

The Inter-Generational Persistence of Child Labor

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May 2002

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I. Introduction

Child labor is a perplexing problem. In fact, it is debatable whether it is appropriate to label it a problem at all. If, as many recent economic studies on the topic suggest, child labor is a result of (and a strategy to avoid) household poverty, then it may be viewed not so much as a problem but as a solution to poverty's crushing effects. This is perplexing for policy makers because this means that banning child labor may, in fact, harm the very people it attempts to help (see, e.g., Basu and Van (1998)). There are many other ways in which this aspect of child labor can lead to situations that pose potential challenges to policy makers. The present study attempts to explore one of them: that the use of child labor by families to avoid poverty can cause it to persist through the generations of that family. If this is indeed the case, then policy makers that wish to promote policies that lead to long-term reductions in child labor are faced with the new challenge of focusing their attention not only on current child laborers, but future ones as well.

Although there has been some excellent recent theoretical work examining the inter-generational links in child labor and identifying the potential for inter-generational child labor traps (see e.g., Baland and Robinson, 2000; Basu, 1999; Bell and Gersbach, 2000; Lopez-Calva and Miyamoto, 2000; Basu, 1999; Ranjan, 1999)ⁱ, there is a marked absence of empirical work on the topic. This study is an attempt to rectify that omission by examining the inter-generational persistence of child labor empirically. Previous empirical work on child labor has primarily focused on isolating the determinants of child labor using survey data (see e.g., Ray, 2000, 1999; Jensen and Neilsen, 1997; Patrinos

and Psacharopoulos, 1997; Psacharopoulos, 1997; and Grootaert and Kanbur, 1995).

This paper takes a different approach by asking two related questions. One, does the child labor status of parents impact the child labor incidence of their children? We find strong evidence that it does. Two, is this link only a function of permanent family income or is there a direct link between the child labor status of the parents and their children? We find evidence that such a direct link exists.

We begin our examination of the inter-generational persistence in child labor first by discussing the economic reasons to expect an inter-generational link, and then by examining empirical evidence from Brazil. Our discussion focuses on the mechanisms through which parental child labor can lead to the child labor of the children, and concentrates on one critical assumption: that child labor interferes with a child's educational attainment. If this assumption is correct, then children who worked while growing up will not be able to command as high a wage as they would have had they not been child laborers. Once they reach adulthood, these individuals will have lower incomes and will more likely be forced to send their children to work as well.

We then turn to an empirical investigation into the persistence of child labor by examining Brazilian household survey data. We exploit the fact that the data include information on the child labor of both parents and children in a family as well as information on the educational achievement of the grandparents. We find that people who start work at a younger age end up with lower earnings as adults, and that children are more likely to be child laborers the younger their parents were when they entered the labor force, and the lower the educational attainment of their parents as well as their grandparents. These findings are consistent with our discussion of the persistence mechanisms. However, we also find that this inter-generational persistence remains even

when we control for proxies of family permanent income, such as current family income and parental education. This result suggests that there may be other reasons for the persistence of child labor over and above poverty, for example, social norms or parental preferences.

II. The Inter-Generational Child Labor Link

As mentioned above, the starting point for our discussion of the inter-generational child labor link is the assumption that families prefer to withhold their children from the labor market until they are adults. Instead they opt to invest in their schooling. However if a family is struggling to survive, they may have to resort to sending some or all of their children to the labor market.

In this section we present a discussion of the inter-generational persistence of child labor that incorporates the essential aspects of previous theoretical work.ⁱⁱ The recent theoretical literature on child labor and poverty traps incorporates a set of core assumptions: that parents are altruistic toward their children; that there is a trade-off between child labor and a child's human capital accumulation; that the child's human capital accumulation is an increasing function of schooling; and that the credit market is imperfect. With these basic assumptions in place, it becomes quite easy to characterize the case of inter-generational persistence in child labor.

We begin by considering a family where parents care about the educational attainment of their children. If the family has access to adequate resources, they will choose to invest in the education of their children. However, if they are faced with the problem of not having enough income from the parents to keep the family above the subsistence level, they will choose to send some or all of their children to work to ensure

the survival of the family. Due to the lack of capital markets, families are unable to borrow against the future earnings of their children and thus have no other choice than to sacrifice some of their children's schooling and send them to work. This reduction in schooling causes a loss of overall human capital accumulation, in other words the knowledge and skills that are valuable in the adult labor market. Thus, this loss of human capital from child labor results in lower wages as adult.

From the simple story outlined above, the cycle becomes clear: if a child is born into a poor family, he/she is more likely to work as a child laborer than a child born into a wealthy family. Having to work as a child laborer limits the amount of education that he/she receives and thus he/she will have lower human capital level as an adult than a child who did not have to work as a child laborer. The low level of human capital means that this same child, now an adult, will earn lower wages as a result. Lower wages as an adult mean that he/she will be more likely to be forced to send his/her children to work as child workers.

