

32746

No. 0515



Social Protection Discussion Paper Series

The Inter-Generational Persistence of Child Labor

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May 2005

Social Protection Unit
Human Development Network
The World Bank

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* Excerpts obtained from the IADB/WB joint book on child labor in LAC

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Many recent economic studies suggest that child labor both is a result of and a strategy to avoid household poverty. If that is the case, then child labor may be viewed not so much as a problem but as a solution to poverty's crushing effects. This means that banning child labor may, in fact, harm the very people it attempts to help (Basu and Van 1998). This study explores whether using child labor to avoid poverty can cause it to persist through generations of families. If this is indeed the case, policy makers who hope to achieve long-term reductions in child labor are faced with the new challenge of focusing their attention not only on current child laborers, but future generations as well.

Though 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 (Baland and Robinson 2000, Basu 1999, Bell and Gersbach 2000, Lopez-Calva and Miyamoto 2000, and Ranjan 1999)¹, there is a marked absence of empirical work on the topic.

Previous empirical work has focused primarily on isolating the determinants of child labor using survey data (Ray 2000a, Ray 2000b, Jensen and Neilsen 1997, Patrinos and Psacharopoulos 1997, Psacharopoulos 1997, and Grootaert and Kanbur 1995). This study asks if the child labor status of parents impacts the child labor incidence of their children, and indicates there is strong evidence that it does. It also asks if there is a direct

¹ This also is closely linked to the idea of poverty traps such as that illustrated in Galor and Zeira (1993).

link between the child labor status of the parents and their children, and again, there is evidence that there is.

The Inter-Generational Child Labor Link

This study begins with the assumption that families prefer to withhold their children from the labor market until they are adults. However, if a family is struggling to survive, they may have to send some or all of their children to work.

This discussion incorporates the essential aspects of previous theoretical work.² The recent theoretical literature on child labor and poverty traps incorporates a set of core assumptions: that parents are altruistic toward their children, there is a trade-off between child labor and a child's human capital accumulation, the child's human capital accumulation is an increasing function of schooling, and the credit market is imperfect.

If a family has access to adequate resources, it will choose to invest in the education of their children. However, if the parents cannot keep the family above the subsistence level, and because they cannot borrow against the future earnings of their children, they will choose to send some or all of their children to work to ensure the family's survival. This reduction in schooling causes a loss of overall human capital accumulation and results in lower wages when the children become adults. In turn, those lower wages make those now-adults more likely to send their children to work as child laborers.

This cycle can lead to multiple generations of a family being stuck in what could be termed a child labor trap, which is easily illustrated with a simple figure. Considering the level of adult human capital as a function of the education received as a child, the idea can be expressed as: $h_t = f(e_{t-1})$. Here, h_t is the level of adult human capital in time

² For a more rigorous theoretical treatment, see Emerson and Portela Souza (2000).

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 the parents' human capital level: $h_{t+1} = f(g(h_t))$.

The shape of this function can take many forms; one very plausible form is illustrated in figure 1. The rationale for such a shape is easily motivated by what is termed 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, such as literacy, 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 parents' human capital, to have an S-shape.

Figure 1 assumes the level of human capital an individual is endowed with (that is, an adult with no education) is 1, and the maximum human capital attainable is \bar{h} . This figure 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 backward, attaining less and less education generation by generation, until it reaches the no education/all child labor equilibrium. This illustrates the child labor trap.

It should be noted that while this is a plausible and quite likely scenario, other reasons could cause persistence in child labor, although those effects are expected to be less important. They include so-called social norms that dictate parents who worked as

children simply send their children to work or feel that working imparts important qualities in children, or that having parents who were child laborers prevents normal returns to education.

Data and Empirical Strategy

A. Data

The data used in this study are taken from the 1996 Brazilian Household Surveys, Pesquisa Nacional por Amostragem a Domicilio (PNAD), conducted by the Brazilian Census Bureau. The survey encompasses approximately 85,000 households in all of Brazil's urban areas and the majority its rural areas, with the exception of the rural areas of the Amazon region.

This study uses a sample of individuals between the ages of 10 and 14 who are considered sons, daughters, or other relatives in the family unit.³ Each observation consists of information about the characteristics of the children and their parents and families. Due to this criterion, families with single household heads are excluded from the analysis.⁴ Finally, the study excludes all observations for which the age difference between the head of the family or spouse and the oldest child is 14 or less.

The child labor variables for the children are constructed as follows: children were considered working if they worked any hours per week.⁵ Children were considered to work full time if they worked twenty hours or more per week. The child labor variable

³ PNAD assigns each individual to a position or 'condition' in the family. They are: (1) person of reference; (2) spouse; (3) son or daughter; (4) other relative; (5) aggregate; (6) pensionist; (7) domestic worker; and (8) relative of the domestic worker.

