable is rescaled[19] (See section 4.4)

-Results

Table 11 shows results of estimating model (4) and (5) for formal loans without controlling for district fixed effects. For aggregate amount of loans received in 2006-2009, the coefficient on dummy for phase-1 i.e. (P_1) is positive and significant at 5% level of significance, while dummy for phase-2 (P_2) is negative and insignificant. For amount of loans received in year 2009, the coefficient on phase-1 dummy is positive and significant (at 1% level of significance), while the coefficient on dummy for phase-2 is positive but insignificant.

These results indicate that aggregate access to credit increases with longer access to employment guarantee. These results do not control for difference in districts, hence should not be interpreted without further investigation. Table 12 reports estimation of model (4) & (5), controlling for district fixed effects. Results are observed to be consistent. Dummy for phase-1 is positive and significant for both aggregate borrowings and borrowings in 2009 (at 1% level of significance)[20]. It is observed that participating in phase-1 of implementation increases aggregate formal borrowings by around Rs. 10,000 (with phase-3 as base category); which is not at all a trivial amount for poor households in rural India. This increase is almost double for loans received in

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[19] Dividing by 10,000.

[20] Dummy for phase-2 is dropped in regression due to collinearity with one of dummies for district fixed effects. Hence, the base category is dummy for rollout phase-3.

2009; when 3 years of program are completed. It can also be seen that land under agricultural cultivation does have a positive (and significant at 0.1% level) effect on access to formal credit; 1 acre of increase in land under agriculture leads to an increase in formal loans by Rs 1640. Also, as seen in section 4.3, phase-1 participants have larger landholdings as compared to phase-2 and phase-3 participants. Hence, these results provide evidence for my hypothesis that having longer access to employment guarantee might have a positive impact on access to credit from formal sources; and this works through the channel of increase in agricultural productivity. To control for heterogeneity in effects of program on households from different caste and religion, I have tested the robustness of these results for various interactions of variables measuring assets of a household with caste and religion of household. These interactions do not affect the results significantly and are not reported due to space constraint.

Moving to loans from informal sources, Table 13 reports the results from estimation of model (4), (5) and (6) without controlling for district fixed effects. None of the coefficients on dummy for phase-1 and phase-2 are significant. It is interesting to observe that size of non-routine expenditure has a positive and significant effect on amount and number of informal loans. This provides evidence that households depend on informal sources mainly for financing the expenditures out of an economic shock (represented by non-routine expenditures).

Same as case of formal loans, these results should not be interpreted without controlling for district fixed effects. Table 14 reports estimation of model (4), (5) & (6), controlling for district level fixed effects. Results are observed to be more consistent across all three models. Coefficients on dummy for phase-1 are positive but not significant for all of the three models[21]. It is again observed that size of non-routine expenditure has a significant positive effect on amount and number of informal borrowings (it ranges from increase of Rs. 0.40-Rs. 0.44 for every Rs. 1 increase in size of non-routine payments). These results suggest that there are no strong effects of longer access to guaranteed employment on informal loans. However, positive coefficient on dummy for phase-1 suggests that longer access to

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[21] Dummy for phase-2 is dropped in regression due to collinearity with one of dummies for district fixed effects. Hence, the base category is dummy for rollout phase-3.

guaranteed employment might allow households to signal a better repayment capability to the local moneylender and he/she will be willing to lend more credit. [22]

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[22] To estimate a more precise effect of longer access to employment on informal loans, a diversified set of variables measuring structure, penetration and screening procedures of lenders should be controlled for.

5. LIMITATIONS

There are two main limitation of this study imposed by lack of some data. First, there is no information of aggregate household income or income from MGNREGA in the ATF survey data hence I am not able to control for those incomes in my regressions. It would have been interesting to know the income elasticity of formal/informal borrowings and find separate elasticities with respect to aggregate household income and income from MGNREGA. It would give a better idea of how access to formal/informal loans respond to more wages earned from longer participation in MGNREGA. I tried to match households in ATF data to the income data of same households in aggregate MGNREGA data. Job card numbers of households are not recorded properly in the ATF survey and hence could not be directly matched to those in MGNREGA data. I used a name-matching algorithm adapted to stata by Election Commission of India[23] that matches phonetic sound of '*hindi*' names, but this procedure did not give good results. Given time and resource constraints, it was not possible for me to match names manually or look for an alternative method.