This cycle can lead to multiple generations of a family being stuck in what could be termed a child labor trap. This is easily illustrated with a simple figure. If we consider the level of adult human capital a function of the education received as a child then we can express this idea as: $h_t = f(e_{t-1})$. Here h_t is the level of adult human capital in time period t (adulthood) for an individual that reached education level e_{t-1} in time period $t-1$ (childhood). If adult wage is an increasing function of human capital h_t then the level of education of the next generation, i.e. the child, e_t will be determined by the parent's human capital level, or: $e_t = g(h_t)$. Thus, the child's human capital level as an adult, h_{t+1} , will be determined by his/her parent's human capital level: $h_{t+1} = f(g(h_t))$. The shape of this function can take on many forms but one very plausible one is

illustrated in Figure 1. The rationale for such a shape is easily motivated by what is termed in the literature ‘sheepskin effects,’ or non-linearities in the returns to education. In other words, the wages one can command from the labor market jump up or at least increase disproportionately upon reaching a certain level of education, for example literacy, a grade school certificate, high school diploma, college degree, etc. These types of ‘sheepskin effects’ can cause the human capital accumulation function of children, which is a function of their parent’s human capital, to have an S-shape like the one in Figure 1.

In Figure 1, we assume that the level of human capital an individual is endowed with (that is, what one would have as an adult if he/she had no education) is 1, and the maximum human capital attainable is \bar{h} . This figure then maps the child’s human capital, h_{t+1} , as a function of the adult’s, h_t . The dynamics of this function suggest that there is a critical level of human capital, h^* , beyond which a family will continue to increase education through the generations until \bar{h} is reached. A family that is below h^* will continue to slide back, getting less and less education generation by generation, until they reach the no education, all child labor equilibrium. Thus, the ‘child labor trap’ is illustrated.

It is worth noting that, while this is a plausible and, we would argue, quite likely scenario, there are other reasons that could cause persistence in child labor. For example if there are so called social norms that dictate that parents who had to work as children send their children to work as well. Or it could be driven in part by parental preferences: perhaps parents who worked as children feel that it imparts important qualities in children and want those qualities instilled in their children as well. There could also be a social stigma attached to having parents that were child laborers that prevents normal returns to

education. These and other stories can also lead to persistence, but in general we expect these effects to be second order.

III. The Data and Empirical Strategy

3.1 The Data

The data used in this study come from the 1996 Brazilian Household Surveys called *Pesquisa Nacional por Amostragem a Domicilio* (PNAD) conducted by *Instituto Brasileiro de Geografia e Estatística* (IBGE), the Brazilian census bureau. It is an annual labor force survey much like the Current Population Survey in the U.S. Covering all urban areas and the majority of rural areas in Brazil (with the exception of the rural areas of the Amazon region), the 1996 PNAD encompasses approximately 85,000 households.

This study utilizes a sample that consists of individuals between 10 and 14 years old that are considered a son, daughter or other relative in the family unit.ⁱⁱⁱ Each observation consists of information on the child's characteristics, his or her parent's characteristics and his or her family's characteristics. Since we are primarily concerned with the impact of the parent's child labor status on the child labor status of the children, we use a sample of observations with complete information of the father's and the mother's characteristics. Due to this criterion, families with single heads are excluded from the analysis.^{iv} Finally, all observations for which the age difference between the head of the family or spouse, and the oldest child is 14 years or below, are excluded as well.

The child labor variables for the children are constructed as follows. A child is considered working if he or she worked on the labor market any strictly positive hours per week.^v Moreover, a child is considered to work full time if he or she worked 20 hours

or more on the labor market per week. Both definitions of child labor will be used to check the robustness of the results.

The child labor variable for the parents is defined as follows. The PNAD survey asks each individual the age at which he or she started to work. A parent who responded that they began working in the labor market at 14 years old or below is considered to have been a child laborer. Again, we will also use an alternate definition where we consider an adult to have been a child laborer if they entered the labor force at age 10 or below to check the robustness of the results and to account for any generational differences in child labor norms.

For each child, we also obtained his or her school attendance status, gender and region of residence. Similarly, we constructed years of schooling, age and employment status of the parents. Table A1 in the Appendix presents the basic statistics of all the variables used in this analysis.^{vi}

3.2 Empirical Strategy

To test the inter-generational effect of child labor we estimate a probit model of the child labor indicator variable on the parental child labor status variables and a vector of other controls. The probit model estimates the effect of the independent variables on the probability that the child is a child laborer. Our goal in estimating the probit model is to capture the persistence in child labor by estimating the effect of having a mother or father who was a child laborer on the probability of the observed child's child labor status while controlling for other observable characteristics that may also effects the child's likelihood of working in the labor market (for example their age, gender, number of siblings, etc.). We first estimate a model that neither controls for the schooling of the

parents nor the income of the family. This is in keeping with the theoretical discussion that hypothesizes that the inter-generational link is transmitted through adult income (which is a function of schooling).

We next test for a 'direct' link in child labor. If the assumption that child labor only comes as a result of familial poverty is correct, then by controlling for family wealth or permanent income, we should see the effect of parental child labor on their children's incidence of child labor disappear. It is well established that parental education is the most reliable predictor of a family permanent income. Thus, we start by including parental education, which, as in the discussion above, is a likely mechanism through which child labor is transmitted between generations. If there is still an effect after controlling for parental education, then we can be fairly confident that education (or at least that aspect of education we can measure – years of schooling – as opposed to some sort of quality normalized measure) is not the entire story. Parental education, however, may not encompass entirely one's family wealth or one's family income flows. Thus, we next include current family income to strengthen the test for a 'direct' link in child labor. A potential problem with this result, however, is that the family income variable is likely endogenous.

