

# The determinants of child labor in China: intergenerational dynamics and bargaining power within the household<sup>1</sup>

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## **Abstract**

This paper examines the determinants and gender differentials of child labor and schooling for Chinese children ages 6-17 years in the paradigm of intergenerational transfer and intrahousehold bargaining using household data from the China Health and Nutrition Survey. There are 3% more girls working than boys, though boys begin working at a slightly younger age. OLS and probit regressions show that mother's education reduces the total hours worked and probability of working for both girls and boys. Gender and birth order are not significant determinants of child labor and schooling outcomes. Intergenerational households reveal gender inequalities where grandfather cohabitation reduces the grandson's probability of working, and grandmother cohabitation increases the granddaughter's probability of attending school. Mother's bargaining power is only significant for sons, but not daughters. This research has implications for not only child labor rights, but also gender equality of child labor and schooling opportunity in households across China.

## **1. Introduction**

### *1.1 Background*

From the perspective of many developed countries, child labor evokes a negative connotation and is considered a highly unregulated global problem. Even though child labor was heavily prominent in industrialized countries for most of the 19<sup>th</sup> century, subsequent economic development and the impact of activist groups have significantly reduced the use of child labor. However, it is argued that through globalization, this same child labor has been merely exported to less-developed countries. According to the International Labour Office (ILO), 317 million children aged 5-17 years are considered working in 2004, which is over 30 million less than the total in 2000. The 2004 figure represents 20.3% of total children (Hagemann et al. 2006).

While child labor persists mostly in low-income countries and in rural areas, it is estimated that less than half of these children are engaged in hazardous work. Not all child labor is harmful or exploitative, as the activities they engage in are mostly within the household and range from helping their family business or farm to doing household chores and child care. United Nations Children's Fund (UNICEF) data suggests that less than 10% of children work outside of the household for paid or unpaid employment (Edmonds and Pavcnik, 2005). For the most part, children are employed by their parents or other family members, often receiving in-kind benefits or apprenticeship in exchange for their labor (Edmonds and Pavcnik, 2005).

The difficulty of better understanding the determinants of child labor is the lack of data on children's detailed work within the household that can then be linked with household dynamics. Because households in low-income countries are typically larger and have several generations living together, information regarding the child's parents and grandparents, e.g. occupation, income, education, is crucial and can provide more insight into the reasons why and to what extent children work, and what other options exist, such as attending school.

### *1.2 Objective of study*

The objective of this study is to explore the effects of intergenerational dynamics and bargaining power within the household on child labor and schooling and to analyze the gender differentials of these linkages. This paper is largely benefited by considering household chores and child care within the framework of child labor. As nearly half of all children working reside in Asia, this region is of particular importance and interest. Within Asia, China is the most populous country with a majority of households living in rural areas. Also, given China's rapid economic development in the past two decades and an average GDP growth rate of over 9% since 2000, child labor has become more prevalent. While the government has tried to regulate labor conditions, economic development and rising wages are reasons enough for local governments to find cheaper labor.

Households in China are predominantly comprised of several generations; very often grandparents live within the same home. Intergenerational and intrahousehold bargaining

power aspects of this research, in addition to restrictive population policies, provide a unique opportunity and composition by which child labor in China is studied. The following section presents a background of the theoretical framework, while Section 3 explains the data and descriptive statistics. Section 4 describes the different methods used to analyze the determinants of child labor and schooling, which are measured by the total hours worked, years of schooling, and likelihood of currently working or attending school, all conditional on gender. Section 5 outlines the major results from the different models. Lastly, Section 6 discusses the implications from the results, limitations of the study, and potential avenues for further research.

## **2. Theoretical Framework**

### *2.1 Child labor and schooling*

As Schultz (1960) first describes in his seminal research on children's human capital, children are "self-employed producers of capital" when they are studying because during this time, they are not consuming leisure. For children who work, their services contribute to economic activities of the household. For children who attend school, their studies strengthen human capital formation and eventually materialize once they begin working. From an economics standpoint, families consider their children's time and contributions within the framework of the household production function. Families wish to optimize their resources given their budget constraints, and whatever value their children bring to the optimization problem is no exception. Economic incentives play a role in child labor and are argued to be more significant than cultural traditions—the

higher the returns to schooling, the less likely the child will work, whereas the greater the child's wages, the greater the probability the child works instead of going to school.

