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Determinants of Child Labour: The Case of Andhra Pradesh

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Abstract

In this study, I examine the extent to which child labour is explained by the main determinants proposed in the literature. I focus on three determinants: income shocks, household composition and parental preferences. In addition, I examine the role of child-specific characteristics, such as psycho-social abilities and nutritional endowment. While there is extensive literature on child labour determinants, it is predominantly theoretical and tends to treat each determinant in isolation from the others. I use two rounds of data from the Young Lives project on a cohort of children living in Andhra Pradesh, India who were interviewed at the ages of 7 and then 11 to examine the effects of inter- and intra-household factors – as well as child-specific characteristics – on child labour in a unified empirical framework. I find that children work more in response to income shocks; that child labour is sensitive to household composition in terms of the age and gender of the other children; and, in urban areas, that it varies according to the bargaining power of women in the household. Investigation of child-specific fixed effects further suggests that nutritional status, reading skills and ability to get along with peers may also be relevant to whether and how much children work.

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1. Introduction

Most working children in developing countries are engaged in domestic tasks, such as caring for other dependants in the household and assisting on the family farm/business. While these children are not involved in 'hazardous' forms of child labour,¹ which are targeted by the International Labour Organisation (ILO) and popularised in the media, the tasks they undertake may nevertheless have adverse effects, including permanent loss of education and earlier marriage (Beegle et al. 2008). This paper uses data from rural India to examine the determinants of this kind of child labour. Currently, the literature around this is predominantly theoretical and tends to focus on one determinant at a time. Clearly, however, the child labour decision is affected by a range of factors simultaneously. Therefore, in order to improve our understanding of who works and how much, there is a need for a more comprehensive approach to investigating which factors are most important, what mechanisms they work through and how they interact with each other. The aim of this study is to make some headway in this direction. In the first part of the analysis, I combine a range of different determinants proposed in the literature into one empirical framework and examine both the relevance of each factor as a child labour determinant and its significance relative to the other factors. The second part of the study focuses on examining a set of additional determinants that have not been explored in the literature. These include some 'inherent' or time-invariant individual characteristics of the children, such as permanent health, cognitive abilities and psycho-social characteristics.

As mentioned above, the literature on determinants of child labour is predominantly theoretical. While there are few rigorous empirical papers examining determinants of child labour, much of the theoretical literature also includes an empirical component looking at whether trends in the data are consistent with the predictions of the models. As a whole, despite its extensiveness, the literature on the determinants of child labour can appear disjointed. The existing papers propose many alternative ways of modeling the child labour decision within a household decision-making framework, differing in the basic assumptions that they make about the decision-making process and preferences in the household, as well as the specific determinants that they emphasise. See Basu (1998) for a comprehensive chronological overview of the theoretical literature on modeling child labour.

In brief, the decision-making process within the household is modeled either as the domain of one individual or as a bargaining process between members of the household. In both sets of models, households maximise total welfare through the allocation of resources among the members of the household according to the weight assigned to each household member. In unitary models, formalised originally by Becker (1964), the weights are assigned by one person. In collective models, formalised by, for instance, Browning et al. (1994), the weights are determined by the bargaining power of the individuals which may vary depending on factors such as how much money the individual brings in and what his/her fallback options are.

Household models also differ in the assumptions made regarding the preferences of the decision maker(s). If the decision makers are altruistic, the child's utility enters into their utility function, resulting in a negative weight on child labour (Bhalotra 2004). In this framework, child labour is a manifestation of constrained household resources and is a consequence of

1 Work which directly compromises child health, safety or morals (ILO website 2008).

poverty. Basu and Van (1998), for instance, develop a model in which parents are assumed to be altruistic. Here, child labour occurs only when market wages for adult labour are too low for the household to sustain a subsistence level of consumption. If, however, parents are not altruistic towards the children, child labour occurs as the result of the welfare maximising process in which it is treated entirely as a consumption good (Becker and Lewis 1973). A comprehensive review of this literature is provided by Grootaert (2007).

The focus in this paper is on the specific determinants of child labour that have been modeled within the broad frameworks discussed above. I focus on some of the more prominent determinants including the ability of households to cope with transitory shocks, age and sex composition of children in the household, the distribution of bargaining power within the household and child-specific characteristics.

The ability of households to cope with shocks is linked to the permanent income hypothesis and consumption smoothing literature (e.g. Townsend 1994). Within this framework, household optimal response to transitory shocks is to borrow or use up buffer stocks. In the presence of credit constraints, however, less effective mechanisms have to be used. These may include child labour. Assuming that there is a trade-off between child labour and human capital accumulation, this may be an inefficient strategy (Baland et al. 2000). Beegle et al. (2006) explore transitory income shocks as a determinant of child labour empirically, using data from rural Tanzania. They find that child labour increases in response to income shocks, but that this increase is mitigated by household asset holdings. This is consistent with better-off households being more able to cope with transitory shocks due to better access to credit.

Another strand of the literature on determinants of child labour has focused on household composition. A number of studies have found some significant associations between the total number and the age-gender composition of children in the household and child labour (Ponczek et al. 2007; Grootaert 1998). Edmonds (2006) proposes an economic explanation for these effects based on the idea of comparative advantage in household production of non-tradable goods. In his model, the amount of schooling and work each child is involved in depends on the returns to each activity for him/her relative to the other children in the household. For instance, if returns to schooling are higher for boys and those with more experience are better at household production, then girls living in households with younger boys will work more than those living in households with younger girls. Another set of explanations focuses on parental preferences. For instance, Ejrnæs et al. (2004) propose a set-up in which parents decide how many children to have based on their budget constraints, the genetic endowments of the existing children and their expectations about the genetic endowments of future children. Parents then either reinforce, compensate or are neutral to the distribution of genetic endowments across their children, depending on their preferences concerning inequality (i.e., parental response is contingent upon the genetic endowments of their offspring).

There are also studies on the effects of within-household distribution of bargaining power. Collective models of household decision making were developed as a response to evidence that household consumption patterns vary with distribution of earnings within the household. Dercon et al. (2000), for instance, find that household resources are not pooled to help women cope with illness shocks in Southern Ethiopia, an area where options for married women are worse than in other parts of the country. If the balance of power within the household affects resource allocation then it can be modeled as a determinant of child labour. Moehling (1995), for instance, finds evidence that working children receive a larger share of household resources, using American data from the early 20th century. Even without assuming that children have some independence and say in household decisions, Basu and

Ray (2002) construct a collective household model in which the balance of power between husband and wife affects how much children work. In this model, the more balanced the bargaining power of husband and wife is, the less the children in the household have to work. This assumes that both parents are altruistic and so do not like sending their children to work, and that the two parents have different preferences over the goods consumed by the household. The outcome of their model is a U-shaped relationship between the balance of bargaining power between husband and wife and child work.

Finally, little work has been done on the role of child-specific characteristics in determining the extent to which children work. The only paper I am aware of is Bacolod and Ranjan (2008), who look at the interaction between wealth and child ability as determinants of child labour and schooling. They construct a theoretical model and provide empirical evidence, using data from the Phillipines, suggesting that while poor households with high ability children are more likely to send them to school than poor households with low ability children, the latter are more likely to let the children remain idle rather than work.

These strands of literature contribute to an interesting, insightful and progressive body of work. However, since prevalence and intensity of child labour is explained by a range of factors simultaneously, a shopping list of determinants is only half of the story; the other half is the interrelation between these determinants and the relative importance of each. There is, in short, scope for unifying the existing literature into a more cohesive story of which children work, why and how much.

While there are very few attempts to examine a range of determinants in one framework (Grootaert 1998), there is no barrier to doing this. For instance, there is no reason why the three groups of determinants discussed above cannot be simultaneously relevant in explaining child labour in households where decisions are made through a collective bargaining process and by parents who are altruistic. The aim of this paper is, therefore, to test empirically the relevance and relative importance of the discussed groups of determinants of child labour, using data from rural India. In addition, the data is used to examine the extent to which inherent individual characteristics explain variation in child labour and what these characteristics may be.