IV. The Inter-Generational Persistence of Child Labor in Brazil

4.1 Unconditional Probabilities

Table 1a presents the proportions of child labor and adult's child labor status in 1996 for the base-line definitions of child labor for the children and parents. In Table 1a, of all 10 to 14 year old children in the sample, 13.9 percent worked in the labor market. 70.6 percent of their fathers were child laborers and 37.2 percent of their mothers started

working at age 14 or below. More importantly, of all children belonging to a family in which the father was a child laborer, 17.3 percent are child laborers. On the other hand, of all children coming from a family in which the father was not a child laborer, only 5.9 percent are child laborers. Similarly, of all children that belong to a family in which the mother was a child laborer, 24.3 percent are child laborers, and all children coming from a family in which the mother was not a child laborer, around 7.8 percent are child laborers.

Table 1b presents similar figures when the child labor variable is defined as working at least twenty hours a week. In this case, of all children aged ten to fourteen, 10.5 percent are child laborers. Again, a child that comes from a family where the father or the mother was a child laborer are approximately three times more likely to be working compared to a child whose father or mother was not a child laborer.

Although these figures are unconditional probabilities, they suggest the existence of inter-generational persistence in child labor in Brazil.

4.2 Probit Model Estimations on Child Labor Indicator Variables

To estimate the effect of parental child labor on the incidence of work among youths aged 10-14, we first estimate a standard probit model. The dependent variable is an indicator that equals one if the child usually works any strictly positive hours in the labor market. This is regressed on indicator variables that equal one if the child's mother and father were child laborers (began working at age 14 or below). Also included are the age of the child, the age of the parents, the number of brothers and sisters aged 0-5, 6-9, 10-14 and 15-17, and indicators for if the child is female, lives in an urban area, has a

father that is not in the labor market, has a mother that is not in the labor market.^{vii} The results are shown in the first column of Table 2.^{viii}

We find that parental child labor has a strong and positive effect on the probability that a child is in the labor force. Moreover, a female child and children in urban areas are less likely to work in the labor market. Also, the greater the number of siblings aged 5 to 14, the more likely the child is to work. Children are also less likely to work if either parent is not in the labor market.^{ix}

If the child labor trap explanation outlined in the model is the only determinant of the intergenerational persistence of child labor, then the parental child labor effect should vanish when one controls for family wealth or any appropriate proxy for it. One such proxy is the education of the parents.

Column three shows the results of the regression added the parent's years of schooling as dependent variables. As expected, the years of schooling of the parents has a strongly negative and significant effect on the child's probability of working. These results indicate that a child is more likely to be a laborer if his/her parents were child laborers and less likely the more educated are his/her parents. The effect of parental child labor remains positive and statistically significant, thus testifies that parental child labor has effects on children's work over and above that of the parents' educational status.

In order to evaluate the impact of the grandparents' education on child labor status of the grandson or granddaughter and to possibly enhance the proxy for family permanent income, we also estimate a probit model that includes the years of schooling of the child's grandparents as explanatory variables.^x Column 5 of Table 2 shows the coefficients from the complete set of regressors. When we include the parents' education variables, the years of schooling of grandparents becomes insignificant. These results

suggest that there is no direct link between grandparents' education and child labor status of the grandchild. Although not reported, we estimated a probit including grandparents' years of schooling but excluding the parents' years of schooling variables. In this case, the grandparents schooling variables became significant. Thus, the schooling effect appears to operate through the education of the parents only.

4.3 Probit Model Estimations including Family Income

Adding income of the family in our probit specification makes the model likely to suffer from an endogeneity problem, but considering income as an explanatory variable is useful for it can help determine if education of the parents is an adequate proxy for permanent family income. The income of the family minus the income from the observed child is included in the regressions in Table 3. The first specification includes both the family income variable as well as the parents' education variable. The results of this regression are given in the first column of Table 3. In this case, the coefficients on both parents' child labor indicator variables are positive and significant and the coefficients on the parents' education variables are negative and significant. The coefficient on the family income variable is not significant, however. In the second specification, shown in column three of Table 3, the schooling of the parents is not included. Here, the coefficients on the parents' child labor indicator variables are still positive and significant but now the coefficient on the family income variable is negative and significant.

From these results it again appears that there is an effect of parental child labor over and above that of the effect on family income and parental education. These results are not predicted by our simple model and suggest that the effects of parental child labor

may be more complex than the simple human capital relationship posited in our model. This suggests that future research is needed to shed more light on this aspect of child labor. For example, it could be that human capital accumulation is not only determined by the amount of education, but by social norms, preferences, the quality of education, the level of education of siblings, the household environment, etc.

Nonetheless, the results suggest that there is indeed a ‘family wealth effect’ on child labor. To illustrate the interaction between parental child labor status and their educational achievement, Figure 2 presents the difference in the probability of working in the labor market for a 12 year-old child coming from a family with parents who were child laborers, compared to a family where parents were not child laborers. It is assumed that both parents have the same level of education, that they are both in the labor market, forty years old and have only one child. The probability differences are constructed for sons and daughters in rural and urban areas separately, and use the coefficients from the first column of Table 2. Notice first that, for any level of parental education, a child that belongs to a family with parents who were child laborers is more likely to be a child laborer. Second, this difference decreases as the education level of the parents increases. This is exactly what we would expect from our child labor persistence hypothesis.

