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Child Labor, School Attendance, and Intrahousehold Gender Bias in Brazil

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An extensive survey data set of Brazilian households is used to test whether intrahousehold gender bias affects the decisions of mothers and fathers to send their sons and daughters to work and to school. An intrahousehold allocation model is examined in which fathers and mothers may affect the education investment and the child labor participation of their sons and daughters differently because of differences in parental preferences or differences in how additional schooling affects sons' and daughters' acquisition of human capital. Brazilian household survey data for 1998 are used to estimate the impact of each parent's education on the labor market participation and school attendance of their sons and daughters. For labor market participation, the father's education has a greater negative impact than the mother's education on the labor status of sons. The father's education also has a greater impact on sons' labor status than on daughters'. For schooling decisions, the mother's education has a greater positive impact than the father's education on daughters' school attendance, but fathers have a greater positive impact on sons' school attendance than on daughters'. JEL codes: J20, O12, O54

This article uses an extensive survey data set of Brazilian households to test whether intrahousehold gender bias influences the decisions of mothers and fathers to send their sons and daughters to work and to school. The results suggest that fathers generally have a greater impact on decisions about sons and mothers generally have a greater impact on decisions about daughters. These results support models of intrahousehold bargaining in the child labor and schooling decisions of a family, even though most theoretical work on child labor has assumed a unitary family model.

The recent theoretical literature on child labor generally assumes (following Becker 1982) that parents have common preferences and are altruistic toward their children (Baland and Robinson 2000; Bell and Gersbach 2000; Dessy 2000; Emerson and Souza 2003; Basu and Van 1998). Additionally, the empirical literature on child labor has explored mainly the relation between the economic conditions and incentives of the family unit and child labor outcomes (Emerson and Souza 2003; Ray 2000; Grootaert and Patrinos 1999; Jensen and Nielsen 1997). Although a unitary model of intrahousehold allocations is a valid starting point for focusing on the poverty dimension of child labor, this emphasis does not account for other potentially important factors. Recently, a few studies have examined intrahousehold allocations explicitly. For example, Basu (2006) and Ridao-Cano (2000) extend intrahousehold behavior to child labor decisions. Both suggest that fathers and mothers have different impacts on the labor supply of their children and that this is potentially related to their relative bargaining power. Neither, however, explores gender bias within the intrahousehold allocation decisions.[1]

There is also an extensive literature on gender differences in human capital investments and outcomes that presents some evidence on intrahousehold gender bias. Sen (1990), for example, reports that males significantly outnumber females in Asia and North Africa, opposite the pattern found in North America and Europe. Other studies have shown that sons are favored in the intrahousehold allocation of nutrients and have better anthropometric outcomes (Behrman 1988; Sen 1984).

Perhaps even more compelling are recent studies that find that the gender bias in child inputs or outcomes is related to the gender of the parent who controls the distribution of child resources. In a study of families in Brazil, Ghana, and the United States, Thomas (1994) finds that children's health achievement (as measured by height for age) is linked to the educational attainment and nonlabor income of the parent of the same sex as the child. In other words, sons are healthier (taller) the more education and nonlabor income the father has, and daughters do better the more education and nonlabor income the mother has. This finding suggests that there may be differences in the preferences of the parents. Studies of Brazil also suggest that there may be important gender-based differences in allocations within a household. For example, Thomas (1990) shows that unearned income controlled by mothers has stronger impacts on family's health than income under fathers' control (see also Tiefenthaler 1999). None of these studies, however, examines intrahousehold gender bias in the child labor context.

In a recent study of child labor, Emerson and Souza (2003) find strong evidence of intergenerational persistence in child labor among families in Brazil.

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1. Basu's theoretical contribution goes further, to include the possibility that the choices taken by the individuals can affect their bargaining power.

Specifically, people who start work at a younger age end up with lower earnings as adults, and children are more likely to work the younger their parents were when they entered the labor force and the lower the educational attainment of their parents and grandparents. These findings are consistent with unitary models of child labor and poverty persistence (Emerson and Souza 2003; Bell and Gersbach 2000; Dessy 2000; Basu 1999; Glomm 1997) in which parents' labor as children reduces their ability to gain human capital through schooling, making them unable to command high enough wages as adults to afford to keep their children out of the labor force.