The next section sets out the empirical strategy and specifications used to analyse the determinants of child labour, followed by Section 3 in which I describe the data in more detail and discuss some descriptive statistics. Section 4 presents the results, and Section 5 concludes.

2. Empirical strategy and specification

2.1 Determinants of child labour

I first examine the relevance and relative importance of three main sets of child labour determinants that have been proposed in the literature, controlling for an extensive range of community, household and individual level characteristics. The first of these is the household's ability to cope with income shocks, the second is household composition, and the third is distribution of bargaining power among key decision makers in the household.

I use the following empirical specification in order to investigate each of the above mechanisms within the same empirical framework, using panel data:

$$y_{ijt} = \delta_0 + \delta_1 X_{ijt} + \delta_2 D_{ijt} + \varepsilon_{ijt} \quad (1)$$

Where the dependent variable y_{ijt} is the number of hours worked by child i in cluster j in round t , X_{ijt} is a set of controls which include individual, household and community characteristics in round t and D_{ijt} is a set of variables proxying for the determinants discussed above, including income shock, age and sex composition of children in the household and the bargaining power of women in the household.

There are two primary concerns with estimating this specification using Ordinary Least Squares (OLS). Firstly, as I am using panel data, the error terms will not be independent across time for each individual. Clustering the error terms at the child level helps to resolve this problem.

The second and main concern is that the determinants of interest could be correlated with omitted variables which are correlated with the outcome of interest. For instance, if involvement in social networks increases women's bargaining power in the household, while also providing households with an alternative consumption smoothing mechanism to child labour, the effect of social networks on child labour would be incorrectly attributed to the bargaining power of women within the household in specification (1).² At the individual level, a classic omitted variable is ability. According to the Ejrnaes et al. (2004) model of endogenous fertility, if parents are inequality loving they are likely to not have children once they have a high-ability child.³ If high ability children also work less, then the effect of ability on child labour will be wrongly attributed to birth order in specification (1).

I add individual fixed effects to the specification to address this second concern. Controlling for individual fixed effects eliminates bias caused by time-invariant individual specific characteristics which are relevant but unobservable in the data, such as social capital and ability, discussed in the examples above. Inclusion of individual level fixed effects is equivalent to including a dummy variable for each individual which allows for variation in the

2 In fact, omitted variable bias affects the estimated coefficients of all the variables in the model, not only the correlate of the omitted variable.

3 The model puts forward three types of parent: inequality loving, inequality neutral and inequality adverse. Inequality neutral parents will allocate resources evenly amongst their children; whilst for those who are inequality adverse, it will never be optimal to have more than one child. Inequality loving parents, meanwhile, are happy with an uneven allocation of resources, and so will carry on having children until they reach the desired outcome, i.e., a high-ability child in whom they will invest more.

intercept across individuals. In a standard OLS model, the intercept reflects the value of the dependent variable when the explanatory variable is zero. In a model with a full set of explanatory variables, the intercept should be the same for everyone. However, in the presence of omitted individual level unobservable characteristics, the intercept differs across individuals. Continuing the example above, setting birth order to zero i.e. only child situation, an only child with greater ability will have a lower value of y (will work less) than a child with less ability. Therefore, in the absence of a control for ability, the intercept differs across the two children. A model with individual specific effects, therefore, absorbs the unobservable variable which there are no explicit controls for. The fixed effects model can be written down in the following way:

$$y_{ijt} = \alpha_i + \gamma_t + \delta_1 X_{ijt} + \delta_2 D_{ijt} + \varepsilon_{ijt} \quad (2)$$

Where α_i is the individual fixed effect and γ_t is the survey round fixed effect. It should be noted that since the sample contains one observation per household, individual fixed effects also incorporate household fixed effects.

There is a further concern with unobservable community fixed effects, such as local institutional characteristics and rural/urban area fixed effects. Neither of these varies over time and so have to be interacted with the time variable in order to be estimated using fixed effects. The preferred specification, therefore, includes not only individual level dummies but also dummies for each cluster, interacted with round of survey, and dummy for whether the area is rural, interacted with round, as in equation (3).

$$y_{ijt} = \alpha_i + \gamma_t + (\theta_j * \gamma_t) + (\varphi_r * \gamma_t) + \delta_1 X_{ijt} + \delta_2 D_{ijt} + \varepsilon_{ijt} \quad (3)$$

Where θ_j is the cluster fixed effect and φ_r is the control for whether the area is rural.

Of course, I am still only controlling for the time-invariant unobservables. If there are also relevant omitted time-variant variables, the results will be biased. I address this concern by including an extensive set of controls for household and individual time-variant characteristics, such as education and occupation of the household head and primary carer of the child, household wealth proxies and household composition variables.

2.2 Unobservable child labour determinants

The preferred main specification (equation (3)) controls for individual level fixed effect (α_i), allowing it to be estimated. The second part of the paper focuses on exploring the individual characteristics that may explain some of the unobservable variation across children which is relevant to how much they work, i.e. the extracted fixed effect. I do this by regressing a range of child-specific characteristics from first round data on the fixed effect, controlling for the set of variables in X_{ij} and D_{ij} from equation (3). I use the following specification:

$$\hat{\alpha}_i = \pi_0 + \pi_1 I_i + \pi_2 C_{ij1} + \varepsilon_i \quad (4)$$

Where $\hat{\alpha}_i$ is the predicted child-specific fixed effect, I_i is a selection of time-invariant individual level characteristics including health, proxies for cognitive and psycho-social abilities, as well as proxies for the social capital of the primary carer. The variable C_{ij1} controls for the observable time-variant individual, household and community characteristics include in the vectors X_{ij} and D_{ij} in equation (3).

In exploring the determinants of the child fixed effect, I build on the existing literature on determinants of child labour to examine which time-invariant or 'inherent' individual characteristics of children have an effect on how much they work. A better understanding of this would not only contribute to the literature on determinants of child labour, but also allow

more robust analysis of its consequences. For instance, if 'more able' children are sent to school and 'less able' children are made to work, then studies examining the impact of child labour on outcomes such as education may be confounding the effect of individual 'ability' on educational attainment with that of child labour. Since 'ability' is unobservable and time invariant, one way to get at it is to examine whether proxies for cognitive and non-cognitive skills of the child explain some of the variation in the fixed effect of child characteristics on how much they work.

3. Data description and summary statistics

3.1 About the data

The data for this study are from the Young Lives data-set. Young Lives is an innovative longitudinal research project investigating the changing nature of childhood poverty. Young Lives is tracking 12,000 children in Ethiopia, India (Andhra Pradesh), Peru and Vietnam over 15 years through a quantitative survey and participatory qualitative research, linked to policy analysis. Young Lives seeks to:

- improve understanding of the causes and consequences of childhood poverty and to examine how policies affect children's well-being
- inform the development and implementation of future policies and practices that will reduce childhood poverty.

The sample consists of two cohorts of children. There are 2,000 children from each of the four countries in the younger cohort (between the ages of 6 and 17 months at the time of the first round of the survey in 2002) and 1,000 children from each of the four countries in the older cohort (between the ages of 7.5 and 8.5 in 2002). The sample is not nationally representative. However, comparisons of basic attributes and characteristics of the children in the samples to larger surveys have shown the selection to be reasonably representative of the children in the region/country (Dercon et al. 2007).

