Child labor supply and National Rural Employment Guarantee Scheme of India

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Abstract

In this paper we quantify the intent-to-treat effects of the presence of the National Rural Employment Guarantee Scheme (NREGS) on child labor outcomes. Little to no empirical literature exists evaluating the effects on child labor decision upon exogenous changes in adult labor supply. We use a Difference-in-Difference (DID) strategy along with child fixed-effects and the *older cohort*[1] of Young Lives India (YLI) panel data to identify the direction and magnitude of changes in child labor supply in Andhra Pradesh and Telangana (formerly Andhra Pradesh) due to the presence of NREGS. With the help of the detailed child time allocation data in YLI panel we differentiate between various *types* of labor activities and with staggered implementation of NREGS we look at changes in *intensive* & *extensive* margins of child labor across genders. We observe significant gender-wise differential effect of the *treatment* (presence of NREGS in a district) on labor supply to household chores, family (or household) enterprises and paid labor. While participation decreased for boys, there was a displacement of girls from labor from one form of activity to another.

1 Introduction

Initially implemented in 2016, the NREGS is India's largest workfare scheme on which the Indian government spent around Rs.34,000 crore ($5 billion) in 2014-2015. It provides at least 100 days of unskilled wage labor on demand for adults in a household, in rural India, at a pre-determined wage rate (which is the same for men and women participants in the scheme). The primary purpose of the scheme is to alleviate poverty by guaranteeing wages through guaranteed employment. Apart from their primary purpose, it is usually argued that such programs have unintended consequences. Few have looked at NREGS's impact on child welfare (we mention some of these below). In this paper we study the effect of presence of NREGS on child labor supply decision (both intensive and extensive margins).

[1]The children in the Young Lives study come from two age groups: 2,000 children born in 2001-02 (the Younger Cohort) and 1,000 children born in 1994-95 (the Older Cohort)

There are roughly 186 million children involved in some form of labor activity and participation in labor activities has decreased from 246 million in 2000 (ILO-website, as of 2013). This includes children who not only work for wages but also children, especially girls, who work in their own household without pay. According to Edmonds and Pavcnik (2005), most children work in their own household hold as compared to waged labor. In our analysis we use all form of activities (paid & unpaid, commercial & noncommercial) as alternate use of time could lead to higher life time utilities as compared to short terms gains obtained from performing these activities. As a simple labor supply decision, we would expect the marginal effects at the optimum to be the same, if it were not for Basu and Van's (1998) *luxury axiom*. The luxury axiom, where they state that parents would not send their children to work if they can afford to, in the presence of credit market frictions, leads to sub-optimal decisions. To see one such effect consider the displacement of schooling by child labor when the household cannot borrow. We know that child labor *at least* partially is responsible for displacing schooling (Ravallion & Wodon (2000)), which is usually correlated with higher lifetime incomes. Thus child labor could lead to inefficient outcome in terms of discounted life time utilities. Since NREGS primarily targets to eliminate poverty, it should have an impact on child labor decision.

The *luxury axiom* suggests a negative income effect on participation in labor activities. It finds support in various empirical studies such as Basu (1999), Ray (2000), Basu and Tzannatos (2003), Emerson and Souza (2003), Edmonds (2005), Edmonds and Pavcnik (2005), and Rickey (2009). In fact Edmonds (2005) suggest that roughly 80% decrease in child labor between 1993 and 1998 (in Vietnam) could be attributed to improved living standards, which were a result of exiting poverty. However, this correlation between household wealth (or income) and child labor is challenged by studies such as Bhalotra and Heady (2003), Edmonds and Turk (2004) and Basu, et al. (2010).These studies show that in poor household an increase in wealth could lead to higher participation by children. The opposing results observed are primarily due to the difference in the type of activities that children are involved in i.e, whether they contribute directly to household income through wages or increase production in the household enterprise with direct labor supply or participate in non-commercial activities. Basu, et al (2010) show that with imperfect labor markets (poor access to work), in extremely poor households, an increase in land holdings (indicative of wealth) could lead to an increase in child labor supply. They suggest that since work that is *close to home* is difficult to find, should the household come across additional wealth & invest it in the household enterprise, the child could work in the expanded enterprise. Edmonds and Turk

(2004), find evidence that Vietnamese households with their own enterprises are more likely to allocate child time to the enterprise. When studying unconditional cash transfers in Ecuador, which leads to higher household income, Edmonds and Schady (2012) find an increase in activitis in the household enterprise among the poorest households. These empirical evidence would suggest that NREGS, which is primarily a poverty alleviation program, could increase or decrease child labor activities, depending on the relative strength of these income and substitution effects, with stronger income effect leading to a decrease in child labor supply.