In another major paper on the economics of child labor, Basu and Van (1998) make two important assumptions called the luxury and substitution axioms. First, the luxury axiom claims that the parents will only have their children work if they are constrained by impoverishing circumstances. Therefore, children may stop working if households earn more income. But the threshold beyond subsistence living is debatable. Several studies support this axiom (Admassie 2002; Edmonds 2001; Grootaert and Patrinos, 1999).

The substitution axiom also states that children can be substitutes for adults when it comes to labor. For instance, if it is too costly for an adult to produce handicrafts or pick tea leaves, then one child or several children can easily substitute the work of an adult. While the institution of banning child labor is considered an improvement along the social and human rights fronts, it can actually be detrimental to the household if they rely on children to meet their subsistence consumption (Basu and Tzannatos, 2003). Granted, child work can also be seen as not just a way of earning wages or household production, but of acquiring skills and specialization. From this point of view, it can serve as strengthening human capital. Emerson and Souza (2002) show in Brazil that child labor traps can also exist if one's parents also began working as children. Basu and Van, among others, argue that there exist multiple equilibria associated with the household's decision to have children work.

## *2.2 Determinants of child labor*

One of the major hypothesized determinants of child labor is poverty, which serves as the basis of the luxury axiom. As countries become richer, fewer children are put to work. Because national or worldwide poverty indicators may not accurately pinpoint the threshold beyond which families stop having their children work, research using poverty measurements have not shown conclusive results using the luxury axiom. A determinant of the extent of child labor is the family's ownership of land. Unfortunately, the dataset used in this study does not provide this information; however, land ownership can have a marginal effect, depending largely on land size and correlation to wealth as the effect can go both ways. Other factors that affect child labor include: age, gender, birth order, living in rural areas, parental schooling, labor and credit markets, migration, and globalization.

## *2.3 Intergenerational dynamics and bargaining power*

Few studies have focused on the determinants of child labor within the context of intergenerational dynamics and bargaining power within the household. This study attempts to shed light on the intrahousehold behavior among Chinese families, as the intergenerational structure can play a predominant part in whether and to what extent a child works or goes to school. Duflo's (2000) research on the impact of pensions in South Africa reveals that granddaughters living in households with grandmothers who received a pension had improved nutritional status through increases in height and weight. Could it be the case where grandchildren are less likely to do household chores if their grandmother or grandfather lives in the household and assumes the work for them?

Are there gender differentials, so grandmothers do the work that potentially could have been for their granddaughters but there is no effect on their grandsons?

Furthermore, with regard to household decision-making, there are several theories of how the household decides to have children work, one of which is that the household behaves as a unitary agent (Becker 1981). Contrary to this model, Lundberg and Pollak (1993) hypothesize that there exists a non-cooperative equilibrium under which each spouse maximizes their own utilities and do not act as a unitary decision-making agent. Another model claims that a child gains more power within the household as his or her wages or value increases (Moehling 1995). While this theory can be empirically tested, the sample size of children who fully answered wage and benefits questions is too small from this dataset to use. Instead, this paper is able to test the other theory that children do not have much power within the household and the mother often aligns her preferences with the child's preferences (Browning et al. 1994) and whether there are gender differentials to this alignment. If the mother has bargaining power within the household, then it is expected that the mother will serve the interests of her children, which may be to reduce the workload or send them to school. Kambhampati and Rajan (2005) find that mother's education is the most important determinant, as opposed to mother's labor or non-labor income, in reducing the child's probability to work.

### **3. Data**

#### *3.1 Data source*

This paper uses data from the 2004 China Health and Nutrition Survey (CHNS), which is a collaboration of the Carolina Population Center at the University of North Carolina at



Chapel Hill, the National Institute of Nutrition and Food Safety, and the Chinese Center for Disease Control and Prevention. The survey was conducted since 1989 in nine provinces (Figure 1) that represent diverse geographical, socio-demographic and development indicators. The most recent survey from 2006 samples 4,400 households and 16,000 individuals, including nearly 2,000 children. Using a multi-stage randomized sampling method, CHNS offers a comprehensive dataset and is one of the largest publicly available datasets on China with information regarding an individual's health and economic status, educational level, socio-demographic background, and diet and exercise habits.