V. The Harmful Effects of Child Labor

So far we have shown strong evidence of inter-generational persistence of child labor in Brazil. However, in order to explain why we should be concerned with the incidence of child labor, it is important to look at the economic consequences of child labor in a person’s life. One main negative effect of child labor is the potential for child

labor to hamper the ability of the adult to generate higher earnings. This is also a key hypothesis of the persistence story outlined in Section II.

In order to assess the impact of having been a child laborer on current earnings, we estimate both a simple OLS regression and a Heckman selection model for both mothers and fathers in the sample. In these specifications we regress the log of current earnings on age and age squared, age they started work and its square, the grandfather's years of schooling, the grandmother's years of schooling and a race indicator variable. In addition, in separate specifications, we add the individual's years of schooling. The Heckman estimations attempt to correct for the fact that we only observe the income of those individuals who 'self-select' to work as adults. If the decision to work as an adult were in any way correlated with having been a child laborer, this would cause our results to be biased and suspect. For the selection-bias corrected estimations we add the number of sons and daughters aged zero to nine years old in the first stage regression. The results are given in Table 4.

For both fathers and mothers, the coefficient on the age they started working is positive and significant in all specifications. In the specification that excludes the years of schooling variables, the age at which the individual started to work coefficients can be interpreted as the forgone earnings of an individual entering one year earlier in the labor market. Moreover, child labor has a negative impact on current earnings even when we control for education and other variables. This means that there are negative aspects of having been a child laborer over and above that of losing out on education, again raising questions about the precise nature of the effects of parental child labor on children. Therefore there do not appear to be positive effects on adult earnings of gaining work experience as a child laborer. The squared term is negative and significant, meaning that

the marginal negative impact of child labor for adults lessens the later the individual enters the labor force.

The results of Table 4 show that *on average* child labor hampers the individual's adult earnings. Emerson and Portela Souza (2002), however, examines this aspect of child labor more closely and finds that in some instances (i.e. for particular occupations) child labor may not be harmful. The general idea is that there may be some professions that have strong vocational aspect to them and by acquiring job-specific human capital for these professions individuals may be able to do well as adults as a result. The results here suggest that though there may be some areas where child labor is beneficial, those areas are greatly outweighed by the ones that are harmful.

IV. Conclusion and Comment on Policy

The results presented in this study suggest that there is a significant relationship between a parent's child labor incidence and years of schooling and those of their children. We find that children are more likely to be child laborers if their parents were as well. In addition, we find that children are less likely to be child workers the more educated their parents are. Moreover, the educational attainment of grandparents does not directly affect the child's labor status, but there seems to be an indirect impact that is transmitted through the parents' education. These results hold when we control for family income as well. Additionally, earnings as an adult are lower, *ceteris paribus*, the earlier the individual enters the labor market. Together, these results paint a striking picture of the inter-generational persistence and the harmful effects of child labor within families.

The fact that there appears to be an inter-generational effect of child labor over and above that which is transmitted through household income and parental education suggests that the simple persistence model, presented in Section II, does not explain all of the ways through which parental child labor effects the children. This suggests that richer models are needed that present a more sophisticated view of the household child labor choice that accounts for this aspect of persistence. If, on the one hand, the results in this study come from some unobservable human capital characteristics that is captured by the parental child labor variables (e.g., school quality), then our finding is essentially capturing the intergenerational effects of poverty persistence and thus it is consistent with our theoretical discussion of child labor persistence. If, on the other hand, it comes from a difference in the preferences of households in which parents were child laborers, or different social norms associated with child labor experience, then the current theoretical child labor literature is not adequate to fully explain child labor in Brazil.

These results pose some complicated challenges for policy makers. If the persistence story as outlined in Section II is correct, or at least a major part of what we have observed, this suggests that it might be better to tackle the child labor problem on a family-by-family basis. What we mean is this: if there are only limited resources to spend on the reduction of child labor it may be better to target this money at select families to raise each out of the child labor 'trap.' This would be much more effective in the long-run than dividing the resources evenly which might ease the poverty incentive to send children of the current generation to work, but may lift only a few families above the critical level of resources needed to keep them out of child labor for the generations to come. Bell and Gersbach (2000) have examined just such a system in their model of education. This type of policy is likely to be very unpopular politically, but would have

lasting long term benefits as opposed to families falling into the same trap and needing to be helped again in the next generation.

One thing is clear however: if child labor is indeed mostly a result of familial poverty, banning child labor can have quite harmful effects (see Basu and Van, 1998) and should be treated with the utmost of caution. However, if there are significant effects of parental child labor that exists over and above that of the link posited in Section II of this paper, for example from social norms, a more challenging policy problem presents itself. If poverty is a small part of the story and norms or parental preferences are the major factors, then policy solutions like absolute bans on child labor may be more effective.

Given the results presented in this study, we believe that both poverty and parental preferences are significant factors, but that poverty is still the most important motivation for child labor that can be targeted by policy makers. Policies like the family-targeted one described above, in conjunction with an educational program to counteract norms or beliefs on the part of parents that child labor is ‘good’ for their children may be the best way to address this problem. These policies are important because, as this study shows, child labor has lasting and harmful effects on an individual’s earnings ability as an adult. The negative effect of the loss of educational attainment is greater than the positive effect of gaining experience as a child laborer.^{xi} Thus intervention is, in our view, both necessary and important.