These results also hold when the analysis is performed for sons and daughters separately. That is, there is a persistence of child labor from parents to sons as well as from parents to daughters. This raises the question, is this effect different for sons and daughters based on the individual level of human capital of their mothers and fathers?

This study uses Brazilian household survey data to estimate the impact of fathers' and mothers' education on the labor market status and school attendance of their sons and daughters separately. It finds compelling evidence that the father's education has a greater impact on the labor status of sons than does the mother's education and a greater impact on the labor status of sons than of daughters. It finds equally compelling evidence that the mother's education has a greater positive impact on the school attendance of daughters than does the father's education and that the father's education has a greater impact on the school attendance of sons than of daughters.

Section I discusses models of household allocations and how altruistic fathers and mothers may have different impacts on their sons and daughters due to differences in their preferences or differences in how additional education affects their children's acquisition of human capital. Section II describes the 1998 Brazilian National Household Survey data used in this study and the variables used in the regression estimations. Section III discusses the empirical results, and section IV offers some policy implications.

I.   Theoretical Discussion

The concept of intrahousehold allocation decisions has a long established place in the literature. Two classes of models typically used in the intrahousehold allocation literature that allow for differences in parental preferences are the family bargaining model (Lundberg and Pollak 1993; McElroy 1990; McElroy and Horney 1981) and the collective model (Browning and Chiappori 1998; Chiappori 1992, 1988). Bargaining models assume that household allocation outcomes reflect a bargaining process in which household members seek to allocate the resources they control to the goods that they individually prefer. The resulting equilibria are sensitive to the threat point definition and equilibrium concept assumed. The collective model leaves unspecified the underlying

nature of the allocation process within the household but assumes that the resource allocations are Pareto efficient.[2]

As male and female household heads may have different preferences in general, and different specific preferences for the outcomes for their children depending on the gender of the child, the allocation of resources within a household can be seen as the result of some kind of resolution of the preference differences of the male and female heads. This resolution may depend on the relative bargaining power of each individual involved in the allocation decision, and this power may depend on several factors, most commonly, income and education.

In general, in the literature, households are modeled as consisting of two heads (mother and father) and some number of children, who can be sons or daughters. Generally, both fathers and mothers are considered altruistic in that they value the consumption of each member of the household and the human capital achievement of their children. In a low-income country setting where child labor is common, the children of the household can go to school, go to work, or spend time in both activities. The amount of schooling children receive determines the wages they are able to command as adults, and children who work are not able to acquire as much education as those who do not. Therefore, the amount of labor income the father and mother bring into the household depends on how much schooling they received as children. Parents who were child laborers command lower wages and are more likely to be impoverished and so are more likely to demand that their children work to supplement the family income, a repetitive pattern that is termed the intergenerational persistence of child labor.

This intrahousehold bargaining framework generates a number of interesting empirical implications. First, the higher is the parents' human capital attainment, the higher is current parental income and the less needed is the child's contribution to current household income. If parents care about the human capital attainment of their children, higher levels of parental education should lead to higher education for their children.[3] Second, the human capital of the parents may have differential effects on the human capital production functions of the children, and these differences may depend in part on the gender of the parent and of the child. Third, parental preferences for their children's human capital attainment may vary by gender of the child, and this may lead to differential investments based on gender. The focus of this article is on the differential effects of fathers and mothers on the child labor participation and education of their sons and daughters.

To fix ideas, consider a four-person household that consists of a father, mother, son, and daughter. Now consider an increase, ceteris paribus, in the father's human capital. The effect on the son's optimal education function is

2. For a summary of intrahousehold allocation models, see Behrman (1997) and Strauss and Thomas (1995). Basu (2006) demonstrates that power within the household can be endogenous.
3. Which can in turn lead to the children's being less likely to work (see Emerson and Souza 2003).

potentially twofold. First, more human capital for the father means more income for the family, and thus the family needs the son to provide less income, and this reduces the amount of child labor. The reduction in child labor means more schooling and thus more human capital for the son, which the family values. Second, the higher human capital of the father may also increase the return to the son's education since having a more educated parent in the household may enhance the learning environment. The family will therefore have an increased incentive to invest more in the son's education.