In addition to the difference in the type of work, disparity has been observed between activities performed by girls & boys and the effect of various exogenous *income-like* shocks (such as Conditional Cash Transfer(CCT)) on child welfare outcomes by gender. Impact of various CCT programs found that the effect on activities performed for pay (and work outside the household) was stronger for boys as compared to girls, while this effect reversed when one looked at domestic unpaid activities, as illustrated by studies of three programs: (i) Oportunidades in Mexico (Behrman et al., (2011a&b)), (ii) the Centre EuropÃl'en de Sociologie et de Science Politique (CESSP) scholarship program in Cambodia (Ferreira et al., (2009)) and, (iii) Programa de Asignacion Familiar (PRAF) in Honduras (Galiani and McEwan, (2011)). This difference in gender-wise time allocation could render policies ineffective for a certain gender if they targeted specific types of labor activities. Our result indicates that if the government targeted paid child labor, it could lead to an increase in labor activities in the household enterprise (at least for girls).

We believe that NREGS effects various household variables, such as household income, labor supply of adult women, etc., which in turn have effects on child time allocation. The rest of the paper will be structured as follows: In section 2, we discuss the characteristics of the NREGS and review literature on the effects of the scheme. In Section 3 we discuss the YLI panel data followed by the empirical strategy that we use in section 4. In section 5 we present the results of the effect of the *treatment* on extensive and intensive margins of various types of child labor activities which are discussed in the section 3. In section 6, we discuss possible reasons for the results.

2 National Rural Employment Guarantee Scheme

Households that intend to enroll in this workfare program must register to the local governing body (Gram Panchayat) and receive a job card. Once they apply for a job with the local governing body, they either receive employment

in 15 days and failing that, the household receives some form of unemployment insurance.

The implementation of the scheme across districts was staggered in three phases beginning in February 2006, followed by the second phase in April 2007 and the final phase in April 2008. The phased roll-out provides with an opportunity to study the effects of the program by comparing districts that received the program earlier against those which received in later phases. The YLI data consists of 6 districts belonging to Andhra Pradesh (and Telangana), 4 of these received the scheme in the first phase of the roll-out with the remaining 2 receiving the scheme in the subsequent phases. Since the YLI round 2 survey was conducted after the first phase and around the implementation of the second phase, this separation of timing in receiving scheme separates the districts into control and treatment group. The districts that received the program act as the control group as the status of the scheme does not change in these locations. While those receiving the scheme in second and third phases act as the treatment group as the status of the scheme changes for these from the baseline. There is large amount of literature on NREGS, focusing on changes in wage or prices and their effects on various development outcomes, using the programâĂŹs staggered implementation to use a DID identification strategy[2]. Districts that were identified as the poorest received the scheme in the earlier phases. We control for differential time trends using household and district level controls in our estimation to address the non-randomness of the program.

The scheme offers pre-determined wage which are usually higher than the prevailing agricultural wages. This leads to an increase in overall wages through decreased participation in the private market as shown by Berg, et al (2015) and Imbert & Papp (2015). The increased wages could effect child labor decision in the household through an income effect. While the income effect should lead to a decrease in child labor in the household, the decrease in adult labor supply to the household enterprise (or farm) could be substituted by the household child leading to an opposite effect. Islam and Sivasankaran (2015) show an increase in time spent on education for younger children and an increase in time spent working outside the household for older children, thus highlighting that dominance of each effect over the other in two age groups they consider[3]. Our result is partially in line with their results as we notice an increase in labor participation for girls and intensive margins for both boys and girls, but it is displaced from other labor activities.

[2]Zimmermann (2014), however discards the DID approach citing the non-randomness in implementation as a key issue. She uses a discontinuity design to conclude that NREGS acts as a safety net for male workers, who move from private casual sector and into family employment (riskier alternative).