Appendix: Basic Statistics for Selected Variables

Table A1 presents the means, standard deviations and the minimum and maximum values for some selected variables. Because years of schooling and child labor are likely correlated, Table A2 presents the correlation matrix for the age at which the individual started work variable and the years of schooling variables for both fathers and mothers. The correlation coefficient is 0.03 for both mothers and fathers, so there is a correlation, but it is not as strong as might be expected.^{xii} Table A3 presents the unconditional probabilities between the labor force participation and schooling of the sons and daughters in the sample. Table A4 presents the raw data associated with the hours worked of the children in the sample.

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Table 1a: Unconditional Probabilities.**Child Working Strictly Positive Hours. Parent Began Working at age 14 or Below.**

Son or Daughter is		Father was a Child Laborer		Mother was a Child Laborer		Total
Child laborer	No	Yes	No	Yes		
No	Number	7991	16833	16708	8116	24824
	Row %	32.19	67.81	67.31	32.69	100
	Column %	94.1	82.72	92.19	75.72	86.07
Yes	Number	501	3517	1416	2602	4018
	Row %	12.47	87.53	35.24	64.76	100
	Column %	5.9	17.28	7.81	24.28	13.93
Total	Number	8492	20350	18124	10718	28842
	Row %	29.44	70.56	62.84	37.16	100
	Column %	100	100	100	100	100

Table 1b: Unconditional Probabilities.**Child Working at Least 20 Hours per Week. Parent Began Working at age 14 or Below.**

Son or Daughter is		Father was a Child Laborer		Mother was a Child Laborer		Total
Child laborer	No	Yes	No	Yes		
No	Number	8132	17690	16990	8832	25822
	Row %	31.49	68.51	65.8	34.2	100
	Column %	95.76	86.93	93.74	82.4	89.53
Yes	Number	360	2660	1134	1886	3020
	Row %	11.92	88.08	37.55	62.45	100
	Column %	4.24	13.07	6.26	17.6	10.47
Total	Number	8492	20350	18124	10718	28842
	Row %	29.44	70.56	62.84	37.16	100
	Column %	100	100	100	100	100

Table 2: Child Labor Persistence. Probit on Child Labor Indicator Variable.

Independent Variables	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error
Child Laborer Father	0.333**	0.029	0.259**	0.030	0.251**	0.039
Child Laborer Mother	0.407**	0.027	0.319**	0.028	0.320**	0.036
Father's Years of Schooling			-0.028**	0.004	-0.025**	0.005
Mother's Years of Schooling			-0.030**	0.004	-0.033**	0.005
Age of the Child	0.208**	0.008	0.211**	0.008	0.214**	0.010
Years of Schooling of the Grandfather (father's side)					0.000	0.009
Years of Schooling of the Grandmother (father's side)					-0.008	0.009
Years of Schooling of the Grandfather (mother's side)					-0.001	0.008
Years of Schooling of the Grandmother (mother's side)					0.002	0.009
Female Child	-0.587**	0.032	-0.593**	0.032	-0.587**	0.042
Urban	-0.842**	0.023	-0.730**	0.024	-0.736**	0.030
Father not in the Labor Market	-0.172**	0.045	-0.236**	0.046	-0.251**	0.062
Mother not in the Labor Market	-0.270**	0.027	-0.361**	0.029	-0.361**	0.036
Father's Age	0.008**	0.002	0.005**	0.002	0.002	0.002
Mother's Age	0.003	0.002	0.000	0.002	0.003	0.003
Number of Boys Aged 0 to 5	0.059	0.022	0.033	0.022	0.001	0.029
Number of Boys Aged 6 to 9	0.118**	0.020	0.087**	0.020	0.063*	0.027
Number of Boys Aged 10 to 14	0.085**	0.018	0.059**	0.018	0.040	0.022
Number of Boys Aged 15 to 17	0.036	0.020	0.012	0.020	0.038	0.026
Number of Girls Aged 0 to 5	0.126**	0.021	0.096**	0.021	0.128**	0.027
Number of Girls Aged 6 to 9	0.122**	0.020	0.092**	0.020	0.109**	0.025
Number of Girls Aged 10 to 14	0.078**	0.018	0.049**	0.018	0.028	0.023
Number of Girls Aged 15 to 17	-0.022	0.023	-0.040	0.023	-0.043	0.029
Constant	-3.871**	0.119	-3.255**	0.124	-3.245**	0.159
Number of Observations	28805.000				28665	
Chi-Squared (n)	4018.73(17)				4094.19(19)	
Pseudo R-squared	0.230				0.1924	

* Statistically significant at the 5% level. ** Statistically significant at the 1% level.
White's heteroskedastic consistent errors used in all regressions.

