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ABSTRACT

Female Labour Force Participation and Child Education in India: The Effect of the National Rural Employment Guarantee Scheme[*]

We study the impact of India's National Rural Employment Guarantee Scheme (NREGS) on children's educational outcomes via women's labour force participation. Using data from the Young Lives Study and taking advantage of the spatial and temporal variation in the intensity of implementation of the NREGS, we find that greater participation of mothers in the program is associated with better educational outcomes of their children. Father's participation in the NREGS, on the other hand, has a negative effect on children's education. Further, the estimated impact of mother's program participation is over and above any income effect induced by the scheme and is robust to concerns about endogeneity of labour force participation and differences in economic trends between districts. We provide evidence which suggests that the mechanism through which children's educational outcomes improve is empowerment of mothers resulting from better labour market opportunities for females.

JEL Classification: I21, I38, J16

Keywords: labour, education, gender, bargaining

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1. Introduction

The World Development Report (2012), focusing on gender equality, finds that women in the poorer regions of the world continue to suffer from disadvantages in the economic sphere. Although, significant progress has been made in reducing gender disparities in health and educational outcomes, economic opportunities continue to be limited for women. The Report underlines the policy priorities of closing gender differences in access to economic opportunities and earnings as well as increasing women's voices within households as a means to reducing poverty in developing countries. In this paper we study the impact of one such policy initiative in India – the National Rural Employment Guarantee Scheme (NREGS) initiated in 2006. While the program's main objective is to alleviate rural poverty by legally guaranteeing a minimum of 100 days of annual employment to households, it also has the potential to empower rural women through greater access to labour market opportunities.

From a gender perspective, there are two interesting features of this program. First, the wage rate provided in this program is uniform across gender, and second, it gives priority to female employment and targets at least one third of the beneficiaries to be women. Thus, NREGS not only has the potential to raise female labour force participation rates by bringing employment opportunities almost to their doorsteps, the equal wage rates provided in NREGS program can potentially reduce any gender disparity prevalent in the rural labour markets. We, therefore, hypothesize that the introduction of this program should lead to greater labour force participation of women, either on the extensive or intensive margin or both.

A rise in women's labour force participation can potentially impact individual and household behaviour on several fronts including marriage, fertility, and intra-household distribution of resources. This paper analyzes the effect of the exogenous policy shock of the implementation of the NREGS on children's well being. Specifically, we explore whether an increase in participation of mothers in NREGS projects affects the educational outcomes of their children differently from that of fathers' participation in the program. If yes, we attempt to understand the mechanism through which this differential effect can be explained.

While an increase in either fathers' or mothers' labour supply could improve their children's outcomes purely due to an income effect, greater labour force participation of mothers could impact children's education through two additional channels. First, women (including mothers) are likely to have more alternative uses of their time than men – market work, household chores and leisure. If children's time in doing household chores substitutes for mother's time then an increase in NREGS participation of mothers may lead to a *decline* in educational attainment of her children.[1] Second, mother's say in household resource allocation decisions may rise due to her higher earned income. Research suggests that this is likely to have a *positive* effect on her children's schooling. If an increase in women's earned income is likely to translate into greater weight being attached to their preferences in resource allocation decisions of the household and mothers prefer to invest more in their children's health and education (Blumberg 1988; Thomas 1990; Hoddinott and Haddad 1995; Quisumbing and Maluccio 2003), relative to

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[1] If mother's and children's time on household chores are not substitutes and child care services in the market are either unavailable or unaffordable, then it is more likely that children are in school when mothers are at work. If children attend school more regulary due to mothers working, then children's educational outcomes might improve.

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fathers, then we should see an improvement in child outcomes. Therefore, an increase in mother's decision-making ability within the family can have a positive impact on her children's welfare (Thomas 1990; Thomas et al. 2002). To sum, the net impact of a change in mother's participation in the labour force on her children's schooling depends on which of these two effects dominates – the substitution effect or the effect of greater bargaining power, holding household income constant.[2]

There exists relatively little empirical research on the impact of parental labour supply on children's time allocation, particularly in a developing country context. Skoufias (1993) shows that an increase in female wages in rural India reduces the time in school significantly for girls only. Similar results were found by Grootaert and Patrinos (1999) in a cross-country study. However, Ilahi (1999) does not find any impact of female wages on children's time use in Peru.

In contrast to the sparse literature on time allocation effects, there is considerable empirical evidence suggesting that households' resource allocation decisions are made in a 'collective' (Chiappori, 1988) or bargaining framework (McElroy and Horney, 1981) where the final allocation usually depends on the bargaining power or weights attached to the preferences of the members of the household. The importance of labour income as a determinant of women's bargaining power within the household has been highlighted recently by Anderson and Eswaran (2010). Using data from Bangladesh, the authors show that the effect of *earned* income on female autonomy is far greater than that of unearned income. Also, women who work on the household farm have no more autonomy than those who are housewives, while those who earn independent income

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[2] We are abstracting from any long term effects of changes in fertility due to increased labour force participation of women since we are looking at these changes over 2 to 3 years only.

have considerably greater autonomy. Luke and Munshi (2011) exploit data from tea plantations in South India where women are employed in permanent wage labor, to find that a relative increase in female income has a positive effect on their children's education. Qian (2008) shows that a change in agricultural pricing policy in post Mao China which increased female labour income increased educational attainment of all children. However, when the policy increased male labour income, educational attainment for girls decreased but had no effect on boys' educational attainment.

Using data from the Young Lives Study (YLS) in the state of Andhra Pradesh in India and taking advantage of the spatial and temporal variation in the intensity of implementation of the NREGS within districts, we find that greater participation of mothers in the program, relative to fathers, is indeed associated with more time spent in school of children within households. We find that this effect on the educational outcome of children is over and above any income effect induced by the NREGS. Moreover, the impact is largely present for the poorest households and limited to the time spent in school by younger children and girls. We also find that for poorer households greater participation of mothers in NREGS has led to higher grade attainment of children. Our findings are robust to concerns about endogeneity of labour force participation and differences in economic trends between districts.

YLS data on household members' say in decision-making and control of income from various sources show that participation in the labour force by mothers significantly increases the probability that they have a say or control over utilization of earnings from those sources. This result, together with the negative impact of father's days of NREGS work and our finding that girls tend to benefit more from an increase in mother's

participation in the program, suggests that women's preferences are the primary drivers of the improvements in educational outcomes of her children when her program participation is higher. Hence our results can be explained within the framework of a bargaining model of household resource allocation.

The findings of our study not only inform us about the impact of female labour supply on intra-household outcomes but it also addresses a broader policy question of the effect of public programmes on improving household outcomes in developing countries. Specifically, our paper extends the current debate in India on the impact of NREGS on poverty (Ravi and Engler, 2009; Uppal, 2009) and finds evidence, albeit through the channel of women's program participation, that supports preliminary findings of positive benefits of NREGS on households.

The paper is organized as follows. Section 2 gives the background on the National Rural Employment Guarantee Scheme and motivates the study. Section 3 describes the data and methodology used in this paper. Section 4 discusses the results and Section 5 concludes.

2.   Background

The National Rural Employment Guarantee Act (2005) of India provides a legal guarantee for up to 100 days of annual employment at a predetermined wage rate to rural households willing to supply manual labour on local public works. The act was operationalised through the National Rural Employment Guarantee Scheme (NREGS) which began in 2006. The program was rolled out in three phases. Initially restricted to

200 "poorest" districts of India (February 2006), it was extended to 130 more districts in May 2007 and to all districts across the country by 1st April 2008.[3]

We analyse data on individuals' labour force participation from Young Lives Study (YLS) - a panel study aimed at understanding the dynamics of childhood poverty. In India, YLS collects child level longitudinal data from six districts in the state of Andhra Pradesh. To date, there have been three rounds of YLS surveys in Andhra Pradesh – 2002, 2007 and 2009-10. We use data from rounds 2 (2007) and 3 (2009-10) of the YLS for reasons of comparability. The NREGS had been implemented in four out of six YLS districts in Andhra Pradesh by 2007 (Phase 1 districts), and the remaining two districts were covered by the program by 2009-10 (Phase 2 & 3 districts). [4]

Using data on NREGS participation of individual household members and comparing 2007 and 2009-10, we find that the overall female labour force participation in the age group of 16 to 60 years has increased substantially from 59 to 72 per cent while the same for males has fallen marginally from 92 to 89 per cent (Figure 1). This rise in female labour force participation is largely driven by casual labour (public and private). Figure 2 shows that in 2007, 28 per cent of the females in this age group were involved in casual wage labour, but in 2009-10, this number has risen to 45 per cent. However, unlike females, participation of males in the casual labour market has not increased in this period; rather, it has remained almost the same. Further disaggregating the labour force participation rates across asset quartiles of the households, from Table 1 we see that the rise in female participation in casual labour market is more prominent for poorer

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[3] Budgeting for NREGS is based on the financial year starting from April and ending in March of the next year.
[4] Anantapur, Cuddapah, Karimnagar and Mahbubnagar implemented the NREGS by 2007. Srikakulam and West Godavari were the two districts that came under NREGS by 2009-10.

households. In the lowest asset quartile, female casual labour has increased by 18 percentage points, while in the upper most asset quartile, it has risen by only 5 percentage points.[5]

With respect to participation in NREGS, the annual average number of days a household worked in NREGS has increased from around 11 days to 40 days (Figure 3). This rise is more prominent in the districts where NREGS was implemented after 2007 (Phase 2 & 3). Moreover, participation of women in NREGS has increased substantially as compared to men: while in 2007, both men and women in a household worked for around 5 days on an average, in 2009-10, women worked for 23 days while men worked for 17 days. Again decomposing the figures across asset quartiles we see that poorer households tended to work for more days in NREGS, particularly in 2009-10 (Table 2). Besides, the rise in female participation in terms of number of days worked in NREGS is also more noticeable in the poorer households.

The data from the YLS establish that casual labour force participation as well as NREGS participation has increased substantially more for women than men between 2007 and 2009-10. However, it is not clear from these data whether these trends are attributable to NREGS implementation per se since the YLS does not have information which would enable us to calculate casual *private* labour force participation trends.

Using household level data from repeated cross-sections in the National Sample Survey (NSS) for the years 1999-2000 (55th round), 2004-05 (61st round), and 2009-10 (66th round) we report, therefore, the trends in wage rates and labour force participation

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[5] Asset Quartiles are generated from an Asset Index which is constructed by Principal Component Analysis of several binary variables indicating consumer durable ownership at the household level. The assets which are considered are: television, radio, car, motorbike, bicycle, telephone, mobile phone, refrigerator, fan, electric oven, table and chair, sofa and bedstead.

rates in casual wage labour for public *and* private works in the state of Andhra Pradesh.[6]

Since the NSS data span pre and post NREGS implementation, any structural changes in the labour market caused by NREGS should be reflected through a change in the trend after 2004-05.

Figure 4 plots the trends in mean real wage rates for *public* casual wage labour by gender for the "working" age group of 16 to 60 years in Andhra Pradesh. While both the female and male public wage rates show an increase between 1999 and 2009-10, we see a steeper rise after 2004-05. Wage rates for women have increased by more than 79 per cent as compared to 58 per cent for men between 2004-05 and 2009-10. The male-female wage ratio has, thus, fallen: from 1.5 in 1999-2000 to 1.3 in 2004-05 and further to 1.1 in 2009-10.[7] Thus, post 2004, women may be less discriminated in terms of wages for public casual work than before.

We investigate next whether there has been any accompanying increase in labour force participation rates for 16-60 year old men and women in *public* casual labour.[8] From Figure 5 we see that there has been a drastic rise in labour force participation in public works, both for men and women. While participation somewhat declined between

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[6] In 2009-10, large parts of India suffered from drought and it can be contended that this weather shock would have affected labour outcomes in the rural economy. As a robustness check, therefore, we also looked at NSS data for 2007-08. Most results reported in this section go through. We report results with 2009-10 data since by then NREGS had been universally implemented in India.