[3]Islam and Sivasankaran (2015) consider two age groups in their study: Younger age group of children aging from 6 to 9 years while the older group consists of children aged between 15 to 17 years

A striking feature of the program is that the scheme requires that a third of those employed under the scheme be women. The participation of mothers in the program could effect labor supply effect through income effect, substitution effect and increased bargaining power of the women in the household. In some regions across India claims of women participation are over 50% (Bhatty (2006) and Deininger and Liu (2013)) because of migration of working men outside the village. Afridi, et al (2013) showed an increase in time spent by a girl child in school, grade progression, and female bargaining power with increase in female participation in NREGS using YLI data and rail fall shocks as an instrument for participation. However, one could also see an exact opposite effect on girl child due to substitution. Older girl children in the household could be forced to perform domestic duties typically handled by women in the household who now participate in NREGS supplied labor activities.

We estimate an intent-to-treat effect of the program instead of effect on the treated due to a number of concerns leading to selection biases. The implementation of the program has been weighed down by corruption and inability to provide desired levels of work. (Niehaus and Sukhtankar (2012) and Dutta et al. (2012)). Niehaus and Sukhtankar (2012) showed that people in charge at the lower levels of governance exploited the program to make illegitimate gains while Dutta et al. (2012) showed that people were unable to obtain sufficient work under the program (at least initially). Apart from supply side concerns such as these, the NREGS is a demand driven scheme where work would be provided on demand. Selection biases due to these concerns render the evaluation of the effect on the treated inconsistent while the intent-to-treat should ameliorate them.

3 Young Lives India Data

We use data from the second and third round of the Young Lives survey conducted in 6 districts of Andhra Pradesh (Now Andhra Pradesh and Telangana) in 2007 and 2010 respectively. The 6 districts where chosen to represent the state of Andhra Pradesh by selecting 2 districts from each geo-political region of the state (Rayalseema, Telangana and Coastal Andhra). The 2 districts in each region were chosen such that one represented the economically weak while the other represented the economically strong section of the region[4].

The interviews of the 2nd round began in January 2007 and lasted till June 2007. This creates a problem in the estimation using a DID methodology. The 4

[4]The 6 districts chosen were: in Coastal Andhra, West Godavari (Richer) & Srikakulam (Poorer), in Telangana, Karimnagar (R) & Mehboobnagar (P), and in Rayalseema, Cuddapah (R) & Anantapur (P)

districts that received NREGS in the 1st phase had almost a year to internalize the presence of NREGS. However, since the second phase of NREGS was rolled out on April 1, 2007, roughly 26% of the interviews for the children in the treatment group happened after the introduction of NREGS. The questions asked in the survey typically refer to time periods such as "last 12-months", "a typical week", "last 4 years" and thus include overlap with time when NREGS is present in the treatment group at the baseline. This makes the assertion that the treatment group is in fact treated after the survey, void. To check if there is implementation of the program in the treatment group, we look at the number of families that registered with the scheme. We observe that none of the households in the treatment had registered in them, thus indicating either lack of awareness or infrastructure related to the scheme. We believe that either way, the scheme would have had no impact on any of the variables of interest up to that point in time.

Since the objective of this paper is to study the effect of the presence of NREGS, which is only implemented in rural areas, we restrict our analysis to only the rural sample. In the YLI survey during January-April 2007, the sample consisted of 747 children residing in rural sites. The study was able to trace 732 of the rural children surveyed in rounds 2 of whom only 6 had migrated from their district in round 2 of the survey. Since the retention in the sample is well above 90%, we do not think that migration or attrition is a major concern for our study. We exclude these children who have migrated between the two rounds. Since the sample at the baseline were all in the age group of 11-12 years, they had roughly completed the same grades, with the treatment group completing almost a grade more on average (Table 1). The sample is further restricted by unavailability of data on some of the control variables and these children (9 out of 724) are dropped from the main regression. In addition to the YLI, we have used data from the NSS's 62 round to estimate district characteristics.