**Table 3: Child Labor Persistence. Probit on Child Labor Indicator
Variable Including Family Income as Explanatory Variable.**

Independent Variables	Coefficient	Std. Error	Coefficient	Std. Error
Child Laborer Father	0.258**	0.031	0.310**	0.030
Child Laborer Mother	0.319**	0.028	0.369**	0.028
Father's Years of Schooling	-0.026**	0.004		
Mother's Years of Schooling	-0.028**	0.004		
Age of the Child	0.212**	0.008	0.211**	0.008
Female Child	-0.583**	0.033	-0.578**	0.033
Urban	-0.718**	0.024	-0.783**	0.024
Father not in the Labor Market	-0.244**	0.046	-0.230**	0.046
Mother not in the Labor Market	-0.363**	0.029	-0.314**	0.028
Father's Age	0.005**	0.002	0.008**	0.002
Mother's Age	0.001	0.002	0.003	0.002
Number of Boys Aged 0 to 5	0.037	0.022	0.052*	0.022
Number of Boys Aged 6 to 9	0.081**	0.021	0.101**	0.021
Number of Boys Aged 10 to 14	0.058**	0.018	0.073**	0.018
Number of Boys Aged 15 to 17	0.011	0.021	0.032	0.021
Number of Girls Aged 0 to 5	0.095**	0.022	0.115**	0.022
Number of Girls Aged 6 to 9	0.095**	0.020	0.113**	0.020
Number of Girls Aged 10 to 14	0.047**	0.018	0.065**	0.018
Number of Girls Aged 15 to 17	-0.030	0.024	-0.015	0.023
Family Income minus Child Income	-0.00002	0.00002	-0.00012**	0.00002
Constant	-3.311**	0.126	-3.797**	0.121
Number of Observations	27791		27926	
Chi-Squared (n)	3935.88(20)		3837.11(18)	
Pseudo R-squared	0.2384		0.2308	

* Statistically significant at the 5% level. ** Statistically significant at the 1% level.

White's heteroskedastic consistent errors used in all regressions.

**Table 4: Effect of Child Labor on Log of Adult Earnings of Fathers and Mothers.
OLS and Heckman Model Estimates.**

Independent Variables	Father							
	OLS				Heckman			
	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error
Age Started Work	0.06132**	0.00869	0.05130**	0.00766	0.06018**	0.00874	0.05101**	0.00768
Age Started Work-squared	-0.00070**	0.00031	-0.00156**	0.00028	-0.00066**	0.00032	-0.00155**	0.00028
Years of Schooling			0.11969**	0.00166			0.11944**	0.00173
Father's years of schooling	0.07389**	0.00317	0.01954**	0.00290	0.07329**	0.00320	0.01949**	0.00290
Mother's years of schooling	0.07557**	0.00351	0.02178**	0.00318	0.07557**	0.00352	0.02189**	0.00319
Age	0.07983**	0.00601	0.05777**	0.00530	0.07634**	0.00621	0.05694**	0.00553
Age-squared	-0.00094**	0.00006	-0.00064**	0.00006	-0.00090**	0.00007	-0.00063**	0.00006
Non-White	-0.44442**	0.01352	-0.27841**	0.01214	-0.44054**	0.01367	-0.27771**	0.01221
Constant	3.52783**	0.15250	3.65264**	0.13444	3.62497**	0.15853	3.67701**	0.14208
Number of Observations	17950		17925		19571		19543	
R-squared	0.3133		0.468					
Lambda					-0.182	0.075	-0.047	0.088
							13041.52	(8)
Chi-squared (n)					7342.63(7)			
Mother								
Age Started Work	0.09744**	0.00590	0.03040**	0.00548	0.07096**	0.00651	0.01697**	0.00590
Age Started Work-squared	-0.00208**	0.00014	-0.00073**	0.00013	-0.00163**	0.00016	-0.00053**	0.00014
Years of Schooling			0.10580**	0.00224			0.08790**	0.00281
Father's years of schooling	0.07091**	0.00394	0.03240**	0.00362	0.06404**	0.00422	0.03293**	0.00386
Mother's years of schooling	0.06762**	0.00424	0.01961**	0.00394	0.05807**	0.00457	0.01913**	0.00420
Age	0.14297**	0.01366	0.06467**	0.01239	0.10366**	0.01434	0.03954**	0.01290
Age-squared	-0.00165**	0.00017	-0.00070**	0.00015	-0.00114**	0.00017	-0.00037**	0.00016
Non-White	-0.38613**	0.01926	-0.27747**	0.01745	-0.37555**	0.02026	-0.28780**	0.01837
Constant	1.25984**	0.27920	2.92562**	0.25350	2.57553**	0.30262	3.89807	0.27312
Number of Observations	8943		8893		13151		13093	
R-squared	0.3047		0.4444					
Lambda					-0.547	0.038	-0.496	0.041
Chi-squared (n)					2019.71(7)			
							2818.71	(8)

* Statistically significant at the 5% level. ** Statistically significant at the 1% level.

White's heteroskedastic consistent errors used in all regressions.