However, and of key interest here, this effect of the increase in the father's human capital need not be the same for all children (see Horowitz and Wang 2004). This should reduce child labor equally across all children if additional schooling increased children's human capital equally. But if additional schooling affects children's acquisition of human capital differently, the reduction in child labor would vary across children. Thus, the increase in schooling will differ across the two children because of their idiosyncratic human capital technologies. The increase in the father's human capital may also affect the marginal returns to education of the son and daughter differently. Finally, the father may favor one child over the other, and his additional human capital may give him stronger bargaining power to impose his preferences. These differences can lead to different investments in education for the son and daughter of the family.

Thus, the idiosyncratic nature of the human capital technology and parental preferences that vary across children can lead to different impacts by each parent on the same child as well as different parental impacts across children. For example, for the same child, it is possible that an increase in the father's human capital will have a different impact than an equal increase in the mother's human capital. In addition, it could be that the effect of an increase in mother's human capital could be different for the son and daughter. Finally, note that these different impacts can also be driven by different parental preferences for the human capital of their children and the relative bargaining power of the father and the mother.

The impact of gender on intrahousehold allocations in a child labor environment is explored as an empirical issue in section III, following the brief data description below.

II. The Data

The data used in this study come from the 1998 Brazilian National Household Survey (PNAD) conducted by the Brazilian Institute of Geography and Statistics. The PNAD is an annual labor force survey that covers all urban areas and most rural areas in Brazil. The 1998 PNAD included a special module on the labor market activities of all children seven years old or older.

The sample consists of all sons and daughters 7–16 years old who live in a two-parent family.[4] Younger children are excluded because compulsory schooling begins at age seven in Brazil, and children over 16 because most definitions consider workers older than 16 as adult laborers, not child laborers.

Because the impact of both parents' human capital on the labor status and schooling of children is of primary concern, a sample of observations is used that has complete information on each parent's characteristics, including years of schooling. Thus families with single heads are excluded from the analysis.[5] Each observation consists of information on the child's characteristics, his or her parents' characteristics, and his or her family characteristics. Finally, all observations for which the age difference between the head of the family or spouse and the oldest child is 14 years or less are excluded. The final sample consists of 26,930 sons and 25,435 daughters.

A child is considered working if he or she worked any number of hours during the survey week. A second child labor indicator variable was constructed that equals one if the child worked 20 hours or more per week. This alternative definition of child labor was used to check the robustness of the main results; all the qualitative results remained the same.[6] For each child, information was also obtained on school attendance, gender, race, area of residence, number of children in family, and age and years of schooling of each parent. In addition, a variable was constructed for the income of the family net of the observed child's earnings from his or her main labor activity. (Basic statistics for all the variables used in this analysis are presented in appendix table A-1.)

III. THE RESULTS

Child labor is widespread in the sample of households in Brazil. Almost 18 percent of all sons work some hours in the labor market, as do almost 9 percent of daughters (table 1). School attendance is also quite high, with almost 93 percent of sons and more than 94 percent of daughters attending

4. The data enable families to be distinguished from households and thus enable siblings to be identified. Additionally, PNAD classifies children as sons and daughters if they are the son or daughter of the head of the household or the spouse. This classification means that children may be classified as siblings who are related legally but not biologically to each other and the parents, but who are living as one family. Finally, the father is called the head of the household if the head is identified as male and the mother is called the spouse (if listed as the opposite sex), and the mother is called the head if the head is identified as female and the father is called the spouse (if listed as the opposite sex).

5. This selection criterion may impose some selection bias if, for example, children in single-headed families are more likely to work. But since the study seeks to capture separate impacts of the father's and mother's schooling, nonlabor income, and child labor status on sons and daughters, the sample with two-parent households is used.

6. The results are not presented here but are available on request.

TABLE 1. Child Labor and School Attendance: Families with at Least One Child Ages 7–16

Child Labor		School Attendance					
		Sons			Daughters		
		No	Yes	Total	No	Yes	Total
No	Number	1,075	21,117	22,192	1,053	22,162	23,215
	Row (%)	4.8	95.2	100	4.5	95.5	100
	Column (%)	55.0	84.6	82.4	75.3	92.2	91.3
Yes	Number	879	3,859	4,738	346	1,874	2,220
	Row (%)	18.6	81.5	100	15.6	84.4	100
	Column (%)	45.0	15.5	17.6	24.7	7.8	8.7
Total	Number	1,954	24,976	26,930	1,399	24,036	25,435
	Row (%)	7.3	92.7	100	5.5	94.5	100
	Column (%)	100	100	100	100	100	100

Source: Authors' analysis based on data from the 1998 Brazilian National Household Survey.

school at least part-time. Among children who work, more than 81 percent of sons and 84 percent of daughters also attend school.