During the round 2 survey, roughly 70% of the sample residing in the control districts were registered in the NREGS, suggesting sufficient coverage of the program to have had effects on labor outcomes during this period. By round 3 survey in 2009-10, the NREGS was implemented in the remaining rural districts in India including the remaining two districts (West Godavari and Srikakulam) in the YLI panel. By this time, approximately 80% of the households residing in the control group and 75% of the households residing in the treated group were registered in the NREGS. This leads us to believe that there was sufficient penetration of the program in the YLI districts to have an effect on various outcomes.

We define three types of child labor activities depending on the type and loca-

tion of work that is performed. Work done within the household, either taking care of individuals in the household or performing domestic chores is termed as *Domestic labor*. Labor supply to the household enterprise, either agricultural or otherwise, such as assisting in the household business, etc is termed as *family enterprise labor*. Lastly, the labor supply outside the household for wages is termed as *market labor* and includes all waged labor activities. We explore both intensive and extensive margins of child labor supply. Thus, for extensive margins, the dependent variable in our regressions is a binary variable indicating whether the child participated in a certain kind of labor activity (variable=1) or not(variable=0). While for intensive margins, the dependent variable was the number of hours that the child dedicated to certain labor activities on a *typical* day.

In Table 1 we compare the control and the treatment groups at the baseline. Observe that the in the treatment group, the participation in domestic labor is roughly 20 percentage points lower than the control group and this difference is statistically significant. Mothers of children in the treatment group participate less in the labor market as compared to control group. This could be a direct consequence of the presence of NREGS in the control group as $1/3^{rd}$ of the labor force must be women under NREGS and 37% of the mothers in the control group participated in the program in the 12 months preceding the interview. This increase in mother's participation in the labor force could be a key mechanism through which NREGS could changes child time allocation.

We also observe significant difference in various household characteristics of control and treatment groups. 66% of the household in the control group had agricultural waged income as one source of income while it was 60% in the treatment group. The treatment group shows significantly higher non-agricultural income with 25% of the household in the treatment group earned income from regular salaried wage as compared to 19% in control group (the difference is statistically significant at a 10% level). Additionally, 29% of the household in the control group earned from Cash-For-Work/Food-For-Work (FFW) while none of the households in the treatment group were involved in such activities. The National FFW program was implemented in 2004 in the poorest 150 districts in the country. FFW as a source of income in the control group indicates that access to NREGS may not be complete and any estimate that we obtain is an underestimate of the magnitude.

Table 1: table

Table 1: Linear regression results to compare Treatment and Control groups at the baseline

Variable	Coefficient	Standard Deviation	Observation
Child characteristics			
Sex (female = 2, male = 1)	-0.0146	-0.04	725
Enrolment (No=0, Yes=1)	0.0335	-0.03	725
Time spent in school (in hours)	-0.1810	-0.20	725
Grade Completed	0.566***	-0.10	725
Number of Elder siblings	-0.387***	-0.08	725
Labor Market Participation	-0.182***	-0.03	725
Domestic Labor	-0.216***	-0.03	725
Familty Enterprise	-0.0288	-0.02	725
Market Labor	0.0029	-0.02	725
Number of Hours spent working (if working)	-0.3320	-0.27	561
Domestic Labor	-0.334**	-0.12	533
Familty Enterprise	-0.6940	-0.83	73
Market Labor	0.3600	-0.85	43
Parental characteristics			
Father's Characteristics			
Father's age (years)	-1.755***	-0.51	691
Highest Education attained (Up to 10th standard=0, 10th and beyond=1)	0.0256	-0.03	725
Mother's Characteristics			
Mother's age (years)	-1.186*	-0.46	715
Is Mother involved in commercial activity	-0.374***	-0.04	715
Highest Education attained (Up to 10th standard=0, 10th and beyond=1)	0.0258	-0.02	725
Household characteristics			
Household size	-0.685***	-0.13	1,450
Average age of household members	0.4350	-0.31	1,450
Number of males in the age group 18–60	-0.236***	-0.05	1,450
Land owned by household (in acres)	-1.575***	-0.18	1,448
Total Commercial Land	-1.383***	-0.17	1,448
Total Agricultural Land	-1.384***	-0.17	1,448
Total Non-agricultural Land	0.000508**	0.00	1,448
Agricultural Income (in Rs)	-2997.7**	-1,123.9	1,442
Non-Agricultural Income (in Rs)	5219.4***	-1,565.6	1,442
If the household has serious debts (No=0, Yes=1)	-0.108***	-0.03	1,450
Benefits from Indira Kranti Patham (IKP)	-0.262***	-0.03	1,450