I use the older cohort data for children from Andhra Pradesh, India. As part of the first round of data collection in 2002, 1,008 children between the ages of 7.5 and 8.5 were selected and interviewed from this area. In addition to the child interviews, the main carer of the child was also interviewed. The child interview provides insights into the child's perceptions of well-being, social capital, participation in and feelings about school and work and health. Tests of the child's basic literacy and numeracy skills, as well as a Raven's test, were also administered. The carer questionnaire focuses on the characteristics of the child's household, including education, health, occupation and remittances of the other household members, socio-economic status including asset, land and livestock ownership, economic changes affecting the household in the three years preceding the survey and the social capital of the carer. The carer is also asked detailed questions about the child, including questions about his/her parents, education, health, occupation and general well-being. Both of the questionnaires were expanded for the second round of the survey to account for the greater maturity of the children and allow investigation of a larger variety of issues. Out of 1,008 children interviewed in Andhra Pradesh in 2002, 994 were re-interviewed in 2006.

This data-set is particularly suitable for the proposed analysis as it uniquely combines the necessary selection of controls for basic individual and household level characteristics with child-level data that contains an unprecedented level of detail. This combination allows for more innovative and in-depth analysis of issues relating to the characteristics and consequences of child poverty than has previously been possible. In addition, with two rounds of data now available, many questions of interest can be analysed in a more rigorous causal framework than is possible with cross-sectional data.

3.2 Summary statistics

The subsample used in this paper consists of all the children for whom two rounds of data are available (994 out of the original 1,008), with the exception of four children who were not included due to missing data.

The outcome of interest is how much children work. I define child work as the average number of hours spent on paid work, unpaid work and domestic tasks per week. Paid and non-paid work will be referred to as 'economic activities' throughout this paper. Unpaid work undertaken by children in the sample includes assisting on the family farm, cattle herding and/or being involved in other family business. Children's responsibilities with respect to domestic tasks include fetching water/firewood, cleaning, cooking etc, and caring for others in the household. Both the children and their carers are asked about amount of time spent on work; I use the information provided by the carers. This is because while the children are asked only about the work done in the week preceding the survey, the carers list all tasks undertaken by children throughout the year, including how many hours per day, days per week and months per year they take up. Since the households in the sample are predominantly agricultural and agricultural labour is subject to substantial seasonal fluctuations, a precise measure of how much children work needs to account for annual fluctuations.

Table 1 presents summary statistics of the outcome variable and a selection of individual and household characteristics included in vector X_{ij} (equation (3)). The first column presents statistics averaged over the two rounds, followed by two columns referring to Rounds 1 and 2, respectively.

Overall, while just over a quarter of the children were working in the first round, by the second round this proportion had increased to 64 per cent. Domestic chores are a much more widespread form of child work than economic activities: by the age of 12 (second round) only 15 per cent of all children were engaged in the latter (including paid and unpaid work), compared to three out of five children engaged in chores. Though involvement in economic activities is not widespread among the children in the sample, this type of work takes up substantially more time than chores. Children engaged in economic activities spend an average of 5 hours a week in the first round and 22.6 hours per week in the second round on this type of work, compared to an average of 10 and 11 hours per week taken up by domestic chores in the first and second rounds respectively.

There is an ongoing debate about whether economic activities should be treated as a different form of child labour to chores. It seems plausible that some of the determinants of these activities may be different. In this paper, due to data constraints, most of the analysis will be conducted using a child work variable, combining chores and economic activities. As shown in Table 1, only 10 per cent of children in the first round and 12 per cent of children in the second round are engaged in economic activities. There is, therefore, not enough variation in the data to conduct robust analysis of economic activities separately from chores at any level of disaggregation. Overall, 28 per cent of the children work in the first round for

an average of 10.8 hours per week and 64 per cent of children work in the second round for an average of 15.7 hours per week.

The first half of Table 1 shows some descriptive statistics of observable time-variant individual and household characteristics of the children in the analysis sample. Girls and boys are equally represented in the sample. All of the children are between the ages of 7 and 8 in Round 1 and 11.5 and 12.5 in Round 2. While in the first round only 2 per cent of the children were not attending school at the time of the survey, by the second round this proportion had increased to 11 per cent. Eighteen children (or 2 per cent) lost their mothers between the two rounds of the survey, joining the 1 per cent who were maternal orphans in the first round. Paternal mortality is slightly more widespread, with 8 per cent being paternal orphans by the second round. The great majority (98 per cent) of primary carers are women and 97 per cent of these are the mothers of the children. Only a fifth of the primary carers had completed primary school and a quarter stay at home doing domestic chores.

Two-thirds of the children in the sample live in rural areas, and the great majority live in male-headed households. About half of the household heads work in the agricultural sector, with less than a third (30 per cent) having completed at least primary school. Since the first round of the survey did not contain an income or consumption module, the consumer durables and housing quality indices, as well as land ownership (acres of land owned by the household) are used as wealth proxies. The consumer durables index is the proportion of durable assets owned by the households of the following: radio, refrigerator, bicycle, television, motorbike/scooter, car, mobile phone, landline telephone, fan, *almairah* (wardrobe), and clock. The housing quality index is based on the number of rooms per person in the household and the main materials used for the walls, roof and floor. Table 1 indicates that there is little change in household wealth according to these wealth proxies.⁴ For instance, land ownership increased between the two rounds from an average of 0.29 acres to 0.32. Despite the small change in wealth, there is a noticeable increase in the number of households with low wealth perception. Carers were asked whether they thought their household was destitute, poor, struggling, able to get by, rich or very rich: the proportion of households who class themselves as destitute, poor or struggling increased from 49 per cent in the first round to 58 per cent in the second round.

Table 2 focuses specifically on the proxies for child labour determinants discussed in the previous section and included in vector D_{ij} in the main specification (equation (3)). These include income shock, household composition and bargaining power of women relative to men in the household.

Both the first and second round questionnaires have shock modules which collect information as to whether a household has been affected by a range of unexpected adversities including, among others, crime, agricultural shocks, natural disasters, death or illness in the family and unemployment. I examine the effect of the most commonly occurring of these, which include crop and natural disaster shock such as drought or pests, loss of livestock through theft or disease, and illness or death of a household member. The summary statistics show that crop shocks and natural disasters were more prevalent between the first and the second rounds, reported by a third of the households, than preceding the first round, reported by 24 per cent of the households. Livestock death and theft affected just under 10 per cent of households in both rounds, while incidence of death or serious illness of household members increased from affecting 28 per cent of households to 33 per cent (Table 2).

4 It is worth noting that while these are the best available controls for household wealth, they are likely to be very approximate.

The household composition variables inform on all children (individuals up to the age of 16) who were living in the household at the time of each round of the survey. On average, households have about the same number of adult males as females and just under two children. Roughly 10 per cent of the children are only children and a third were the oldest in the household by the second round.

Bargaining power of women relative to men is proxied by the relative education of adult women to men in the household, as in Basu et al. (2002).⁵ It is constructed as the ratio between the years of education attained by the most educated female in the household relative to the sum of the education attained by the most educated male and female in the household. On average, the most educated males in the sample households have two more years of education than the most educated females, at 5.3 and 3.4 years respectively. The ratio of the two, therefore, indicates that on average men have more bargaining power in the household than women.⁶

4. Results

I first examine the results of regressing a range of individual, household and community level controls, along with a basic selection of proxies for specific child labour determinants on the outcome variable; this is a 'kitchen-sink' first step of the analysis. I then conduct a more in-depth analysis of each determinant of interest, including splitting the effects by area of residence, gender and wealth and trying out alternative proxies. This allows me to define a specification with a more refined selection of child labour determinants, which I then use for extracting the individual fixed effect. I focus on the determinants of this fixed effect in the last part of this section.

4.1 'Kitchen-sink' results

Table 3 presents the first set of results. The dependent variable in Columns (1) and (2) is the average number of hours spent on work (including chores) per week. The results in Column (1) are from a pooled OLS regression with clustered standard errors. In Column (2), I control for individual fixed effects.