The child questionnaire covers detailed sections on the frequency and duration of labor activities across different types of paid and unpaid occupations. In addition to primary and secondary occupations, specific information on the work activities of children with regard to the informal sector, such as home gardening, collective and household farming, raising livestock or poultry, collective and household fishing, and small household businesses are obtained. Furthermore, children are asked about their time allocation for household chores and child care of other children aged six and younger within and outside the home. Other sections comprise of physical activities, food and alcohol consumption, use of health services, and health status. Annual household income is taken from 2004, as this information is not available for 2006. It includes wages and benefits received from the informal sector.

Because the adult questionnaire asks some questions about the adult's parents, linking the child and adult questionnaires creates an intergenerational dataset that spans across three generations. Out of the 1,064 total children aged 6 to 17 years with complete information, 125 children have regularly worked throughout the previous year.

### *3.2 Descriptive statistics*

In Table 1, the mean total number of hours worked is 1.62, with a standard deviation of 8.66, which reflects the greater proportion of children who do not engage in any work activities. Girls work slightly more hours than boys at 1.80 hours per week compared to 1.47. Of the children who work, their mean total number of hours is 20.06. The average probability of working is 8.1% for overall children, 6.5% for boys, and 9.9% for girls. Children, on average, have completed 5.71 years of formal schooling. About 91% of the children surveyed currently attend school, with girls attending school at a 3% higher rate than boys.

About 54% of the sample is male, while children are, on average, 9.05 years old. The mean birth order for both boys and girls is 1.42, with a standard deviation of 0.64. The father's total years of schooling is, on average, 9.40 years, whereas the mother's total years of schooling is almost 1 year less at 8.49 years. Representative of China's population, over 70% of the children sampled are from rural areas. About 25% and 34% of the boys interviewed have at least one grandfather and at least one grandmother living in the same household, respectively. Of the girls, 23% and 31% have at least one grandfather and at least one grandmother living in the same household, respectively. In

addition, about 90% of households have fathers living in the household, while 99% of mothers live in the same household as the child. Lastly, 68% of mothers have bargaining power within the household, as defined as the mother having an equal to or higher educational attainment level compared to the father.

#### 4. Methods

Two basic econometric methods are employed for this study: ordinary least squares (OLS) and probit regressions. There are several ways to measure bargaining power within the household, such as with non-labor income or differential wages. In this paper, bargaining power is quantified by the comparison of the highest educational attainment level of mothers and fathers. Mothers are defined as having bargaining power if they have attained an equal or higher level of education. The labor activities reported for children include both formal and informal sectors.

##### 4.1 OLS regression

The following OLS regression is estimated in the total children sample for the total number of hours worked in a week:

$$\begin{aligned}
 Y = & \alpha + \beta_0 \text{Age} + \beta_1 \text{Gender} + \beta_2 \text{Birth\_order} + \beta_3 \text{Rural} + \beta_4 \text{Log}(\text{income}) \\
 & + \beta_5 \text{Father's\_educ} + \beta_6 \text{Mother's\_educ} + \beta_7 \text{Grandfather} + \beta_8 \text{Grandmother} \quad (1) \\
 & + \beta_9 \text{Birth\_order} * \text{Gender}
 \end{aligned}$$

where  $Y$  is the total number of hours worked in a week;  $Age$  is the child's age in years;  $Gender$  is 1 if male, 0 if female;  $Birth\_order$  is the child's birth order;  $Rural$  is the place of residence, 1 if rural, 0 if urban;  $Log(\text{income})$  is log of household's annual income;

*Father's\_educ* is father's years of schooling; *Mother's\_educ* is mother's years of schooling; *Grandfather* is 1 if at least one of the child's grandfathers lives in the same household; *Grandmother* is 1 if at least one of the child's grandmothers lives in the same household; and *Birth\_order\*Gender* is the interaction term between birth order and gender.

