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Child Labor and Schooling in Bolivia: Who's Falling Behind? The Roles of Domestic Work, Gender, and Ethnicity

DANIELA ZAPATA
University of North Carolina, Greensboro, NC, USA

DANTE CONTRERAS
Universidad de Chile, Santiago, Chile

and

DIANA KRUGER *
Universidad Adolfo Ibañez, School of Business Administration, Viña del Mar, Chile

Summary. — We analyze the role of gender and ethnicity in the work-school tradeoff among school-aged children. We observe domestic chores in Bolivian data and consider them work, finding that girls are 51% more likely than boys to be out of school and working, mostly in domestic activities. For indigenous children the probability is 60% higher than non-indigenous, and indigenous girls are 23% more likely than boys to be out of school and working. A more comprehensive measure of child labor reveals that in countries with large indigenous populations, indigenous girls are most vulnerable to future poverty and exclusion due to low education.

Key words — child labor, domestic work, schooling, gender, Latin America, Bolivia

1. INTRODUCTION

Child labor is a common phenomenon in poor countries. Despite the fact that most countries adhere to international conventions to curtail child labor, millions of children in LDCs work daily as street vendors or shoe shiners. If working as a child translates into lower educational attainment, then the future economic well-being of children might be in jeopardy since education is one of the most important tools to increase income and escape from poverty. Girls' educational outcomes are of particular importance in the work-school decision, since empirical evidence reveals that the education of girls has externalities that benefit society as a whole: in addition to individual earnings and labor market performance, girls' education is a crucial factor for improving family health and lowering birth rates (Schultz, 2004).

In recent years, there has been a proliferation of empirical work on child labor, which has given a better understanding of its causes and of the consequences of different policy interventions. [1] The official definition of child labor by the International Labor Organization (ILO) includes children who work in economic activities, which comprise all market production (paid work) and certain types of non-market production (unpaid work), including the production of goods for self-consumption. Researchers have used several definitions of child labor to capture the concept behind the ILO definition. Most of them regard as working children those who are economically active or who work in market-oriented activities. Other authors consider only children who work outside the home (Gunnarsson, Orazem, & Sanchez, 2006) or children who have positive labor earnings (Moehling, 2005). However, a less explored area of research is the role that domestic work plays in the school-work tradeoff, and to what extent—if any at all—domestic activities displace schooling.

From a policy perspective, child work is considered harmful if it interferes with children's health or educational advancement, as lower educational attainments are correlated with future poverty. Domestic activities, on the other hand, are not generally viewed as problematic, and they are not considered a threat to children's future economic outcomes. Nonetheless, domestic work can be time-intensive and it is not gender-neutral: thus, its exclusion from child labor definitions and analyses can lead to misleading conclusions regarding girls' outcomes, as they usually undertake such activities (Edmonds, 2006; Levison & Moe, 1998).

In this sense, it is important to include all work that children perform—inside and outside the home—to accurately assess its potentially negative role. Omitting household responsibilities from the definition of child work could explain why most empirical evidence has found that boys are more vulnerable to the negative effects of child work. Ignoring domestic work excludes an important element from the scope of policies ori-

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ented toward increasing schooling and reducing child labor, especially where girls are concerned.

Among the studies that have previously analyzed the role of domestic work in children's outcomes is Levison and Moe (1998), which estimated the determinants of domestic work and schooling among unmarried girls aged 10–19 in Peru. They find that family income reduces the probability that a girl performs chores and that conditional on performing chores, better socioeconomic variables reduce the number of hours spent on chores and increase the number of hours spent on school. Levison, Moe, and Knaul (2001) estimated the determinants of the four possible time-allocation decisions (studying only, working only, concurrent studying and working, or doing neither) of youth aged 12–17 years in urban Mexico. They compared definitions of work with and without household chores and found that once domestic work is included, young girls are 7.7 percentage points less likely to specialize in school than boys.

More recently, Amin, Quayes, and Rives (2006) studied the determinants of the probabilities that children perform market, domestic, and both types of work using data from 1995 to 1996 Bangladesh Household Expenditure Survey. Their results indicate that both market and household work are negatively correlated with schooling, although they do not explicitly model the joint nature of these decisions. Kruger, Berthelon, and Soares (2010) estimate a multinomial model for Brazilian children aged 10–14 years and find that if household work is included in the definition, girls are more likely to work and less likely to be in school than boys.

In this paper, we analyze the decisions of child work and schooling in Bolivia, using a definition of work that includes both market and domestic chores. We explore whether girls are more likely to be left out of school than boys with such a definition. Girls' outcomes deserve attention because Bolivia's labor market has large gender disparities: unemployment rates are higher among women, they earn less than men, and they work in lower-quality jobs. If we consider that education is a crucial determinant in labor market outcomes, then girls' success in early educational outcomes is important in attenuating such biases in the future.

We also analyze school and work outcomes among indigenous children. Depending on how it is defined, between 30% and 40% of Bolivia's population is indigenous, and it lags behind the non-indigenous in terms of human development. The main indigenous groups in Bolivia are Quechua and Aymara, representing 18% and 11% of the population, respectively, by our definition, which is based on the child's mother tongue. As Table 1 reveals, the indigenous represent approximately 30% of the country's population, yet they represent 37% of the country's poor, which is in turn correlated with lower education and health outcomes and lower incomes in general.

Despite advances in political representation, most of the indigenous population continues to live in a situation of exclusion, poverty, and inequality: average household income *per capita* is about 60% lower among indigenous households, in part due to discrimination and in part because indigenous workers have about 4 years less of education than non-indigenous workers, even after controlling for income. Thus, in the design for policies that alleviate these gaps in development, it is important to understand early education decisions and how they relate to work—both market work and domestic activities. In this paper we explore whether indigenous children, especially girls, are more or less likely to work or attend school than non-indigenous children of similar characteristics, and how domestic work is correlated with these outcomes.

This investigation contributes to the existing child labor literature along several dimensions. First, our data include time use information, which allows us to construct a measure of work that includes domestic tasks. Few empirical child labor papers include domestic chores in their definition, and this is the first analysis to do so for Bolivia.

Secondly, we analyze if the work-school tradeoff differs across ethnic lines. Differences between indigenous and non-indigenous children may be due to different income and wealth levels, different access to schools and labor markets, or to cultural differences regarding work and formal education. Our paper is able to ascertain whether culture plays a role in children's outcomes. Finally, we explore whether the two types of work—market or domestic—affect children's outcomes differently.

We find that relative to boys, girls are 23% more likely than boys to be out of school and work when the definition includes domestic chores, and this likelihood increases as work becomes more intensive in domestic hours. Indigenous children are more likely to be out of school and working compared to non-indigenous children; additionally, the non-enrollment probability is 83% higher for indigenous versus non-indigenous girls when work is mostly domestic. Our econometric analysis suggests that these ethnic differences are due to cultural factors.

As expected *a priori*, parental income is positively correlated with school enrollment. The presence of pre-school aged siblings in the household is positively correlated with the likelihood of being out of school and working. The effect of young brothers or sisters is different depending on the type of work performed: boys with young siblings are more likely to work in market-intensive activities and not be in school, while girls are more likely to work in predominantly domestic activities and not be enrolled in school.