[7] For the country as a whole, the wage ratio, which rose from 1.1 in 1999-00 to 1.7 in 2004-05, has dropped back to 1.1 in 2009-10, thus exhibiting a potential declining trend post 2004.

[8] We take into account casual labour done both as the principal occupation as well as a subsidiary occupation.

1999-00 and 2004-05 it has risen sharply to 6.41 per cent for men and 6.49 per cent for women in 2009-10 from almost no participation in 2004-05.[9]

The analysis for private casual labour force participation does not exhibit the trends we observe for public casual labour and is more or less flat for both men and women although wage rates for casual private works have increased for both genders, possibly due to substitution of labour from private to public works (Imbert and Papp, 2011). These results are reported in the Appendix. To summarize, our analyses indicate that the trends we observe in casual labour force participation of women in the YLS may have been driven primarily by public works or specifically, the NREGS.

3.   Data and Methodology

A.   Data

In order to identify the effect of the NREGS on children's education via their mothers' participation in the labour force, we conduct our empirical analysis at the level of the child using the two comparable waves of the YLS surveys - 2007 and 2009-10. The panel data set we construct is restricted to children in the age group of 5 to 14 years in 2007, the school going age group. In order to construct our data set we use the following exclusion rules: first, we include only children living in rural areas in both periods. This rules out children who may have migrated to urban areas. However these form less than 1 per cent of our sample. Second, we exclude children for whom we cannot identify mothers in the sample (5 per cent of the original sample). Third, for econometric reasons explained

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[9] These trends hold for the country as a whole, although the increases are smaller in magnitude. The rise in female labour force participation rates in public works has been from 0.09 per cent in 1999-00 to 0.21 per cent in 2004-05 and then to 2.74 per cent in 2009-10. A similar trend is visible for men.

below, we restrict our attention to children present in both rounds of the survey; we thus drop 2.9 per cent of the children present in 2007. Finally, we exclude children for whom there is some missing information on relevant covariates in either of the years. Our data set, after these exclusions, contains information on 2893 children for both years.

Table 3 describes the relevant summary statistics of our data-set for 2007 and 2009-10. The time spent in school by children in the reference period (a typical day in the last week) has gone up from 5.87 hours in 2007 to 7.06 hours in 2009-10. This increase in time spent in school is largely reflective of more regular school attendance. Children in the survey, who reported attending school regularly, spent almost two hours more in school than those who reported going to school irregularly, on a typical day. We can, therefore, interpret greater time spent in school by a child as an indicator of greater number of days of school attendance.

The rise in time spent in school was accompanied by a rise in the highest grade completed during this period. But the highest grade completed rose by less than the 3 year increase in the average age during the same period indicating either grade repetition or drop-outs. However, enrollment rates rose by 10 percentage points, largely a result of most 5 year olds joining school by 2009-10.[10]

During the same period, the proportion of children with either parent working in NREGS almost doubled. This increase in participation on the extensive margin was accompanied by a rise in the number of parental days of work on NREGS projects as well. The proportion of children whose mothers were working in NREGS rose from 28

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[10] There may be a variation in grade attainment depending on when the survey was conducted. In March of each year, students get promoted to the next grade. While all children in the 2009-10 were interviewed between August of 2009 and March 2010, children in 2007 were interviewed before and after March. This introduces the possibility that those interviewed before March were in lower grade than those interview after March. We take this into account in our analysis.

per cent to 61 per cent, a change larger than the corresponding change in proportion of children whose fathers were working in NREGS (a change from 25 per cent to 49 per cent). Further, we find that the average number of days that the mothers worked on NREGS increased by almost five times, while the average number of days worked by fathers rose, but not as much. Thus the share of the mother in the total work days in NREGS rose by about 8 percentage points among children who had at least one parent working in NREGS.

Further, the mean annual household income (in 2009 rupees) went up from Rs. 32,949 in 2007 to Rs 50,683 in 2009-10. The main source of income and the increase in income was non agricultural activities. Although annual agricultural income almost doubled during this period, its contribution to total income was minimal in both years.[11] Table 3 also suggests that there is a rise in wealth over the period of our study. Using asset quartiles, we find that a larger proportion of children live in households in the 3rd and 4th quartile in 2009-10 as compared to 2007. [12] While this change is large, it is consistent with the rise in real incomes noted above. It is also important to note that the household size has remained more of less unchanged during this period.

While preliminary evidence presented above suggests that mother's NREGS participation and number of days of work have gone up, it would be incorrect to draw a causal link between that and changes in children's time spent in school since decisions regarding labour supply of household members are endogenous. However, the

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[11] The reference period for non agriculture income is slightly different from agriculture income. While information on non agriculture income was collected over a reference of last 12 months, information on agriculture income was collected over the last agricultural year. Since the two periods have substantial overlap, we add the two to calculate total income.
[12] We use the pooled sample of 2007 and 2009-10 to generate the asset index. Pooling over the years ensures that the asset quartile changes over years reflect absolute changes in wealth rather than a change in the relative position in the wealth distribution within any year.

introduction of the NREGS also leads to exogenous shifts in the demand for labour. One

such measure of demand is the total number of 'in-progress' NREGS projects in a mandal

(or sub-district). This is unlikely to be determined by factors specific to the labour supply

decision of any individual household or even a village. However, progress on a larger

number of projects within a mandal indicates that there are relatively more work

opportunities for households residing in that area.[13] The last row in Table 3 suggests that

the number of such NREGS projects did increase during the period of our study.

Moreover, this increase was not uniform across mandals. Hence the change in demand

for labour for NREGS projects varied both over time and across mandals in Andhra

Pradesh.

B.   Methodology

In this section, we specify our empirical model and discuss the estimation strategy we

adopt to test our hypothesis.

        To begin with, note that NREGS participation by household members can have

two distinct effects on children's time spent in school (TSS).[14] First, as household

members work on NREGS, the total income of the household (INC) may rise.[15] In so far

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[13] It is important here to point out that an individual's decision to not work on NREGS project will neither affect the progress of the project (unless no person in the mandal wants to work) nor will it affect the total number of projects in a mandal on which progress has been made.

[14] The time spent in school is recorded as hours spent in school on a typical day in the previous week. The total time spent on education on a typical day consists of time spent in school and time spent on studying outside school (private tuition and at home). The average time spent on education outside the school in the sample is less than 20 per cent of the total time spent on education on a typical day.

[15] NREGS work is only one of many activities performed by members of the household. If NREGS work done by a member does not cause changes in the total labour supplied to other household activities, then total income will rise by the additional income from NREGS. However, the possibility of doing work as a part of NREGS is expected to change the allocation of labour to various activities. If households reallocate work rationally, then total income will tend (contd...)

as households consider the education of children to be a normal good, this income effect may result in a rise in children's time spent in school.[16] Second, NREGS could have an additional direct impact on children's education due to greater labour force participation of mothers, but in two *opposite* directions: a negative substitution effect and a positive bargaining power effect. Thus, the net impact of a change in mother's participation in the labour force on her children's schooling is an empirical question. We posit that, controlling for INC and the number of days worked on NREGS by the father (FATHER_NREGS), a positive effect of the number of NREGS days by the mother (MOTHER_NREGS) on children's educational outcomes would suggest that the latter effect dominates the negative substitution effect.[17]

There are several child and household level factors that could confound the effects of NREGS participation of mothers on her children's time spent in school. We, therefore, include Z - a vector of household variables that may change over time, in our empirical specification. For instance, households often smooth any income shocks with dissaving of assets. Hence we take into account household wealth represented by Asset Quartiles (D_i^{ASSETS}). Further, since poorer households are more likely to work on NREGS, omitting asset ownership would confound the effects of parental labour supply on TSS. We also include land owned by the household as an indicator of wealth. Households' optimization

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to increase. However, in this case, the total income need not rise by just the amount earned through NREGS work.

[16] Whether the income effect is significant or not is a function of the cost of schooling as well. If physical access to schooling is relatively easy and costs of schooling are subsidized (as in primary schooling), any effect of an increase in household income may be muted for the age group under study here.

[17] As explained earlier, the number of days of NREGS work done by mothers and fathers have gone up over the period of the study. This is true not only for the districts where NREGS was implemented in 2008 but also for districts where it was implemented in 2006.

process is also a function of the size of the household and migration of members can cause substantial changes in the decisions taken by households. Hence we include the number of household members (HH_SIZE) in Z as well. Our analysis also controls for whether the household' reference week was a school holiday. However, the results hold up when we restrict our sample to only those children for whom the previous week was not a school holiday.

Next, we include X, which denotes the vector of child specific time variant variables that could affect TSS. As a part of X, we include the highest grade achieved by the child. This is to account for the fact that the time spent in school may systematically vary with grade. We include the square of GRADE (SQ_GRADE) to allow for non linearity in this effect.[18] Moreover, the time children can spend in school may depend on their age. Older children are more likely to spend time working outside or looking after their siblings. We allow for this effect to be non-linear in age by including age (AGE) and square of age (SQ_AGE) in X.

While the variables included in Z and X are observable to the econometrician, there may be unobservables at the geographic level (district, mandal and village), household level and there may also exist child specific unobserved heterogeneity. If these unobservables are correlated with the regressors on the right hand-side and they also affect time spent in school, it would lead to the issue of endogeneity and thereby inconsistency of our estimates. Our specification, therefore, includes time invariant child characteristics viz. ability (α_{chvmd}), household characteristics viz. parental preferences

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[18] Our results are unchanged when we exclude GRADE from the vector X.

for schooling (α_{hvmd}), mandal level characteristics (α_{md}), and village characteristics viz. culture(α_{vmd}).

A potential problem for our empirical exercise is the phased implementation of NREGS. Districts that had NREGS earlier (Phase 1) may be different from those that had NREGS later (Phase 2). Moreover, these districts may have different economic growth trajectories as well as trends in educational attainment. To take into account these concerns, we allow for district specific intercepts α_d and introduce district specific time trends (α_{dt}) We also control for a secular time trend (α_t), that allows for increases in demand for and supply of schooling.[19]

In addition to district specific trends, there could be trends that are driven by rising awareness of rights due to social audits. For example, social audits that make households aware of their rights may also lead to a demand for public schools. Hence NREGS participation and children's time in school could be driven by this rising awareness. To control for this, we allow the trend to depend on the number of social audits that have taken place in the mandal prior to the date of the survey $(Soc\_audits_{mdt} * t)$.

More formally, we estimate the following specification:

$$
\begin{aligned}
TSS_{chvmdt} = {} & \alpha_0 + \alpha_t + \alpha_{chvmd} + \alpha_{hvmd} + \alpha_{vmd} + \alpha_{md} \quad + \alpha_d + \alpha_{dt} + \beta X_{chvmdt} \\
& + \delta Z_{hvmdt} + \varphi_1 INC_{hvmdt} + \varphi_2 FATHER\_NREGS_{chvmdt} \\
& + \varphi_3 MOTHER\_NREGS_{chvmdt} + \rho Soc\_audits_{mdt} * t + \varepsilon_{chvmdt} \quad (1)
\end{aligned}
$$

where the subscript c refers to a child in household h in village v in mandal m in district d. t refers to time, which takes the value 0 for the year 2007 and 1 for the period 2009-

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[19] This period is also one of renewed efforts to universalize primary education, through district level government policies (viz., Sarva Shiksha Abhiyan or SSA).

10. Thus, using the temporal variation in the number of days of NREGS work done by the mothers and fathers between 2007 and 2009-10 our empirical model aims to identify the effect of NREGS participation of mothers on TSS (φ_3).