Secondly, absence of a baseline data of surveyed households does not allow me to present a clear picture of differences in access to credit before and after the program has been implemented. It would be more informative to know how access to credit for households responds to implementation of the program and then to the length of participation in the program.

Given these constraints on data, I have tried to control for as many observables as possible in my regressions. Wherever appropriate I have used variables that are not expected to change overtime to estimate participation in program, effects of longer participation etc. Other than that I have done a vast literature survey to look for variables like caste, religion, education etc., which to some extent may proxy for economic status of a household for the cases I am using. Also, by controlling for a large breadth of household assets and their interactions with caste, religion dummies, I have attempted to control for economic status of a household, as closely as possible.

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[23] This code (*"amin"* in stata) matches phonetic sound of hindi names at a preset level of precision. See <http://eci.nic.in/DevForum/Source_Code/Name_Suggestor.txt>

6. CONCLUSION

EGS have been advocated for providing safety nets to poor population in a developing economy through their mechanism of self-selection of poor and providing them a guaranteed minimum level of livelihood security. As observed in section 3, EGS have been an effective tool to provide income security and enhance productivity of existing work opportunities. By increasing productivity of existing economic opportunities and through income earned by participating in EGS, a poor household might be able to borrow more against their future and hence, will be able to stabilize the effect of various economic shocks. This study uses data from a comprehensive survey of access to various financial services for a sample of households in rural India along with the data of participation in MGNREGA for the same sample to investigate, if participating in EGS (MGNREGA in this study) has a positive impact on access to credit for poor households.

Findings from this study provide evidence that longer participation in PWP under EGS enables economically backward households to borrow more from formal sources. This study highlights some important features of MGNREGA, which enables a typical EGS to have a multidimensional positive impact on lives of rural poor, including better access to formal credit. It is observed that MGNREGA has been successful in efficiently targeting rural poor, which ensures the availability of transfer benefits only for the targeted population. Also, MGNREGA has been successful in developing an initial link between financial institutions and financially excluded poor population by disbursing wages through bank/post office accounts. It is observed in this paper that, already existing link between banks and poor households has helped them in getting formal credit. MGNREGA had a positive impact on agricultural productivity (as seen in section 3) and this is evident by larger landholdings for households, who are participating longer in the program (see section 4). With increasing productivity of the prime source of livelihood for rural households, they are encouraged and are able to invest more in their farms by borrowing from formal sources.

This study provides empirical evidence for policymakers involved in designing public work programs for having multidimensional impact on tackling poverty. It shows that with efficient targeting mechanism and flexibility in an EGS, poor participants can

come out of poverty trap by better stabilizing the economic shocks and greater access to formal credit. However, findings from this study must be carefully interpreted before generalizing for different circumstances and geographical locations. This study uses sample from few districts of a state in India, which has distinct economic features in comparison to any other state in India or any other location around the world. It must also be noted that for a program like MGREGA to have sustained positive impact, it should be scrutinized periodically at implementation and budgetary fronts to ensure fairness and efficiency.

BIBLIOGRAPHY

Acharya, S., and V. G. Panwalkar. "The Employment Guarantee Scheme in Maharashtra: Impact on Men and Women Workers." Regional Research Paper, Bangkok, 1988.

Ahmed, Raisuddin, and Mahabub Hossain. "Infrastructure and Development of a Rural Economy." Working Paper, Washington D.C., 1987.

Aleem, I. "Imperfect Information,Screening,and the Cost of informal Lending: A Study of a Rural Credit Market in Pakistan." In *The economics of rural organization;theory,practice,and policy*, by Hoff and Stiglitz, 131-154. Oxford: Oxford University Press, 1993.

Asian Development Bank. "Finance for the Poor: Microfinance Development Strategy." Report, Manila, 2000.

Bardhan, P.K, and A. Rudra. "Interlinkage of land, labour and credit relations: An analysis of village survey data in East India." *Economic and Political Weekly*, 1978: 367-384.

Barrett, C.B, M.R. Carter, and M. Ikegami. *Poverty traps and social protection.* Discussion paper, World Bank, 2008.

Basu, Priya. *Improving Access to Finance for India's Rural Poor.* Washington D.C.: World Bank, 2006.

Bhende, Walker, Lieberman, and Venkataram. "EGS and the Poor,Evidence from Longitudinal Village Studies." *Eonomic and Political Weekly*, 1992.