Standard errors in parentheses
* p<0.05, ** p<0.01, *** p<0.001
Agricultural income includes earnings from sale of livestock products, sale of livestock, etc., agricultural waged work and trading & selling of commodities such as grains & animals.
Education of the parents is defined as a binary variable with parents who have not completed grade 10 assigned 0 and those with higher education assigned 1

The treated group has lower amount of land as compared to the control group. However almost all of the difference arises from the higher land holding for agricultural purposes by households in the control group. An interesting result observed is that the treated group, which is supposed to be socially better (as they received the treatment later) are more liquidity constrained (roughly 18% households stated that they would not be able to raise Rs. 1000 in the next

Table 2: Difference in difference regressions of participation in various labor activities clustered at the district level

	Participation in any form of labor activity		
	All	Boys	Girls
Treated*TIME	-0.109*	-0.125*	-0.093**
	(0.043)	(0.058)	(0.032)
	Participation in domestic labor activity		
	All	Boys	Girls
Treated*TIME	-0.117**	-0.137**	-0.097**
	(0.038)	(0.047)	(0.031)
	Participation in the family enterprise		
	All	Boys	Girls
Treated*TIME	-0.090**	-0.127**	-0.053
	(0.022)	(0.045)	(0.035)
	Participation in paid labor activity		
	All	Boys	Girls
Treated*TIME	-0.054	-0.024	-0.081
	(0.035)	(0.027)	(0.045)
N	1449	708	741

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

week as compared to 2% of the control group). One could *at least partially* attribute this to NREGS in control group, whereby individuals could borrow with the assurance to payback by working for the scheme.

When we look at the DID between the two groups across the two time periods in Table 2 & 3, we observe that there is a decrease in the labor force participation in the treated group after it has received treatment as compared to the control group (column 1). The decrease is observed in both boys and girls. While the decrease in boys labor is driven by a decrease in participation in domestic chores and family enterprise, the decrease observed for girls is primarily due the lower participation in domestic chores. We do not observe a difference in difference of participation levels in paid labor activities between the two groups after the treatment. However, when we look at intensive margins, there is a decrease in the number of hours spent working for both boys & girls and the difference is driven by decreased supply of labor hours to family enterprise across both genders. But the sign reverses when we control for differential trends & fixed effects as specified in the main regression in the next section and shown in the results.

Table 3: Difference in difference regressions of number of hours supplied to various labor activities clustered at the district level

	Hours of work in any form of labor activity		
	All	Boys	Girls
Treated*TIME	-1.018**	-1.071*	-0.942***
	(0.300)	(0.463)	(0.192)
	Hours of work in domestic labor activity		
	All	Boys	Girls
Treated*TIME	-0.355	-0.446	-0.248
	(0.189)	(0.249)	(0.185)
	Hours of work in the family enterprise		
	All	Boys	Girls
Treated*TIME	-0.380**	-0.495**	-0.264**
	(0.127)	(0.189)	(0.087)
	Hours of work in paid labor activity		
	All	Boys	Girls
Treated*TIME	-0.283	-0.130	-0.429
	(0.217)	(0.204)	(0.276)
N	1449	708	741

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

4 Estimation Strategy

The staggered implementation of NREGS provides an ideal quasi-experimental setup for understanding effect of change in exogenous labor demand on development outcomes. However, the criterion for phasing out of the scheme was not random and targeted the poorest districts in India. Our sample includes 4 of the poorest districts in India (Cuddapah, Anantapur, Mahaboobnagar and Karimnagar) and hence received the scheme in the 1st phase of its roll out. The remaining two districts in the sample, Srikakulam & West Godavari received the scheme in phase 2 and 3 respectively. Taking advantage of this difference in the timing of the implementation of the scheme, we use the DID methodology. Due to lack of data from round one on key variables, we do not try to establish the parallel trends assumption which is paramount to the analysis. Another concern with using the 1st round data of the YLI panel is that the control group was introduced to the treatment between the collection of data for round 1 and 2, thus introducing an exogenous shock that effects the control characteristics. Instead we control for differential trends using baseline household and district characteristics that could have an effect on the outcome variables. Since we cannot claim that the districts were subjected to similar trends before the introduction of the treatment, by controlling for the trends in the determinants of the dependent variable in our regressions, we can claim the consistency of the analysis.