⁴ 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-year-old children was used. In this case the head of the family's characteristics were used instead of the father and mother's characteristics. In order to capture separate impacts of the father's and the mother's child labor status and to have a straight interpretation of the coefficients, the results are presented with the sample described in the text.

⁵ PNAD asks the usual hours worked per week for each individual during the week before the survey.

for the parents is defined as follows: parents who said they began working at age 14 years or younger were considered child laborers. Each child's school attendance status, gender, and region of residence was obtained, as were the parents' years of schooling, age, and employment status.⁶

B. Empirical Strategy

The study estimates a probit model of the child labor indicator variable on the parental child labor status variables and a vector of other controls on the probability that the child was a child laborer. The model does not control for the schooling of the parents nor the income of the family, in keeping with the hypothesis that the inter-generational link is transmitted through adult income, which is a function of schooling.

Next, the study tests for a direct link to child labor. Controlling for family wealth or permanent income, the effect of parental child labor on their children's incidence of child labor should disappear if it is true that child labor only results from familial poverty. Because it is well established that parental education is the most reliable predictor of a family's permanent income, that factor is included as a likely contributor to inter-generational child labor. If there is still an effect after controlling for parental education, it is fairly certain that education is not the entire explanation. The current family income is included to strengthen the test; however, it is possible that the family income variable is likely endogenous.

The Inter-Generational Persistence of Child Labor in Brazil

A. Unconditional Probabilities

Table 1a presents the proportions of child labor and parents' child labor status in 1996 for the baseline definitions of child labor for children and parents. In Table 1a, of all

⁶ All results in this chapter come from the un-weighted sample. All of the empirical tests in this study were

10- to 14-year-old children in the sample, 13.9% worked and 70.6% of their fathers and 37.2% of their mothers were child laborers. More importantly, in families in which fathers were child laborers, 17.3% of the children were child laborers. On the other hand, in families in which fathers were not child laborers, only 5.9% of the children were child laborers. Similarly, in families in which mothers were child laborers, 24.3% of the children were child laborers; of those whose mothers were not child laborers, around 7.8% of the children were child laborers.

Table 1b presents similar figures when child labor is defined as working at least twenty hours a week. In this case, of all children aged 10 to 14, 10.5% were child laborers. Again, children from families in which a parent was a child laborer were approximately three times more likely to be child laborers, compared to those whose parents were not. Although these figures are unconditional probabilities, they suggest the existence of inter-generational persistence in child labor in Brazil.

B. Probit Model Estimations on Child Labor Indicator Variables

A standard probit model is estimated to consider the effect of parental child labor on the incidence of work among 10- to 14-year-olds. The dependent variable is an indicator that equals one if the children usually worked in the labor market. This is regressed on indicator variables that equal one if the children's mothers and fathers were child laborers. The model also included the ages of the children and parents, the number of siblings aged 0 to 5, 6 to 9, 10 to 14 and 15 to 17, and indicators for if the children

were female, lived in an urban area, or had a parent who was not in the labor market.⁷

The results are shown in the first column of table 2.⁸

The study found that parental child labor had a strong and positive effect on the probability that children would join the labor force. Female children, those in urban areas, and those with one parent not in the labor market were less likely to work, as were those who had neither parent in the labor market.⁹ However, the greater the number of siblings aged 5 to 14, the more likely the children were to work.

The third specification reported in table 2 shows the results of the regression when the parents' years of schooling were added as dependent variables. As expected, the parents' years of schooling had a strongly negative effect on the children's probability of working; however, the effect of parental child labor remained positive and statistically significant.

The research also estimates a probit model that includes the grandparents' years of schooling as explanatory variables. Column 5 of table 2 shows the coefficients from the complete set of regressors. The grandparents' years of schooling became insignificant when the parents' education variables were included, suggesting there is no direct link between grandparents' education and their grandchildren's child labor status. Although not reported, the study also estimates a probit including grandparents' years of schooling but excluding the parents' years of schooling. In this case, the grandparents' schooling

⁷ 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.

⁸ A similar model was estimated for the case when child labor was defined as a child who worked at least twenty hours in the week of reference. The research obtained qualitatively the same results.

⁹ In the sample, roughly 10% of men and 46% 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 child labor history of those not in the labor market was not observed and, in the extreme case (they all were child laborers), the negative and significant sign on those 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. Because only 10% of fathers were not in

becomes significant; thus, the schooling effect of the grandparents on their grandchildren appears to operate through the education of the parents.

C. Probit Model Estimations Including Family Income

Adding family income to the probit specification can cause an endogeneity problem, but considering it as an explanatory variable is useful in determining whether parents' education is an adequate proxy for permanent family income. The family's income 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 are shown 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. The schooling of the parents is not included in the second specification, shown in column 3 of table 3. 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.