Bianchi, Milo. *Credit Constraints, Entrepreneurial Talent, and Economic Development.* Research Paper, World Institute for Development Economic Research, 2009.

Binswanger, H.P. "Attitudes toward Risk:Experimental Measurement in Rural India." *American Journal of Agricultural Economics*, 1980: 395-407.

Binswanger, Hans, et al. "Common Features and Contracts in Labor Relationsin the Semiarid Tropics of India." In *Contractual Arrangements, Employment,and Wages in Rural Labor Markets in Asia*, by H.P Binswanger and M.R Rosenzweig. New Haven: Yale University Press, 1984.

Carter, M., and M. Ikegami. "Looking Forward: Theory-based Measures of Chronic Poverty and Vulnerability." In *Poverty Dynamics: Interdisciplinary Perspectives*, by T. Addison, D. Hulme and R. Kanbur. Oxford: Oxford University Press, 2009.

Chowdhury, Noimuddin, and M. Asaduzzaman. "Benefits of the Rural Works Programme under RD - 1: An Indicative Assessment." *Bangladesh Development Studies*, 1983: 227-235.

Conning, J., and C. Udry. *Rural financial markets in developing countries.* 2007.

Dandekar, Kumudini. *Employment Guarantee Scheme: An Employment Opportunity for Women.* Bombay: Gokhale Institute Studies, 1983.

Dandekar, Kumudini, and Sathe Manju. "Employment Guarantee Scheme and Food for Work Programme." *Economic and Political Weekly*, 1980: 707-713.

Datt, and Ravallion. "Transfer Benefits from Public -Works Employment:Evidence for Rural India." *The Economic Journal* (The Economic Journal), 1994: 1346-1369.

Dercon, Stefan. "Wealth, risk and activity choice:cattle in western Tanzania." *Journal of Development Economic*, 1998: 1-42.

Doan, Gibson, and Mark. "What determines credit participation and credit constraints of thr poor in pre-urban areas, Vietnam?" December 17, 201. http://mpra.ub.uni-muenchen.de/27509/ (accessed August 20, 2011).

Draze, J, and A.K Sen. *Hunger and Public Action.* Oxford: Oxford University Press, 1989.

Eswaran, M., and A. Kotwal. "Access to Capital and Agrarian Production Organisation." *Economic Journal*, 1986: 482-498.

Fafchamps, M, and J Pender. "Precautionary Savings,credit constraints,and irreversible investment:Evidence from semi-arid India." *Journal of Business and Economic Statistics*, 1997: 180-194.

Fernando, N.A. *Low Income Households' Access to financial services: International Experience, Measures for improvement and the future.* Special Studies, Asian Development Bank, 2007.

Friedman, M. *A theory of the consumption function.* Princeton: Princeton University Press, 1957.

Gaiha, R, and K Imai. "Maharashtra Employment Guarantee Scheme." Policy Brief 6, London, 2006.

Government of India. *The National Employment Guarantee Act 2005.* Operational Guidelines, Ministry of Rural Development, 2008.

ISWSD. "Impact of National Rural Employment Guarantee Scheme on the Living and Working Conditions of Women in Rural India." Survey Report, 2006.

Johnson, Doug. *Does NREGA help rural poor to cope with bad weather?* Working Paper 32, Chennai: Center for Microfinance, Institute of Financial Management and Research, 2009.

Kotwal, A, and M Eswaran. "Credit as Insurance in Agrarian Economics." *Journal of Development Economics*, 1989: 37-53.

McKinnon, R. *Money and Capital in Economic Development.* Published, Washington D.C.: The Brookings Institution, 1973.

Mehrotra, S. "NREGA Two Years On: Where do we go from here?" *Economic and Political Weekly*, 2008.

"MGNREGA Outcomes for 2009 - 2010." *Netnrega.* September 12, 2011. http://164.100.12.7/Netnrega/mpr_ht/nregampr_dmu.aspx?flag=1&page1=S& month=Latest&fin_year=2009-2010 (accessed September 12, 2011).

"MGNREGS outcomes for AP." *nrega.ap.gov.* 2011. http://nrega.ap.gov.in/Nregs/Home_eng.jsp (accessed September 11, 2011).

Morduch, J. "Income smoothing and consumption smoothing." *The Journal of Economic Perspectives*, 1995: 103-114.

Murgai, R, and M Ravallion. "Employment Guarantee in Rural India." *Economics and Political Weekly*, 2005.