The key dependent variables as described in the above section are the intensive and extensive margins of labor supply of the YL child. Baseline household characteristics are interacted with time to capture differential time trends that individuals belonging to a particular type of household at the baseline are subjected to. Similarly baseline district characteristics are interacted with time to capture district specific time trends. In addition to trends, we include child specific fixed effects in our main regression. Therefore the main specification that we use to estimate the effect of the presence of NREGS on child labor outcomes is as follows:

$$\begin{aligned} y_{ihdt} = \alpha_0 + \alpha_1 Treated_{ihd} + \alpha_2 Time_t + \alpha_3 Treated_{ihd} * Time_t \\ + \alpha_4 H_{hd0} * Time_t + \alpha_5 D_{d0} * Time_t + \delta_{ihd} + \epsilon_{ihdt} \end{aligned} \tag{1}$$

where y_{ihdt} stands for the extensive (0 or 1) or intensive margin (no of hours) of child labor of the i^{th} child in household h in district d in time period t. Household baseline characteristics, H_{hd0}, included (1) number of elder sibling at the base line, (2) grade completed by the child at the time of the survey, (3) whether the household had some debt or not (indicated by a dummy which was 0 when the household had not debt), (4) whether the household benefited

from IKP (dummy which is 0 if no), (5) total agricultural land owned, leased, rented or borrowed by the household (in terms of number of acres), (6) total commercial land which is owned, leased, rented or borrowed by the household and not used for agricultural purposes, (7) average age of the households, (8) total number of adult males in the household (adult males defined as men who were 18 years or older and 60 years or younger), (9) size of the household, (10) whether the mother participated in commercial activity or not (indicated by a dummy take 0 if the mother did not participate), (11) natural log of income (of the previous 12 months) from agricultural activities and (12) natural log of income (of the previous 12 months) from non-agricultural activities. District baseline characteristics, D_{d0}, included percentages of (1) Hindu population in the district, (2) rural population in the district, (3) agricultural population in the district (those with agriculture as the primary source of income) and (4) educated population in the district (percentage of those who have education greater than 8^{th} standard).

5 Results

We run separate sets of regressions for the two types of margin that we study and further separate them based on various types of labor activities that we defined. We run the main specification by increasing the controls step-wise, beginning with only controlling for baseline household controls, then following it up by adding baseline district variables and ultimately adding child specific fixed effects which is our strictest specification. We also estimate the specification separately for girls and boys to capture the differential impact of the treatment across the gender. This would direct us towards specific mechanisms through which the treatment effects our outcomes.

When we look at first 3 columns of Table 4, we observe that there was a fall in participation due to the presence of NREGS in the order of roughly 10% and the decrease is driven by boys. Boys participated less in domestic chores and labor activities in the family enterprise. No significant effect on participation rate of girls in any form of labor activity is observed. From columns 4 to 6 of Table 4, we notice a reversal in effect and observe that the treatment increase participation across genders primarily due to increased participation in domestic chores. Decrease in family enterprise labor for boys and market labor for girls is noticed. However, when we run the fixed effects regression with all the controls, we observe from column 7 to 9, that there was indeed a decrease in participation, which was primarily driven by decrease participation of boys in all types of activities. We observe that there was a 31% decrease in

boys participating in domestic chores, 10% in labor activities associated with family enterprise and 8% in paid labor. However, we observe that there was no change in the participation of girls in the labor market. But we do notice substitution between participating in domestic chores or paid labor and labor supply to family enterprise for girls. Girls moved from working for pay

[htbp]

Participation in labor activity of any form

	All	Boys	Girls	All	Boys
Treated*TIME	-0.105*	-0.141*	-0.077	0.204**	0.219**
	(0.047)	(0.058)	(0.045)	(0.067)	(0.082)

Participation in domestic labor activities

	All	Boys	Girls	All	Boys
Treated*TIME	-0.106*	-0.118*	-0.081	0.234**	0.302**
	(0.046)	(0.053)	(0.042)	(0.082)	(0.115)