Given this specification, and using data on a balanced panel of children over the two time periods, we estimate a child fixed effects model. In doing so, we eliminate α_{chvmd}, α_{hvmd}, α_{vmd} and α_{vd} as well as α_{d}. The child fixed effects model uses the temporal variation for each child c and demeans variables from the child level mean. This eliminates all observable variables that are time invariant; therefore such child (e.g. the gender of the child) and household level variables (e.g. education of parents that we may have possibly considered) are eliminated. If we assume that the deviation of the observed variables from their mean values are not correlated with the deviation of the error term from its mean values, this estimation procedure would yield consistent estimators of φ_1, φ_2 and φ_3.

The main concern with our estimation strategy is that parental labour supply decisions are likely to be made simultaneously with investments in children's education. Thus, father's and mother's participation in the NREGS may remain endogenous even though we account for unobserved, time invariant household and child level heterogeneity. To address this simultaneity issue, we adopt a 2SLS estimation procedure using mandal (sub-district) level rainfall shocks in the month of May and June and variation in the demand for NREGS labour as instruments. We define a rainfall shock (RAIN) as the deviation of rainfall recorded in May and June for the mandal in the year prior to the survey from the long term (20 year) average rainfall, for the same months, in

that mandal.[20] The demand for NREGS labour is captured by the number of projects currently 'in-progress' in the mandal (PROJECTS).[21] In our preferred specification, therefore, with three endogenous variables (INC, FATHER_NREGS, MOTHER_NREGS) and three instruments (RAIN, PROJECTS, RAIN*PROJECTS), our estimating equation is just identified. We discuss the validity of our instruments next.

C. Validity of instruments

Agricultural production in India continues to be dependent upon rainfall. The choice of rainfall in May-June of the reference period as an instrument is, thus, driven by the nature of agricultural activity in the region of our study. Rice is the main crop cultivated in Andhra Pradesh. Using the YLS data we find that among rural households, the crop which the largest proportion of households cultivate (almost 36 per cent across rounds 2 and 3) is rice.[22] The cultivation of rice is highly water-intensive. The crop is mainly cultivated in flooded, standing water fields. But prior to cultivation in the paddy fields, the rice seedlings (which cannot survive in flooded fields) are grown in nurseries. They are then manually transplanted into the flooded fields. It is therefore expected that rainfall in the pre-monsoon season will promote the development of rice seedlings enabling

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[20] The variable capturing rainfall shocks (RAIN) is constructed from the precipitation data available from the Center of Climatic Research at the University of Delaware. The data includes monthly precipitation values at 0.5 degree intervals in latitude and longitude. To match this data at the mandal level, the nearest latitude-longitude to each mandal headquarter is taken. To construct the rainfall shock at the mandal level, the long term (1990-2008) average mandal level rainfall in the months of May and June are estimated. Standard deviation of rainfall for the same period is also calculated at the mandal level. Then rainfall shock is defined as the deviation of actual rainfall in the months of May and June in the last year from the long term average, divided by the standard deviation.

[21] Data on the number of ongoing projects at the mandal level is obtained from the Andhra Pradesh Government's website on NREGS (http://nrega.ap.gov.in/).

[22] Groundnuts is a distant second, with about 16% of rural households engaged in its cultivation.

farmers to increase their cultivation of rice during the monsoon season. This in turn would create greater demand for labour for transplanting. Majority of the transplanting work is done by women because it is delicate work and is a highly labour-intensive activity (Mies, 1986).[23] Our assumption, therefore, is that, ceteris paribus, demand for female labour for agricultural work will be higher if premonsoon rainfall is high.

The monsoon typically arrives in Andhra Pradesh in mid June. Hence the premonsoon rainfall falls mostly in the month of May and early June. Furthermore, schools are closed for summer vacations from the last week of April to mid June every year in Andhra Pradesh.[24] Thus it is unlikely that rainfall in this period will have a direct effect on time spent in school or grade attainment either due to households' labour substitution decisions or supply-side factors such as teacher attendance.

Our second instrument is the number of NREGS projects currently in progress in the mandal.[25] Before we discuss the validity of this instrument it is imperative to discuss the administration of the NREGA projects in general and in AP in particular. There are three tiers of administration of NREGA projects in Andhra Pradesh - district, mandal and village. While the district administration is responsible for overseeing the implementation of the NREGA program, the Mandal Parishad Development Office (MPDO) is the main

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[23] Foster and Rosenzweig (1996), using data from Philippines, show that men were more likely to undertake agricultural tasks that require greater upper body strength such as plowing whereas women were more likely to be engaged in activities such as weeding. The division of labour, by gender, thus depends on the comparative advantage of the sexes in various tasks.

[24] See http://aputf.org/go_s/Rc.No.31,Dt.22.07.2011.pdf for an official circular of the Department of Education on the schedule of public schools in AP.

[25] This instrument represents a cumulation of all projects which are in progress in a financial year. Projects are not necessarily completed within the same financial year that they begin in. So this is a stock variable that reflects previous as well as current NREGS projects. Ideally, we would have liked to use lagged values of this variable. Unfortunately, since the reference period for the 2nd round of the YLS is 2006 and the NREGA was initiated in February, 2006, lagged data do not exist for both rounds of the YLS survey.

agency for administering each NREGA project and sanctioning all financial payments for projects undertaken in that mandal. The village council's role is limited to recommending the list, and priority, of NREGA projects to be implemented to the MPDO. Since the NREGA is envisaged as a demand-driven program, households are expected to apply for work and once a critical mass of demand is generated in a gram panchayat (a collection of 1 to 3 villages) in a mandal, a project has to be selected from the approved list of works and sanctioned by the district administration. Thus the main concern with the IV's validity is that current, individual demand may determine the number of projects in progress, partly or fully, at the mandal level.

Note that our instrument is defined at the level of the mandal - a collection of 11 to 39 gram panchayats (in the YLS sample) - and the sanctioning of projects is at the district and mandal level. Furthermore, although the NREGA envisages a demand driven programme, the reality is quite different according to several recent studies. Imbert and Papp (2012) report that "many people are unaware of their full set of rights under the programme"; "in practice, very few job card holders formally apply for work while the majority tend to wait passively for work to be provided." Other research on NREGS districts in Andhra Pradesh (Ravi and Engler, 2009; Afridi et al., 2012) also indicates that the programme is supply rather than demand driven.[26] Hence, given the fact that the program is driven by the supply of projects at the district and mandal level and that our intrument is defined at the level of the mandal, it is unlikely that there are significant effects of current household demand on program intensity at the mandal level.

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[26] In survey of 1500 households across 8 districts in AP, Afridi et al. (2012) find that less than 14 per cent of households has applied for NREGA employment in 2010-11, 4 years after the inception of the program.

The concern that remains then is whether temporal changes in awareness of NREGA entitlements (including demanding work; Khera, 2011) are accompanied with changes in the demand for public schooling (quality or quantity).[27] On the other hand, say there is no increase in awareness but the administration is learning how to implement NREGS, which improves between 2006-2009 and this learning spills over to the provision of the public good of interest to us – education. In either case, our IV will not meet the exclusion restriction as it would have a direct effect on educational outcomes.

We address the latter concern first. In Andhra Pradesh, school participation is near universal.[28] According to the Annual Survey of Education Report (ASER, 2006), the percentage of out of school rural children in the 6-14 age group was between 0 to 5 per cent in all the YLS districts except West Godavari where it was between 5 to 10 per cent in 2006. Learning levels were higher than the average for the country and have remained more or less steady during this period (ASER, 2006 and 2009). Thus any administrative "learning" with respective to public schooling would be minimal, if at all. Enrolments in private rural schools actually declined for 6-14 year olds by about 5 percentage points between 2006 and 2009 (ASER, 2006 and 2009). This suggests that any improvements in educational attainment that we find is unlikely to be driven by improvements in either public schools or an increase in private school presence. Second, while it is quite likely that administrative capacity and NREGA implementation improves over time, it is unlikely that this would be accompanied by administrative improvements in public schooling. The administrative machinery that has been created for the NREGA

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[27] The NREG Act allows for the conduct of regular "social" audits of project expenditures by stakeholders. In AP the state government has institutionalised social audits since 2006.

[28] Enrolment of children in 6-10 years age group was 92.91per cent in round 2 and 92.58 per cent in round 3 (92.70 overall); enrolment in 11-14 age group was 80.59 per cent in round 2 and 86.48 per cent in round 3 (83.35 overall) in our sample.

implementation at the grassroot level and which helps expand capacity for the program is different and delinked from that required for public schooling (see Figure A3 in the appendix for more details). Third, there has been no change in local governments since 2006 in AP. State legislative elections returned the same political party back to power (Congress) in May, 2009, *after* our survey reference period. Hence, there are unlikely to have been any significant changes in political will for implementation of public programmes either.

To address the former concern, we first use data from the YLS to check whether political participation or participation in community led demand for certain public goods was correlated with the occurrence of social audits. The timing, frequency and conduct of social audits in a mandal is determined centrally by an independent body – the Society for Social Audit, Accountability and Transparency (SSAAT) – in Andhra Pradesh. Hence, the number of audits conducted in a mandal should be exogenous to the village and household. We find an insignificant effect of the occurrence of social audits on awareness between the second and third round of the YLS surveys in a household fixed effects model (see Table A2 in the appendix). Nevertheless, as discussed in the empirical model above, we include a variable "number of social audits that took place in the mandal between the two survey rounds" in all our baseline regression analyses to control for any direct effect of 'awareness' improvements on children's schooling. Our results are robust to the inclusion of this variable.

4. Results

A. Overall impact on children's time in school

Our hypothesis is that once we control for households assets, total income and other child, household village, mandal and district level characteristics, the coefficients of MOTHER_NREGS would be positive. Results in Table 4 show that this is indeed the case for time spent in school. Column 1 reports the results of an OLS-FE regression of child's time spent in school on parental participation in NREGS, accounting for unobservable heterogeneity in child characteristics and differences in trends across districts. We find that the coefficient of MOTHER_NREGS and FATHER_NREGS are positive but insignificant. However, as pointed out above, this specification does not account for the possible endogeneity of labour force participation of parents and household income. We, therefore, look at the 2SLS results in column 2.[29]

Instrumenting for the three endogenous variables in column 2, we find that the coefficient on MOTHER_NREGS is positive and significant at 1 per cent. This result validates our hypothesis given that the change in days of NREGS work by mothers

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[29] The first stage results (Table A1 in the appendix) suggest that our instruments are good predictors of the endogenous variables. First stage regression equations have F statistics ranging from 42.55 to 71.47. Moreover, at least one instrument is significant in each regression equation making their use valid. The first stage results suggest that an increase in the number of on-going NREGS projects in a mandal increases the household income and parents' participation in such projects, as hypothesized. The coefficient on RAIN turns out to be insignificant for female NREGS participation while significant for male participation, where as the coefficient for RAIN*PROJECTS is positive and signficant and more or less similar for both female and male participation in NREGS. These results point out that the response of females to NREGS is lesser than that of males when the rainfall in May and June is good. This is consistent with the fact that, in the years of good pre-monsoon rains, females are more likely to work in rice fields than men. The coefficient of RAIN is negative though insignificant for annual household income. This insignificance could be because agriculture income is a very small part of total annual household income. Moreover, here we use rainfall in only May and June as an instrument. However, a good rain shock for the summer crop may well be followed by a bad rain shock during the winter crop, resulting in an insignificant (or even negative) effect of May-June rainfall on total annual agricultural income.

between the two survey rounds represents a substantial increase in the proportion of household earnings attributable to mothers. To elaborate, between 2007 and 2009-10, the average number of days worked by the mother on the NREGS projects went up by more than 16 days. This indicates a doubling of contribution to household income, to 6.8 per cent in 2009-10, if (as we explained in section 2) there is no crowding out from private labour. The estimated coefficient of 0.224, therefore, implies a 3.6 hours per day (0.224 x 16.16) increase in the time spent in school of the child over this period. For a typical school day lasting 8 hours, this effect is equivalent to attending school almost half a day more. If we extrapolate this impact over an entire academic year, we can view this effect as an almost 50 per cent increase in school attendance rate. [30]

Note that since mother's NREGS participation is likely to have two opposing effects on children's educational outcomes, as discussed in the previous section, a positive coefficient on MOTHER_NREGS indicates that the bargaining effect dominates any labour substitution effect. Thus, in so far as our estimated coefficient is a consequence of higher bargaining power of mothers, it may be a lower bound on the impact of the bargaining effects of NREGS on child outcomes.