The rest of the paper unfolds as follows: Section 2 describes the patterns of child labor and schooling in Bolivia. Section 3 presents a theoretical motivation for the empirical strategy, as well as a description of our data. Section 4 discusses the estimation results. We conclude with Section 5 of final remarks and policy implications.

2. SCHOOL AND WORK AMONG BOLIVIAN CHILDREN

The educational system of Bolivia consists of 8 years of compulsory primary education for children aged 6 and older. Most schools—both public and private—operate upto two

Table 1. *Bolivia: contribution to poverty by Ethnic group (children aged 7–14 years) Source: own calculations based on MECOVI 2001*

Ethnic group	Number	%	Poverty (*N*)	Contribution (%)
Quechua	1,431,504	17.6	1,157,692	22.1
Aymara	869,656	10.7	704,931	13.5
Other indigenous	60,807	0.7	55,096	1.1
Non-indigenous	5,777,390	71	3,310,809	63.3
Total	8,139,357	100	5,228,528	100

Ethnic group based on mother tongue. Poverty includes extreme and non-extreme poor. Does not include foreign language speakers or persons who do not speak.

daily shifts of approximately 5 h. Due in part to a national Education Reform started in 1994, by 2001 the primary net enrollment rate in Bolivia was 97% for both boys and girls.[2] Although there is no apparent gender gap in enrollment, a greater proportion of Bolivian girls never enter the formal school system (ECLAC, 2004), and among children that enroll in school, 24% of girls drop out before completing primary school compared to 19% of boys. The outcome gaps are even greater along ethnic lines: 42% of indigenous children drop out before primary school completion compared to 14% of non-indigenous children.[3]

The gap in education outcomes across ethnicities can be attributed to several factors. One possibility is that school supply is lower in the remote highland areas of Bolivia where indigenous children live; however, our data indicate that among indigenous and non-indigenous households, distance to school is not a relevant reason for not enrolling children in school. Another possibility is that income and wealth differences are responsible for the education gap, as indigenous families have lower income, higher unemployment, and lower-quality jobs (Contreras, Kruger, & Zapata, 2007). Finally, cultural differences across ethnicity may also be responsible for the difference in schooling outcomes if attitudes toward education and/or work differ across cultures. We explore these reasons in Section 4(c).

Bolivian data reveal that most children participate in many hours of domestic tasks. Almost 84% of children aged 7–14 reported spending at least an hour on household chores the previous week (Table 2), and these activities are more common among girls: 88% did chores, compared to 80% of boys. Furthermore, Bolivian children spend an average of 15 h/week—roughly 2 h daily—performing chores. Girls spent four more weekly hours on these activities than boys (almost 17 vs. 13 h, respectively). Domestic work is also more common among indigenous (91%) than non-indigenous (82%) children, although conditional on performing domestic tasks they work similar numbers of hours.

Table 2 also reveals that market work is more common among boys relative to girls—32 versus 25% participation rates—and among indigenous (58%) versus non-indigenous children (18%). Furthermore, working children spend an average of 21 weekly hours dedicated to market activities, equivalent to 4 h/day during the school week.

If both market and domestic work are considered, 88% of girls perform some kind of work activity compared to 83% of boys, and 94% of indigenous children worked compared to 83% of non-indigenous. On average, children spend 22 weekly hours on total work (market and domestic), which can conflict directly with educational activities.

3. EMPIRICAL SPECIFICATION, DATA AND VARIABLES

We model parental preferences with a unitary household model with two members, a parent and a child. Parents derive utility from consumption (C) and the child's human capital (H). The parent wishes to maximize the level of human capital of the child, which for simplicity is a function of the time spent by children on schooling activities s:

$$H = h(s; v), \tag{1}$$

where v is an individual-specific factor that captures individual and family characteristics affecting the productivity of investments in human capital. This function has the usual properties: $h' > 0$ and $h'' < 0$. For simplicity, v is a linear function of a vector of demographic characteristics of the child (x), the household (z), and a random term (u). Thus $v = \gamma_c' x + \gamma_h' z + u$.

The child's time is allocated to either the labor market (m) or to schooling (s), so that the child's time constraint is:

$$T = m + s. \tag{2}$$

Although leisure is not modeled explicitly, it could be seen as part of the time spent on a broader definition of human capital investments. For instance, time spent playing or resting can be considered a complementary part of the child's education.

Additionally, the definition of work can include market activities, household work that is not traded in the market, such as chores, or both. For ease of exposition, in this section we only discuss market work; however, given the importance of household chores in children's time allocation—especially for girls—our empirical section explores the trade-off between child work and schooling outcomes with a definition that explicitly includes hours spent on domestic chores.

Parents and children can sell their labor in the market. We are not interested in the substitution decision between adult and child labor, so in order to simplify the discussion, we assume that parental labor supply, $\underline{M}$, is inelastic and that the adult wage w_p is constant, so that the only labor decision analyzed is the child's. Children who work m hours in the labor market earn market wage w_c. Thus, households face the following income constraint:

Table 2. *Bolivia: incidence (%) and intensity of work outcomes, by gender and ethnicity (children aged 7–14 years)*

Outcome	Boys	Girls	Non indigenous	Indigenous	Non-indigenous boys	Indigenous boys	Non-indigenous girls	Indigenous girls	Total
Performed at least 1 h of domestic chores?									
Yes	80.4	87.8	81.8	91.0	78.0	87.8	85.7	94.3	84.1
Ave. hours/week (conditional on performing chores)	13.1	17.4	15.1	15.8	12.9	13.3	17.1	18.2	15.3
Worked in market activities at least 1 h?									
Yes	31.6	24.7	18.4	57.7	21.6	61.3	15.1	54.0	28.2
Ave. hours/week (conditional on working)	20.7	21.1	22.2	19.6	22.0	19.4	22.6	19.8	20.9
Performed at least 1 h of any type of work (domestic or market)?									
Yes	83.3	88.2	83.2	93.5	80.2	92.6	86.1	94.4	85.7
Ave. hours/week (conditional on working)	20.4	23.1	19.7	27.4	18.4	25.5	20.9	29.3	21.8

Own calculations based on MECOVI 2001.

$$C = w_p\underline{M} + w_c m = \kappa + w_c m_c = Y, \quad (3)$$

where C is total household consumption of market goods with its price normalized to 1, $\kappa = w_p\underline{M}$ is constant parental earned income, and $w_c m$ is child's labor income. Eqn. (3) states that household consumption C must equal household income Y.

Maximizing household utility subject to (1)–(3) yields the following optimal market labor and schooling time allocations of the child:

$$\begin{aligned} &s^*(w; v, \kappa, T_c), \\ &m^*(w; v, \kappa, T_c). \end{aligned} \quad (4)$$

These time allocation decisions are functions of the child market wage, the level of parental income, individual and household specific variables, and the child's time constraint.