Ninno, Carlo del, K Subbarao, and A Milazzo. "How to make Public Works work: A review of the experiences." Unpublished Mimeo, 2009.

"Notifications RBI/2005-06/204." *Reserve Bank of India.* 2005. http://www.rbi.org.in/Scripts/NotificationUser.aspx?Id=2615&Mode=0 (accessed July 23, 2011).

"nrega.net." *MORD - Guidelines.* 2009. http://www.nrega.net/csd/convergence-guidelines/guideline_conver_MOA.pdf (accessed August 20, 2011).

NREGA: Opportunities and Challenges. Survey Report, New Delhi: Centre for
    Science and Environment, 2008.
"Promote No-frills Accounts." Business Line, September 26, 2006.
Raisuddin, Ahmed, Omar Chowdhury, Mahabub Hossain, Shubh Kumar, and M.Abul
    Quasem. "Development Impact of the Food for Work Program in
    Bangladesh:Tehnical Papers." Dhaka and Washington D.C., 1985.
Ravaillon, M. "Land-Contingent Poverty Alleviation Schemes." *World Development
    17,* 1989: 1223-1233.
Ravallion, M. *Reaching the Poor through Rural Public Employment: Arguments,
    Evidence and Lessons from South Asia.* The World Bank Research Observer,
    1991.
RFAS. *Rural Finance Access Survey.* New Delhi: National Council for Applied
    Economic Research, 2003.
Rosenzweig, M.R, and K.I Wolpin. "Credit market constraints, consumption
    smoothing and the accumulation of durable production assets in low income
    countries:Investment in bullocks in India." *Journal of Political Economy,*
    1993: 223-244.
Rutherford, Stuart. *The Poor and thier Money.* New Delhi: Oxford University Press,
    2000.
Silva, J.S, and S Tenreyo. "The log of gravity." *Review of Economics and Statistics,*
    2006: 641-658.
Song, Maikel Lieuw-Kie, and Kate Philip. *Mitigating a job crisis: Innovations in
    public employment programmes(IPEP).* Employment Report, Employment
    Sector, ILO, 2010.
Subbarao, K. *Interventions to Combat Household-Level Food Insecurity: A review of
    India's experience.* Washington D.C.: World Bank, Population and Human
    Resources Department, 1989.
Uppal, Vinayak. *Is NREGA a safety net for children?* Young Lives Student Papers,
    Department of International Development, University of Oxford, 2009.
Wallker, Thomas S., and Ryan G. James. "Village and Household Economies in
    India's Semi-Arid Tropics." Baltimore: Johns Hopkins University Press,
    1990.
World Savings Bank Institute(WSBI). *Access to Finance Resolution.* Brussels: WSBI,
    2004.
Zingales, L., and R. Rajan. *Saving Capitalism from the Capitalists.* New Jersey:
    Princeton University Press, 2004.

APPENDIX A: TABLES

Table 1- Districts in MGNREGA (Andhra Pradesh)

SL. No.	District in Phase-I (year 2006)	SL. No.	District in Phase-II (year 2007)	SL. No.	District in Phase-III (year 2008)
1.	ADILABAD	1.	NELLORE	1.	WEST GODAVARI
2.	ANANTAPUR	2.	EAST GODAVARI	2.	KRISHNA
3.	CHITTOR	3.	SRIKAKULAM	3.	VISHAKHAPATNAM
4.	CUDDAPAH	4.	KURNOOL		
5.	KARIMNAGAR	5.	PRAKASAM		
6.	KHAMMAM	6.	GUNTUR		
7.	MAHBUBNAGAR				
8.	MEDAK				
9.	NALGONDA				
10.	NIZAMABAD				
11.	RANGAREDDI				
12.	VIZIANAGARAM				
13.	WARANGAL				

Table 2- Difference in Average number of days per household (phase-wise)

Comparison Year	Difference in Phases	Difference [Average no. of days per household]
2007	Phase I – Phase II	22.72***
2008	Phase I – Phase III	33.27***
2008	Phase II - Phase III	22.76***

Significance: $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

Table 3- Difference in Average amount (Rs.) per household (phase-wise)

Comparison Year	Difference in Phases	Difference [Average amount (Rs.) per household]
2007	Phase I – Phase II	1730.50***
2008	Phase I – Phase III	2694.90***
2008	Phase II - Phase III	1976.30***