Each OLS regression is then run separately by gender according to the following equation:

$$Y = \alpha + \beta_0 Age + \beta_1 Birth\_order + \beta_2 Rural + \beta_3 Log(income) + \beta_4 Father's\_educ + \beta_5 Mother's\_educ + \beta_6 Grandfather + \beta_7 Grandmother + \beta_8 Bargain \quad (2)$$

where the variable definitions are the same as in Equation 1 above and women's bargaining power *Bargain* is included.

In running the model for years of schooling, the OLS regressions for total children and for children by gender are the same as Equations 1 and 2, with the exception of the dependent *Y* variable, which then represents the years of schooling completed.

#### 4.2 Probit regression

The following probit regression is used to estimate the factors that affect the child's probability of currently working. Equation 3 outlines the specification below:

$$Prob(Z) = \alpha + \beta_0 Age + \beta_1 Gender + \beta_2 Birth\_order + \beta_3 Rural + \beta_4 Log(income) + \beta_5 Father's\_educ + \beta_6 Mother's\_educ + \beta_7 Grandfather + \beta_8 Grandmother + \beta_9 Birth\_order * Gender \quad (3)$$

where  $Z$  is whether or not the child is currently working and the rest of the explanatory variables are defined as in Equation 1.

Probit regressions on the probability of currently working are then run separately by gender according to the equation below:

$$\begin{aligned} \text{Prob}(Z) = & \alpha + \beta_0 \text{Age} + \beta_1 \text{Birth\_order} + \beta_2 \text{Rural} + \beta_3 \text{Log}(\text{income}) \\ & + \beta_4 \text{Father's\_educ} + \beta_5 \text{Mother's\_educ} + \beta_6 \text{Grandfather} + \beta_7 \text{Grandmother} \\ & + \beta_8 \text{Bargain} \end{aligned} \quad (4)$$

where the explanatory variables are defined as in Equations 1 and 2.

The probit model is also used to estimate the probability of currently attending school for total children and separately for boys and girls samples. The probit equations used are the same as Equations 3 and 4, where  $Z$  now denotes the likelihood of currently attending school.

## 5. Results

### 5.1 *Children's labor*

In Table 2, controlling for other variables, age is positively significant at the 0.01 level for the total sample and separately for boys and girls. In other words, the older the child, the greater the number of hours worked per week. With regard to birth order, while the overall and girls samples are positive, the opposite is the case with boys, as an increase in birth order corresponds with a decrease in the hours worked in a week. But none of the birth order coefficients are significant, with all else constant. While the mother's years of schooling is strongly and negatively significant at the 0.01 level for the overall and girls samples and 0.05 level for boys, father's education is positive and not significant in the models. The inclusion of mother's bargaining power is only significant for boys. More specifically, when a mother has equal or greater educational attainment as the father, the son works about two fewer total hours a week compared to the son of mothers without bargaining power.

For the overall and boys samples, as the log of annual household income increases, the total number of hours worked in a week significantly decreases. However, this effect is not seen with girls, as increases in household income are associated with increases in hours worked, albeit not significantly. Controlling for other variables, neither being male nor the interaction of birth order and gender are statistically significant, although both variables have large positive and negative effects, respectively. Furthermore, while grandparent cohabitation is not a significant correlate of the regression, it is worthwhile to note that the magnitude of the grandmother is larger than that of a grandfather for both

boys and girls, though more substantially for girls, reducing the workload for girls by over one hour per week. The models suggest that children overall work less when living in the same household with their grandmother.

Age is again highly significant and increases the probability of whether a child is currently working, as shown in Table 3. Once the mother's bargaining power is considered, birth order becomes important and is positive for both boys and girls suggesting that the younger children have over 30% increased probability of working. An additional year of father's schooling reduces the probability to work by about 20% for girls, but is not significant for boys. Across all models, children living in rural areas have a significantly greater probability of working, which increases with mother's bargaining power. The household annual income is significant for boys and only for the girls sample with mother's bargaining power.

The total sample of children and boys who live with a grandfather have less probability of currently working, while there is no effect from living with a grandmother in any of the models. The addition of mother's bargaining power in the regressions correlates with a significantly higher probability of working for boys, but the same is not seen for girls. In fact, while the mother's years of education grows more significant in magnitude for boys, the negative effect is smaller for girls and not significant. Rather, the father's years of schooling continues to be significant at the 0.05 level and nearly doubles the probability of currently working for girls when bargaining power is considered.