The pooled OLS results are noticeably different from the fixed effects results, but the majority of significant associations become insignificant once individual level unobservables are controlled for. In Column (1) there is a significant negative association between child labour and the occupation of the head of household, suggesting that children living in households headed by individuals who are employed in agriculture work less than those living in households headed by those working in the service, manufacturing or business sectors. Individual fixed effects, however, absorb the significance of this association.⁷ The same

5 Dercon et al. (2000) find some evidence suggesting that bargaining power of wives in households in some parts of rural Ethiopia is affected by the relative wealth of the husband and wife at marriage, the equality of the division of assets dictated by customary divorce laws in the specific area and the age-gap between the husband and wife. These findings offer a range of other proxies for the power balance in the household, which will be explored in future work.

6 There are a number of instances when none of the adults in the household have schooling. In these cases women are assumed to have as much bargaining power as the men, and the ratio is set at 0.5.

7 As noted in Section 2, since there is only one observation per household in every round, controlling for individual fixed effects also controls for household fixed effects.

happens with household wealth controls. In the OLS specification, there is a negative and significant relationship between the housing quality and consumer durables indices and child labour, which disappears once individual and household fixed effects are controlled for.

A few of the significant controls in Column (1) remain significant, including child age and the location of the household. Since all the children are within 12 months of each other in age, the age variable is in months rather than years. Controlling for individual fixed effects, age has a very significant positive effect on child labour suggesting that in both rounds, the older children work more. In both the OLS and fixed effects specifications children living in rural areas work more.⁸

Focusing on the specific determinants, the income shock variable becomes significant once individual fixed effects are introduced. Children in households affected by a crop/natural disaster shock increase the number of hours they work per week by 1.8 hours, which is equivalent to a 28 per cent increase relative to the average. In contrast, while remaining negative, the significance of the effect of illness or death of household member disappears once household fixed effects are controlled for.

Finally, while the number of adult males in the household is positively associated with child labour, at first glance, neither the gender nor age of the other children in the household, nor the bargaining power of women, is significant in explaining variation in child labour. I explore each set of variables in more detail below to establish whether the lack of effect is robust, or just not coming through in this general specification.

Table 4 presents the results for chores and economic activities separately, using a fixed effects specification. As discussed above, because only a small proportion of children are engaged in economic activities, the possibilities for robust analysis of the determinants of child involvement in economic activities separately from chores are limited. The lack of variation in the economic activities variable becomes especially problematic once results are disaggregated to look at differences in impacts across subgroups in the sample. Therefore, economic activities and chores are only used as separate outcome variables in the 'kitchen sink' analysis. In the rest of the paper, as in Table 3, the outcome variable is child work, which incorporates both economic activities and chores.

The results in Table 4 suggest that crop shocks and natural disasters result in children spending more time on economic activities. In contrast, the positive effect of crop shocks on amount of time spent on chores is much smaller in magnitude and not statistically significant. Instead, amount of time spent on chores is affected by a number of household and individual level characteristics, such as education of the household head, occupation of the carer, and whether the child's mother is alive. Children living in households headed by more educated individuals, and those whose carers are primarily occupied with household chores, spend less time doing chores. In contrast, there is a significant positive relationship between amount of time spent on chores and mother being alive.

4.2 A more detailed analysis

4.2.1 Shocks

I disaggregate the effect of income shocks by area of residence and gender (Table 5). The rest of the variables in these specifications are as in Table 3, Column (2).

⁸ In Column (2), area of residence is controlled for by interacting rural dummy with round of survey.

Columns (1) and (2) show the effect of shocks separately for rural and urban areas. In rural areas, shocks have differing effects, depending on the type of shock. While a crop shock or natural disaster increases the amount children work by approximately two hours per week, death or illness of household members reduces the amount children work by a similar amount of time. In urban areas the shock effects are very different. As expected, crop shocks and natural disasters have no effect on urban child labour, since these households tend to be engaged in non-agricultural activities. Surprisingly, death and illness of household members also has no significant effect, despite its strong impact in rural areas. Finally, livestock theft, which does not affect child labour in rural areas, results in a substantial increase in children's workload. The exact magnitude of the effect should be treated with some caution since the incidence of livestock theft in the sample is lower than other shocks.

While these results are interesting, they may not be robust. In the specifications in Table 5, shocks are not instrumented. In order to interpret the results causally, therefore, exogeneity has to be assumed. The exogeneity argument is perhaps most convincing in application to the crop shock and natural disasters. It is becoming widely accepted in the literature that health shocks cannot be treated as exogenous since factors that make individuals vulnerable to health shocks may also affect outcomes of interest (see, for instance, Mohanan 2008). A similar argument applies to livestock shocks as vulnerability of livestock to pests and diseases is to a great extent determined by how well the household is able to look after the livestock. The remaining most plausibly exogenous income shock is natural disaster or crop destruction. In the remainder of this section, I therefore concentrate on the effect of this shock in rural areas.

Columns (3) and (4) show the breakdown of the income shock effect in rural areas by gender. This disaggregation reveals that the significance of the crop shock effect on child labour is driven entirely by its effect on girls. Girls' workload increases by 2.6 hours per week in response to a crop shock, which at the average work level of 6.5 hours is a 40 per cent increase. The effect on boys is very small and statistically insignificant.

4.2.2 *Household composition*

The general specification (Table 3, Column (2)) controls for household composition using scaled age-rank of the child, as well as the number of older boys and older girls there are in the household.⁹ None of these are statistically significant despite a range of findings to the contrary in the literature (for instance Edmonds 2006). A more careful analysis reveals that this lack of impact is evidence of the specification being too crude, rather than actual independence of child labour from household composition.

Household composition effects are analysed using a subsample of children who live with other children; this excludes 10 per cent of the observations (only children) from the original sample. I first replace the scaled age rank variable by un-scaled age rank coupled with a control for the total number of children in the household (Table 6, Column (1)). In Column (2), I also relax the functional form, allowing for the effect of change in age-rank to differ depending on the initial position. To achieved this, the age-rank variable is replaced with dummy variables for those in first place (oldest), second place, and third place or younger. The omitted category are the oldest children (rank=1). The results now show a distinct age rank effect: living in a household with an older child increases the amount a child works, if he/she is the second oldest (Column (2)). Having more than one older child in the household

⁹ Scaled age-rank is age-rank of the child relative to the other children in the household, scaled by the total number of children.

appears to negate this effect, but only in combination with being the youngest child in the household (Column (3)). Being a middle child with at least two older siblings increases the weekly workload by as much as six hours per week. Overall, the age rank results suggest that in households with more than one child, children at either extreme (oldest and youngest) work less than children in the middle.

I also examine the gender dimension of household composition to see whether the older sibling effect is gender specific. Edmonds (2006), for instance, suggests that if returns to education vary by gender then the gender composition of older and younger siblings will affect boys and girls differently. Results in Columns (4) (5) and (6) show that the positive effect of having older siblings on child labour actually applies to girls specifically with respect to living with older girls. Overall, girls living in households with older girls work 5.5 hours more per week than those living in households with other children, but no older girls (Column (5)). While statistically very weak, there is some evidence of a positive effect of presence of older boys on how much younger boys work (Column (6)).¹⁰

One possible explanation for the seeming independence of child labour and the presence of children of the opposite sex is lack of substitutability between tasks done by girls and boys. In consistence with this, the data suggest that boys and girls are engaged in different types of child labour. Although both boys and girls spend the majority of their working time on chores, on average, working boys spend a significantly higher proportion of work time on economic activities than girls (33 per cent versus 15 per cent respectively).

4.2.3 *Bargaining power of women*

The education of adult women relative to men in the household, which plausibly reflects bargaining power of women, appears to have no impact in the main specification on aggregated child labour (Table 3, Column (2)), or on its individual components – economic activities and chores (Table 4). However, splitting the sample by area of residence and gender shows that this is because the effects appear to move in opposite directions depending on the area of residence (Table 7). The results show that in urban areas, the more educated the women in the household are relative to the men, the less children work (Column (1)). A one standard deviation increase in bargaining power causes a 2.7 hour decrease in child labour. While the effect is negative for both boys and girls, it is larger in magnitude and statistically significant only for boys.