Significance: $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

Table 4- Caste wise distribution of households

	Aggregate Data		Only MGNREGA participants	
Caste	Number of Households	Percentage of total (%)	Number of Households	Percentage of total (%)
Scheduled Caste (SC)	404	**21**	254	**27**
Scheduled Tribe (ST)	147	**8**	89	**8**
Other Backward Caste (OBC)	912	**48**	449	**48**
Most Backward Caste	77	4	30	3
General	382	20	114	12

Table 5- Probit of Participation in MGNREGA

Method: Probit	(1) Participating in MGNREGA (dummy)	(2) Participating in MGNREGA and in phase-1 (dummy)
Dummy for lower caste	0.411***	0.592***
	(5.55)	(6.58)
Can read but not write	0.123	-0.200
	(0.60)	(-0.81)
Can write but not read	0.472	0.991
	(1.21)	(1.60)
Signature only	0.492***	0.515***
	(5.90)	(5.40)
Cannot read and write	0.390***	0.390***
	(5.67)	(4.87)
Muslim	-0.626***	-0.691***
	(-3.56)	(-3.49)
Christian	0.0181	0.0284
	(0.13)	(0.15)
Phase-1	0.867***	-
	(7.10)	-
Phase-2	0.533***	-
	(4.39)	-
Constant	-1.153***	-0.434***
	(-10.83)	(-3.66)
N	1922	1444

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6- Usage of Formal/Informal loans

Category of loan usage	Percentage of 'Formal' loans	Percentage of 'Informal' loans
Buying agriculture machinery or input	59	19
Repaying old debt	13	7
Health expenditure	11	25
Household consumption	28	27

Table 7- Reasons for not taking a Formal loan

Reason for not taking loan	Percentage of total responses
Loan application rejected	11
No idea about loan products	**20**
Already have or could get another loan	**12**

Table 8- Reasons for not taking an Informal loan

Reason for not taking loan	Percentage of total responses
Higher interest rates	7
Irregular income flow	**41**
Already have or could get another loan	**30**

Table 9- Reasons for not taking a formal Bank Account

Reason for not taking a formal Bank account	Percentage of total responses	
	Aggregate Data	**Only MGNREGA participants**
Not enough money to save in Bank Account	10	4
Do not want/need a Bank Account	5	-
No information about Bank Accounts	7	3
Do not have proper paperwork	3	-

Table 10- Probit of receiving a formal loan

Method: Probit	(1) Have a formal loan outstanding (dummy)
Formal account for government benefits (dummy)	0.151*
	(2.32)
Consumption exp. (Rs.)	0.0000352*
	(2.15)
Landholdings (Acres)	0.172***
	(11.00)
Informal savings (Rs.)	-0.0000941**
	(-2.90)
ST	0.0661
	(0.47)
OBC	0.278**
	(3.09)
Most Backward Caste	0.129
	(0.73)
General	0.557***
	(5.15)
Muslim	-0.324
	(-1.89)
Christian	-0.278
	(-1.68)
Gender (female)	-0.527***
	(-5.07)
Can read but not write	0.0484
	(0.22)
Can write but not read	-0.987
	(-1.68)
Signature only	0.113
	(1.27)
Cannot read and write	-0.0277
	(-0.34)
Constant	-1.573***
	(-8.84)
N	1911

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 11- Model (4) & (5) for formal borrowings [Without district fixed effects]

Method: Poisson based Pseudo maximum likelihood	(1) Agg. Amt. Received (Rs.)	(2) Amt. Received in 2009 (Rs.)
Phase-1	0.733*	1.656**
	(2.10)	(2.64)
Phase-2	-0.147	0.0385
	(-0.32)	(0.04)
Log [consumption expenditure (Rs.)]	-0.0932	0.0348
	(-0.53)	(0.17)
Log [No. of non-routine payments]	0.182	0.111
	(1.44)	(0.70)
Log [size of non-routine payments (Rs.)]	0.175**	0.374***
	(2.98)	(4.78)
Land under agriculture [Acres]	0.171***	0.229***
	(5.64)	(6.00)
Savings (Informal) (Rs.)	-0.000124	-0.000113
	(-1.57)	(-1.03)
Savings (Formal) (Rs.)	0.0000315	0.0000424
	(1.59)	(1.33)
Muslim	1.210	1.777**
	(1.84)	(2.70)
Christian	0.845*	1.124***
	(2.53)	(3.37)
Can read but not write	-0.0745	-0.516
	(-0.18)	(-0.83)
Signature only	-0.177	-0.0955
	(-0.98)	(-0.39)
Cannot read and write	-0.274	-0.443*
	(-1.67)	(-2.01)
Female	-0.405	-0.342
	(-1.53)	(-0.90)
ST	0.0357	0.329
	(0.13)	(1.08)
OBC	0.369*	0.168
	(2.06)	(0.72)
Most backward caste	0.616	-0.340
	(1.49)	(-0.41)
General	0.789**	0.422
	(2.91)	(1.40)
Agriculture as income source	0.253	0.288
	(1.13)	(0.85)
Amount outstanding before 2009 (Rs.)		-0.0000353**
		(-2.66)
Constant	-2.995	-7.458***
	(-1.92)	(-3.95)
N	772	772