A series of bivariate probit models were estimated to test the impact of intrahousehold gender differences on child labor and educational outcomes. Because child labor and schooling decisions are likely related, as evidenced by the high proportion of children in the sample who both work and attend school, a bivariate probit model is useful for combining information from the correlation among the errors of the child labor regression and the child schooling regression.

The bivariate probit model does impose some restrictions on the error terms. To ensure robustness, separate probit models were also estimated, as was a multinomial logit model in which the choices are the four combinations of working and attending school. In both cases, the results are essentially qualitatively the same. (These results are available in the supplemental appendix at http://wber.oxfordjournals.org.[7])

The first bivariate probit model estimated is a regression of the child labor indicator variable and the school attendance indicator variable (for daughters

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7. Logit models were estimated as well, with qualitatively the same results; these are available on request.

and sons separately) on the father's and mother's years of schooling, control-ling for child's age and other individual characteristics.[8] The other character-istics are whether the individual is nonwhite, to control for race effects; whether the individual lives in a rural area or metropolitan area, to control for differential labor and education markets; and the age of the parents as an additional control for income and family size, to control for the diluting effects of many children on household resources. As mentioned, parental years of schooling are included as a proxy for the human capital of parents, and the objective is to test for differential impacts of parental human capital on the school attendance and child labor of sons and daughters.

The coefficient estimates for child labor suggest that the higher the parent's schooling, the less likely the child is to work (table 2). However, fathers' and mothers' schooling have different impacts on sons' work status. A father's education has a stronger negative impact than a mother's on a son's likelihood to work. The chi-square tests for the parents' schooling coefficients confirm this result, rejecting the hypothesis that a father's and a mother's education have the same impact on a son's probability of working. The coefficient esti-mates for the bivariate probit on school attendance are positive and significant for both the father's and the mother's education levels. More important, the chi-square test reveals that the mother's education has a greater positive impact on a daughter's probability of attending school than does the father's edu-cation. A father's and mother's education do not have different impacts on a son's probability of attending school, however.

The results are also presented for the marginal effects (evaluated at the means of the independent variables) and a test of the difference between the marginal effects of each parent's schooling on a son's and a daughter's prob-ability of working (table 3). Because these are separate estimations, the covari-ances are unknown, but considering that there is a strong and positive correlation (0.72) between the two education measures, they are almost surely positive. In these estimations, the covariances are assumed to be zero, providing a stronger test than the standard t-test of the hypothesis that the two marginal effects are not significantly different from zero.

A father's education has a stronger and significantly negative impact on a son's probability of working compared with the impact on a daughter, regard-less of school attendance. Also, a father's education has a positive and signifi-cantly greater impact on a son's school attendance than on a daughter's school attendance if they do not work. If they do work, however, a father's education has a significantly larger but negative impact on a son's school attendance than on a daughter's school attendance.

8. Separate bivariate probit regressions are estimated for sons and daughters because the decisionmaking processes for them are likely to be quite different. For example, decisions concerning girls may depend on whether girls are needed to help with household chores, whereas that may not be the case for boys.