Due to data limitations on the number of hours spent in school or working, it is usually possible to study only the participation decision—that is, the school enrollment or work decision—and not the hours spent going to school and working. Thus, to derive our empirical specification, from Eqn. (4) we define a latent variable model where the number of hours in school and working are functions of a vector of individual (X) and family characteristics (Z) and a random error term:

$$\begin{aligned} s_i^* &= X_i\alpha_1 + Z_j\alpha_2 + \omega_i, \\ m_i^* &= X_i\beta_1 + Z_j\beta_2 + \varepsilon_i. \end{aligned}$$

We do not observe s_i^* or m_i^*, only whether these are positive. Thus the empirical specification of the participation decisions s_i and m_i is as follows:

$$s_i = \left\{\begin{matrix} 1 & \text{if } s_i^* > 0 \\ 0 & \text{otherwise} \end{matrix}\right\} \quad m_i = \left\{\begin{matrix} 1 & \text{if } m_i^* > 0 \\ 0 & \text{otherwise,} \end{matrix}\right\}$$

where s_i is a variable equal to 1 if the child is enrolled in school, and m_i is a variable that equals 1 if the child works. We model these outcomes as joint decisions where the schooling and work choices are correlated. We further assume that the errors follow a bivariate normal distribution, and estimate the following with a bivariate Probit:

$$\begin{aligned} \Pr(s_i = 1) &= \Pr(s_i^* > 0) = \Pr(X_i\alpha_1 + Z_j\alpha_2 + \omega_i \geq 0), \\ \Pr(m_i = 1) &= \Pr(m_i^* > 0) = \Pr(X_i\beta_1 + Z_j\beta_2 + \varepsilon_i \geq 0), \end{aligned} \quad (5)$$

where X_i is a vector of individual child characteristics and Z_j is a vector of household variables that affect the child's schooling productivity, parental income, and geographic factors that proxy for the child's wage. Among the individual characteristics that affect schooling and work decisions are child's age, ethnicity, and sex. The latter will allow us to capture differences across gender lines. Family characteristics may include education of the parents and geographic location, for instance. The full set of control variables is discussed below.

(a) *The data*

The data used in this study are from Bolivia's national household survey (MECOVI), administered by the National Statistical Institute during November and December of each year (Instituto Nacional de Estadísticas, 2002). The MECOVI is a nationally representative survey that contains characteristics for every person in the household. We limit our analysis to data from the 2001 round because it included a time-use section with detailed information about domestic activities of household members, allowing us to analyze the role of domestic tasks. The 2001 MECOVI included 5,845 households and 25,166 individuals; we restrict our sample to children aged 7–14 years who are related to the household head, resulting in a sample of 5,277 children, nearly half of which are girls.

(b) *Dependent variables*

The dependent variables s_i and m_i correspond to individual children's school and work decisions, respectively. The school day in Bolivia lasts only 5 h, allowing children to work part-time. As a result, an important percentage of children combine work and schooling. Our definition of schooling is based on information on whether children are enrolled in school.[4]

We are interested in analyzing work activities that can potentially harm school achievements; thus, we define child laborers as children aged 7–14 years who work 15 h or more per week.[5] In this paper, due to the availability of time-use data on domestic tasks, we are able to explore two concepts of work. The first is the usual definition—based on the International Labor Organization's guidelines—that equals 1 if the child works 15 h or more in market activities, while the second definition includes both market and domestic activities—that is, equals to 1 if the child works 15 h or more in market or domestic activities.[6]

Table 3 summarizes children's time allocation between the two activities across gender and ethnicity, using both definitions of work. We see that with a market-based definition,

Table 3. *Bolivia—work and schooling rates, by gender and ethnicity (children aged 7–14 years)*

	Market work				Market and domestic work			
	Only working	Only studying	Studying and working	None	Only working	Only studying	Studying and working	None
Gender								
Boys	2.8	81.9	13.2	2.1	3.6	61.4	33.6	1.4
Girls	1.9	83.4	11.4	3.3	4.1	50.6	44.2	1.1
Ethnicity								
Non-Indigeneous	1.4	87.7	8.7	2.3	2.6	61.8	34.6	1.1
Indigeneous	5.3	67.5	23.3	3.8	7.6	39.1	51.8	1.6
Gender and ethnicity								
Non-indigenous boys	1.7	86.4	10.0	1.9	2.3	67.4	29.0	1.2
Indigenous boys	6.1	68.7	22.8	2.4	7.1	44.0	47.5	1.5
Non-indigenous girls	1.0	88.9	7.4	2.6	2.8	56.1	40.2	0.9
Indigenous girls	4.5	66.3	23.9	5.3	8.1	33.9	56.3	1.7
Average	2.3	82.7	12.3	2.7	3.8	56.1	38.9	1.2

Own calculations based on MECOVI 2001. Working children worked at least 15 h/week, in market or domestic activities.

the incidence of work for boys is 16%—either exclusively (2.8%) or while in school (13.2%). In comparison, 13% of girls work in market activities. If we consider both domestic and market activities in the definition, 48% of girls report working at least 15 weekly hours, compared to 37% of boys, revealing that if domestic tasks are considered, then the ILO definition considering only market work underestimates child labor incidence, and more so for girls.

Table 3 also reveals that under both definitions, indigenous children are more likely to work than the non-indigenous. The market work rate of indigenous children (29%) is almost three times greater than the work rate for non-indigenous (10%). This relative difference is smaller once domestic work is included, as 59% of indigenous children work compared to 37% of children who are not indigenous.

(c) *Explanatory variables*

The vector of exogenous, child-specific variables includes a dummy variable for sex of the child that equals one if the child is a girl, a dummy variable that indicates whether the child is indigenous, and dummy variables for age of the child.

We include the following variables that control for the family's demographic composition: whether the head of the household is female, number of children younger than 6 years, number of children (other than self) aged between 6–9, 10–14, and 15–18 years, and number of female and male adults present in the home other than the parents. As in Levison and Moe (1998) we assume that household composition is exogenously determined in the short run.

The presence of pre-school aged children in the household increases the demand for domestic labor dedicated to childcare activities, probably increasing the workloads of older siblings in the household. The effect of the presence of school-aged children (6–18 years) on the two dependent variables is ambiguous: siblings compete for scarce education resources within the household, so that a larger number may have a negative effect on the likelihood of schooling. On the other hand, the presence of more school-aged children facilitates sharing the burden of domestic tasks, so that the likelihood of schooling may increase.

The presence of other adults in the household (besides the parents) may alleviate some of the burden of domestic chores that children face, increasing their likelihood of attending school. Additionally, adults are probably working so that their presence may capture additional income capacity. We explore the possibility of different effects by the gender of the adult.

We included variables that measure the educational level of the head of the household as proxies for the parents' permanent income.[7] Specifically, we included categorical variables that equal 1 if the head of the household completed primary or secondary school, respectively (the comparison category was less than primary education). We did not include household income directly for two reasons: first, it may be endogenously determined by the decision to send a child to work. Second, studies reveal that in societies where the population depends on self-employment, subsistence agriculture, or other informal employment, income is inaccurately measured and may not reflect household welfare (Wahba, 2006).[8] To capture the effect of differences in wealth, we included dummy variables indicating if the house has piped water and electrical power, which might also affect the amount of time required to perform domestic work.

In rural areas of Bolivia, agricultural child labor is affected by cultural aspects and considered part of children's development, while different factors cause urban child labor, such as economic crises or cultural factors of rural immigrants (ILO, 1998). To control for these and other differences, we include a dummy variable for rural location of the household.

Finally, we include fixed effects at the municipal level in order to control for permanent differences across municipalities, such as education supply-side factors (availability of schools) and local labor market conditions that might affect child labor demand or supply, such as adult and child wages, unemployment rates, and economic activity. Summary statistics for all variables, by gender and ethnicity, are found in Table 4.