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 12- Model (4) & (5) for formal borrowings [controlling for district fixed effects]

Method: Poisson based Pseudo maximum likelihood	(1) Agg. Amt. Received (Rs.)	(2) Amt. Received in 2009 (Rs.)
Phase-1	1.093**	1.940**
	(2.63)	(2.93)
Phase-2	-0.190	0.00850
	(-0.41)	(0.01)
Log [consumption expenditure (Rs.)]	-0.0634	0.153
	(-0.34)	(0.61)
Log [No. of non-routine payments]	0.200	0.116
	(1.43)	(0.75)
Log [size of non-routine payments (Rs.)]	0.170*	0.380***
	(2.51)	(4.39)
Land under agriculture [Acres]	0.164***	0.230***
	(5.03)	(5.89)
Savings (Informal) (Rs.)	-0.000167*	-0.000201
	(-1.98)	(-1.75)
Savings (Formal) (Rs.)	0.0000351	0.0000542
	(1.63)	(1.58)
Muslim	1.167	1.726**
	(1.72)	(2.67)
Christian	0.892**	1.068**
	(2.62)	(3.03)
Can read but not write	-0.227	-0.453
	(-0.48)	(-0.74)
Signature only	-0.192	-0.0259
	(-1.01)	(-0.09)
Cannot read and write	-0.288	-0.449*
	(-1.82)	(-2.00)
Female	-0.445	-0.303
	(-1.71)	(-0.87)
ST	0.0345	0.295
	(0.13)	(1.00)
OBC	0.421*	0.142
	(2.28)	(0.57)
Most backward caste	0.804	-0.0808
	(1.92)	(-0.10)
General	0.827**	0.354
	(2.84)	(1.21)
Agriculture as income source	0.180	0.203
	(0.77)	(0.58)
Amount outstanding before 2009 (Rs.)	-	-0.0000350**
	-	(-2.67)
Constant	-3.039	-8.228***
	(-1.81)	(-3.75)
N	772	772

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 13- Model (4), (5) & (6) for Informal borrowings [without district fixed effects]

Method: Reduced form regression	(1) Agg. Amt. received (Rs.)	(2) Amt. received in 2009 (Rs.)	(3) No. of outstanding loans in past 6 months
Phase-1	11081.7	10446.7	-0.255
	(0.40)	(0.97)	(-0.87)
Phase-2	24844.1	24694.8	-0.474
	(0.69)	(1.03)	(-1.29)
Consumption Expenditure (Rs.)	-1.670	-1.901	0.0000764^{*}
	(-1.25)	(-1.37)	(1.97)
No. of non-routine expenditures	-111.4	370.2	0.235^{***}
	(-0.11)	(0.42)	(4.03)
Size of non-routine expenditures (Rs.)	0.376^{*}	0.442^{*}	0.0000108^{***}
	(2.10)	(2.38)	(5.61)
Land holding (Acres.)	-2221.1	-2187.8	0.000784
	(-1.09)	(-1.13)	(0.25)
Savings (Informal) (Rs.)	-2.650	-5.123	0.00000408
	(-0.41)	(-1.24)	(0.07)
Savings (Formal) (Rs.)	0.242	-0.437	-0.0000180
	(0.27)	(-0.85)	(-0.65)
Muslim	-46128.0	-43885.8	-0.125
	(-1.46)	(-1.34)	(-0.30)
Christian	4470.5	8869.1	-0.0401
	(0.40)	(0.81)	(-0.15)
Can read but not right	21125.5	-1642.4	-0.268
	(1.20)	(-0.19)	(-0.84)
Can write but not read	-24085.7	-4546.9	-0.345
	(-1.28)	(-0.28)	(-0.84)
Signature only	-11958.9	-517.7	0.00958
	(-1.28)	(-0.08)	(0.05)
Cannot read or write	-9739.9	1477.5	-0.201
	(-1.01)	(0.27)	(-1.25)
Female	-1586.1	387.1	-0.0502
	(-0.20)	(0.06)	(-0.24)
ST	19874.1	11058.9	0.114
	(1.91)	(1.58)	(0.47)
OBC	20148.7^{*}	11087.5	0.0825
	(2.36)	(1.67)	(0.52)
Most backward caste	17732.5	13738.3	0.287
	(1.07)	(1.35)	(0.63)
General	31782.9	12405.5	-0.0551
	(1.69)	(1.59)	(-0.22)
Agriculture as income source	15770.4	11432.2	0.0615
	(1.67)	(1.29)	(0.32)
Amount outstanding before 2009 (Rs.)		0.00983	
		(0.21)	
Constant	-22561.5	-29018.2	1.832^{***}
	(-0.70)	(-1.30)	(3.53)
N	179	179	644