TABLE 2. Bivariate Probit Results on Child Labor and School Attendance

Independent Variable	Sons		Daughters	
	Coefficient	Standard Error	Coefficient	Standard Error
Child labor				
Father's years of schooling	−0.051	0.004	−0.025	0.005
Mother's years of schooling	−0.024	0.004	−0.031	0.005
Age	0.298	0.005	0.226	0.005
Nonwhite	−0.049	0.023	−0.059	0.027
Rural	0.788	0.026	0.567	0.029
Metropolitan area	−0.472	0.028	−0.251	0.032
Age of father	0.001	0.002	−0.001	0.002
Age of mother	−0.005	0.002	−0.004	0.002
Number of children	0.043	0.006	0.039	0.007
Intercept	−4.432	0.084	−3.958	0.095
Father's years of schooling = Mother's years of schooling	13.760[a]	0.000[b]	0.590b[a]	0.441[b]
School attendance				
Father's years of schooling	0.059	0.005	0.037	0.006
Mother's years of schooling	0.061	0.005	0.079	0.006
Age	−0.105	0.006	−0.068	0.006
Nonwhite	−0.024	0.027	0.002	0.030
Rural	−0.095	0.030	−0.208	0.032
Metropolitan area	0.013	0.031	−0.068	0.033
Age of father	−0.001	0.002	−0.002	0.002
Age of mother	0.003	0.002	0.001	0.003
Number of children	−0.056	0.007	−0.044	0.008
Intercept	2.431	0.098	2.258	0.108
Father's years of schooling = Mother's years of schooling	0.030[a]	0.867[b]	17.510[a]	0.000[b]
Rho	−0.151	0.019	−0.155	0.022
Wald chi-square	6,478.74	0.000	3,459.24	0.000
Number of observations	26,717		25,223	

[a]Chi-square

[b]P>chi-square

Note: White-Huber heteroskedastic consistent errors used in regressions.

Source: Authors' analysis based on data from the 1998 Brazilian National Household Survey.

In general, the marginal impact of parents' education on child labor is much higher for children who attend school (perhaps the more marginal cases) than for children who do not. For school attendance, the marginal impact of parental education is higher for children who do not work than for children who do. In fact, parents' years of schooling have a negative marginal impact on children's school attendance if a child works. This could be an artifact of the self-selection mechanism: educated parents may send their children to work only if they are desperate, whereas less educated parents may be more willing to make a marginal tradeoff

TABLE 3. Marginal Effects of Father's and Mother's Education

	Sons		Daughters		Difference	
	dy/dx	Standard Error	dy/dx	Standard Error	dy/dx(S) − dy/dx(D)	Standard Error[a]
On child Labor						
			If child does not attend school			
Father's years of schooling	−0.0012	0.0001	−0.0003	0.0001	−0.0009	0.0001
Mother's years of schooling	−0.0009	0.0001	−0.0006	0.0001	−0.0003	0.0001
			If child does attend school			
Father's years of schooling	−0.0065	0.0006	−0.0019	0.0004	−0.0047	0.0007
Mother's years of schooling	−0.0026	0.0006	−0.0022	0.0004	−0.0004	0.0007
On school attendance						
			If child does not work			
Father's years of schooling	0.0120	0.0007	0.0047	0.0006	0.0073	0.0009
Mother's years of schooling	0.0082	0.0007	0.0081	0.0006	0.0001	0.0009
			If child does work			
Father's years of schooling	−0.0043	0.0004	−0.0025	0.0004	−0.0018	0.0006
Mother's years of schooling	−0.0047	0.0004	−0.0053	0.0004	0.0007	0.0006

[a]Assuming zero covariance.

Source: Authors' analysis based on data from the 1998 Brazilian National Household Survey.

between some school time and some additional income. Surprisingly, the marginal impacts of parents' education on school attendance if a child does work is negative. This is unexpected and may be due to a selection process in more educated households in which part-time work to supplement family income is uncommon, and only those who have given up on school go to work.

Thus, the initial results suggest that a father's years of schooling have a greater impact on both a son's labor status and his school attendance than on a daughter's. The mother has a very small, yet significantly greater mitigating impact on a daughter's labor status if she does not attend school.

To better understand the results, consider the following example. Imagine a son and a daughter in a household where both parents have four years of education (equivalent to the completion of first primary in Brazil). Now consider the impact on these children of having parents with eight years of education instead (equivalent to the completion of second primary in Brazil). The impact of adding four years of schooling for both the father and the mother can be estimated by using the estimated marginal effects from table 3 (which are evaluated at the means of the independent variables). If both the son and the daughter were attending school, the son would be 2.6 percent less likely to work because of the increase in the father's education, but only 1 percent less likely because of the increase in the mother's education.[9] The daughter would be 0.8 percent less likely to work because of the increase in the father's education, and 0.9 percent less likely because of the increase in the mother's education. If both the son and daughter were not working, the son would be 4.8 percent more likely to attend school because of the increase in the father's education, but 3.2 percent more likely because of the increase in the mother's education. The daughter would be 1.9 percent more likely to attend school because of the increase in the father's education, but 3.2 percent more likely because of the increase in the mother's education.