Table A1: Unweighted Means

Children's Variables	Obs	Mean	Std. Dev.	Min	Max
Age	28847	12.011	1.421	10	14
female indicator variable	28847	0.492	0.500	0	1
Hours	28842	3.763	10.796	0	98
working strictly positive hours indicator variable	28842	0.139	0.346	0	1
working at least 20 hours per week indicator variable	28842	0.105	0.306	0	1
urban indicator variable	28847	0.774	0.418	0	1
schooling indicator variable	28841	0.925	0.263	0	1
only school indicator variable	28,841	0.822	0.383	0	1
school and work indicator variable	28,836	0.102	0.303	0	1
only work indicator variable	28,842	0.024	0.153	0	1
no school, no work indicator variable	28,836	0.050	0.218	0	1
years of schooling	28830	3.341	1.946	0	9
age started work	4542	10.055	1.997	4	14
Fathers' variables					
Age	28847	43.824	9.225	25	98
years of schooling	28801	4.920	4.559	0	17
age started work	27125	12.134	3.688	4	40
Earnings	28300	521.001	905.135	0	40000
child labor (age 14 or below)	28847	0.706	0.456	0	1
child labor (age 10 or below)	28847	0.394	0.489	0	1
not in labor market	28814	0.100	0.300	0	1
Mothers' variables					
Age	28847	39.602	7.748	25	91
years of schooling	28744	5.035	4.375	0	17
age started work	17075	13.900	5.784	4	56
Earnings	28710	143.869	445.588	0	20000
child labor (age 14 or below)	28847	0.372	0.483	0	1
child labor (age 10 or below)	28847	0.203	0.402	0	1
not in labor market	28831	0.462	0.499	0	1
Grandparents' variables:					
years of schooling of the grandfather (father's side)	22085	2.016	2.949514	0	17
years of schooling of the grandmother (father's side)	23813	1.707	2.649685	0	17
years of schooling of the grandfather (mother's side)	23470	2.075	2.879995	0	17
years of schooling of the grandmother (mother's side)	25059	1.744	2.618133	0	17
Families' variables:					
family income minus child income	27953	838.897	1299.069	0	63500
number of Boys Aged 0 to 5	28847	0.195	0.471	0	5
number of Boys Aged 6 to 9	28847	0.267	0.514	0	4
number of Boys Aged 10 to 14	28847	0.863	0.771	0	4
number of Boys Aged 15 to 17	28847	0.252	0.495	0	3
number of Girls Aged 0 to 5	28847	0.191	0.469	0	5
number of Girls Aged 6 to 9	28847	0.266	0.515	0	3
number of Girls Aged 10 to 14	28847	0.835	0.763	0	5
number of Girls Aged 15 to 17	28847	0.209	0.455	0	4

Table A2: Correlation Matrix

	<u>Fathers</u>	
	<u>age started work</u>	<u>years of schooling</u>
<i>age started work</i>	1	
<i>years of schooling</i>	0.0322**	1

	<u>Mothers</u>	
	<u>age started work</u>	<u>years of schooling</u>
<i>age started work</i>	1	
<i>years of schooling</i>	0.0329**	1

** Statistically significant at the 1% level.

**Table A3: Child Labor Status and School Attendance of Children
Aged 10 to 14**

Son or Daughter is a Child Labor		Son or Daughter Attend School		Total
		<i>No</i>	<i>Yes</i>	
<i>No</i>	Number	1,397	23,423	24,820
	Row %	5.63	94.37	100
	Column %	65.01	87.77	86.07
<i>Yes</i>	Number	752	3,264	4,016
	Row %	18.73	81.27	100
	Column %	34.99	12.23	13.93
Total	Number	2,149	26,687	28,836
	Row %	7.45	92.55	100
	Column %	100	100	100

Table A4: Weekly Hours Worked Among Working Children Aged 10 to 14

Weekly Hours Worked	Frequency	Percent	Cum.
One to Nine	341	8.49	8.49
Ten to Nineteen	657	16.35	24.84
Twenty to 29	1363	33.92	58.76
Thirty to 39	648	16.13	74.89
Forty or More	1009	25.11	100.00

Figure 1: Multiple Generation Child Labor Trap.