4. RESULTS

We are interested in analyzing the role that domestic work plays in the school and work decisions of Bolivian families. As a benchmark, we estimated the determinants of these two

Table 4. *Bolivia: descriptive statistics (children aged 7–14 years)*

Variable	All		Girls		Boys		Indigenous		Non Indigenous	
	Mean	S. Dev.	Mean	S. Dev.	Mean	S. Dev.	Mean	S. Dev.	Mean	S. Dev.
Market work rate	0.15	0.35	0.13	0.34	0.16	0.37	0.29	0.45	0.10	0.30
Market and domestic work rate	0.43	0.49	0.48	0.50	0.37	0.48	0.59	0.49	0.37	0.48
School enrollment	0.95	0.22	0.95	0.22	0.95	0.21	0.91	0.29	0.96	0.19
Female	0.50	0.50					0.49	0.50	0.50	0.50
Indigenous	0.25	0.43	0.25	0.43	0.25	0.43				
Rural	0.40	0.49	0.40	0.49	0.40	0.49	0.83	0.38	0.26	0.44
Age	10.43	2.28	10.45	2.29	10.42	2.27	10.41	2.26	10.44	2.29
Female-headed household	0.17	0.37	0.17	0.37	0.17	0.37	0.13	0.34	0.18	0.38
Primary ed.-head of hhold.	0.18	0.38	0.18	0.38	0.18	0.38	0.11	0.31	0.20	0.40
Secondary ed.-head of hhold.	0.21	0.40	0.21	0.41	0.20	0.40	0.04	0.18	0.26	0.44
No. children aged 0–5	0.88	1.01	0.88	1.00	0.88	1.01	1.12	1.08	0.80	0.97
No. children aged 6–9	0.66	0.74	0.66	0.74	0.66	0.74	0.70	0.71	0.65	0.75
No. children aged 10–14	0.80	0.82	0.83	0.84	0.77	0.80	0.85	0.80	0.79	0.83
No. children aged 15–18	0.51	0.70	0.51	0.71	0.51	0.69	0.54	0.67	0.50	0.71
No. female adults (age 19+)	0.28	0.60	0.27	0.59	0.28	0.61	0.20	0.44	0.30	0.64
No. of male adults (age 19+)	0.25	0.57	0.26	0.58	0.25	0.56	0.22	0.52	0.26	0.59
Hhold. has running water	0.64	0.48	0.63	0.48	0.65	0.48	0.35	0.48	0.74	0.44
Hhold. has electricity	0.67	0.47	0.67	0.47	0.67	0.47	0.30	0.46	0.80	0.40
Observations	5,271		2,616		2,655		1,408		3,863	

outcomes with the child labor definition based on 15 h of weekly market work, with a bivariate Probit model. These results are found in Table 5. Columns (1) and (2) present results for the likelihoods that children work, and that they enroll in school, respectively, while in columns (3) and (4) the dependent variable includes both market and domestic work. Table 5 presents coefficients of the bivariate Probit estimations, indicating the direction of the effect of the explanatory variables. Tables 6–8 (discussed below) present average marginal effects.

(a) *Definitions of work*

Table 5 reveals that if the definition of child labor considers only market-oriented activities, girls are less likely than boys to be working (column 1) and although the schooling coefficient is imprecisely estimated results suggest that they are less likely to be enrolled in school (column 2). This result summarizes the findings of most child labor studies: boys are more likely than girls to work if work is defined as market activities. One novel finding, however, is that contrary to other findings for Latin America, in Bolivia, girls may be less likely to be enrolled in school than boys, revealing a gender bias in detriment of girls' human capital.

If we include both market and domestic tasks in the definition of work, girls are more likely to work than boys are (column 3). They also appear to be less likely to be enrolled in school (column 4), but the result is not statistically significant. As an important percentage of children perform domestic chores, and in order to assess the role of domestic work in schooling decisions, our estimations henceforth include only the total work (market and domestic) definition.

(b) *Total work and gender*

In Tables 6–8, we present average marginal effects of all explanatory variables on the possible work-school outcomes: the probability that children only work (Works–No School), the probability that they only attend school without working (School–No Work), and the probability that they do both (School and Work). [9] To contextualize their magnitude, in our discussion we convert the marginal effects in Tables 6–8 to

Table 5. *Bolivia: child work (15+ hours) and school enrollment—Bivariate probit regressions (children aged 7–14 years)*

Explanatory variable	Market Work		Market and domestic work	
	(1) Works	(2) In school	(3) Works	(4) In school
Female	−0.170***	−0.121	0.360***	−0.0907
	(0.064)	(0.085)	(0.049)	(0.085)
Indigenous	0.304***	−0.357***	0.118	−0.373***
	(0.102)	(0.132)	(0.083)	(0.131)
Rural	0.449***	−0.114	0.424***	−0.112
	(0.105)	(0.148)	(0.085)	(0.145)
Female-headed household	0.0457	0.0957	0.00771	0.0652
	(0.091)	(0.132)	(0.071)	(0.135)
Primary ed.-head of hhold.	0.120	0.621***	−0.0243	0.627***
	(0.094)	(0.181)	(0.073)	(0.183)
Secondary ed.-head of hhold.	−0.335***	0.689***	−0.355***	0.657***
	(0.126)	(0.224)	(0.077)	(0.230)
No. children aged 0–5	−0.0392	−0.0427	0.0695***	−0.0585
	(0.034)	(0.043)	(0.026)	(0.043)
No. children aged 6–9	−0.0215	−0.143**	0.0207	−0.135**
	(0.045)	(0.061)	(0.035)	(0.061)
No. children aged 10–14	−0.00518	−0.000950	−0.0388	0.00611
	(0.040)	(0.057)	(0.031)	(0.057)
No. children aged 15–18	−0.00894	−0.0907	0.0329	−0.0985*
	(0.045)	(0.055)	(0.037)	(0.055)
No. female adults (age 19+)	0.0592	0.0124	−0.0509	0.0402
	(0.067)	(0.080)	(0.045)	(0.080)
No. of male adults (age 19+)	−0.129**	−0.111*	−0.0841*	−0.105
	(0.062)	(0.066)	(0.046)	(0.066)
Hhold. has running water	−0.110	0.141	−0.172**	0.131
	(0.090)	(0.107)	(0.072)	(0.109)
Hhold. has electricity	−0.219**	0.616***	−0.117	0.632***
	(0.109)	(0.131)	(0.083)	(0.133)
Constant	−1.773***	1.756***	−0.992***	1.781***
	(0.246)	(0.338)	(0.182)	(0.325)
Number of observations	5,271		5,271	
Correlation coefficient ρ	−0.468		−0.347	
Wald test $\rho = 0$ χ^2	67.51		32.81	

MECOVI 2001. Robust standard errors in parentheses.
Estimations include age dummies and municipal fixed effects.
* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

elasticities by dividing the marginal effect by the average of the dependent variable (reported at the bottom of the tables).[10]

Table 6 reports the marginal effects on the probability that children are enrolled in school and work in either domestic or market activities, for all children and separately by the child's sex. Column (1) reveals that girls have a 23% higher probability of working without school relative to boys.[11] Girls are also 41% more likely to combine work and school than boys are (column 3), and 20% less likely to be exclusively in school without working (column 2).