## *5.2 Children's schooling*

In Table 4, age is expectedly significant and positive across all models. The father's education is statistically significant for the years of schooling for boys, whereas the mother's education is highly significant for that for girls. An additional year of education for a father makes nearly no difference on girls' education. Living in rural areas is associated with less years of schooling completed for the total sample and girls, while the log of a household's annual income has a small and non-significant effect. Also not significant on children's years of schooling are having either a grandfather or grandmother living in the same household, gender, the interaction of gender and birth order, and the mother's bargaining power.

Age has a negatively significant influence on the probability of currently attending school in all models (Table 5), with the exception of the inclusion of the mother's bargaining power among girls. In general, as children become older, they are less likely to be in school. Also, as birth order increases, children, especially boys, are less likely to attend school. On the one hand, father's education is not significant and mostly positive, with the exception of the model with mother's bargaining power included for boys. On the other hand, for overall children and girls, the mother's education is significant at the 0.01 level. Similar to the results from other tables, mother's bargaining power is a major factor for the attendance of boys, but not of girls. When it is included, the probability of currently attending school decreases by about 80% for sons of mother's with bargaining power. However, an additional year of schooling is still positively significant for boys and the total sample.



Living in rural areas only affects boys in the model with mother's bargaining power by increasing the probability of currently attending school by 43%. The household annual income hardly has any influence on school attendance. In addition, gender, birth order, and having at least one grandfather living in the same household have no significant influence on current schooling. Fascinatingly, in the total and girls models controlling for mother's bargaining power, grandmothers have a significantly positive correlation with school attendance. Granddaughters having at least one grandmother living in the same household have a 130% greater probability of currently going to school than those who do not. Yet this phenomenon is not seen with the presence of grandfathers.

## **6. Discussion**

### *6.1 Determinants of child labor and schooling*

In reference to the luxury axiom, the results lend support to the hypothesis that children will stop working once the household earns enough income to bring themselves out of poverty or subsistence living (Tables 2 and 3). But the household income factor is predominant among boys, since boys of wealthier households work less. To more accurately test for this axiom, it may be worthwhile to ask households information on their most basic needs and subsistence living standards.

One of the most interesting findings of this study is the effect of intergenerational dynamics. Not only is this effect linked to the parents, but it also extends to the grandparent's generation. First, parental education has a significant impact on all four outcome variables of total hours worked in a week, years of schooling completed, and the

probabilities of working or going to school (Tables 2-5). Mother's education plays more of a role in the extent of child labor and schooling, which supports the theory that the mothers try to internalize their children's preferences and her influence on household decision-making when she has some kind of bargaining power. What requires further analysis is why once the mother's bargaining power is controlled for that her additional years of schooling is only significant for boys and not for girls. This is not to say that the father does not have any influence within the household. For instance, additional years of schooling for the father is associated with a reduced probability of working for girls and more schooling for boys (Table 3). For the most part, however, father's education compared to mother's education has smaller effects on both boys and girls.

Secondly, grandparents also play a role in the likelihood of working or going to school. The influence of this older generation is consistent with Duflo's findings, where grandmothers may care for their granddaughters more because the presence of a grandmother in the same household is associated with a much higher probability that the granddaughter attends school (Table 5). It may be that grandmothers take care of the household chores and other childcare duties, which girls are typically responsible for, but then the results in Table 2 would have picked up this effect. The girls may be first born and having a grandmother present to physically take her granddaughter to and from school may be one of the several motivating forces that allow the girl to attend school. Parents may be more willing with their sons to do the same, but not with their daughters. Therefore, the grandmother is the person who takes care of the granddaughter.

Not just grandmothers are important. Grandfathers also have an effect on his grandchildren, more noticeably with grandsons. For the grandsons who have at least one grandfather living in the same household, they have an 87% reduced probability of working (Table 3). However, this relationship may be misleading because the child questionnaire only asks if the children (not the older generation) take care of other children; information on whether the children take care of their grandchildren is not available. But it can also be convincing that grandfathers substitute for child labor in performing the work that children would otherwise have to do. This intergenerational dynamic can be bi-directional, as it may be children who are labor substitutes for the elderly.