Participation in labor activities in the family enterprise

	All	Boys	Girls	All	Boys
Treated*TIME	-0.034	-0.134*	0.035	-0.013	-0.120***
	(0.037)	(0.066)	(0.031)	(0.040)	(0.029)

Participation in paid labor activities outside the household

	All	Boys	Girls	All	Boys
Treated*TIME	-0.003	0.005	-0.003	-0.121***	0.069
	(0.043)	(0.044)	(0.053)	(0.021)	(0.038)
Baseline Household Controls	Yes	Yes	Yes	Yes	Yes
Baseline District Controls	No	No	No	Yes	Yes
Fixed Effects	No	No	No	No	No
N	1427	704	723	1427	704

Sample size represents data points from both time periods of the 725 children in the sample and drops those

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

in the household performing domestic chores to participating in the family enterprise.

When we look at the effect of treatment on the intensive margins in Table 5, we notice from the 1st three columns that the treatment did not effect the margins significantly. However when we introduce the baseline district controls, we notice that there was an increase in the number of hours that boys spent working in the family enterprise and for paid labor. However, girls work less number of hours for pay and instead substitute it with more hours performing domestic chores and working for the household enterprise by roughly the same

amount. In columns 7-9 of Table 5, we notice that the presence of NREGS lead to an overall decrease in the number of hours that children participated in the labor market (noticed across both genders). There was partial substitution observed in the form of increase labor hours in the family enterprise. This substitution is seen across genders, but from different types of work. Girls decrease the number of hours spend working for pay and increase working in the household enterprise while boys decreased hours in domestic chores and increase working for the family enterprise.

6 Discussion

Why do we observe a decrease in participation across almost all types of work and genders but an increase in intensive margins in the family enterprise? There are possibly multiple mechanisms at work. We observe that boys participation decrease across all the types of work, which could be a direct result of an income effect, where the increase in income due to the presence of NREGS leads to parents pulling their boys from various types of labor activities, most notably reduced participation in domestic chores. The increased income could lead to the household replacing the boy's labor and allocating the free time in other non-labor activities. However, we notice that the decrease in girl participation in the paid market decreases by 36%. Since in rural India, it is less preferred that girls leave the household for work, an increase in income due to NREGS, could lead to lower income requirement in the household from girl participation in the paid market. Hence the paid market labor is displaced by household enterprise labor. The decrease in participation in the domestic chores could be a result of increased income or substituting in the household enterprise for the adult labor displaced due to NREGS (this effect should be independent of the gender).

[htbp]

Intensive margin of Labor activity of any form (no. of hours on a typical day)

	All	Boys	Girls	All	Boys	G
Treated*TIME	-0.451	-1.064	0.080	0.704	1.533***	0
	(0.548)	(0.689)	(0.543)	(0.363)	(0.321)	(0

Intensive margin of domestic labor activities

	All	Boys	Girls	All	Boys	G
Treated*TIME	-0.381	-0.566*	-0.177	0.300	-0.207	0.
	(0.204)	(0.256)	(0.211)	(0.189)	(0.212)	(0

Intensive margin of labor activities in the family enterprise

	All	Boys	Girls	All	Boys	G
Treated*TIME	-0.155	-0.544*	0.078	0.860***	1.006***	0
	(0.189)	(0.260)	(0.158)	(0.178)	(0.099)	(0

Intensive margin of paid labor activities

	All	Boys	Girls	All	Boys	G
Treated*TIME	0.085	0.047	0.179	-0.457**	0.735**	-1.
	(0.320)	(0.389)	(0.377)	(0.161)	(0.285)	(0
Baseline Household Controls	Yes	Yes	Yes	Yes	Yes	
Baseline District Controls	No	No	No	Yes	Yes	
Fixed Effects	No	No	No	No	No	
N	1427	704	723	1427	704	

Sample size represents data points from both time periods of the 725 children in the sample and drops those

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Intensive margins indicate that while boys participated less due to the introduction of NREGS in the treated group, they worked longer hours in the family enterprise. Increased hours could be due to lower labor supply from household adults in the household enterprise and moving it to either NREGS or private market for higher wages. We see that girls trimmed paid labor hours, which could be a direct consequence of low preference of household girls working in the market as mentioned above. There was no effect on market labor hours of boys, possibly because, boys are more likely to work at places where the number of hours supplied are fixed and inflexible in contrast to girls who are more likely to supply domestic help in the market.