These findings reveal that when domestic tasks are included in the definition of work, girls have a higher probability of working than boys. Section (d) below analyzes further, whether work that is more intensively domestic is more harmful to girls' schooling relative to work that is intensively market-oriented.

We also find that controlling for individual and household specific factors, indigenous children—specifically, girls—are 83% more likely to be out of school and work, and 16% less likely to be exclusively in school than non-indigenous girls (Table 6, columns 4 and 5). Section (c) analyzes further the role of ethnicity in children's work and school outcomes.

Children who live in rural areas—both boys and girls—are less likely to exclusively be in school and they have a 30% higher probability of work while in school than urban children (Table 6, columns 2 and 3). This could be because agriculture has a higher demand and adaptability for children's labor than other activities, or to cultural differences between cities and rural areas, as was discussed above.

We find that even small amounts of schooling of the head of the household induce some school enrollment of their children. Children from families where the head of the household has complete primary education are 60% less likely to work without going to school compared to families where the household head did not complete primary education (Table 6, column 1). Parental education has a larger effect on boys, who are 70% less likely to exclusively work if the head of the household completed primary school, compared to girls, who are 50% less likely to work if the household head completed primary school (columns 4 and 7, respectively).

Relatively high levels of parental education, that is, completion of secondary schooling, are required to increase the probability of exclusive schooling (column 2)—perhaps because only high-income families are able to purchase domestic services in the market so that their children are not required to perform household tasks. Indeed, the MECOVI data indicate that in Bolivia, 80% of households that report hiring one or more domestic workers have heads of households that completed a high-school degree or more.

The probabilities of work and school enrollment are not affected by whether the head of the household is female. However, other household demographics matter: children who have younger siblings of pre-school age (0–5 years) are 9% more likely to be at work without going to school (Table 6,

Table 6. *Bolivia: child work (15+ hours) and school enrollment, by child's sex—children aged 7–14 years Bivariate probit regressions (marginal effects)*

Explanatory variable	All			Female			Male		
	(1) Works–No School	(2) School–No Work	(3) School and Work	(4) Works–No School	(5) School–No Work	(6) School and Work	(7) Works–No School	(8) School–No Work	(9) School and Work
Female	0.00946*	−0.10647***	0.0998***						
	(0.0049)	(0.0146)	(0.0147)						
Indigenous	0.0250**	−0.0445*	0.0109	0.0399**	−0.0779**	0.0281	0.0154	−0.017	−0.00747
	(0.0099)	(0.0242)	(0.0236)	(0.0176)	(0.0358)	(0.0361)	(0.0103)	(0.0327)	(0.0311)
Rural	0.0113	−0.130***	0.122***	0.0027	−0.123***	0.126***	0.0201	−0.134***	0.111***
	(0.0084)	(0.0261)	(0.0264)	(0.0101)	(0.0364)	(0.0375)	(0.0128)	(0.0368)	(0.0352)
Female-headed household	−0.00311	−0.00078	0.00544	−0.00182	0.0153	−0.0136	−0.00501	−0.00465	0.0131
	(0.0065)	(0.0207)	(0.0207)	(0.0083)	(0.0285)	(0.0286)	(0.0073)	(0.0285)	(0.0281)
Primary ed.-head of hhold.	−0.0254***	0.0174	0.0181	−0.0242***	0.0201	0.0118	−0.0244***	0.022	0.0147
	(0.0047)	(0.0217)	(0.0217)	(0.0057)	(0.0300)	(0.0295)	(0.0058)	(0.0306)	(0.0305)
Secondary ed.-head of hhold.	−0.0276***	0.115***	−0.0790***	−0.0201*	0.0886***	−0.0642**	−0.0277***	0.123***	−0.0836***
	(0.0049)	(0.0217)	(0.0218)	(0.0104)	(0.0306)	(0.0318)	(0.0037)	(0.0290)	(0.0285)
No. children aged 0–5	0.00389*	−0.0214***	0.0171**	0.00334	−0.0271**	0.0239**	0.00373	−0.0171*	0.0125
	(0.0022)	(0.0075)	(0.0073)	(0.0031)	(0.0109)	(0.0106)	(0.0028)	(0.0102)	(0.0099)
No. children aged 6–9	0.00707**	−0.00907	−0.000829	0.00682*	0.00201	−0.0117	0.0063	−0.0175	0.0086
	(0.0032)	(0.0103)	(0.0103)	(0.0037)	(0.0147)	(0.0148)	(0.0041)	(0.0139)	(0.0134)
No. children aged 10–14	−0.00083	0.0113	−0.0109	−0.000233	0.0182	−0.0189	−0.000599	−0.000117	0.00111
	(0.0029)	(0.0091)	(0.0091)	(0.0038)	(0.0127)	(0.0128)	(0.0034)	(0.0125)	(0.0121)
No. children aged 15–18	0.00541*	−0.0118	0.00452	0.00529	−0.0219	0.0158	0.00404	−0.0049	−0.00135
	(0.0029)	(0.0107)	(0.0105)	(0.0034)	(0.0150)	(0.0149)	(0.0039)	(0.0148)	(0.0138)
No. female adults (age 19+)	−0.00271	0.0156	−0.0127	0.00367	0.0169	−0.023	−0.00816**	0.0174	−0.00549
	(0.0041)	(0.0134)	(0.0128)	(0.0055)	(0.0200)	(0.0188)	(0.0041)	(0.0174)	(0.0166)
No. of male adults (age 19+)	0.00415	0.0218	−0.0295**	0.00189	0.0148	−0.0183	0.00281	0.0363**	−0.0442**
	(0.0034)	(0.0133)	(0.0131)	(0.0049)	(0.0193)	(0.0190)	(0.0041)	(0.0180)	(0.0176)
Mean-Dep.Var.	0.0419	0.53481	0.40979	0.0483	0.4878	0.45184	0.03523	0.58117	0.36836
Number of Observations		5,271			2,616			2,655	

Work includes market and domestic work. MECOVI 2001. Robust standard errors in parentheses.
Estimations include municipal fixed effects, age dummies, and controls for whether the household has running water and electricity.
* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

column 1). This reveals that an important task in domestic activities is taking care of younger siblings, and that it is sufficiently time-intensive that it deters children from enrolling in school. This negative correlation between childcare duties and schooling is missed if the work definition does not include domestic chores (Table 5, columns 1 and 2), highlighting the relevance of analyzing all activities that distract children from educational tasks, especially girls.

We also find that the presence of primary school-aged siblings (aged 6–9) is correlated with a higher probability of being out of school and working (Table 6, column 1). This effect is only statistically significant among girls, who have a 14% higher probability of non-enrollment compared to girls without siblings in this age group. This finding is suggestive that children may be competing within the household for scarce education resources.

The presence of older primary school-aged siblings (aged 10–14) does not affect the likelihood of work or school enrollment, while having secondary school-aged siblings (aged 15–18) may dissuade school enrollment (column 1). Our findings on the role of demographic composition of the family reveal that the presence of pre-school aged children, that is, the demand for childcare, is an important determinant correlated with the decision to pull children—especially girls—out of school.