The only perplexing results are that of the mother's bargaining power. When mother's have equal or greater educational attainment than their male counterparts, boys work more hours, have a higher probability of working, or have a lower probability of attending school (Tables 2, 3, and 5). These coefficients are exactly opposite of what is expected. One possible explanation for the child labor outcome may be that the sons are performing different types of work, possibly ones that require a higher skill set, or work that is still favored over going to school. Therefore, the son's outside options may have increased and may be better than attending school. Another possibility is that because the mother is of equal or higher education compared to her husband's, she may be working longer hours and unable to take care of her children or do household chores, for which the son ends up taking responsibility. A third hypothesis could be that the mother home-schools her children instead of having them go to school. They may have more work

activities that they can accomplish without spending travel time and cost to and from school.

When using a stricter definition of bargaining power, e.g. if the mother has a higher educational attainment than the father, the results are very similar (not shown here). It would be interesting to compare these results with another variable for bargaining power, such as non-labor income, which is not available in this dataset.

### *6.2 Limitations of the study*

The first major limitation of the study is the small sample size. Even though the sample for household and adults are relatively large, the amount of missing data severely limits the intergenerational analysis. The second limitation is the lack of information regarding the grandparents. Having at least one grandparent living in the same household can have a variety of interpretations. For instance, the grandfather may be the head of the household and still have a significant command of the household's decisions. The grandparent may require their grandchildren to take care of them. In an extension of the substitution axiom, the grandparent may also assume the role of a laborer and absorb some of the work activities that may otherwise be delegated to their grandchildren.

As it is premature to claim any overarching policy implications, child labor may not be a harmful or abusive occurrence. Rather, this study considers child labor as a part of the overall household production function. Given the results, mother's education is clearly the most important mitigating factor in the probability and extent of child labor and positive influence on schooling.

Further studies should take advantage of the changes over time with panel data. The temporal variations within the same household will yield more useful information on how households change in response to differing intergenerational dynamics, bargaining power, and income, among other variables. With the current models, parents' education most likely will not change over time, but the use of income may pose some interesting comparisons. Different models and their specifications can also be employed to analyze the determinants of child labor. For instance, this study would stand to further benefit from a conditional model of only children who are working. Within the child laborer sample, one can better differentiate the significant factors for more hours worked or the different types of work.

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**Figure 1.** Map of provinces surveyed in China (China Health and Nutrition Survey).





**Table 1.** Descriptive statistics of boys, girls, and total children (China Health and Nutrition Survey).

	Total		Boys		Girls	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Dependent variables						
Total hours worked in a week	1.617	8.657	1.467	8.731	1.798	8.570
Probability of working	0.081	0.272	0.065	0.247	0.099	0.299
Years of schooling	5.712	3.241	5.687	3.289	5.742	3.186
Current school attendance	0.909	0.288	0.894	0.308	0.926	0.261
Independent variables						
Age	9.052	4.993	8.966	5.054	9.156	4.920
Male	0.545	0.498				
Birth Order	1.417	0.641	1.456	0.669	1.369	0.603
Father's years of schooling	9.395	3.229	9.322	3.253	9.483	3.200
Mother's years of schooling	8.489	3.555	8.349	3.532	8.657	3.577
Rural	0.707	0.455	0.725	0.447	0.687	0.464
Log of annual household income	8.681	1.092	8.700	1.108	8.658	1.075
Grandfather living in HH	0.245	0.430	0.254	0.436	0.234	0.424
Grandmother living in HH	0.326	0.469	0.339	0.474	0.311	0.463
Mother's bargaining power	0.680	0.467	0.677	0.468	0.683	0.466

**Table 2.** OLS Regression on total hours worked for boys, girls, and total children (China Health and Nutrition Survey).