In contrast, the effect of FATHER_NREGS is negative and significant at 1 percent significance level in column 2. Disaggregation of this effect, discussed in the next section, shows that this effect is greater for poorer households and for older boys,

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[30] We recognize that any additional time spent in school could be substituted by less time spent studying outside school leading to an insignificant effect of mother's NREGS work days on total time spent on education on a typical day. In an alternate specification, therefore, we consider the total time spent on education (including time spent studying outside the school) as the dependent variable. Our results are unchanged.

potentially indicating substitution of fathers' time on non-NREGS work with that of children's time.[31]

In so far as NREGS income is a part of total income, any NREGS work by parents may lead to a rise in the time spent in schooling. In column 1 we find that the coefficient on total household income is insignificant. However the point estimate is positive and the p value is 0.17. Once we account for the endogeneity of household income in column 2, we get a similar positive but much larger point estimate for income. However, the p value is still around 0.17. This suggests that, even if there are income effects, there may be too much heterogeneity in this effect, so as to render the coefficient insignificant. The insignificant coefficients for asset quartiles echo the same argument. In rural areas, land is usually a good predictor of wealth. We find that, in the OLS-FE specification, the effect of land is positive and significant. However, this result turns insignificant when we look at the 2SLS-FE results in column 2. In a later part of the paper we will examine this issue more by stratifying households by their base wealth levels.

As pointed out, children's time spent in school and parental NREGS participation may covary because of increasing awareness, through social audits. While the OLS-FE results estimate this effect to be negative, the 2SLS-FE results find this effect to be positive but insignificant. Recall that the variable, "number of NREGS social audits in the mandal between the two survey rounds x time" allows for different trends in time

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[31] The negative coefficient on father's NREGS work is also consistent with our result on mother's NREGS work. For a given level of income and mother's NREGS participation, a rise in father's NREGS participation might imply that a larger share of household income is earned by the father. If this larger share of income bestows greater bargaining power to fathers relative to mothers, and fathers prefer to invest resources in goods other than children's education, then the time spent in school by children could fall.

spent in school depending on the number of audits that have taken place in the mandal before the survey. Our results point out, that if anything, the change in time spent in schooling is lesser in mandals with more social audits.

The coefficient on household size is negative but insignificant in both columns. The coefficient on time is positive and significant in column 1 but is insignificant in column 2. In both cases, the point estimates are large representing the effect of increasing age of the child over time. While the child's age drops out as it is collinear with time, we find that there is a non-linear effect of age. The square of age turns out to be negative in columns 1 and 2. The greater the age, the lower the increase in time spent in school. This reflects the higher opportunity cost of time in school for older children. The coefficient of the term linear in GRADE is negative and significant while that on the quadratic term is positive. The argument for GRADE is similar to that of age (and may indeed be picking up some of the effect). As children progress to higher grades, they are more likely to drop out of school, leading to a fall in time spent in school in the current year. However, for those who continue to attend school, as they move into higher grades, the time spent in school goes up.

B.   Heterogeneity of impact on children's time in school

The reported average effect of NREGS participation by mothers may hide large heterogeneity of impact across households belonging to different wealth strata. To address some of these issues related to heterogeneity of effects we run our regressions by two indicators of household wealth - asset quartiles and land ownership. We construct four sub-samples of children who belong to households in each of the four asset quartiles

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in 2007 (recall that the quartiles are still based on the pooled sample of 2007 and 2009-10). Doing so not only allows us to look at heterogeneous impacts across wealth levels but also addresses the issue of transition in wealth quartiles. In addition, we classify households into those whose land ownership was less than the median land ownership and more than the median land ownership (based on 2007 distribution of land in the sample).

The results in Table 5 suggest that the effect of MOTHER_NREGS is significant for the households which were in the first two quartiles in 2007. The marginal coefficient on MOTHER_NREGS is 0.105 for the first quartile (column 1) and 0.212 for the second quartile (column 2). There is no significant impact of MOTHER_NREGS in households belonging to higher wealth quartiles.

Given that the number of days of NREGS work done by mothers in households belonging to the first quartile increased from 5.67 days in 2007 to 26.23 days in 2009-10, the implied increase in time spent in school is 2.16 hours. The effect of NREGS work done by mothers on time spent in school for the second quartile of wealth is larger at 3.29 even though the increase in days of NREGS work done by mothers rose less, from 5.73 days to 21.26 days. Since the coefficient is insignificant for higher asset quartiles, this indicates that the overall result, that we observed in the last section, is driven by the sub-sample of children who belonged to households in the first two wealth quartiles in 2007. For these children, mother's work in NREGS contributed even more to the total income of the household than in the entire sample. While the NREGS income earned by the mother as a proportion of total household income was 3.1 per cent in 2007, it was 9.1 per

cent in 2009-10 for households in the first wealth quartile. For the second quartile, this proportion increased from 3.2 percent in 2007 to 6.2 percent in 2009-10.

The effect of the days worked by the father on NREGS projects on children's time in school is negative (-0.089) and significant only for asset 1. It is insignificant for all wealth quartiles. This implies that the total effect of working on NREGS is maximum for households in asset quartile 2 in 2007. In general, households in asset quartile 2 have shown a large secular rise in time spent in schooling. This is indicated by the large significant coefficient on the trend (6.405).

A similar story is indicated by results in columns 5 and 6 where households are classified on the basis of land owned in 2007. The results for days worked on NREGS projects by the mother and father are significant only for households who owned less than the median land (1.04 acres) in 2007. The two sets of results therefore indicate that the days worked on NREGS by the mother, ceteris paribus, has only had an impact for the poorer households.

Next, we look at whether the effect of mother's days of NREGS work differs by the characteristics of the child in Table 6. In columns 1 and 2 we disaggregate the overall analysis by the gender of the child. The coefficient on mothers' days of NREGS work suggests a positive impact on only female children. While the p value in the case of male children is 0.115 suggesting that there may also be some impact on boys, the coefficient for the female child at 0.271 is much larger than that for male children (0.177). This implies that the rise in time spent in school for female children is 4.5 hours (the average number of days of NREGS work for mothers in the subsample with only female children is 4.67 days and 21.3 days in 2007 and 2009-10 respectively).

The days of NREGS work by the father has no impact on the female children. However it is negative (-0.139) and significant for the male children.[32] We also find that in the case of male children, there is a positive secular trend (3.412) indicating a general rise in schooling for male children over time.

Columns 3 and 4 further disaggregate the effect of NREGS work by parents by the age of the child. We divide the sample of children into two groups: those who were in the age group 5-9 years in 2007 and those who were 10-14 years old. Results show that the effects indeed vary across the two age groups. The days worked by the mother in NREGS is positive and significant (0.225) for the younger age cohort. The rise in days of work by the mother (4.4 in 2007 to 20.4 in 2009-10 for this sub-sample) lead to a 3.6 hour increase in time spent in school for this younger cohort. The number of days father worked on NREGS is negative and significant for both the age groups but it is larger for the 10-14 age group (-0.276 for 10-14 year age groups relative to -0.168 for the 5-9 year age group).

Therefore, the overall impact of parental work on NREGS is greater for the younger age group than for the older age group. There could be two reasons for this. First, since the opportunity cost of being in school goes up for higher age groups, mother's NREGS income or greater bargaining power may not be able to fully compensate for these higher costs. Second, as discussed earlier, the substitution effect of

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[32] Our results are in keeping with the findings of existing research on the impact of parental resources on children's outcomes. Previous literature suggests that the impact of mother's influence on household decision-making may differ by the gender of the child (Thomas 1990; Murthi et al. 1995) but the literature is not conclusive on whether it exacerbates or reduces gender differences. For instance, Thomas (1990) finds that in Brazil women's education has a significantly stronger effect on girls' health while educated fathers prefer to invest more in boys. In Java (Thomas et al. 2002) and Cote d'Ivoire (Haddad and Hoddinott 1994), on the other hand, women with greater earned income allocate more resources to sons' health.

mother's NREGS work may kick in more strongly for older children whose time on household chores is likely to be a closer substitute for mother's time. This is also apparent from the insignificant effect of mother's NREGS work on older girls.

C.   Impact on children's grade progression

In the previous sections, we have shown that mothers' work on NREGS projects positively affects children's time spent in school. In this section, we delve into whether an increase in attendance rates in school has translated into higher grade attainment. But there are certain caveats to interpreting the effect of NREGS work days on children's grade progression. First, the highest grade completed is right censored for the sub-sample of children who are still enrolled in school. This is not the case, however, for children who have completed schooling (17 year olds in 2009-10) or have dropped out by the time of the survey interview. Second, the effect of parental labour market activities may not be reflected completely in grade attainment for those households which are interviewed before April (March is the last month of an academic year) since the highest grade attainted by children in these households would be right censored. Finally, the highest grade completed is a stock variable that may be determined not just by current NREGS participation of parents but also program participation between 2007 and 2009-10. Our assumption of a monotonically increasing relationship between program participation in 2007 and 2009-10 may not be valid.

To find the determinants of GRADE, we consider a slight modification of the empirical model presented above. We estimate the following specification:

$$GRADE_{chvmdt} = \alpha'_0 + \alpha'_t + \alpha'_{chvmd} + \alpha'_{hvmd} + \alpha'_{md} + \alpha'_{vmd} + \alpha'_d + \alpha'_{dt}$$
$$+ \beta' X'_{chvmdt} + \delta' Z_{hvmdt} + \varphi'_1 INC_{hvmdt}$$
$$+ \varphi'_2 FATHER\_NREGS_{chvmdt} + \varphi'_3 MOTHER\_NREGS_{chvmdt}$$
$$+ \rho' SOCIAL\_AUDITS_{md} * t + \varepsilon'_{chvmdt} \qquad (2)$$

The dependent variable is grade attainment of a child (subscripts follow the same convention as in equation 1). The only difference in regressors between this specification and specification 1 is that GRADE is now the dependent variable. Hence we refer here to the modified vector of child level characteristics, which does not include GRADE in X'_{chvmdt}.

We report results of OLS-FE and 2SLS–FE in Table 7.[33] For the overall sample, we find that while MOTHER_NREGS is positive and significant in OLS-FE specification in column 1, it becomes insignificant for 2SLS-FE in column 2. Similarly, FATHER_NREGS is negative and significant when we run OLS-FE but is insignificant in the case of 2SLS-FE. Therefore, for the overall sample, we find no effect of NREGS work (by either parent) on grade progression. However, when we stratify the sample by households' land holdings in 2007, we find that MOTHER_NREGS is positive and significant for households with less than median land holdings (columns 3 and 4). The coefficient of 0.031 implies that the increase in the days worked by the mother on NREGS projects, among this sub-sample (3.87 days in 2007 to 22.2 days in 2009-10), has lead to an increase in grade attainment by 0.568, which is more than half an academic year. The days worked by the father has no significant effect on grade attainment. For households with more than median land holdings, there is no effect of either parent's

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[33] The number of missing values is less when we consider grade attainment. Thus we run the regressions with 2961 children. We use the same three instruments as in our main specification for TSS.

working on NREGS. This result substantiates what we have also observed for time spent in school - that the effect of days of NREGS work by mother is more visible in the lower economic strata.[34]

To sum, our results for grade attainment are muted but consistent with what we observed for time spent in school. It suggests that the days of work by the mother on NREGS, ceteris paribus, has lead to better educational outcomes for her children.