Table 6 reveals that the presence of adult family members affects boys only: boys who live with an adult female relative are 23% less likely to be out of school than boys without (Table 6, column 7). Similarly, boys living with an adult male relative are 12% less likely to combine school with work and 6% more likely to be in school without working. This finding is probably due to the fact that the presence of more adults probably brings more income into the household, alleviating the need for boys to enter the labor market.

(c) *Ethnicity*

The probability of being out of school and working is 0.025 or 60% higher for indigenous children versus non-indigenous of similar income and wealth levels (Table 6, column 1). All our estimations include municipality dummy variables, which control for differences in school supply across municipalities. Moreover, as we mention in a previous section, neither indigenous nor non-indigenous households report distance to school as a relevant factor in the enrollment decision of their children, which implies that the difference in school enrollment is not due to differences in school availability.

Thus, our findings suggest that cultural differences across ethnicities explain the gap in school enrollment. The Quechua and Aymara cultures of Bolivia have historically viewed the public school system with distrust and ambivalence (Howard & Canessa, 1995). Schools in general and teachers specifically are viewed as centrally managed institutions that denigrate indigenous traditions, such as language and agricultural technology (Regalsky & Laurie, 2007).

On the one hand, parents value the acquisition of literacy skills and of Spanish as a second language, for pragmatic reasons (so that they are better able to negotiate with Spanish-speaking intermediaries in market transactions). On the other hand, many indigenous families consider the education imparted by Bolivian schools as having little value. Among the negative views of schools is that until the 1994 reforms, all education was in Spanish and most indigenous children did not understand the lessons taught. Indigenous parents also believe that their children become "lazy" in school because they do not learn proficient Spanish (due to the lack of bilingual instruction), and because by sitting in the classroom they are not available to work in family agriculture and learn productive methods (Howard & Canessa, 1995). One of the main goals of the 1994 Education Reform was to teach Spanish as a second language and to expand bilingual education nationally, yet implementation has been slow: by the year 2000, less than 20% of rural schools and a handful of urban schools were bilingual (Contreras & Talavera, 2003).

To further analyze ethnic differences, we estimated our econometric model separately for indigenous and non-indigenous children, which we present in Table 7. The first three columns of Table 7 replicate the results for all children from Table 6.

We find that relative to indigenous boys, indigenous girls are 23% more likely to work and be out of school (column 4), while there is no difference in school desertion between non-indigenous girls and boys (column 7). Part of the explanation may lie in the prevalence of traditional gender roles in indigenous cultures. If the expectation that women are mainly responsible for domestic responsibilities is stronger among the indigenous, then it follows that girls begin to play this role early in life and that their school achievements may not be as valued as those of indigenous boys. Furthermore, investments in girls' schooling may obtain low returns in the labor market, as 75% of employed rural women do not receive any income for their work (Contreras *et al.,* 2007). Safety may also explain why indigenous girls are kept from school: in some rural schools in the highlands where Quechua and Aymara children attend school, it is not uncommon for teachers to routinely rape their female students (Regalsky & Laurie, 2007).

These findings have important policy lessons. First, bilingual education coverage needs to expand, prioritizing regions where indigenous communities are located. In addition to expanding coverage, it is also important that authorities earn the community's support for bilingual education, as parents have opposed the reforms in some school districts due to implementation mistakes. [12]

Another policy option is to adapt the school calendar in rural indigenous locations so that it does not interfere with the local agricultural harvest seasons. Both Quechua and Aymara cultures believe that exclusive schooling makes children "lazy", and they value the traditional, labor-intensive agricultural production technology passed down through generations. Flexible school calendars may reduce the perceived negative trade-off between child work and schooling.

Finally, special attention must be paid to girls' education among indigenous communities. First and foremost, their physical security must be assured. Education authorities could sponsor community meetings as the one cited in Regalsky & Laurie (2007, p. 241), where parents, teachers, peasant organizations, and other authorities met to find a solution to the persistent teacher–student rapes in their schools. If parents feel that their daughter's physical integrity is at risk at school, then indigenous girls will be excluded from the benefits of a formal education.

(d) *Intensity of domestic versus market work*

The child labor literature assumes that market work is more harmful for children's schooling outcomes than domestic activities. We would like to be able to analyze whether the type of work children undertake—domestic or market—affects them differently. We thus classify children into two categories according to whether the hours of work they perform are

Table 7. *Bolivia: child work (15+ hours) and school enrollment, by ethnicity—children aged 7–14 years Bivariate probit regressions (marginal effects)*

Explanatory variable	All			Indigenous			Non-Indigenous		
	(1) Works–No School	(2) School–No Work	(3) School and Work	(4) Works–No School	(5) School–No Work	(6) School and Work	(7) Works–No School	(8) School–No Work	(9) School and Work
Female	0.00946*	−0.10647***	0.0998***	0.0167**	−0.103***	0.0859***	0.00663	−0.106***	0.102***
	(0.00487)	−0.0146	(0.0147)	(0.00812)	(0.0257)	(0.0250)	(0.00473)	(0.0169)	(0.0169)
Rural	0.0113	−0.130***	0.122***	0.0354	−0.244***	0.211***	0.00450	−0.0919***	0.0903***
	(0.00835)	(0.0261)	(0.0264)	(0.0313)	(0.0599)	(0.0639)	(0.00663)	(0.0279)	(0.0283)
Female-headed household	−0.00311	−0.000780	0.00544	−0.0113	0.00826	0.00750	−0.00122	0.00573	−0.00415
	(0.00649)	(0.0207)	(0.0207)	(0.0103)	(0.0476)	(0.0462)	(0.00604)	(0.0224)	(0.0223)
Primary ed.-head of hhold.	−0.0254***	0.0174	0.0181	−0.0334***	−0.0521	0.0992**	−0.0158***	0.0189	0.00425
	(0.00469)	(0.0217)	(0.0217)	(0.00961)	(0.0483)	(0.0475)	(0.00450)	(0.0231)	(0.0230)
Secondary ed.-head of hhold.	−0.0276***	0.115***	−0.0790***	−0.0315***	−0.0716	0.117*	−0.0201***	0.119***	−0.0912***
	(0.00487)	(0.0217)	(0.0218)	(0.0111)	(0.0632)	(0.0650)	(0.00413)	(0.0224)	(0.0222)
No. children aged 0-5	0.00389*	−0.0214***	0.0171**	0.00131	−0.00157	−0.000226	0.00362	−0.0279***	0.0239***
	(0.00222)	(0.00746)	(0.00732)	(0.00345)	(0.0129)	(0.0124)	(0.00221)	(0.00876)	(0.00850)
No. children aged 6–9	0.00707**	−0.00907	−0.000829	0.00907*	0.0227	−0.0376*	0.00330	−0.0156	0.0113
	(0.00318)	(0.0103)	(0.0103)	(0.00535)	(0.0203)	(0.0195)	(0.00288)	(0.0115)	(0.0113)
No. children aged 10–14	−0.000830	0.0113	−0.0109	0.00461	−0.0151	0.00950	−0.00315	0.0160	−0.0120
	(0.00289)	(0.00908)	(0.00909)	(0.00465)	(0.0163)	(0.0162)	(0.00276)	(0.0104)	(0.0103)
No. children aged 15–18	0.00541*	−0.0118	0.00452	−0.00361	0.0254	−0.0219	0.00564**	−0.0165	0.00868
	(0.00285)	(0.0107)	(0.0105)	(0.00534)	(0.0200)	(0.0185)	(0.00264)	(0.0120)	(0.0119)
No. female adults (age 19+)	−0.00271	0.0156	−0.0127	0.0132	−0.00796	−0.0107	−0.00469	0.0195	−0.0134
	(0.00414)	(0.0134)	(0.0128)	(0.00807)	(0.0334)	(0.0323)	(0.00463)	(0.0146)	(0.0139)
No. of male adults (age 19+)	0.00415	0.0218	−0.0295**	0.00638	0.00109	−0.0105	0.00176	0.0281*	−0.0326**
	(0.00341)	(0.0133)	(0.0131)	(0.00694)	(0.0266)	(0.0260)	(0.00311)	(0.0150)	(0.0147)
Mean-Dep.Var.	0.04193	0.53481	0.40979	0.0724	0.4006	0.5085	0.0308	0.5837	0.3738
Number of Observations		5,091			1,408			3,863	