Variables	Total		Boys		Girls	
Dependent: Total hours worked in a week						
Age	0.359*** (0.060)	0.283*** (0.055)	0.389*** (0.087)	0.319*** (0.081)	0.302*** (0.082)	0.225*** (0.072)
Birth order	0.485 (0.677)	0.671 (0.682)	-0.432 (0.633)	-0.258 (0.633)	0.449 (0.646)	0.691 (0.622)
Father's years of schooling	0.143 (0.104)	0.074 (0.158)	0.064 (0.154)	0.211 (0.234)	0.194 (0.139)	-0.118 (0.209)
Mother's years of schooling	-0.427*** (0.098)	-0.235 (0.150)	-0.353** (0.141)	-0.383* (0.229)	-0.504*** (0.134)	-0.063 (0.193)
Rural	-0.199 (0.603)	0.458 (0.562)	-0.354 (0.891)	0.452 (0.854)	0.087 (0.805)	0.618 (0.721)
Log of household annual income	-0.368 (0.271)	-0.431* (0.254)	-0.913** (0.390)	-0.880** (0.367)	0.318 (0.376)	0.223 (0.348)
Grandfather living in HH	0.040 (0.858)	0.181 (0.776)	-0.216 (1.258)	0.099 (1.178)	0.032 (1.150)	0.091 (0.996)
Grandmother living in HH	-0.765 (0.785)	-0.637 (0.716)	-0.302 (1.163)	-0.216 (1.099)	-1.141 (1.036)	-0.873 (0.906)
Male	1.345 (1.330)	1.461 (1.275)				
Birth order*Gender	-0.940 (0.860)	-0.960 (0.864)				
Mother's bargaining power		1.227 (0.794)		2.174* (1.216)		0.066 (1.013)
Constant	3.664 (2.665)	1.998 (2.631)	9.573** (3.739)	6.301* (3.787)	-1.587 (3.457)	-2.127 (3.315)
Observations	1063	925	574	493	489	432
R-squared	0.080	0.054	0.081	0.068	0.092	0.051

Notes: Standard error in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 3.** Probit regression on currently working for boys, girls, and total children (China Health and Nutrition Survey).

Variables	Total		Boys		Girls	
Dependent: Currently working						
Age	0.120*** (0.019)	0.115*** (0.021)	0.135*** (0.029)	0.137*** (0.033)	0.104*** (0.026)	0.0940*** (0.029)
Birth order	0.142 (0.129)	0.302* (0.164)	0.0942 (0.129)	0.303* (0.156)	0.152 (0.133)	0.319* (0.168)
Father's years of schooling	-0.0482** (0.024)	-0.0443 (0.053)	-0.009 (0.037)	0.101 (0.081)	-0.0857** (0.033)	-0.205** (0.082)
Mother's years of schooling	-0.0952*** (0.021)	-0.145*** (0.056)	-0.105*** (0.031)	-0.273*** (0.088)	-0.0944*** (0.031)	-0.0247 (0.077)
Rural	0.504*** (0.170)	0.783*** (0.237)	0.630** (0.262)	0.987*** (0.383)	0.487** (0.235)	0.706** (0.316)
Log of household annual income	-0.0472 (0.063)	-0.0169 (0.077)	-0.138* (0.082)	-0.160* (0.095)	0.0821 (0.099)	0.227* (0.133)
Grandfather living in HH	-0.560* (0.292)	-0.528 (0.339)	-0.865* (0.495)	-0.800 (0.560)	-0.388 (0.391)	-0.435 (0.483)
Grandmother living in HH	-0.0345 (0.209)	-0.0297 (0.245)	0.0422 (0.300)	0.228 (0.352)	-0.132 (0.302)	-0.235 (0.373)
Male	-0.171 (0.316)	-0.0896 (0.378)				
Birth order*Gender	-0.0715 (0.178)	-0.0874 (0.219)				
Mother's bargaining power		0.413 (0.264)		1.017** (0.434)		-0.0603 (0.355)
Constant	-1.622*** (0.627)	-2.214*** (0.839)	-1.606* (0.845)	-2.388** (1.101)	-2.243** (0.904)	-3.280** (1.340)
Observations	1063	925	574	493	489	432

Notes: Standard error in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 4.** OLS Regression on years of schooling for boys, girls, and total children (China Health and Nutrition Survey).