D.   Impact of mother's work status on empowerment

Our results suggest that an increase in labour force participation of mothers has beneficial effects on her children but not so of fathers'. The time allocation hypothesis indicates that there should be a negative or zero effect of mother's labour force participation on children's educational outcomes, particularly girls. While we do find that there is an insignificant effect of mother's program participation on older children and boys, 5 to 9 year olds and girls tend to benefit. While the former can be explained in terms of non-substitutability of younger children's time with mother's time on household chores, the latter effect suggests that women's preference could be coming into play.

In order to further test our hypothesis of improvements in women's decision-making abilities within households as a result of increased participation in the labour market, we use data from the second round of the Young Lives survey. The second round

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[34] When we classify the sample by children's age group, we find that the coefficient on MOTHER_NREGS is significant and positive for the age group 5-9 years, whereas there is no significant impact for the older age group of 10-14 years. We do not find any significant impact of parental participation in NREGS when we classify the sample by any other individual or household characteristic (viz. gender or household assets).

of the YLS data contains detailed information on various decision-makers within a household.[35] Our dependent variable is the binary response to the following questions:

a. "Is the caregiver responsible for making the key decisions about any of the plots?" (Land)

b. "Does the caregiver control the use of the earnings from the sale of goods or rent from any of these plots?" (Earnings from land)

c. "Is the caregiver responsible for making the key decisions about any of these work for wages activities?" (Wage activities)

d. "Is the caregiver responsible for controlling the earnings from any of these from work for wages activities?" (Earnings from wage activities)

The sample is restricted to caregivers who are mothers in age group 16-60 years.[36] Our main variable of interest is whether the woman works. We expect the woman's work status to be affected by the number of 'in-progress' NREGS projects in the mandal and the long-term deviation of rainfall in May-June of the reference period. We, therefore, instrument work status by these two variables and their interaction. Controls for individual and household characteristics such as –age, education, household's asset quartiles and household size – are included within a district fixed effects specification. The results are reported in Table 8.

The positive and significant coefficient on 'working' across all outcomes suggests that greater participation of mothers in the labour market does increase the say and control these women have on important decisions being made within the household. In a rural setting earnings from land and from wages are likely to be the two most important

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[35] These data were not collected for households in round 3 of the YLS.
[36] The labour force participation rate among fathers in our sample is 98.4 per cent, almost universal.

sources of income for households.[37] This result, therefore, bolsters our claim that an increase in work opportunities for women is likely to have a positive effect on their decision-making abilities within the household. The positive impact of mother's NREGS work on girls' time in school and our analysis here indicates that our findings cannot be explained purely within a unitary framework of the household.[38]

5. Conclusion

The role of increasing women's bargaining power within households as a means of reducing poverty has been emphasized in discussions on development policy. In this paper, we look at one such policy initiative in India - the National Rural Employment Guarantee Scheme. While the scheme has been conceived primarily to provide households a guaranteed income through employment on public projects, it is sensitive to issues of gender discrimination in the labour marker. Given that private casual wages for women are often less than those of men, the scheme stipulates equal wage rates across gender. It also gives priority to female employment and targets at least one third of the beneficiaries to be women. Thus the scheme aims to increase and improve rural women's labour market opportunities.

In this paper we contend that, ceteris paribus, an increase in participation of a mother on NREGS projects could affect her household's outcomes such that they reflect her preferences better. Using panel data collected by the Young Lives Study in a large

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[37] We find no impact of work status of mothers on their participation in decisions related to earnings from livestock and self-employment activities of the household.

[38] In order to test for the possibility that schools substitute for day care for working mothers, we control for the demographic composition of the household. Under this hypothesis, the effect of mothers working on children's time in school should be insignificant if there are older siblings in the household to take care of the younger ones. But our results are unchanged when we control for demographic composition of the household. See Table A3 in the appendix for details.

southern state of India (Andhra Pradesh) and taking advantage of intra district variation in rainfall shock and the number of NREGS projects 'in-progress', we find that greater participation of women in NREGS works has a positive effect on her children's time in school. Moreover we find that this effect is largely on children in the poorest wealth group, for girls and younger children in the household.

Our findings of the positive effect of mothers' program participation on children's time spent in school carries implications for their educational attainment as well. Our results suggest that grade attainment of younger children and those in less landed households improves due to mothers' NREGS participation, implying that more time in school translates into better educational attainment for some groups of children.

We find evidence that suggests that the positive impact of mothers' increased program participation could be due to her improved position in household decision-making. Our assertion is supported by recent qualitative evidence on the empowering effects of NREGS on rural women (Pankaj and Tankha, 2010; Khera and Nayak, 2009) accompanied by more rigorous findings of increased labour force participation of rural women due to this public program (Azam, 2012). Thus, our study not only informs us about the impact of female labour supply on intra-household outcomes but also extends the current debate in India on the effects of one of its most ambitious poverty alleviation program.

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Figure 1: Labour Force Participation by Gender
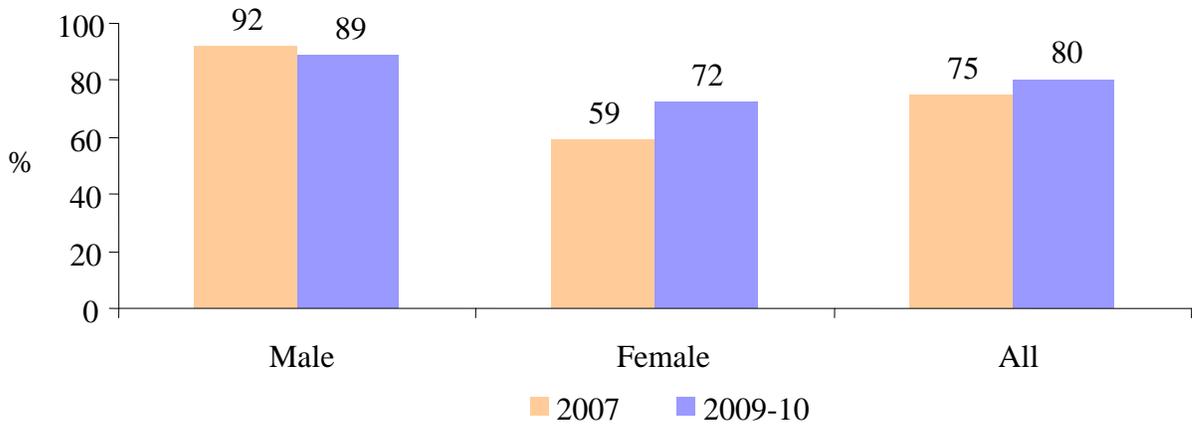
Notes: Individuals belonging to the working age of 16-60 years are included. Sample size is 5832 in 2007 and 6021 in 2009-10.
Source: Young Lives data.

Figure 2: Labour Force Participation by Work Type and Gender
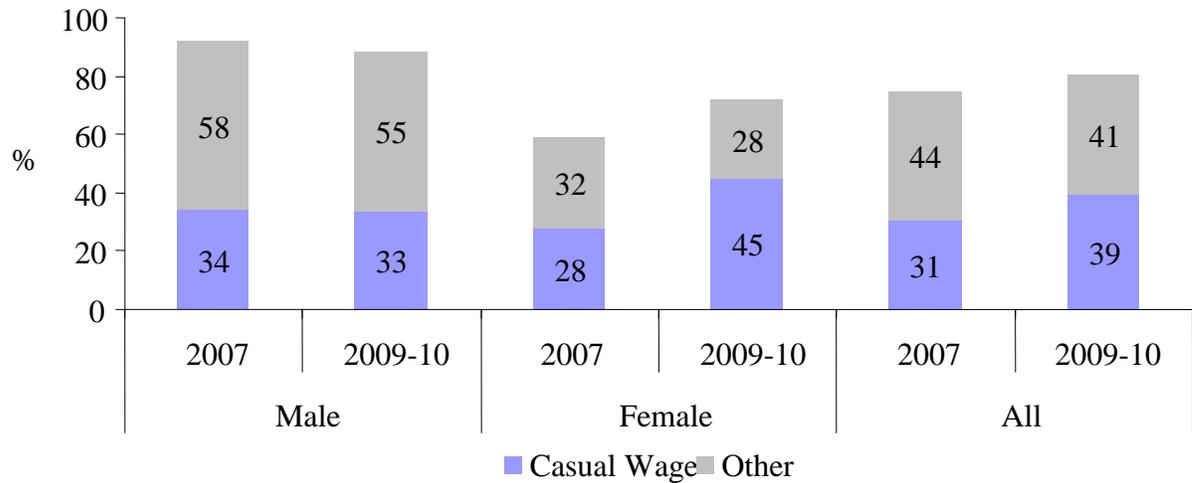
Notes: Same as in Figure 1.
Source: Young Lives data.

Figure 3: Number of Days Worked in NREGS (Household Level)
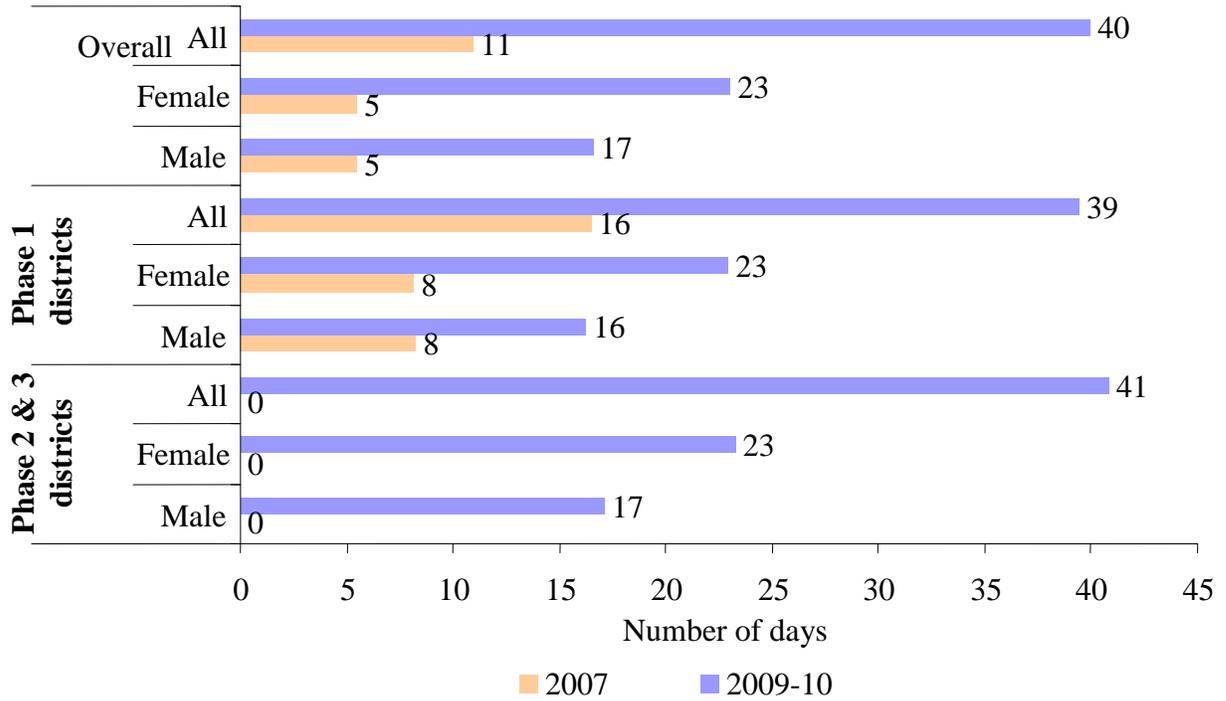
Notes: The figures are at the household level. The sample consists of 2122 households in 2007 and 2114 households in 2009-10. NREGS was implemented in the Phase 1 districts in 2006 and in the rest of the districts in 2007 and 2008.
Source: Young Lives data.