Work includes market and domestic work. MECOVI 2001. Robust standard errors in parentheses.
Estimations include municipal fixed effects, controls for age of the child and controls for whether the household has running water and electricity.
* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

mostly in market or domestic activities, and analyze if the results differ between these groups.

We defined a relatively low-domestic (high-market) intensity category if less than 50% of total hours worked were domestic, and a high-domestic (low-market) intensity category if 50% or more of total hours worked were dedicated to domestic chores. [13] As in the previous section child laborers are defined as children who work 15 h or more per week. Most children—3,829 out of 5,251 or 73%—dedicate the greater proportion of their working time to domestic chores.

We then analyzed whether outcomes differ between children who spend most of their time in domestic relative to market work. We present these results in Table 8. For ease of exposition, we only present and discuss the variables whose effects differ across the low/high intensity category. [14] Panel 1 includes results for children whose work hours are mostly for the market, that is, their work is low-domestic intensity, while Panel 2 summarizes results for children whose work hours are mostly domestic.

The empirical results reveal that when work is of low-domestic (high-market) intensity, boys and girls are just as likely to be out of school and working (Panel 1). If work is high-domestic intensity, on the other hand, girls are 51% more likely to be out of school and working than boys (Panel 2, column 1). Similarly, girls are 26% less likely to be in school without working than boys when work is of high-domestic intensity (Panel 2, column 2).

These findings could occur if children in the high-domestic category work longer hours than those in the low-domestic intensity category. However, our data reveal that children in the high-domestic intensity category worked fewer hours: 17 weekly hours on average, compared to 23 weekly hours by children in the more market-intensive category. Thus, even though domestic work is less time-intensive, girls are more likely than boys to work without being enrolled in school.

We must be careful not to attribute causality to this correlation between intensity of domestic work and non-enrollment among girls. Although it may be that domestic tasks are not as complementary to schooling as it is generally believed, it is likely that parents choose to withdraw their daughters from school because they feel that schooling will not be very beneficial for girl's future employment outcomes or because they feel that that school does not provide a safe environment for girls. Once girls are removed from school, they are able to dedicate a larger number of hours to domestic chores relative to market activities.

We also find that among the high-domestic intensity group, indigenous children—specifically, indigenous girls—are more likely to be out of school than the non-indigenous (Panel 2, columns 1 and 4), but no apparent differences exist across ethnicity in the low-domestic category. This finding suggests that domestic work is negatively correlated with the school enrollment of indigenous children, especially girls.

The presence of pre-school aged children has different effects on boys and girls. We find in the low-domestic (high-market) intensity group, boys with pre-school aged siblings are more likely to work and not be enrolled in school than boys without siblings (Panel 1, column 7). Girls with pre-school aged

Table 8. *Bolivia: child work (15+ hours) and school enrollment, selected results—children aged 7–14 years by intensity of domestic work—Bivariate probit regressions (marginal effects)*

Explanatory variable	All			Female			Male		
	(1) Works–No School	(2) School–No Work	(3) School and Work	(4) Works–No School	(5) School–No Work	(6) School and Work	(7) Works–No School	(8) School–No Work	(9) School and Work
Panel 1: low intensity of domestic work (<50% total hours worked)									
		N = 1,422			*N = 566*			*N = 856*	
Female	0.00913	−0.0411	0.031852						
	(0.0113)	(0.0262)	−0.02773						
Indigenous	0.0211	−0.0538	0.0294	−0.0186	−0.237***	0.273***	0.0172	−0.00414	−0.0219
	(0.0231)	(0.0391)	(0.0406)	(0.0369)	(0.0521)	(0.0616)	(0.0195)	(0.0466)	(0.0477)
No. children aged 0–5	0.00961**	−0.0276**	0.0163	0.000252	−0.0152	0.0168	0.0163**	−0.0661***	0.0481***
	(0.00448)	(0.0131)	(0.0141)	(0.00505)	(0.0190)	(0.0200)	(0.00639)	(0.0158)	(0.0161)
No. female adults (age 19+)	−0.0154**	0.0105	0.0108	−0.00370	−0.0109	0.0179	−0.0182**	0.0353	−0.0117
	(0.00755)	(0.0238)	(0.0237)	(0.0130)	(0.0329)	(0.0352)	(0.00911)	(0.0287)	(0.0275)
No. of male adults (age 19+)	−0.00472	0.0450*	−0.0424*	−0.0273**	0.0757**	−0.0447	−0.00907	0.0374	−0.0274
	(0.00822)	(0.0248)	(0.0253)	(0.0123)	(0.0349)	(0.0366)	(0.00935)	(0.0301)	(0.0285)
Mean dep. var.—low intensity	0.0759	0.4107	0.4993	0.0689	0.5141	0.4028	0.0806	0.4159	0.4895
Panel 2: high intensity of domestic work (>=50% total hours worked)									
		N = 3,829			*N = 2,042*			*N = 1,787*	
Female	0.0152***	−0.150***	0.136***						
	(0.00516)	(0.0175)	(0.0174)						
Indigenous	0.0219**	−0.0316	−0.00122	0.0647***	−0.0720*	−0.0148	0.00240	0.00576	−0.0115
	(0.0106)	(0.0293)	(0.0280)	(0.0169)	(0.0400)	(0.0368)	(0.00828)	(0.0412)	(0.0387)
No. children aged 0–5	0.00281	−0.0230***	0.0200**	0.00577*	−0.0380***	0.0322***	0.000461	−0.00288	0.00214
	(0.00223)	(0.00880)	(0.00848)	(0.00344)	(0.0123)	(0.0117)	(0.00186)	(0.0126)	(0.0121)
No. female adults (age 19+)	−0.00144	0.0310*	−0.0306**	0.00277	0.0409*	−0.0467**	−0.00453	0.0203	−0.0125
	(0.00405)	(0.0160)	(0.0150)	(0.00555)	(0.0218)	(0.0195)	(0.00302)	(0.0216)	(0.0210)
No. of male adults (age 19+)	0.00486	0.00252	−0.0103	0.00516	−0.0222	0.0164	0.00280	0.0277	−0.0359*
	(0.00326)	(0.0156)	(0.0151)	(0.00505)	(0.0222)	(0.0213)	(0.00237)	(0.0211)	(0.0209)
Mean-dep.var. (high intensity)	0.0295	0.5790	0.3787	0.0436	0.5093	0.4363	0.0134	0.6586	0.3128

Work includes market and domestic work. MECOVI 2001. Robust standard errors in parentheses.
Estimations include municipal fixed effects.
* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

siblings, on the other hand, are more likely to work while out of school in the high-domestic intensity group (Panel 2, column 4). This finding reveals that the presence of pre-school aged siblings is negatively correlated with the school enrollment of all primary-school aged children: boys do not enroll in school to work in the market, possibly to earn more income, while girls do not enroll in school to work in the home, responsible for childcare responsibilities. In either case, an important policy implication is that augmenting public pre-school coverage would help increase school enrollment of older brothers and sisters.