There is an overall decrease in work hours indicating that children spend more time performing non-labor activities. Both the intensive and extensive margins indicate an increased demand of child labor in the family enterprise (at least for

girls) and decreased participation in domestic chores. Income effect possibly dominates as we observe a substantial decrease in participation in the paid market. Hence we can partially conclude that the NREGS decreases child labor in domestic and paid markets, while labor supply to family enterprise is ambiguous with differences across genders and margins.

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8 Appendix

Table 1: Descriptive Statistics from round 2 (Baseline) of the survey

	Control Group			Treated Group		
Variable	**Observations**	**Mean**	**Standard Deviation**	**Observations**	**Mean**	**Standard Deviation**
Child characteristics						
Sex (female = 2, male = 1)	480	1.5167	0.5002	245	1.5020	0.5010
Enrolment (No=0, Yes=1)	480	0.8604	0.3469	245	0.8939	0.3086
Time spent in school (in hours)	480	5.8625	2.5525	245	5.6816	2.6092
Grade Completed	480	5.3854	1.2953	245	5.9510	1.1477
Number of Elder siblings	480	1.2771	1.1415	245	0.8898	0.9189
Labor Market Participation	480	0.8354	0.3712	245	0.6531	0.4770
Domestic Labor	480	0.8083	0.3940	245	0.5918	0.4925
Familty Enterprise	480	0.1104	0.3137	245	0.0816	0.2744
Market Labor	480	0.0583	0.2346	245	0.0612	0.2402
Number of Hours spent working (if working)	401	2.8753	2.9765	160	2.5438	2.6937
Domestic Labor	388	1.8995	1.3950	145	1.5655	0.8063
Familty Enterprise	53	4.0943	3.2061	20	3.4000	2.9629
Market Labor	28	7.1071	2.7667	15	7.4667	2.4162
Parental characteristics						
Father's Characteristics						
Father's age (years)	459	41.4	6.5884	232	39.7	5.9271
Highest Education attained (Up to 10th standard=0, 10th and beyond=1)	480	0.15	0.3533	245	0.17	0.3777
Mother's Characteristics						
Mother's age (years)	471	35.2	6.1014	244	34.0	5.3339
Is Mother involved in commercial activity	471	0.7473	0.4350	244	0.3730	0.4846
Highest Education attained (Up to 10th standard=0, 10th and beyond=1)	480	0.04	0.1850	245	0.06	0.2402
Household characteristics						
Household size	480	6.1667	2.5833	245	5.4816	1.9047
Average age of household members	480	25.7	5.2850	245	26.1	5.9253
Number of males in the age group 18–60	480	1.47	0.9018	245	1.23	0.6706
Land owned by household (in acres)	479	2.8852	3.7617	245	1.3100	2.0493
Total Commercial Land	479	2.4244	3.6219	245	1.0412	1.7271
Total Agricultural Land	479	2.4243	3.6219	245	1.0406	1.7269
Total Non-agricultural Land	479	0.0001	0.0016	245	0.0006	0.0048
Agricultural Income (in Rs)	476	12,067.6	22,808.3	245	9,069.9	13,897.2
Non-Agricultural Income (in Rs)	476	13,353.1	24,931.8	245	18,572.5	33,611.7
If the household has serious debts (No=0, Yes=1)	480	0.5938	0.4916	245	0.4857	0.5008
Benefits from Indira Kranti Patham (IKP)	480	0.5396	0.4990	245	0.2776	0.4487

Source: YL Round 2 Data (Older Cohort)
IKP: Facilitates access for poor women to employment, skill up gradation, training, credit and other support services.
Agricultural income includes earnings from sale of livestock products, sale of livestocks, etc., agricultural waged work and trading & selling of commodities such as grains & animals.
Education of the parents is defined as a binary variable with parents who have not completed grade 10 assigned 0 and those with higher education assigned 1.

Figure 1: Participation of YL children in the 2 groups, in various activities at various times