Figure 4: Wage Rate for Public Casual Labour in Andhra Pradesh
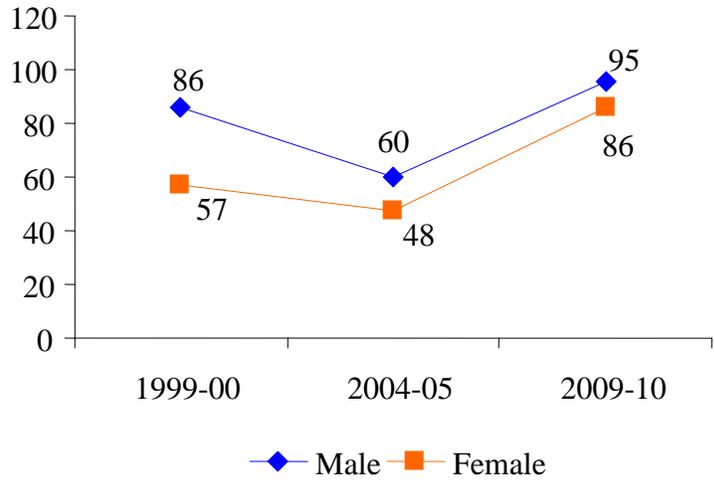
Notes: The wage rates are calculated for the working population in the age group of 16-60 years.
The wage rates are deflated using CPI-AL and are expressed in 2009-10 rupees.
Source: National Sample Survey data from 55th round (1999-00), 61st round (2004-05) and 66th round (2009-10).

Figure 5: Participation in Public Casual Labour in Andhra Pradesh
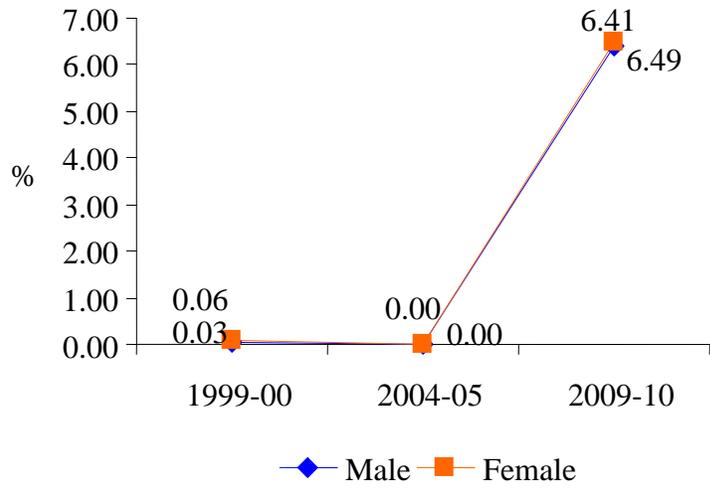
Notes: The labour force participation figures are calculated considering both the usual principal and subsidiary activity status of the individuals. Working population belonging to the age group of 16-60 years is considered.
Source: National Sample Survey data from 55th round (1999-00), 61st round (2004-05) and 66th round (2009-10).

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Table 1: Labour force participation by work type, gender and asset quartile (%)

Asset Quartiles	Gender	2007 (Sample size = 5832)			2009-10 (Sample size = 6021)			Change between rounds		
		Casual	Other	All	Casual	Other	All	Casual	Other	All
Asset Quartile 1	Male	48	44	92	44	46	90	-4	2	-2
	Female	41	28	69	59	24	82	17	-4	13
	All	45	36	80	51	34	86	7	-1	6
Asset Quartile 2	Male	39	53	92	36	53	89	-3	0	-3
	Female	29	31	60	50	27	77	20	-4	17
	All	34	42	76	43	40	83	9	-2	7
Asset Quartile 3	Male	27	65	92	29	59	88	2	-7	-5
	Female	18	32	50	36	30	66	18	-2	16
	All	22	48	71	32	44	77	10	-4	6
Asset Quartile 4	Male	8	82	91	9	78	87	1	-5	-4
	Female	8	40	48	14	33	47	6	-7	-1
	All	8	61	69	11	55	66	3	-6	-3

Notes: (a) Individuals in the age group of 16-60 years are considered. (b) Asset Quartiles are generated from an Asset Index which is constructed by Principal Component Analysis of several binary asset ownership variables at the household level. The assets which are considered are: television, radio, car, motorbike, bicycle, telephone, mobile phone, refrigerator, fan, electric oven, table and chair, sofa and bedstead.

Source: Young Lives data.

Table 2: Number of days worked in NREGS by asset quartile (household level)

Asset Quartiles	2007 (N = 2122)			2009-10 (N = 2114)			Change between rounds		
	Male	Female	All	Male	Female	All	Male	Female	All
Asset Quartile 1	7	6	13	19	28	48	12	22	34
Asset Quartile 2	6	6	12	17	24	41	11	18	30
Asset Quartile 3	5	5	9	16	20	37	12	15	27
Asset Quartile 4	3	2	5	8	10	18	5	7	13

Note: The figures are at the household level. See Table 1 for description on the Asset Quartiles.

Source: Young Lives data.

Table 3: Summary statistics

Variable	2007			2009-10		
	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.
Child characteristics						
Sex (Male=1, Female=2)	2893	1.52	0.50	2893	1.52	0.50
Age (yrs.)	2893	8.28	2.99	2893	11.28	2.99
Enrolment	2893	0.80	0.40	2893	0.90	0.29
Time spent in school (hours)	2893	5.87	2.11	2893	7.06	2.46
Highest grade completed	2961	2.63	2.60	2961	4.75	3.05
Parents participated in NREGS	2893	0.33	0.47	2893	0.66	0.47
Total number of days parents worked in NREGS	2893	9.29	21.44	2893	36.00	47.59
Mother's characteristics						
Mother's age (yrs.)	2893	30.35	5.48	2893	33.31	5.45
Whether mother is working	2890	0.61	0.49	2886	0.84	0.37
Whether mother has worked in NREGS	2893	0.28	0.45	2893	0.61	0.49
Number of days mother worked in NREGS	2893	4.64	11.18	2893	20.80	28.36
Mother's share in total days parents worked in NREGS	2893	0.18	0.32	2893	0.41	0.37
Mother's share in total days parents worked in NREGS conditional on parents participated in NREGS	966	0.54	0.33	1902	0.62	0.28
Father's characteristics						
Father's age (yrs.)	2893	36.29	6.35	2893	39.22	6.26
Whether father is working	2886	0.99	0.11	2886	0.98	0.15
Whether father has worked in NREGS	2893	0.25	0.43	2893	0.49	0.50
Number of days father worked in NREGS	2893	4.65	11.86	2893	15.20	24.66
Father's share in total days parents worked in NREGS	2893	0.15	0.29	2893	0.25	0.29
Father's share in total days parents worked in NREGS conditional on parents participated in NREGS	966	0.46	0.33	1902	0.38	0.28
Household characteristics						
Annual non-agricultural income (Rs.)	2893	28650	30269	2893	42108	47551
Annual agricultural income (Rs.)	2893	4299	22572	2893	8575	40526
Asset quartile 1	2893	0.39	0.49	2893	0.15	0.36
Asset quartile 2	2893	0.25	0.43	2893	0.19	0.39
Asset quartile 3	2893	0.23	0.42	2893	0.27	0.44
Asset quartile 4	2893	0.13	0.33	2893	0.39	0.49
Household size	2893	5.76	2.13	2893	5.74	2.20
Land owned (acre)	2893	2.15	3.30	2893	3.55	41.05

Total number of days household worked in NREGS	2893	11.23	26.78	2893	42.81	55.92
Total number of social audits between the two rounds	2893	1.14	0.58	2893	1.14	0.58
Whether date of interview was during school summer vacation period	2893	0.08	0.27	2893	0.00	0.00
Whether date of interview was after March	2893	0.35	0.48	2893	0.00	0.00
Community (Mandal) characteristics						
Rainfall shock in May-June	2893	0.50	0.48	2893	-0.61	0.50
Number of 'in-progress' NREGS projects	2893	2.11	4.63	2893	6.70	10.92

Source: Young Lives Study

Table 4: Effect of number of days mother worked in NREGS on child's time spent in school

	OLS-FE	2SLS-FE
	(1)	**(2)**
Annual household income in thousands (INC)	0.001	0.077
	(0.172)	(0.175)
Number of days mother worked in NREGS (MOTHER_NREGS)	0.001	0.224***
	(0.445)	(0.005)
Number of days father worked in NREGS (FATHER_NREGS)	0.001	-0.264***
	(0.578)	(0.003)
Square of age (SQ_AGE)	-0.064***	-0.052***
	(0.000)	(0.000)
Highest grade completed (GRADE)	-0.164**	-0.471**
	(0.012)	(0.023)
Square of highest grade completed (SQ_GRADE)	0.039***	0.043**
	(0.000)	(0.016)
Household size (HH_SIZE)	-0.049	-0.425
	(0.131)	(0.178)
Asset Quartile 2 (D_2^{ASSETS})	0.039	0.040
	(0.729)	(0.908)
Asset Quartile 3 (D_3^{ASSETS})	-0.199	-0.162
	(0.110)	(0.749)
Asset Quartile 4 (D_4^{ASSETS})	-0.228	-0.892
	(0.161)	(0.210)
Land owned (LAND)	0.002**	-0.003
	(0.014)	(0.447)
Number of social audits * Time	-0.316**	0.220
	(0.020)	(0.718)
Date of interview during summer vacation	-0.699***	-0.812
	(0.001)	(0.226)
Time	4.141***	1.526
	(0.000)	(0.395)
Constant	11.122***	
	(0.000)	
District Level Trends	Yes	Yes
Child Fixed Effects	Yes	Yes
Observations	5,786	5,786
Number of Children	2,893	2,893
R-squared	0.302	

Notes: Robust p values in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 5: Decomposition of effect by asset quartiles and land ownership (2SLS-FE)