In contrast, in rural areas, relative education of women and men appears to have no impact on how much children work. This result holds for both boys and girls (Table 7, Columns (4)-(6)).

While in this analysis the relative education of women in the household is used to proxy women's bargaining power, it may also be an indicator of wealth. For instance, if there are differences in returns to women's and men's education in the labour market, the effects I find may reflect wealth rather than bargaining power. Even the differences I find across rural and urban areas may reflect this effect, if returns to education differ across rural and urban areas. This is not unlikely since the labour markets in urban and rural areas are dominated by different sectors with demand for different skills. It is particularly important to consider these possibilities as the available controls for wealth are very approximate.

In order to control for the wealth effect, I interact the consumer durables index with the continuous bargaining power variable. The results are very different across poorer and

¹⁰ This result is only significant at 80 per cent level of confidence.

wealthier households. The significant negative effect previously found for urban households only holds for wealthier households, where a one standard deviation increase in bargaining power results in a 5 hour decrease in child work (Column (7)). In rural areas, the effect of bargaining power on child labour in wealthier households is also negative, but it is not statistically significant. Strikingly, however, children living in poorer households work significantly more if women in the household are more educated than the men. A one standard deviation in bargaining power here results in more than a 2 hour increase in child labour (Column (8)).

4.3 Discussion

This subsection pulls together the results for each of the child labour determinants, describing overall trends and highlighting the largest effects. Table 8 summarises the results for each of the analysed determinants.

Both of the within household determinants – age and sex composition of the other children – as well as the relative education of adult women and men in the household, have significant and different effects on subgroups in the sample.

Household composition has an impact on middle children relative to the youngest or oldest children. It appears that this effect works primarily through girls who work significantly more if there are older girls living in the same household. There is also an indication that how much boys work may be somewhat sensitive to whether there are older boys living in the household. There is, however, no cross-gender effect i.e. the presence of older siblings of the opposite sex does not have an impact on child labour. Turning to the magnitude of these effects, it is important to be careful about the number of observations. By far the largest household composition effect is experienced by children living in households with more than one older sibling and at least one younger sibling. Children in this position work six hours more per week on average than the oldest child in the household, which is a 100 per cent increase relative to the average hours worked in the whole sample. However, these children make up 18 per cent of the sample in Round 1 and 9 per cent of the sample in Round 2,¹¹ and since in fixed effects models the impact is identified through observations that change across the rounds, this outcome is not sufficiently for the magnitude of the effect to be taken at face value. Perhaps more reliable is the substantial effect of the presence of older girls on how much younger girls in the sample as a whole work. The addition of at least one older girl to the household increases how much the younger girls work by more than 5 hours per week or 40 per cent of the average.

How educated the women in the household are relative to men affects children in poorer and richer households in opposite directions. In wealthier urban households, a one standard deviation increase in women's relative education index reduces how much children work by about 5 hours a week. In poorer rural areas the effect is the opposite, increasing child work by 2 hours a week. The significance of bargaining power effects appears to be mainly driven by boys.

Finally, in addition to being more sensitive to household composition effects, the workload of girls is more affected by income shocks than that of boys. Loss of crops due to pests, fire or theft as well as natural disasters result in, on average, a three hour increase in how much

¹¹ It should be highlighted that the age rank is with respect to *all* other children in the household and is not an indicator of birth order.

girls living in rural households work per week. Arguably, this shock is more likely to be exogenous than other reported shocks. However, as it is mainly relevant in a rural context, I cannot use it to examine the impact of income fluctuations in urban areas.

4.4 Child fixed effect

The above analysis of determinants of child labour enables me to refine the general specification used initially (Table 3, Column (2)), adding the necessary interactions and controlling for various determinants more accurately.¹² I use this specification to estimate the child level fixed effect, which contains unobservable household and individual characteristics relevant to variation in child labour. In this last part of the analysis I examine the possible determinants of this fixed effect using the specification discussed in Section 2 (equation (4)).

Table 9 summarises the variables included in the vector of time-invariant individual level characteristics I_i (equation (4)). These variables fit into four main sets of determinants: health, cognitive abilities, psycho-social characteristics and social capital of carer.

The health variables are selected to reflect the child's permanent health status rather than short-term health around the time of the survey. Height-for-age shows long-term nutritional status: children who are stunted by age 7 are unlikely to catch up at an older age. Children who suffer from life-threatening or long-term illnesses may also have permanently inferior health status in comparison to unaffected children. Finally, there is some literature suggesting that children born later may have worse health endowments as a result of the depletion of the mother's nutritional 'resources' as a consequence of having many children (Behrman 1988). Therefore, I include the number of older siblings the child has as a proxy for the child's nutritional endowment.

The determinants of cognitive skills include a Raven's test score and the child's level of reading evaluated on a scale of one to four. It is unlikely that the Raven's test score is contaminated by a schooling effect since, at the age of 7, children have not had a lot of schooling. Level of reading, on the other hand, is more likely to be correlated with schooling, which in itself is an important determinant of how much children work. This is because reading is among the first skills taught at school, so children who have been at school for a year may have much better reading ability than those who have not started school. I interact level of reading with grade at school to see whether the reading level has an effect over and above that of schooling. The non-cognitive skills, or psycho-social abilities, are proxied by five scores developed from carers' responses to 20 statements about a range of tendencies and personality traits of their children. The scores and their component parts are described in detail in Table 9.

Finally, since only one child per household is included in the sample, the fixed effect includes not only the child level unobservables, but may also include carer and household unobservables. I therefore also add controls for the social capital of the carers, proxied by whether she is a member of a women's group,¹³ and an indicator for whether he/she trusts the local community.

12 The new variables describing the household composition effect include a dummy variable for age rank, a control variable for being the youngest child and for the number of children in the household. There is also an interaction between crop shock and gender, as well as between the women's bargaining power proxy and the consumer durables index.

13 Membership in other groups is rare, while 36 per cent of all the carers are in a women's group. Since the great majority of carers are women, an indicator for being in a women's group is used as a proxy for the social networks of a carer.

The results of regressing the determinants described on the child fixed effect, controlling for time-variant observable community, individual and household characteristics are presented in Table 10. As explained in Section 2, the fixed effect is an individual level intercept indicating the value of the dependent variable when all the explanatory variables are zero. A positive association between the fixed effect and a determinant, therefore, suggests that there is a positive association between this determinant and how much a child works.

Table 10 shows that long-run nutritional status, child's reading ability and his/her relationship with peers are all relevant in explaining variation in child labour across children. The results suggest that girls with a greater height for age z-score work more than those with worse nutritional status. This nutrition effect only holds for girls, however. While the Raven's test score has no effect, reading ability is strongly and negatively associated with the fixed effect. The latter effect is mitigated but not eliminated by schooling: though the magnitude of the negative effect of reading ability is greater among children who have more schooling, it remains highly significant among those who have spent less time at school. Finally, there is also a strong negative association between having peer problems and the fixed effect, suggesting that the more problematic children's relations with their peers are, the less they work.

5. Conclusion

This paper has examined a range of determinants of child labour. It differs from the mainstream literature on the subject in two respects. Firstly, it moves away from analysing each determinant in isolation, combining a selection of factors in one empirical framework. These factors include income shocks, which highlight the role of resource constraints, the age and gender composition of the children in the household, reflecting production patterns within the household and the relative education of adult women in the household, proxying the role of preferences. Secondly, this paper also begins to look at whether variation in child labour is in part explained by specific, may be even inherent, characteristics of the children. An attempt is made to gain some understanding of what these may be.