These results are not predicted by the simple model, suggesting the effects of parental child labor may be more complex than the simple human capital relationship posited in the model and that future research is needed. For example, it is possible that human capital accumulation is not only determined by the amount of education, but also by social norms, preferences, the quality of education, the level of education of siblings, the household environment, etc.

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.

Figure 2 compares the probability of working in the labor market for a 12-year-old child of parents who were child laborers and a child of parents who did not work as children. It is assumed that both parents work, have the same level of education, are 40 years old, and have only one child. The probability differences are constructed separately for sons and daughters in rural and urban areas and use the coefficients from the first column of table 2. At any level of parental education, children from families with parents who were child laborers are more likely to be child laborers. This difference decreases as the education level of the parents increases, as expected.

The Effects of Child Labor on Future Earnings

Child labor also holds the potential to hamper an adults' ability to generate higher earnings. To assess this impact, the study estimates both a simple OLS regression and a Heckman selection model for both mothers and fathers. The specifications regress the log of current earnings on age and age squared, the age at which the parents started work and its square, the grandfathers' years of schooling, the grandmothers' years of schooling and a race indicator variable. The individual's years of schooling are added in separate specifications. The Heckman estimations attempt to correct for the fact that the study only observed the income of those individuals who self-selected to work as adults; the results would be biased and suspect if the decision to work as an adult is in any way correlated with having been a child laborer. For the selection-bias corrected estimations, the number of sons and daughters aged 0 to 9 years old is added in the first stage regression; see table 4 for the results.

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 started to work coefficients is interpreted as the forgone

earnings of an individual entering the labor market one year earlier. Further, child labor has a negative impact on current earnings even when the study controls for education and other variables. This means 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 effects of parental child labor on children. 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, which means 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, examined this aspect of child labor more closely and found that in some instances (i.e., for particular occupations) child labor may not be harmful. The general idea is that in some professions with strong vocational aspects, individuals may be able to do well as adults. However, these results suggest that though there may be some areas in which child labor is beneficial, they are greatly outweighed by those that are harmful.

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. Children are more likely to be child laborers if their parents worked as children and the less educated their parents are. 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 controlled for family income. In addition, the earlier an individual enters the labor market, the lower his earnings are as an adult. Together, these results paint a striking picture of the inter-

generational persistence of poverty and the harmful effects of child labor within dynastic families.

This suggests that the simple persistence model does not explain every way in which parental child labor affects children and that richer models are needed. If this study's results are derived from some unobservable human capital characteristics captured by the parental child labor variables (e.g., school quality), then the finding essentially captures the inter-generational effects of poverty persistence and is consistent with the theoretical discussion of child labor persistence. If, on the other hand, the results stem from a difference in the preferences of households in which parents were child laborers or different social norms associated with child labor, the current theoretical child labor literature is inadequate to fully explain child labor in Brazil.

These results pose complicated challenges for policy makers. If the persistence theory, or a major portion of it, is correct, it may be better to tackle the child labor problem on a family-by-family basis: if there are limited resources it may be better to target select families to raise each out of the child labor trap. Bell and Gersbach (2000) have examined just such a system in their education model. This type of policy is likely to be politically unpopular but would have lasting long-term benefits.

If child labor is indeed primarily a result of familial poverty, banning child labor can have quite harmful effects (Basu and Van 1998) and should be treated with the utmost of caution and a more challenging policy problem is presented. If, however, poverty is a small part of the story and norms or parental preferences are the major factors, policy solutions such as absolute bans on child labor may be more effective.

This study indicates that both are significant factors. It is easier for policy makers to address policy alleviation than parental preferences, but it is possible to marry the two.

Policies such as those that target individual families for conditional income transfers that create incentives to alter behavior and also incorporate educational programs to counteract traditional beliefs that child labor is good for children could affect both avenues at the same time. As this study shows, child labor has lasting and harmful effects on an individual's earnings ability as an adult and the negative effect of the loss of educational attainment is greater than the positive effect of gaining experience as a child laborer.¹⁰ Thus, intervention is both necessary and important.

¹⁰ For most occupations. See Emerson and Portela Souza (2002).

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Table 1a: Unconditional Probabilities

Child Working Strictly Positive Hours, Parent Began Working at Age 14 or Younger.						
Son or Daughter Is Child Laborer		Father Was a Child Laborer		Mother Was a Child Laborer		Total
		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 Younger.						
Son or Daughter Is Child Laborer		Father Was a Child Laborer		Mother Was a Child Laborer		Total
		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				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.

Appendix Table: 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

Figure 1: Child Human Capital as a Function of Parental Human Capital