	Asset Quartiles				Land Ownership	
	Asset Quartile 1	Asset Quartile 2	Asset Quartile 3	Asset Quartile 4	Land ≤ Median (1.04 acre)	Land > Median (1.04 acre)
	(1)	(2)	(3)	(4)	(5)	(6)
Annual household income in thousands (INC)	0.001	-0.093	0.487	-0.040	0.017	0.205
	(0.988)	(0.266)	(0.910)	(0.859)	(0.516)	(0.879)
Number of days mother worked in NREGS (MOTHER_NREGS)	0.105**	0.212*	1.418	0.724	0.147***	0.713
	(0.024)	(0.061)	(0.914)	(0.846)	(0.001)	(0.723)
Number of days father worked in NREGS (FATHER_NREGS)	-0.089**	-0.133	-2.221	-0.798	-0.187***	-0.819
	(0.041)	(0.316)	(0.893)	(0.800)	(0.005)	(0.745)
Square of age (SQ_AGE)	-0.079***	-0.094***	0.143	-0.057	-0.050***	-0.089
	(0.000)	(0.000)	(0.944)	(0.814)	(0.000)	(0.138)
Highest grade completed (GRADE)	-0.434**	-0.309	-3.403	-1.470	-0.333*	-1.657
	(0.023)	(0.348)	(0.881)	(0.806)	(0.085)	(0.781)
Square of highest grade completed (SQ_GRADE)	0.045***	0.052*	0.240	0.059	0.041**	0.107
	(0.002)	(0.065)	(0.843)	(0.878)	(0.024)	(0.655)
Household size (HH_SIZE)	-0.044	0.456	-3.013	-0.091	-0.161	-0.903
	(0.841)	(0.490)	(0.918)	(0.905)	(0.356)	(0.886)
Asset Quartile 2 (D_2^{ASSETS})	0.600	0.989	-5.480		0.213	-1.194
	(0.100)	(0.550)	(0.912)		(0.520)	(0.805)
Asset Quartile 3 (D_3^{ASSETS})	0.092	1.364	1.092	-7.334	0.134	-1.678
	(0.847)	(0.317)	(0.955)	(0.864)	(0.758)	(0.489)
Asset Quartile 4 (D_4^{ASSETS})	0.030	2.525	-15.625		-0.254	-1.034
	(0.974)	(0.175)	(0.889)		(0.656)	(0.772)
Land owned (LAND)	0.043	0.161	-0.286	0.007	0.153	-0.011
	(0.688)	(0.609)	(0.926)	(0.796)	(0.210)	(0.905)
Number of social audits * Time	-0.602	-1.336	6.375	-0.343	-0.146	1.143
	(0.127)	(0.342)	(0.953)	(0.940)	(0.760)	(0.916)
Date of interview during summer vacation	-0.287	-2.071	-1.538	-4.628	-0.497	-2.422
	(0.509)	(0.115)	(0.964)	(0.822)	(0.309)	(0.643)
Time	4.959***	6.405*	-15.449	4.556	2.449*	0.638
	(0.000)	(0.053)	(0.951)	(0.451)	(0.061)	(0.983)
District Level Trends	Yes	Yes	Yes	Yes	Yes	Yes
Child Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,248	1,448	1,352	738	3,056	2,730
Number of Children	1,124	724	676	369	1,528	1,365

Notes: Robust p values in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 6: Decomposition of effects by gender and age group (2SLS-FE)

	Gender		Age-group	
	Male	**Female**	**5-9 years**	**10-14 years**
	(1)	**(2)**	**(3)**	**(4)**
Annual household income in thousands (INC)	0.013	0.132	0.049	0.040
	(0.772)	(0.449)	(0.388)	(0.590)
Number of days mother worked in NREGS (MOTHER_NREGS)	0.177	0.271*	0.225***	0.122
	(0.115)	(0.095)	(0.004)	(0.185)
Number of days father worked in NREGS (FATHER_NREGS)	-0.139**	-0.467	-0.168**	-0.276**
	(0.022)	(0.115)	(0.013)	(0.048)
Square of age (SQ_AGE)	-0.064***	-0.030	-0.033	-0.036
	(0.000)	(0.438)	(0.252)	(0.403)
Highest grade completed (GRADE)	-0.608***	-0.088	-0.511**	-0.164
	(0.003)	(0.847)	(0.023)	(0.746)
Square of highest grade completed (SQ_GRADE)	0.063***	0.012	0.035	0.033
	(0.000)	(0.783)	(0.342)	(0.271)
Household size (HH_SIZE)	0.014	-0.913	-0.070	-0.524
	(0.947)	(0.409)	(0.784)	(0.336)
Asset Quartile 2 (D_2^{ASSETS})	-0.149	0.394	-0.119	0.275
	(0.617)	(0.652)	(0.770)	(0.602)
Asset Quartile 3 (D_3^{ASSETS})	-0.638	1.069	-0.118	-0.015
	(0.131)	(0.583)	(0.818)	(0.985)
Asset Quartile 4 (D_4^{ASSETS})	0.044	-2.498	-0.804	0.118
	(0.941)	(0.316)	(0.379)	(0.858)
Land owned (LAND)	-0.089	-0.006	-0.135	-0.000
	(0.209)	(0.605)	(0.241)	(1.000)
Number of social audits * Time	0.175	0.109	0.071	-0.255
	(0.726)	(0.946)	(0.927)	(0.673)
Date of interview during summer vacation	-1.172	0.197	-2.165***	1.578
	(0.124)	(0.903)	(0.002)	(0.345)
Time	3.412***	-1.012	1.260	0.645
	(0.003)	(0.866)	(0.586)	(0.859)
District Level Trends	Yes	Yes	Yes	Yes
Child Fixed Effects	Yes	Yes	Yes	Yes
Observations	2,794	2,992	3,544	2,242
Number of Children	1,397	1,496	1,772	1,121

Notes: Robust p values in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 7: Effect of number of days mother worked in NREGS on child's on grade progression

|	Overall		Heterogeneity (2SLS-FE)	
	OLS-FE	2SLS-FE	Land ≤ Median (1.04 acre)	Land > Median (1.04 acre)
	(1)	(2)	(3)	(4)
Annual household income in thousands (INC)	0.000	-0.035*	-0.017	-0.055
	(0.817)	(0.051)	(0.167)	(0.461)
Number of days mother worked in NREGS (MOTHER_NREGS)	0.003***	0.033	0.031*	-0.034
	(0.003)	(0.161)	(0.069)	(0.819)
Number of days father worked in NREGS (FATHER_NREGS)	-0.002**	-0.024	-0.028	0.010
	(0.046)	(0.294)	(0.224)	(0.949)
Square of age (SQ_AGE)	0.015***	0.014***	0.015***	0.014**
	(0.000)	(0.000)	(0.000)	(0.026)
Household size (HH_SIZE)	-0.034**	0.165	0.087	0.222
	(0.033)	(0.149)	(0.448)	(0.526)
Asset Quartile 2 (D_2^{ASSETS})	-0.122**	-0.204**	-0.259**	0.156
	(0.024)	(0.024)	(0.010)	(0.681)
Asset Quartile 3 (D_3^{ASSETS})	-0.054	-0.261*	-0.212	0.079
	(0.345)	(0.094)	(0.135)	(0.854)
Asset Quartile 4 (D_4^{ASSETS})	-0.093	0.151	0.054	-0.004
	(0.234)	(0.440)	(0.795)	(0.991)
Land owned (LAND)	0.000	0.003**	0.076	0.004
	(0.128)	(0.033)	(0.176)	(0.424)
Number of social audits * Time	0.049	-0.329	-0.367	-0.257
	(0.500)	(0.217)	(0.296)	(0.703)
Date of interview after March	0.116**	-0.326	-0.144	-0.281
	(0.020)	(0.176)	(0.608)	(0.537)
Time	1.463***	2.160***	1.958***	2.818
	(0.000)	(0.000)	(0.000)	(0.241)
Constant	1.652***			
	(0.000)			
District Level Trends	Yes	Yes	Yes	Yes
Child Fixed Effects	Yes	Yes	Yes	Yes
Observations	5,922	5,922	3,142	2,780
Number of Children	2,961	2,961	1,571	1,390
R-squared	0.764			

Table 8: Effect of work status of mothers on their decision-making within household

	Land	Earnings from Land	Wage Activities	Earnings from Wage Activities
	(1)	(2)	(3)	(4)
Working	1.061***	1.242***	0.966***	1.364***
	(0.003)	(0.001)	(0.002)	(0.001)
Age	-0.013	-0.031	0.015	-0.002
	(0.521)	(0.144)	(0.420)	(0.949)
Age squared	0.0002	0.0004	-0.0002	0.00003
	(0.392)	(0.140)	(0.431)	(0.941)
Highest grade passed	0.006**	0.007**	0.002	0.007*
	(0.029)	(0.021)	(0.427)	(0.100)
Household size	-0.012*	-0.009	-0.009	-0.018*
	(0.065)	(0.200)	(0.240)	(0.071)
Asset quartile 2	0.075*	0.091**	0.030	0.067
	(0.086)	(0.043)	(0.459)	(0.185)
Asset quartile 3	0.084	0.154**	0.018	0.096
	(0.158)	(0.013)	(0.743)	(0.165)
Asset quartile 4	0.115	0.137*	0.074	0.200*
	(0.150)	(0.094)	(0.410)	(0.087)
Household's land ownership	-0.005	0.001	-0.018***	-0.019**
	(0.360)	(0.907)	(0.009)	(0.024)
Muslim	0.247**	0.199	0.012	0.300*
	(0.049)	(0.160)	(0.926)	(0.088)
Christian	0.125	-0.026	-0.076	-0.233
	(0.410)	(0.854)	(0.594)	(0.117)
SC	-0.097*	-0.117**	0.047	0.091
	(0.066)	(0.033)	(0.426)	(0.216)
ST	-0.080	-0.121	0.072	0.016
	(0.370)	(0.186)	(0.301)	(0.853)
Backward caste	-0.023	0.022	0.071	0.152**
	(0.622)	(0.647)	(0.232)	(0.047)
Mixed caste	-0.338	-0.316	0.025	-0.055
	(0.197)	(0.306)	(0.832)	(0.527)
Constant	-0.162	-0.002	-0.085	-0.067
	(0.548)	(0.996)	(0.748)	(0.837)
District fixed effects	Yes	Yes	Yes	Yes
Observations	1,946	1,977	1,500	1,474

Notes: Robust p-values in parantheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Figure A1: Participation in Private Casual Labour in Andhra Pradesh
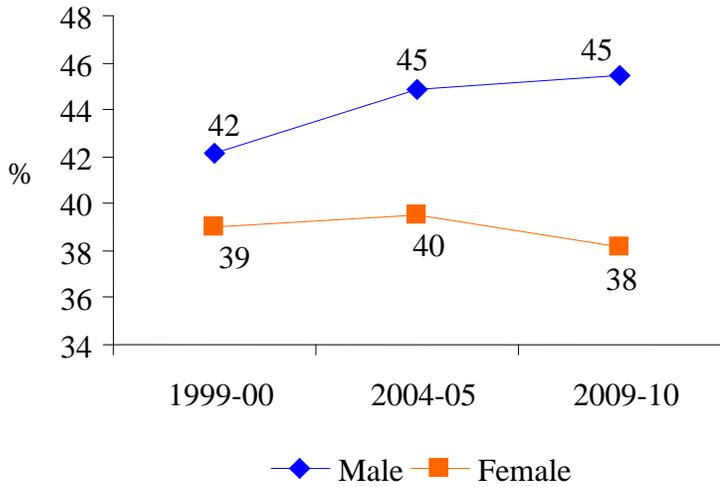
Figure A2: Wage Rate for Private Casual Labour in Andhra Pradesh

Notes: The wage rates are calculated for the working population in the age group of 16-60 years.

The wage rates are expressed in 2009-10 rupees.

Source:National Sample Survey data from 55th round (1999-00), round (2004-05) and 66th round (2009-10).