I find that income shock increases the amount children work in the sample by nearly two hours a week, or 33 per cent of the average. The group most affected by income shocks are girls who live in rural areas. Within the household, children who have older and younger siblings work significantly more than the oldest children in the household. This effect works primarily through girls who on average work 3.3 hours more per week if older girls are present in the household. The impact of having older siblings is almost entirely offset if the child is also the youngest child in the household. Finally, the effect of the education of women relative to men in the household, intended as a proxy for the women's bargaining power, depends on the location of the household. While in urban households, child work is significantly lower if women have more bargaining power, the reverse is the case in rural households.

I also extract the child-specific fixed effect from estimations of the child labour determinants, and look at the correlates of this fixed effect. I find some evidence to suggest that child health, cognitive skills and ability to get along with peers affect how much a child works. While girls with better long-term nutrition work more, children who have better reading skills, irrespective of their schooling, and those who have problems with their peers, work less.

In order for child labour policies to be effective, it must be recognised that some groups of children are more vulnerable than others. This paper offers an attempt at carefully identifying such groups, highlighting the complexity of the mechanisms at work. The results suggest that girls especially would benefit from policies that would provide households with means of coping with agricultural shocks, such as better access to insurance and credit. They also show that policies need to be sensitive to the local labour markets and target larger households separately from smaller households, as child labour trends in these may be different.

Determinants of child labour work through many channels. There are, therefore, many ways in which each of the factors analysed may affect child labour. For instance, income shocks may raise child labour because children are treated as buffer stock, or it may be a strategy adopted by credit-constrained households only. Household composition effects may be evidence of parental preferences, or strictly economic decisions based on comparative advantage in production. It is beyond the scope of this study to establish the precise mechanisms through which each of the determinants affects how much children work. This study is a step towards a more comprehensive and cohesive picture of the factors influencing variation in child labour than is offered by existing literature. No attempt is made to argue that the factors found to be significant reflect one mechanism as opposed to another. What I have tried to convey is that determinants of child labour work simultaneously within one framework. There is much scope in future empirical work for refining the proxies for the determinants proposed in the theoretical literature, as well as establishing the relative importance and precise mechanism through which these work.

References

- Bacolod, M. and P. Ranjan (2008) 'Why Children Work, Attend School and Stay Idle: The Roles of Ability and Household Wealth', *Economic Development and Cultural Change* 56: 791-828
- Baland, J. and J. Robinson (2000) 'Is Child Labor Inefficient?', *Journal of Political Economy* 108.4: 663-79
- Basu, K. and R. Ray (2002) *The Collective Model of the Household and an Unexpected Implication for Child Labor: Hypothesis and an Empirical Test*, Policy Research Working Paper 2813, Washington DC: World Bank
- Basu, K. (1999) 'Child Labor: Cause, Consequence, and Cure, with Remarks on International Labor Standards', *Journal of Economic Literature* 47: 1083-119
- Becker, G. (1964) *Human Capital*, New York: Columbia University Press
- Becker, G. and H. Lewis (1973) 'On the Interaction of Between the Quantity and Quality of Children', *Journal of Political Economy* 81.2: S279-S288
- Beegle, K., R. Gatti and R. Dehejia (2006) 'Child Labor and Agricultural Shocks', *Journal of Development Economics* 81.1: 80-96
- Beegle, K., R. Gatti, R. Dehejia and S. Krutikova (2008) *The Consequences of Child Labor: Evidence from Longitudinal Data in Rural Tanzania*, Policy Research Working Paper 677, Washington DC: World Bank
- Behrman, J.R. (1988) 'Nutrition, Health, Birth Order and Seasonality: Intrahousehold Allocation among Children in Rural India', *Journal of Development Economics* 28.1: 43-62
- Bhalotra, Sonia (2004) *Early Childhood Investments in Human Capital: Parental Resources and Preferences*, Bristol Economics Discussion Paper 04/562, Bristol: Department of Economics, Bristol University
- Browning, M., F. Bourguignon, P. Chiappori and V. Lechene (1994) 'Income and Outcomes: A Structural Model of Intrahousehold Allocation', *Journal of Political Economy* 102.6: 1067-96
- Dercon, S. and E. Cooper (2007) 'Understanding Child Poverty in Developing Countries: Opportunities using the Young Lives Longitudinal Survey Data', Draft, University of Oxford
- Dercon, S. and P. Krishnanan (2000) 'In Sickness and in Health: Risk Sharing within Households in Rural Ethiopia', *Journal of Political Economy* 108.41: 688-727
- Edmonds, Eric (2006) 'Understanding Sibling Differences in Child Labor', *Journal of Population Economics* 19.4: 795-821
- Edmonds, E. and N. Pavnick, (2005) 'Child Labor in the Global Economy', *Journal of Economic Perspectives* 19.1: 199-220
- Ejrnaes, M. and C. Portner (2004) 'Birth Order and the Intrahousehold Allocation of Time and Education', *The Review of Economics and Statistics* 86.4: 1008-19
- Grootaert, C. (1998) 'Explaining the Demand and Supply of Child Labour: A Review of the Underlying Theories', mimeo, ILO

Grootaert, C. (2007) *Child Labor in Cote d'Ivoire: Incidence and Determinants*, Policy Research Working Paper 1905, Washington DC: World Bank

International Labour Organization website (*undated*) <http://www.ilo.org> (accessed 17 March 2009)

Kanbur, R. and C. Grootaert (1995) 'Child Labor: An Economic Perspective', *International Labour Review* 134.2: 187-203

Moehling, C. (1995) 'The Intrahousehold Allocation of Resources and the Participation of Children in the Household Decision Making: Evidence from Early 20th Century America', mimeo, Northwestern University, Evanston, IL

Mohonan, Manoj (2008) *Consumption Smoothing and Household Responses: Evidence from Random Exogenous Health Shocks*, Working Paper No.23, Cambridge, MA: Center for International Development at Harvard University

Ponczek, V. and A.P. Souza (2007) 'The Causal Effect of Family Size on Child Labor and Education', mimeo, Sao Paulo School of Economics

Townsend, Robert M. (1994) 'Risk and Insurance in Village India', *Econometrica*, 62.3: 539-91

Appendix

Table 1: *Summary statistics*

	All		Round 1		Round 2	
	Mean	sd	Mean	sd	Mean	sd
Individual and Household Characteristics						
Age	9.65	2.13	7.57	0.49	11.73	0.45
Child is female	0.51	0.50	0.51	0.50	0.51	0.50
Current school grade	4.07	2.54	1.94	0.75	6.20	1.80
Male household head	0.91	0.29	0.92	0.27	0.89	0.31
HH head occupation = agriculture	0.47	0.50	0.50	0.50	0.45	0.50
HH head occupation = chores/unemployed	0.04	0.18	0.00	0.04	0.07	0.25
HH head schl. compl. primary plus	0.30	0.46	0.28	0.45	0.33	0.47
HH members own dwelling	0.85	0.35	0.86	0.35	0.85	0.35
Housing quality index	0.42	0.29	0.40	0.29	0.44	0.29
Consumer durables index	0.25	0.19	0.24	0.20	0.27	0.18
Area of land owned per capita	0.30	0.54	0.29	0.49	0.32	0.58
HH wealth perception: Destitute/poor/struggle	0.53	0.50	0.49	0.50	0.58	0.49
Mother alive	0.98	0.15	0.99	0.11	0.97	0.17
Father alive	0.95	0.22	0.97	0.16	0.92	0.27
Carer schl compl. primary plus	0.20	0.40	0.19	0.39	0.21	0.41
Carer main occupation is hh chores	0.25	0.44	0.28	0.45	0.23	0.42
Carer is hh head	0.08	0.27	0.05	0.23	0.10	0.30
Child Work: Any						
Child works (chores and/or economic activities)	0.46	0.50	0.28	0.45	0.64	0.48
Child does chores	0.42	0.49	0.24	0.43	0.60	0.49
Child undertakes economic activities	0.12	0.33	0.10	0.29	0.15	0.35
Child Work: Hrs per week (all)						
Child work: Average hours per week	6.52	11.27	2.98	6.15	10.05	13.83
Child chores: Average hours per week	4.60	6.83	2.46	5.08	6.74	7.64
Child economic activities: Average hours per week	1.92	8.04	0.52	2.65	3.32	10.88
Child Work: Hrs per week (among those who work)						
Child work: Average hours per week	14.26	12.95	10.81	7.25	15.74	14.49
Child chores: Average hours per week	10.92	6.45	10.29	5.22	11.17	6.87
Child economic activities: Average hours per week	15.78	17.74	5.39	6.87	22.59	19.32
Total observations	990		990		990	