Finally, the presence of a female and male adult (other than parents) affects mostly girls' probabilities of working and the type of work performed. If work is of high-domestic intensity, the presence of a female adult is correlated with an 8% greater probability that girls exclusively go to school and with an 11% lower probability of work and school (Panel 2, columns 5 and 6, respectively). The presence of a male adult, meanwhile, is correlated with a 40% lower probability of market-intensive work and being in school and with a 15% higher probability of exclusive schooling (Panel 1, columns 4 and 5, respectively). These findings suggest that adult females in the household alleviate girls' domestic responsibilities, sufficiently so that they are able to focus just on school (Panel 2, column 5), while adult men probably provide more income to the home, making girls' market work less necessary (Panel 1, column 4).

5. CONCLUSIONS AND FINAL REMARKS

The definition of child labor that most empirical studies have used considers only economic activities, ignoring the fact that children spend important amounts of time performing household chores, especially girls. We used a dataset from Bolivia that contains information on time use within the household, so that our definition includes work dedicated to domestic tasks.

Many working children dedicate time to both market and domestic activities. We analyzed whether outcomes differed by the type of work performed, and classified children into two categories based on intensity of domestic activities. This analysis revealed that if work is mostly domestic, girls are less likely to be exclusively in school, and more likely to work and go to school than boys.

The fact that families assign a greater share of domestic responsibilities to girls (while boys tend to specialize in market-oriented work) is likely to have an effect on women's future outcomes, like their decision to participate in the labor market, career selection, or occupational choice. This finding is relevant because differences between men and women's labor market outcomes are typically associated with differences in their training, experience, age, marital status, career commitment, or quality of their social networks (Contreras *et al.,* 2007).

Our findings suggest that in Bolivia, cultural differences across ethnicities explain the gap in school enrollment between indigenous and non-indigenous populations. The Quechua and Aymara cultures of Bolivia believe that attending school without work does not allow valuable productive experience for their children. Thus, a feasible policy lesson would be to make the school year calendar flexible in rural, indigenous towns so that it does not interfere with the local agricultural harvest season. Until the late 1990s, all school instruction was in Spanish when many children spoke an indigenous language at home. Though the country has made substantial improvements in recent years, bilingual education coverage needs to expand, prioritizing regions where indigenous communities are located. Finally, girls' education among indigenous communities needs special attention, ensuring first and foremost their physical security.

Our findings reveal strong a demand for childcare within the household, as the presence of pre-school aged children has a negative effect on the school enrollment of their primary-school aged siblings. An important policy implication is that increasing coverage of public pre-schools would help increase school enrollment of older brothers and sisters. Public investments in pre-school programs would have positive effects not only on the pre-schoolers themselves, but also on older brothers and sisters, who would otherwise have to enter the labor force or stay home to care for them.

We find that the presence of an adult family member other than the child's parents in the household decreases the probability that a girl works: if the adult relative is female, girls are more likely to be exclusively in school, and if the adult family member is male, girls are less likely to just work. This reveals that adult women alleviate the burden of household chores that girls face, and adult men alleviate income constraints that drive girls out of school. This finding emphasizes the importance of publicly-provided childcare, since taking care of young siblings is likely to be an important domestic chore. Furthermore, since poverty is a relevant factor in alleviating child labor, an additional policy implication is that cash transfers conditional on school enrollment should promote girls' schooling in Bolivia.

Evidence found in this paper indicates that indigenous girls are a particularly vulnerable group: they are in serious risk of falling behind other children in terms of their schooling outcomes, affecting their future economic opportunities and making them more vulnerable to living in poverty and exclusion as adults.

NOTES

1. For a recent survey see Edmonds (2007).

2. Contreras and Talavera (2003).

3. Authors estimates from MECOVI 2001. Although there are several ways to define indigenous, in this study we classified children based on their mother tongue.

4. The precise question of the MECOVI survey asks "did you enroll in a primary or secondary grade or college during this year?"

5. ILO Convention 33 Art. 2 indicates that "children under 14 years of age... who are still required by national laws or regulations to attend primary school, shall not be employed in any employment to which this Convention applies except as hereinafter otherwise provided". Art. 3 indicates that "Children over twelve years of age may, outside the hours fixed for school attendance, be employed on light work.... the duration of which does not exceed 2 h per day". ILO Convention 138 Art. 7 establishes that children with ages 13–15 may perform light work that does not conflict with school, but does not establish maximum hours of work. Based on the Conventions just mentioned, reports from the International Labor Organization on child labor (ILO, 2002, p. 32, and ILO, 2006, p. 22) define regular child work when children aged 14 or less work between 15 and 42 h/week. We performed sensitivity analyses of different thresholds of defining children as working (5, 10, and 20 h/week), and the results did not change.

6. The MECOVI questions to define market work were "did you work last week?" and "if not, were you absent due to sickness, vacation, labor strike, adverse weather, etc.?" To define domestic work, the question was: "During the previous week, did you carry out any of the following activities within your household? Take care of children and/or elderly family members; cook and clean the household; wash and/or iron clothes; perform minor household repairs; shop for food; chop and carry firewood; carry water from external water source; organize and maintain neatness.

7. Nearly 90% of the children in our sample are daughters or sons of the household head so that head of household's education is a good proxy for parental education. We explored if not being a son/daughter of the household head had an impact on children's outcomes and found that it does not.

8. Informality rates are high in Bolivia: almost 50% and 90% in urban and rural areas, respectively (Contreras et al., 2006).

9. We do not discuss the fourth outcome, no school/no work because our theoretical motivation has assumed that children either work or go to school.

10. Let η be the elasticity of the outcome with respect to the explanatory variable. Thus, $\eta = \frac{\hat{\beta}}{\bar{Y}} \times 100$ where $\hat{\beta}$ is the coefficient of the bivariate Probit regression; therefore, $\hat{\beta} = \frac{\partial Y}{\partial X}\overline{X}$.

11. The elasticity is obtained by dividing the coefficient of female in column (1) is 0.00946 by the mean of the dependent variable 0.0419, which converted into a percentage is 23%.

12. One example of an implementation mistake is that Quechua and Aymara textbooks were ready and distributed before Spanish as a second language textbooks, which gave rise to suspicion among parents that their children would not be taught Spanish (Contreras & Talavera, 2003).

13. To be classified in either high or low-domestic intensity, total hours worked must be non-zero. In our data, 20 children responded positively to working but reported zero hours of work.

14. Full results are available from the authors upon request.

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