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 14- Model (4), (5) & (6) for informal borrowings (controlling for district fixed effects)

Method: Reduced form regression	(1) Agg. Amt. received (Rs.)	(2) Amt. received in 2009 (Rs.)	(3) No. of outstanding loans in past 6 months
Phase-1	19596.5	12594.6	0.132
	(0.68)	(1.02)	(0.47)
Phase-2	20774.3	22167.8	-
	(0.59)	(0.91)	-
Consumption Expenditure (Rs.)	-1.604	-1.831	0.0000747
	(-1.19)	(-1.36)	(1.87)
No. of non-routine expenditures	213.1	654.5	0.237***
	(0.26)	(0.79)	(4.23)
Size of non-routine expenditures (Rs.)	0.397*	0.442*	0.0000106***
	(2.23)	(2.46)	(5.46)
Land holding (Acres.)	-3545.1	-2736.9	-0.00241
	(-1.79)	(-1.47)	(-0.68)
Savings (Informal) (Rs.)	-3.264	-8.015	-0.00000362
	(-0.50)	(-1.81)	(-0.06)
Savings (Formal) (Rs.)	0.0496	-0.811	-0.0000286
	(0.05)	(-1.32)	(-1.01)
Muslim	-50404.8	-39519.5	-0.0935
	(-1.61)	(-1.31)	(-0.21)
Christian	9384.1	11256.0	-0.0255
	(0.75)	(1.10)	(-0.09)
Can read but not right	14950.2	-6693.8	-0.235
	(0.82)	(-0.83)	(-0.76)
Can write but not read	-31480.6	-9409.8	-0.193
	(-1.61)	(-0.55)	(-0.40)
Signature only	-13428.0	-1253.8	0.0428
	(-1.43)	(-0.20)	(0.24)
Cannot read or write	-9739.7	1223.4	-0.179
	(-0.97)	(0.22)	(-1.12)
Female	-228.7	4459.5	-0.0870
	(-0.03)	(0.66)	(-0.42)
ST	15145.2	5205.1	0.0108
	(1.55)	(0.73)	(0.04)
OBC	25449.4**	12610.0	0.0695
	(2.73)	(1.69)	(0.43)
Most backward caste	16082.2	10939.8	0.222
	(0.95)	(0.97)	(0.49)
General	31891.2	12898.5	-0.0947
	(1.73)	(1.73)	(-0.39)
Agriculture as income source	15180.8	8899.9	0.0546
	(1.67)	(1.02)	(0.28)
Amount outstanding before 2009 (Rs.)	-	0.0114	-
	-	(0.26)	-
Constant	-16383.8	-23907.8	1.278**
	(-0.52)	(-1.08)	(2.83)
N	179	179	644

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
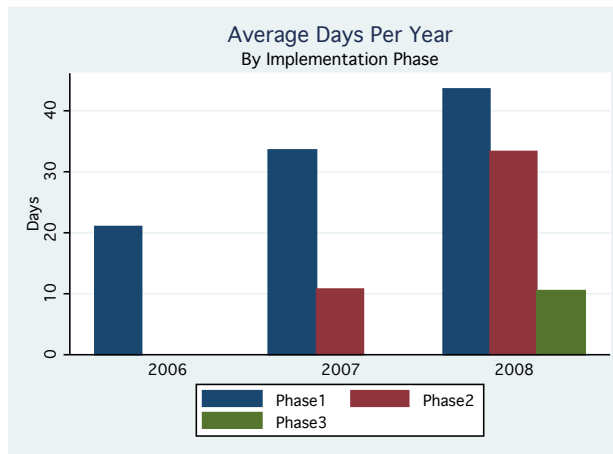
APPENDIX B: FIGURES