To check the robustness of these results three additional regressions were performed: one with an additional variable of family income minus the observed child's income, one with the sample size reduced to households with only one son and one daughter, and one with the sample size reduced only to households with mothers at least 40 years old and with exactly three children. The chi-square tests of the equivalence of the estimated coefficients on fathers' and mothers' years of education for all three robustness checks are presented in table 4. The difference in the estimated marginal effects of all three additional regression estimations are presented in table 5. The full results of all three estimations are presented in the supplemental appendix.

The first robustness check repeats the estimates presented in tables 2 and 3, but with the additional variable of the family's income net of the observed child's income. Including this variable can be problematic as there is the strong possibility that the variable is endogenously determined with the school and work decisions of the children. Additionally, parental education is generally a very good proxy for family income and wealth, and so correlation between the two regressors is likely to be high. Nonetheless, if the results remain unchanged even with the inclusion of this variable, it enhances the robustness of the results. In this set of regressions, the same pattern emerges as in tables 2 and 3: the father's education has a greater mitigating effect on

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9. Based on the estimated 0.65 percent per year decline in a son's probability of working and the estimated 0.26 percent decline in a daughter's probability of working.

TABLE 4. Chi-square Tests from Robustness Checks

	Sons		Daughters	
	Chi-Square	P>Chi-Square	Chi-Square	P>Chi-Square
	Child labor[a]			
Father's years of schooling = Mother's years of schooling	13.920	0.000	0.033	0.567
	School attendance[a]			
Father's years of schooling = Mother's years of schooling	0.030	0.855	16.200	0.000
	Child labor[b]			
Father's years of schooling = Mother's years of schooling	4.480	0.034	0.010	0.933
	School attendance[b]			
Father's years of schooling = Mother's years of schooling	3.560	0.059	17.430	0.000
	Child labor[c]			
Father's years of schooling = Mother's years of schooling	5.060	0.025	0.170	0.680
	School attendance[c]			
Father's years of schooling = Mother's years of schooling	0.330	0.567	0.640	0.423

[a]Bivariate probiton on child Labor and school attendance with family income minus child's earnings.

[b]Bivariate probiton child Labor and school attendance with at least one son and one daughter ages 7–16.

[c]Bivariate probiton child labor and school attendance with three-child families and mothers over age 40.

Note: White-Huber heteroskedastic consistent errors used in regressions.

Source: Authors' analysis based on data from the 1998 Brazilian National Household Survey.

the son's child labor status than does the mother's education, and the mother's education has a greater impact on the daughter's school attendance than does the father's education. The father's education has a greater mitigating impact on the son's child labor and school attendance than on the daughter's. And the mother's education has a slightly greater mitigating impact on the daughter's child labor than does the father's education if the daughter does not attend school.

The second robustness check is to ensure that the results are not being biased by the comparison of some households with children of the same gender with households with mixed-gender children. Estimations of the models presented in tables 2 and 3 were performed again on a sample of children from households with at least one son and one daughter between the ages of 7 and 16. While this restriction more than halves the sample size, none of the qualitative results change except that the father's education no longer has a differential impact on school attendance if the child works.

TABLE 5. Marginal Effects from Robustness Checks

	With Family Income Minus Child's Income		Only Families with one Son and One Daughter 7–16		Only Families with Mothers Ages 40+ and Three Children	
	Difference[a]	Standard Error[b]	Difference[a]	Standard Error[b]	Difference[a]	Standard Error[b]
	If child does not attend school[c]					
Father's years of schooling	−0.0008	0.0001	−0.0010	0.0002	−0.0009	0.0004
Mother's years of schooling	−0.0003	0.0001	−0.0007	0.0002	−0.0004	0.0004
	If child does attend school[c]					
Father's years of schooling	−0.0045	0.0007	−0.0046	0.0013	−0.0100	0.0026
Mother's years of schooling	−0.0003	0.0007	−0.0007	0.0013	0.0002	0.0026
	If child does not work[d]					
Father's years of schooling	0.0070	0.0010	0.0074	0.0016	0.0109	0.0030
Mother's years of schooling	0.0000	0.0010	0.0013	0.0016	0.0008	0.0031
	If child does work[d]					
Father's years of schooling	−0.0017	0.0006	−0.0017	0.0010	0.0000	0.0013
Mother's years of schooling	0.0006	0.0006	0.0002	0.0010	−0.0006	0.0013

[a]Difference.