Table 2: *Summary statistics: determinants of child labour*

	All		Round 1		Round 2	
	mean	sd	mean	sd	mean	sd
Shock						
HH affected by natural disaster or crop shock	0.29	0.45	0.24	0.43	0.33	0.47
HH affected by theft/death of livestock						
HH affected by severe illness/death of a household member	0.08	0.28	0.09	0.28	0.08	0.27
	0.31	0.46	0.28	0.45	0.33	0.47
Household Composition						
Number of children in the hh	1.70	1.16	1.78	1.15	1.62	1.16
Age rank scaled by total no. of children in hh	0.73	0.26	0.75	0.25	0.70	0.27
Child is the oldest in the hh	0.30	0.46	0.26	0.44	0.34	0.47
Child is the second oldest in the hh	0.40	0.49	0.38	0.49	0.42	0.49
Child age rank is third or more	0.20	0.40	0.27	0.45	0.13	0.34
Number of older boys in hh	0.41	0.63	0.50	0.70	0.32	0.54
Number of younger boys in hh	0.44	0.64	0.39	0.61	0.49	0.67
Number of older girls in hh	0.45	0.67	0.51	0.72	0.38	0.61
Number of younger girls in hh	0.40	0.66	0.37	0.62	0.43	0.70
Number of males over the age of 17	1.56	0.97	1.40	0.85	1.72	1.06
Number of females over the age of 17	1.67	0.96	1.46	0.80	1.87	1.06
Bargaining Power						
Years of schooling attained by the most educated female in the hh	3.37	4.37	2.83	4.12	3.91	4.55
	5.31	5.02	4.67	4.99	5.94	4.97
Years of schooling attained by the most educated male in the hh	0.41	0.29	0.42	0.27	0.40	0.30
Bargaining power: women						
Number of observations	990		990		990	

Table 3: *Predictors of child work: dependent variable = average number of hours worked per week*

	(1) Pooled OLS	(2) Individual Fixed Effects
age in months	0.166*** (0.063)	2.213*** (0.643)
male hh head	0.560 (1.068)	-1.481 (2.066)
hh head occupation = agriculture	-1.275* (0.677)	0.054 (0.981)
hh head occupation = chores/unemployed	1.927 (2.186)	2.632 (1.769)
hh head schl. compl primary plus	-1.088* (0.632)	-1.632 (1.391)
hh members own dwelling	0.842 (0.617)	-0.140 (1.224)
housing quality index	-2.081** (1.059)	-1.161 (1.745)
consumer durables index	-5.324*** (1.513)	0.525 (3.111)
log of land owned per capita	-0.091 (0.065)	-0.065 (0.138)
hh wealth perception: destitute/poor/struggle	0.497 (0.508)	-0.419 (0.706)
mother alive	0.219 (2.166)	3.656 (3.436)
father alive	-0.875 (1.773)	-2.800 (2.323)
carer schl. compl. primary plus	0.068 (0.615)	2.951 (2.865)
carer main occupation is hh chores	-1.610*** (0.547)	-0.531 (1.094)
carer is hh head	2.209 (1.580)	0.167 (2.249)
hh affected by natural disaster or crop shock	0.302 (0.690)	1.872** (0.890)
livestock theft/death	0.603 (1.002)	-0.819 (1.249)
hh member affected by serious illness/death	-1.104** (0.547)	-1.066 (0.718)
age rank scaled by total no. of children in hh	-0.176 (1.181)	0.595 (3.578)
number of older boys in hh	0.039 (0.392)	-2.533 (1.581)
number of older girls in hh	-0.356 (0.388)	0.687 (1.505)

	(1) Pooled OLS	(2) Individual Fixed Effects
number of males over the age of 17	0.495 (0.380)	-0.597 (1.414)
number of females over the age of 17	-0.727** (0.341)	0.713 (1.055)
bargaining power of women in hh	-0.481 (1.070)	-0.803 (1.458)
Round==2	-1.529 (3.244)	-108.775*** [^] (33.955)
rural	3.457* (1.987)	7.943* [^] (4.343)
R-squared	0.18	0.28
Number of observations	1,976	1,976

note: .01 - ***; .05 - **; .1 - *; standard errors are in brackets; [^]=variable is interacted with round of survey; Both specifications include controls for cluster (interacted with round of survey in col (2)).

Table 4: *Predictors of child work by type of work (Initial Household Fixed Effects)*

	(1) Economic Activities	(2) Chores
age in months	1.959*** (0.514)	0.254 (0.392)
male hh head	-1.066 (1.650)	-0.415 (1.258)
hh head occupation = agriculture	0.372 (0.783)	-0.318 (0.597)
hh head occupation = chores/unemployed	1.952 (1.414)	0.680 (1.077)
hh head schl. compl primary plus	-0.007 (1.111)	-1.626* (0.847)
hh members own dwelling	0.542 (0.978)	-0.681 (0.745)
housing quality index	-0.873 (1.394)	-0.288 (1.063)
consumer durables index	0.689 (2.486)	-0.164 (1.894)
log of land owned per capita	-0.067 (0.110)	0.003 (0.084)
hh wealth perception: destitute/poor/struggle	-0.198 (0.564)	-0.220 (0.430)
mother alive	-0.101 (2.745)	3.757* (2.091)
father alive	-1.561 (1.856)	-1.239 (1.414)
carer schl compl. primary plus	1.343 (2.289)	1.608 (1.744)
carer main occupation is hh chores	0.638 (0.874)	-1.169* (0.666)
carer is hh head	0.794 (1.797)	-0.627 (1.369)
hh affected by natural disaster or crop shock	1.356* (0.711)	0.516 (0.542)
livestock theft/death	-0.078 (0.998)	-0.740 (0.760)
hh member affected by serious illness/death	-0.561 (0.574)	-0.504 (0.437)
age rank scaled by total no. of children in hh	4.035 (2.859)	-3.439 (2.178)
number of older boys in hh	-1.146 (1.263)	-1.387 (0.963)
number of older girls in hh	-0.061 (1.203)	0.747 (0.916)

	(1) Economic Activities	(2) Chores
number of males over the age of 17	0.453 (1.129)	-1.051 (0.861)
number of females over the age of 17	0.454 (0.843)	0.259 (0.642)
bargaining power of women in hh	0.425 (1.165)	-1.228 (0.887)
interview round [^]	-101.947*** (27.127)	-6.828 (20.670)
rural [^]	6.254* (3.470)	1.688 (2.644)
R-squared	0.14	0.28
Number of observations	1,976	1,976

note: .01 - ***; .05 - **; .1 - *; standard errors are in brackets; [^]=variable is interacted with round of survey; specification includes controls for cluster (interacted with round of survey).