Variables	Total		Boys		Girls	
Dependent: Years of schooling						
Age	0.903*** (0.014)	0.917*** (0.014)	0.903*** (0.020)	0.930*** (0.021)	0.901*** (0.018)	0.903*** (0.019)
Birth order	-0.021 (0.103)	-0.051 (0.121)	-0.091 (0.094)	-0.056 (0.105)	-0.004 (0.099)	-0.054 (0.116)
Father's years of schooling	0.0314* (0.017)	0.027 (0.030)	0.0636** (0.025)	0.0770* (0.044)	-0.004 (0.022)	-0.033 (0.042)
Mother's years of schooling	0.0434*** (0.015)	0.042 (0.029)	0.028 (0.022)	0.008 (0.044)	0.0614*** (0.021)	0.0812** (0.040)
Rural	-0.250*** (0.095)	-0.167 (0.102)	-0.206 (0.142)	-0.118 (0.152)	-0.275** (0.127)	-0.217 (0.136)
Log of household annual income	-0.005 (0.043)	0.054 (0.047)	-0.034 (0.061)	0.041 (0.063)	0.039 (0.063)	0.091 (0.071)
Grandfather living in HH	0.033 (0.147)	0.070 (0.153)	-0.033 (0.214)	0.131 (0.224)	0.101 (0.201)	0.007 (0.211)
Grandmother living in HH	-0.015 (0.127)	-0.101 (0.133)	0.081 (0.187)	-0.033 (0.198)	-0.121 (0.170)	-0.170 (0.177)
Male	0.097 (0.207)	-0.002 (0.228)				
Birth order*Gender	-0.078 (0.131)	-0.026 (0.152)				
Mother's bargaining power		-0.063 (0.150)		0.093 (0.227)		-0.218 (0.198)
Constant	-5.113*** (0.439)	-5.687*** (0.497)	-4.990*** (0.609)	-6.108*** (0.691)	-5.285*** (0.587)	-5.448*** (0.679)
Observations	789	665	421	351	368	314
R-squared	0.865	0.877	0.853	0.868	0.882	0.890

Notes: Standard error in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 5.** Probit regression on current school attendance for boys, girls, and total children (China Health and Nutrition Survey).

Variables	Total		Boys		Girls	
Dependent: Current school attendance						
Age	-0.101*** (0.020)	-0.0781*** (0.022)	-0.111*** (0.027)	-0.110*** (0.031)	-0.0850*** (0.032)	-0.0289 (0.034)
Birth order	-0.259* (0.144)	-0.237 (0.192)	-0.244** (0.115)	-0.363*** (0.139)	-0.158 (0.152)	-0.168 (0.199)
Father's years of schooling	0.025 (0.025)	0.015 (0.054)	0.035 (0.034)	-0.028 (0.070)	0.026 (0.039)	0.058 (0.090)
Mother's years of schooling	0.0616*** (0.022)	0.104* (0.055)	0.030 (0.029)	0.140* (0.074)	0.106*** (0.035)	0.093 (0.089)
Rural	0.127 (0.146)	0.226 (0.170)	0.251 (0.187)	0.433* (0.223)	-0.047 (0.246)	-0.127 (0.292)
Log of household annual income	-0.011 (0.067)	-0.003 (0.076)	0.000 (0.082)	-0.037 (0.097)	-0.048 (0.116)	-0.007 (0.136)
Grandfather living in HH	0.038 (0.269)	-0.011 (0.314)	0.076 (0.347)	0.238 (0.438)	-0.065 (0.447)	-0.657 (0.549)
Grandmother living in HH	0.281 (0.226)	0.492* (0.279)	0.139 (0.285)	0.143 (0.353)	0.525 (0.396)	1.309** (0.623)
Male	-0.265 (0.322)	-0.154 (0.383)				
Birth order*Gender	0.051 (0.180)	-0.076 (0.231)				
Mother's bargaining power		-0.443 (0.270)		-0.802** (0.379)		-0.127 (0.413)
Constant	2.331*** (0.696)	1.896** (0.856)	2.241*** (0.832)	2.771** (1.102)	2.052* (1.100)	0.935 (1.347)
Observations	792	668	423	353	369	315

Notes: Standard error in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1