[b]Assuming zero covariance.

[c]Marginal effects of father's and mother's education on child labor.

[d]Marginal effects of father's and mother's education on school attendance.

Source: Authors' analysis based on data from the 1998 Brazilian National Household Survey.

The final robustness check seeks to eliminate a potential source of bias that may arise from the potential endogeneity of the family size variable. To deal with this problem, the original sample was restricted to families with a mother over age 40 (thus those who have most likely completed their fertility decisions) and with three children (those who chose to have three children plus some random error). Doing so severely reduces the sample to about 10 percent of its original size, restricting the ability to measure the point estimates with

precision. The qualitative results remain for the child labor regressions but disappear for the school attendance regressions.

Together, these results suggest that, as found in previous studies of child health (Thomas 1994), for example, there is intrahousehold gender bias in the allocation of resources in the child labor context, with mothers favoring daughters and fathers favoring sons. In intrahousehold models this can arise because of idiosyncratic technologies that convert education into human capital, or differences in parental preferences related to a child's gender.

IV. Conclusion

This investigation of the impact of parental education and the impact of intrahousehold gender differences on child labor and school attendance in Brazil finds that higher parental education increases the probability that a child will attend school and decreases the likelihood of a child entering the labor market. These impacts differ across fathers and mothers and across sons and daughters. As education and income are highly correlated, the results suggest that parents may direct resources selectively, with fathers investing more heavily in sons and mothers in daughters.

The results have potentially important policy implications. If, as this study finds, gender matters for the intrahousehold allocation of resources, then the gender of the adult recipient of transfers and the gender of the intended target may both matter. For example, if the policy goal is to reduce child labor, and child labor is predominantly a male activity in an economy, then the findings suggest that transfers allocated to the father may be more effective in reducing overall child labor than transfers to the mother. If the goal is to increase female school attendance rates, it may be more effective to allocate transfers to the mother than to the father. From a program effectiveness standpoint, it may be important to determine which parent receives the money, and how much they receive, based on the composition of the family and on the goals of the program.

Appendix

TABLE A-1 Unweighted Basic Statistics

Variable	Number of Observations	Mean	Standard Error	Minimum	Maximum
Sons					
Child's age	26,930	11.517	2.851	7	16
Nonwhite child	26,927	0.519	0.500	0	1
School	26,930	0.927	0.259	0	1
Work	26,930	0.176	0.381	0	1

(Continued)

TABLE A-1 Continued

Variable	Number of Observations	Mean	Standard Error	Minimum	Maximum
Sons					
Rural	26,930	0.235	0.424	0	1
Metropolitan area	26,930	0.348	0.476	0	1
Number of children	26,930	3.229	1.674	1	13
Age of father	26,930	42.596	8.824	22	94
Age of mother	26,930	38.287	7.328	22	97
Father's years of schooling	26,830	5.164	4.404	0	15
Mother's years of schooling	26,805	5.386	4.243	0	15
Family income minus child's earnings	18,520	938.624	1,467.554	0	37,850
Daughters					
Child's age	25,437	11.459	2.840	7	16
Nonwhite child	25,436	0.506	0.500	0	1
School	25,436	0.945	0.228	0	1
Work	25,436	0.087	0.282	0	1
Rural	25,437	0.228	0.420	0	1
Metropolitan area	25,437	0.357	0.479	0	1
Number of children	25,437	3.253	1.720	1	13
Age of father	25,437	42.551	8.819	22	101
Age of mother	25,437	38.320	7.351	22	92
Father's years of schooling	25,345	5.195	4.378	0	15
Mother's years of schooling	25,297	5.407	4.223	0	15
Family income minus child's earnings	17,317	948.205	1,491.230	0	36,682

Source: Authors' analysis based on data from the 1998 Brazilian National Household Survey.

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