Table 5: *The role of shocks: dependent variable = average number of hours worked per week (Individual Fixed Effects)*

	(1) Rural areas	(2) Urban areas	(3) Rural areas, girls	(4) Rural areas, boys
consumer durables index	2.523 (4.081)	-1.250 (4.821)	-2.432 (6.118)	5.483 (5.672)
housing quality index	-1.643 (2.314)	0.344 (2.630)	-0.891 (3.329)	-0.806 (3.378)
hh members own dwelling	-2.109 (1.965)	1.334 (1.540)	-2.395 (2.858)	-2.756 (3.006)
hh affected by natural disaster or crop shock	2.129** (1.035)	0.574 (1.932)	2.567* (1.497)	0.349 (1.476)
livestock theft/death	-1.657 (1.408)	5.580* (2.926)		
hh member affected by serious illness/death	-2.446*** (0.916)	1.844 (1.158)		
Number of observations	1,294	682	672	622

note: .01 - ***; .05 - **; .1 - *; standard errors are in brackets

Table 6: *The role of other children in the household: Dependent variable = average number of hours worked per week (Individual Fixed Effects)*

	(1)	(2)	(3)	(4)	(5) Girls only	(6) Boys only
number of children in hh	1.170 (0.985)	0.898 (0.837)	0.716 (0.898)	-0.088 (0.916)	-0.648 (1.381)	-0.106 (1.247)
age rank among children living in hh under 17yrs old	-0.688 (1.234)					
age rank = 2	4.067** (1.907)		4.039* (2.075)			
age rank = 3+	2.236 (2.600)		6.085* (3.166)			
age rank = 3+ * youngest child				-5.550** (2.642)		
youngest child in household				-0.782 (2.808)		
any older boys in the household				1.638 (1.871)	0.199 (2.678)	3.583 (2.775)
any younger boys in the household				1.542 (2.362)	1.378 (3.427)	0.594 (3.466)
any older girls in the household				3.270* (1.985)	5.490* (2.905)	1.444 (2.996)
any younger girls in the household				2.869 (2.631)	6.391 (4.131)	2.137 (3.609)
Number of observations	1,786	1,786	1,786	1,786	912	874

note: .01 - ***; .05 - **; .1 - *; standard errors are in brackets.

Table 7: *The role of balance of bargaining power in the household: dependent variable = average number of hours worked per week (Individual Fixed Effects)*

	(1) Urban	(2) Urban girls	(3) Urban boys	(4) Rural	(5) Rural girls	(6) Rural boys	(7) Urban	(8) Rural
consumer durables index	-1.821 (4.778)	-9.950 (6.798)	-3.588 (7.317)	3.375 (4.083)	-0.169 (6.130)	5.175 (5.658)	6.325 (7.632)	12.661** (5.700)
bargaining power of women in hh	-6.648*** (2.483)	-5.184 (3.956)	-6.761* (3.535)	0.430 (1.796)	0.440 (2.711)	1.292 (2.595)	-1.594 (4.450)	5.673** (2.878)
bargaining power of women*consumer durables index							-17.559 (12.841)	-24.042** (10.335)
Number of observations	682	342	340	1,294	672	622	682	1,294

note: .01 - ***; .05 - **; .1 - *; standard errors are in brackets

Table 8: *Summary of child labour determinants*

Variable	Effect on average number of hours children work per week
Shock	
Overall	1.872**
Boys in rural areas	0.349
Girls in rural areas	2.567*
Household composition	
Age rank	-0.688
Age rank = 2	4.067**
Age rank = 3plus	2.236
Age rank = 3plus (middle child)	6.085*
Age rank = 3plus (youngest child)	-0.217
Living in a hh with older girls	3.27*
Living in a hh with older boys	1.638
Living in a hh with older girls (if child is female)	5.49*
Living in a hh with older boys (if child is male)	3.583
Bargaining Power	
Education of women in hh relative to men	-0.803
Urban areas	-6.648***
Rural areas	0.430
Richer urban hh	-12.8**
Poorer rural hh	5.673**

Table 9: *Variables used for determining individual level heterogeneity*

Variable	Definition
Female	One if child is female
Height for age z-score	Age and gender normalised value of height
Height for age z-score * female	Age and gender normalised value of height interacted with female
Any long-term illness	One if child has health problems that affect one or more of the following: how he/she makes friends, his/her ability to work, has other long term health problems
Any life-threatening illness in last 3 years	One if child has suffered from a life-threatening illness in the 3 years preceding the survey
Number of older siblings	Number of children child's biological mother has had before the child
Raven's test score	Total number of correctly answered questions on Raven's test
Level of reading	Level of child's reading: 1 = can't read anything, 2 = reads the letters, 3 = reads the words, 4 = reads the sentence
Grade at school	Grade attained at school
Level of reading*grade at school	Level of child's reading interacted with grade attained at school
<i>Psycho-social abilities</i>	<i>Scores (0=Normal, 1=Borderline, 2=Abnormal) based on following statements</i>
Emotional symptoms	<ol style="list-style-type: none"> 1. Child often complains of headaches, stomach-aches, or sickness 2. Child has many worries, often seems worried 3. Child is often unhappy, downhearted or tearful 4. Child is nervous and clingy in new situations 5. Child has many fears, is easily scared
Conduct problems	<ol style="list-style-type: none"> 1. Child often has temper tantrums 2. Child is generally obedient, usually does what adult requests 3. Child often fights with other children or bullies them 4. Child often lies or cheats 5. Child steals from home, school or elsewhere
Hyperactivity	<ol style="list-style-type: none"> 1. Child is restless, overactive, cannot stay still for long 2. Child is constantly fidgeting or squirming 3. Child is easily distracted, concentration wanders 4. Child thinks things out before acting 5. Child sees tasks through to the end, good attention span
Peer problems	<ol style="list-style-type: none"> 1. Child is rather solitary, tends to play alone 2. Child has at least one good friend 3. Child is generally liked by other children 4. Child gets picked on or bullied by other children 5. Child gets on better with adults than with other children
Pro-social behavior	<ol style="list-style-type: none"> 1. Child is considerate of other people's feelings 2. Child shares readily with other children 3. Child is helpful if someone is hurt, upset or feeling ill 4. Child is kind to young children 5. Child often volunteers to help others
Carer is a member of a women's group	One if primary carer of child is a member of a women's group
Carer does not trust the community	One if primary carer agrees that 'the majority of people in this community would try to take advantage of you if they got the chance'.

Table 10: *Determinants of child fixed effect: dependent variable = child fixed effect*

	Coefficient	Standard-error
Female	3.402***	0.944
Height for age z-score	0.292	0.328
Height for age z-score * female	1.185**	0.482
Any long-term illness	-0.265	1.048
Any life-threatening illness in last 3 years	0.025	1.106
Number of older siblings	0.215	0.169
Raven's test score	-0.037	0.054
Level of reading	-3.375***	0.669
Grade at school	-3.624***	0.834
Level of reading * grade at school	0.931***	0.264
Emotional symptoms	0.089	0.322
Conduct problems	-0.010	0.304
Hyperactivity	-0.296	0.457
Peer problems	-0.754**	0.295
Pro-social behaviour	-0.293	0.422
Carer is a member of a women's group	-0.456	0.571
Carer does not trust the community	-0.948	0.589
Joint <i>F</i> -test	4.71***	
Number of observations	972	

note: .01 - ***; .05 - **; .1 - *;

Young Lives is an innovative long-term international research project investigating the changing nature of childhood poverty.

The project seeks to:

- improve understanding of the causes and consequences of childhood poverty and to examine how policies affect children's well-being
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Young Lives is coordinated by a small team based at the University of Oxford, led by Jo Boyden.

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Save the Children – Bal Raksha Bharat, India

Sri Padmavathi Mahila Visvavidyalayam (Women's University), Andhra Pradesh, India

Grupo de Análisis para el Desarrollo (Group for the Analysis of Development), Peru

Instituto de Investigación Nutricional (Institute for Nutritional Research), Peru

Centre for Analysis and Forecast, Vietnamese Academy of Social Sciences, Vietnam

General Statistics Office, Vietnam

The Institute of Education, University of London, UK

Child and Youth Studies Group (CREET), The Open University, UK

Department of International Development University of Oxford, UK

Statistical Services Centre, University of Reading, UK

Save the Children UK (staff from the Rights and Economic Justice team in London as well as staff in India, Ethiopia and Vietnam).



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