Table A1: First stage regressions (for overall results)

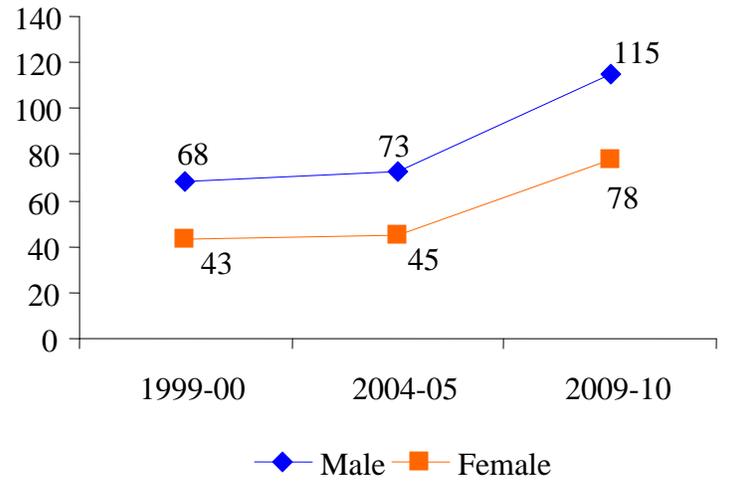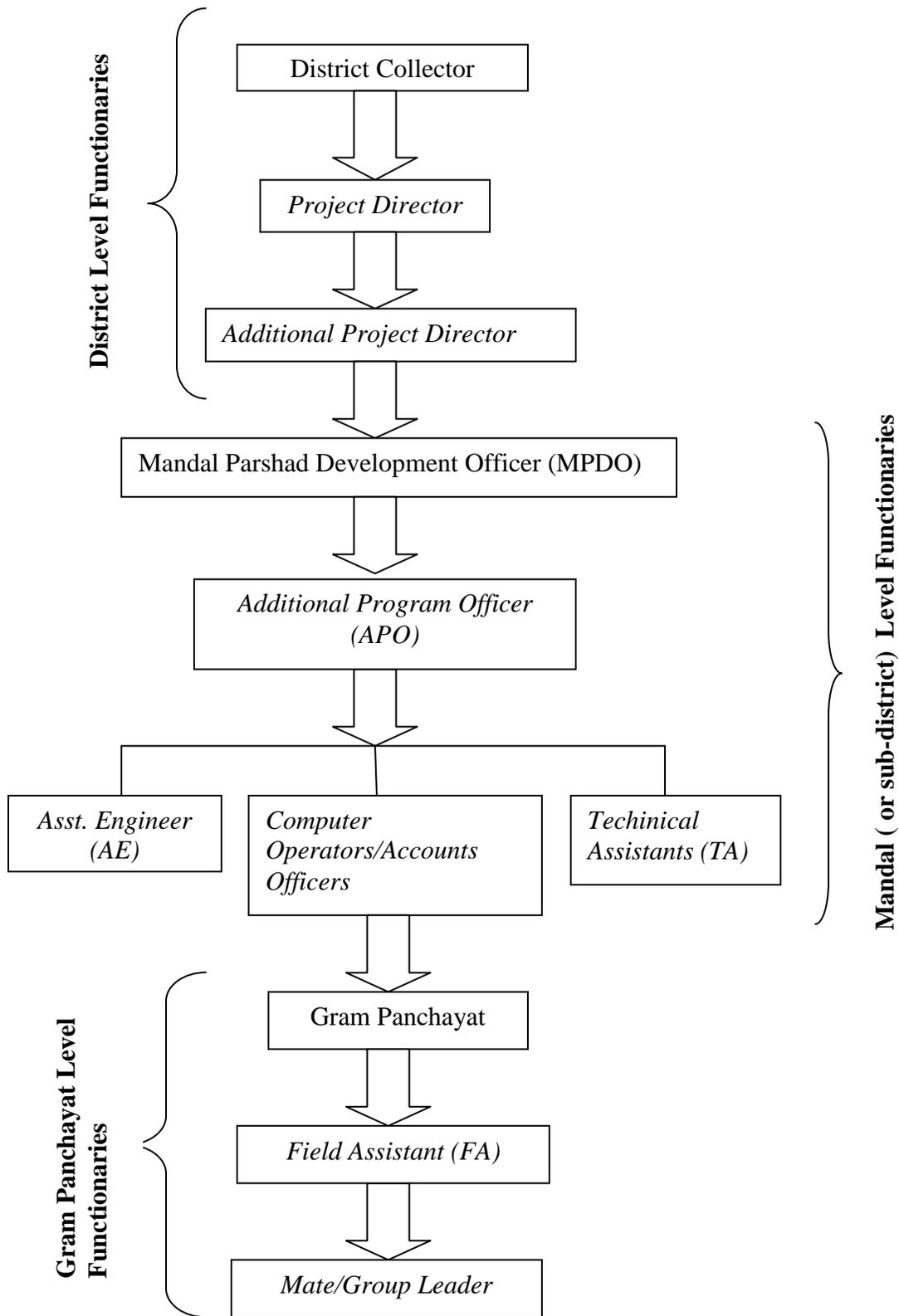|	Time Spent in School		
	Annual household income in thousands (INC)	**Number of days mother worked in NREGS (MOTHER_NREGS)**	**Number of days father worked in NREGS (FATHER_NREGS)**
	(1)	**(2)**	**(3)**
Rainfall shock in May-June (RAIN)	-12.895	2.570	7.032*
	(0.108)	(0.587)	(0.091)
Number of ongoing NREGS projects (PROJECTS)	0.359**	0.200**	0.481***
	(0.045)	(0.043)	(0.000)
RAIN * PROJECTS	-0.126	0.479***	0.408***
	(0.660)	(0.002)	(0.002)
Square of age (SQ_AGE)	-0.106	-0.011	0.007
	(0.226)	(0.822)	(0.879)
Highest grade completed (GRADE)	-0.141	0.527	-0.699
	(0.916)	(0.474)	(0.308)
Square of highest grade completed (SQ_GRADE)	0.066	0.021	0.053
	(0.568)	(0.769)	(0.423)
Household size (HH_SIZE)	5.112***	0.044	0.053
	(0.001)	(0.894)	(0.839)
Asset Quartile 2 (D_2^{ASSETS})	-1.753	1.450	0.797
	(0.252)	(0.214)	(0.460)
Asset Quartile 3 (D_3^{ASSETS})	-4.128	2.137	0.853
	(0.113)	(0.136)	(0.520)
Asset Quartile 4 (D_4^{ASSETS})	7.124**	-3.045*	-2.902**
	(0.023)	(0.079)	(0.048)
Land owned (LAND)	0.069***	-0.004*	-0.001
	(0.000)	(0.070)	(0.669)
Number of social audits * time	-10.592***	-0.427	-2.983*
	(0.001)	(0.833)	(0.098)
Date of interview during summer vacation	0.885	8.152***	6.150***
	(0.814)	(0.000)	(0.000)
Time	13.880	18.894**	25.889***
	(0.392)	(0.042)	(0.002)
Constant	17.383	-0.196	-0.939
	(0.201)	(0.969)	(0.843)
District Level Trends	Yes	Yes	Yes
Child Fixed Effects	Yes	Yes	Yes
Observations	5,786	5,786	5,786
Number of Children	2,893	2,893	2,893
R-squared	0.129	0.269	0.190
F-Stat	45.49	71.47	42.55

Notes: Robust p-values in parantheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Figure A3: Administration of NREGA projects in Andhra Pradesh

District Level Functionaries

- District Collector
- *Project Director*
- *Additional Project Director*

Mandal (or sub-district) Level Functionaries

- Mandal Parshad Development Officer (MPDO)
- *Additional Program Officer (APO)*
- *Asst. Engineer (AE)*
- *Computer Operators/Accounts Officers*
- *Techinical Assistants (TA)*

Gram Panchayat Level Functionaries

- Gram Panchayat
- *Field Assistant (FA)*
- *Mate/Group Leader*

Note: functionaries specific to NREGS in italics.

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Table A2: Effect of social audits on household awareness

	Taken action on a community problem	Participated in awareness campaign	Participated in protest march / demonstration	Voted in local elections	Index 1[#]	Index 2[##]
	(1)	(2)	(3)	(4)	(5)	(6)
Number of social audits * Time	0.039	-0.046	-0.070***	0.002	-0.191	-0.191
	(0.225)	(0.105)	(0.001)	(0.832)	(0.132)	(0.131)
Average age of the household	0.002	-0.002	0.001	0.001	0.002	0.002
	(0.492)	(0.428)	(0.531)	(0.547)	(0.813)	(0.824)
Household size	0.001	0.009	0.000	0.001	0.019	0.019
	(0.832)	(0.136)	(0.969)	(0.745)	(0.431)	(0.434)
Land owned	0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.204)	(0.607)	(0.492)	(0.247)	(0.790)	(0.793)
Asset Quartile 2 (D_2^{ASSETS})	0.034	0.010	-0.009	-0.003	0.056	0.057
	(0.116)	(0.633)	(0.572)	(0.742)	(0.530)	(0.524)
Asset Quartile 3 (D_3^{ASSETS})	0.031	0.038	-0.002	-0.002	0.114	0.114
	(0.203)	(0.117)	(0.901)	(0.815)	(0.243)	(0.241)
Asset Quartile 4 (D_4^{ASSETS})	0.050	0.047	-0.006	-0.005	0.153	0.154
	(0.115)	(0.145)	(0.779)	(0.680)	(0.248)	(0.244)
Time	-0.086**	-0.077**	0.074***	0.005	-0.103	-0.105
	(0.022)	(0.038)	(0.004)	(0.651)	(0.493)	(0.488)
Constant	0.033	0.076	0.015	0.974***	-0.351*	-0.349*
	(0.554)	(0.123)	(0.652)	(0.000)	(0.096)	(0.098)
District Level Trends	Yes	Yes	Yes	Yes	Yes	Yes
Household Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,229	4,230	4,231	4,234	4,226	4,226
Number of Households	2,123	2,123	2,123	2,123	2,123	2,123
R-squared	0.046	0.056	0.038	0.022	0.057	0.058

Notes: Robust p values in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.
Index 1 is obtained by principal component analysis (PCA) of the dependent variables in column 1, 2, 3 and 4.
Index 2 is obtained similarly by PCA of the dependent variables in column 1, 2, and 3 (excluding 4).

Table A3: Effect of number of days mother worked in NREGS on child's time spent in school

	OLS-FE	2SLS-FE
	(1)	**(2)**
Annual household income in thousands (INC)	0.001	0.071
	(0.202)	(0.166)
Number of days mother worked in NREGS (MOTHER_NREGS)	0.001	0.225***
	(0.456)	(0.004)
Number of days father worked in NREGS (FATHER_NREGS)	0.001	-0.267***
	(0.558)	(0.002)
Square of age (SQ_AGE)	-0.063***	-0.054***
	(0.000)	(0.000)
Highest grade completed (GRADE)	-0.161**	-0.468**
	(0.016)	(0.021)
Square of highest grade completed (SQ_GRADE)	0.039***	0.043**
	(0.000)	(0.015)
Number of 0-4 years old females in household	*0.071*	*-0.569*
	(0.574)	*(0.367)*
Number of 0-4 years old males in household	*0.047*	*-0.238*
	(0.730)	*(0.664)*
Number of 5-9 years old females in household	*0.076*	*0.044*
	(0.483)	*(0.898)*
Number of 5-9 years old males in household	*0.013*	*-1.165*
	(0.927)	*(0.113)*
Number of 10-15 years old females in household	*0.048*	*-0.153*
	(0.645)	*(0.723)*
Number of 10-15 years old males in household	*-0.048*	*-0.686*
	(0.737)	*(0.162)*
Number of females above 15 years of age in household	*-0.022*	*-0.698*
	(0.812)	*(0.257)*
Number of males above 15 years of age in household	*-0.165**	*-0.076*
	(0.081)	*(0.816)*
Asset Quartile 2 (D_2^{ASSETS})	0.051	-0.006
	(0.649)	(0.985)
Asset Quartile 3 (D_3^{ASSETS})	-0.186	-0.235
	(0.139)	(0.609)
Asset Quartile 4 (D_4^{ASSETS})	-0.218	-0.860
	(0.181)	(0.212)
Land owned (LAND)	0.002**	-0.002
	(0.014)	(0.506)
Number of social audits * Time	-0.308**	0.108
	(0.025)	(0.842)
Date of interview during summer vacation	-0.697***	-0.773
	(0.001)	(0.245)
Time	4.098***	1.810
	(0.000)	(0.269)
Constant	10.907***	
	(0.000)	
District Level Trends	Yes	Yes
Child Fixed Effects	Yes	Yes
Observations	5,786	5,786
Number of Children	2,893	2,893
R-squared	0.302	

Notes: Robust p values in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.
Controls for households' demographic composition in italics.