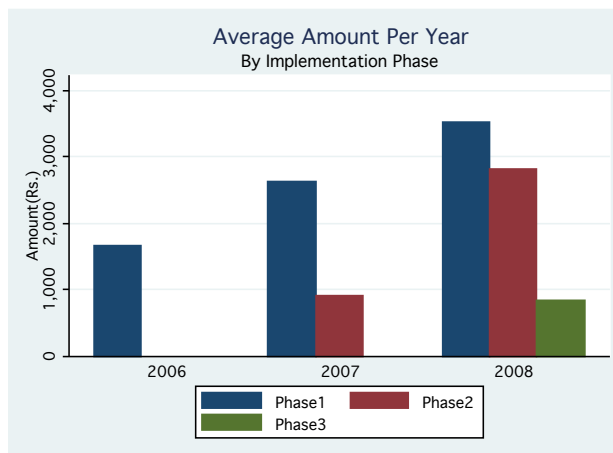Figure 1- Average days per year (By Implementation Phase)

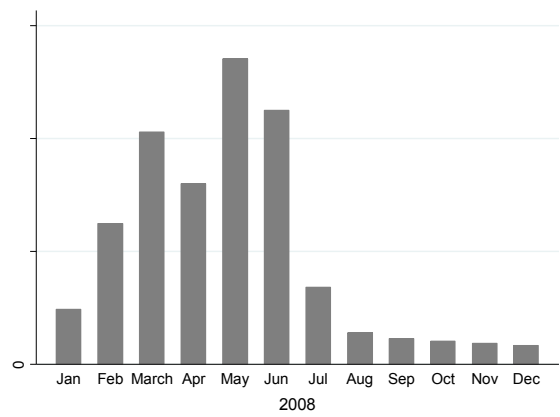Figure 2- Average amount per year (By Implementation Phase)

Figure 3- Average wages in MGNREGA by Months (For phase-1 districts)
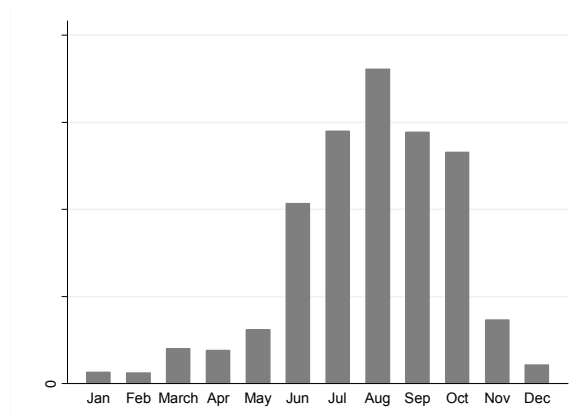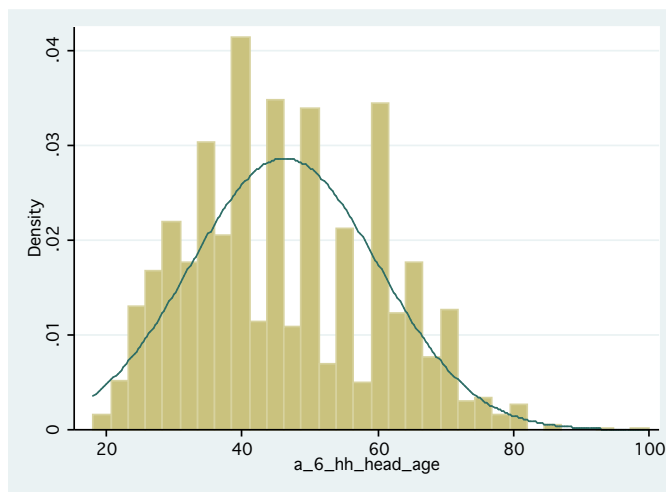

Figure 4- Average rainfall by Months (For phase-1 districts)

Figure 5- Age of household head (ATF survey)