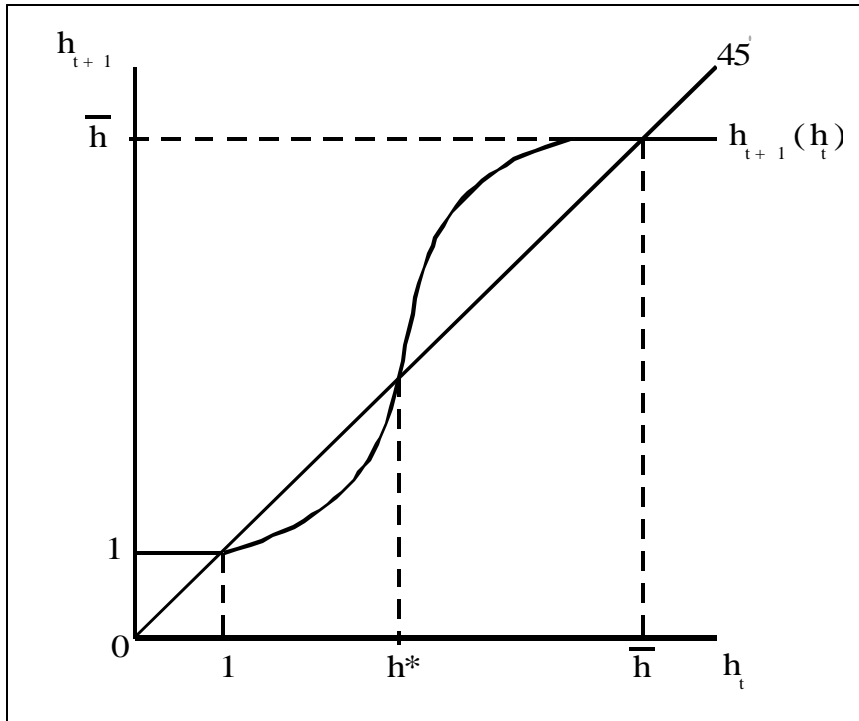
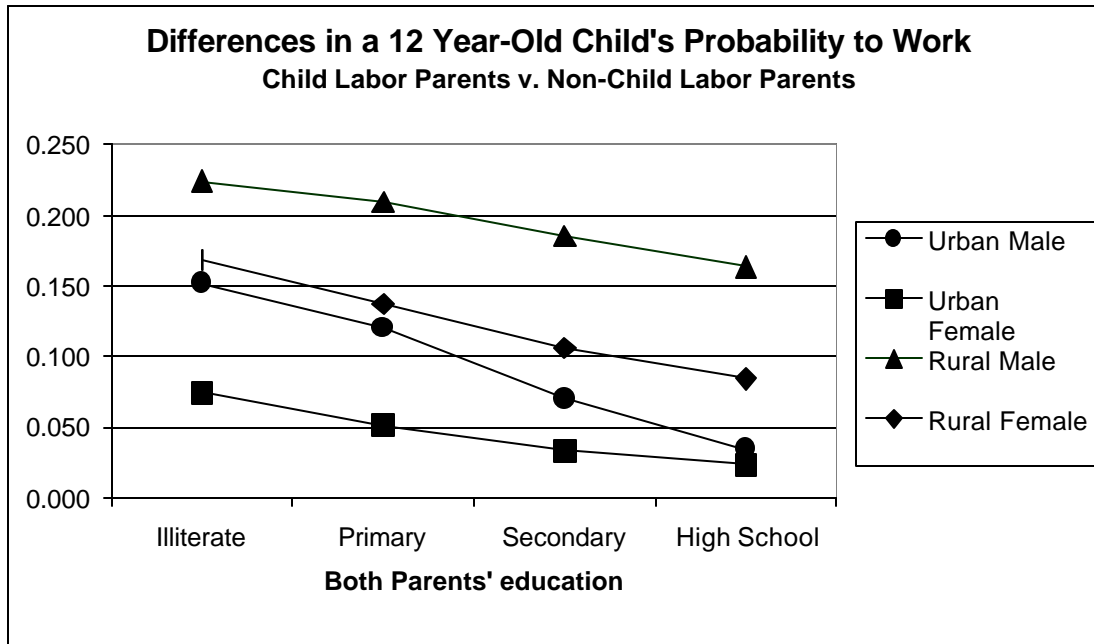


Figure 2: Differences in a 12 Year-Old Child's Probability to Work.



Endnotes

ⁱ This is also closely linked to the idea of poverty traps like that illustrated in Galor and Zeira (1993).

ⁱⁱ For a more rigorous theoretical treatment, please see Emerson and Portela Souza (2000).

ⁱⁱⁱ PNAD assigns each individual to a position or ‘condition’ in the family. They are: (i) person of reference; (ii) spouse; (iii) son or daughter; (iv) other relative; (v) aggregate; (vi) pensionist; (vii) domestic worker; and (viii) relative of the domestic worker.

^{iv} This selection criterion may impose some selection bias if, for example, children in single head families are more likely to work. However, similar results were obtained when a full sample of 10 to 14 years old children were used. In this case the head of the family’s characteristics were used instead of the father and mother’s characteristics. Since we want to capture separate impacts of the father and the mother’s child labor status and to have a straight interpretation of the coefficients, we present the results with the sample described in the text.

^v PNAD asks the usual hours worked per week for each individual working during the week before the survey.

^{vi} All results presented in this paper come from the un-weighted sample. We replicated all of the empirical tests in this paper using a weighted sample and obtained qualitatively the same results.

^{vii} The inclusion of the indicator variables of a parent not in the labor market accounts for the fact that for those parents not in the labor market, the age started to work is unknown.

^{viii} Similar model was estimated for the case when child labor is defined as a child that worked at least 20 hours in the week of reference. We obtained qualitatively the same results.

^{ix} In our sample, roughly 10 percent of men and 46 percent of women were not in the labor market. There seems to be no reason, *a priori*, to think that these individuals would be more or less likely to have been child laborers. However the fact is that we do not observe the child labor history of those not in the labor market and, in the extreme case (they all were child laborers), the negative and significant sign on the not in the labor market variables for fathers and mothers could counteract the positive coefficient on the parental child labor variable and could mean that the net effect of child labor status is insignificant. As only 10 percent of fathers are not in the labor market, it seems very unlikely that this would be the case, but it is potentially a problem for the effect of maternal child labor.

^x PNAD 1996 presents the educational attainment of the grandparents in ten categories. We converted these categories into years of schooling in the following way:

<i>Category</i>	<i>Years of Schooling</i>
No school or incomplete first grade, first grade degree	0
Incomplete elementary or complete first to third grade, first grade degree	2
Complete elementary or complete fourth grade, first grade degree	4
Incomplete half first cycle or fifth to seventh grade, first grade degree	6
Complete half first cycle or complete eighth grade, first grade degree	8
Incomplete half second cycle or incomplete second grade degree	9.5
Complete half second cycle or complete second grade degree	11
Incomplete superior	13
Complete superior	15
Complete master or doctorate	17

^{xi} For most occupations. See Emerson and Portela Souza (2002).

^{xii} Ravallion and Wodon (2000) present evidence from Bangladesh that the two (education and child labor) are not perfectly correlated.