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CHILD LABOR AND SCHOOL DECISIONS IN URBAN AND RURAL AREAS: CROSS COUNTRY EVIDENCE

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Abstract

Child labor is widespread in developing countries, but its causes are debatable. Poverty is considered the primary reason, but many theoretical and empirical analyses show that other factors, such as lack of access to credit, poor school quality, and labor market opportunities play equal or even greater roles in the decision to have children work. This study surveys the existing literature and, taking into account urban-rural divides, aims to shed light on the debate with empirical evidence from Nepal, Peru, and Zimbabwe. We find that while poverty drives child work and schooling in rural areas, it does not appear to significantly influence such decisions in urban areas. This suggests that policies such as trade sanctions or a ban on child labor in rural areas could have an adverse effect as child labor decisions in such areas are more likely a response to poverty and subsistence requirements. Similarly, improving access to credit has greater potential for alleviating child labor and enhancing school enrollment in rural than urban areas, particularly in Nepal and Zimbabwe. On the other hand, the availability of alternative childcare options appears to considerably decrease child labor and create conditions for higher school attendance rates in urban than in rural areas. Finally, evidence from all three countries indicates that efforts to bolster adult educational levels and wages will help curb the prevalence and intensity of child labor and improve the likelihood that children stay in school.

Contents

Tables

Appendix Tables

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1. Introduction

It is universally accepted that the rate of economic growth depends crucially on the stock of human capital in a country (Romer 1987; Lucas 1988; Barro 1991; Mankiw, Romer, and Weil 1992). The process of building capabilities to reduce poverty and vulnerability thus should involve enhancement of individual and household human capital assets. A low level of human capital development has been long identified as a major impediment to economic growth and the elimination of poverty in developing countries. Several studies (e.g., Vijverberg 1993; Glick and Sahn 2000) find high returns in the labor markets for investments in education for both men and women. Glick and Sahn (1997) show that the earnings of women and men increase with schooling in both self-employment and wage employment by using data from a developing country. Similarly, other studies have consistently shown that child education has higher returns than other physical assets (e.g., Psacharopoulos 1994). Despite these apparent benefits and high potential returns to education, the level of education and educational attainment remain remarkably low in most developing countries, and child labor participation, considered to be a competing activity to schooling, continues to be a common phenomenon.

Child labor is widespread in developing countries. Estimates by the International Labor Organization (ILO 1996) of the number of children under age 15 who work ranges from 100 to 200 million. UNICEF (1991) estimated that there were 80 million children ages 10–14 who undertook work so long or arduous that it interfered with their normal

development. Though many, including parents themselves, agree that childhood is a period of school learning and physical and mental development—and not of primarily income-generating work—many young children in low-income countries participate in the labor force, and their chance of receiving even primary education is minimal. How do parents decide whether to send their children to school, and how do they calculate the costs of not doing so?[1]

The causes of child labor are debatable, although poverty is considered as the primary reason. That there is a higher geographic concentration of child workers in poor countries (see Basu 1999) indicates the inverse association of child labor and income. Basu and Van (1998) argue that the mass phenomenon of child labor does not reflect the selfishness of parents wanting to enjoy more leisure time while their children work, but rather that stark poverty and household survival compels them to send their children to work. For poor households, school investment decisions are associated with a host of decisions regarding use of time and other resources of various household members. Changes in household circumstances, such as becoming poor, may elicit important time-use changes, not only of children who are students or potential students, but of parents as well. In developing countries, often more than one member of the household generates income (e.g., Ersado 2002 on Zimbabwe; Pradhan and van Soest 1997 on Bolivia), which often necessitates the use of child labor. Several studies that looked at schooling determinants in developing countries find that household wealth does figure

[1] These costs include perpetuating the vicious circle of poverty and vulnerability and extending it from the current generation to the next.

predominantly in child schooling and work decisions (e.g., Basu and Van 1998). Bhalotra (2000a) finds that in Pakistan child work is caused by poverty.

Studies, citing evidence mainly from Latin America, argue that the rates of child labor are higher at times when children have better work opportunities as measured by local labor market conditions (Levison, Moe, and Knaul 2001; Binder 1999). Since the seminal paper by Becker (1964), many development researchers have recognized the importance of opportunity costs in schooling decisions. The opportunity costs of schooling increases as market wages for child labor increase. Furthermore, differences in labor market conditions by gender may differentially affect the schooling decision for boys and girls.

Still others argue that factors such as credit market imperfection, not poverty, play a role in sending children to work or keeping them at home to take care of domestic household responsibilities, even though returns on education (which accrue in the future) are higher.[2] Cross-sectional data from India and other developing countries show that a higher incidence of poverty is not correlated with a higher incidence of child labor (e.g., Swaminathan 1998). The Becker model and more recently Ranjan (2001) imply that income does not matter if complete credit markets exist. A study by Jacoby (1994) finds that borrowing constraints negatively affect children's schooling attainment in Peru. Studies also exist that highlight the child labor decision as part of household's risk-management strategy (Mendelievich 1979; Jacoby and Skoufias 1997; Grootaert and

[2] Ranjan (1999), using a two-period overlapping generation model, shows that credit constraints, not poverty, play a role in a household's decision to use child labor instead of sending their children to school.

Kanbur 1995). Households need to minimize the impact of shocks such as job losses and failed harvest on their income. Lack of access to credit for smoothing income fluctuations over time might, therefore, lead to a higher prevalence of child labor. Jacoby and Skoufias (1994) used a measure of variability of household income in rural India and found that when variability increased, school attendance declined.

Lack of access to school and low school quality could also affect child schooling and work decisions. For households rationally maximizing their welfare, low demand for schooling might arise because of low quality or excessive costs. Inaccessibility of schools or their poor quality thus may spur parents to engage their children in more immediate and profitable pursuits (e.g., Grootaert and Patrinos 1999). Schooling costs—since schooling is the main competing time use for children—could also be an important determinant of the likelihood of child work (e.g., Siddiqi and Patrinos 1995). Some children may have to work to afford the direct costs of schooling. Even with sufficient access to school, child labor may still continue to be a common phenomenon if the household decisionmaking process gives more weight to income from children's labor and less weight to children's schooling because of unequal distributions of wealth among households (Grootaert and Kanbur 1995) or other cultural, environmental, and unobservable factors.

While labor is the poor's greatest asset, child labor raises important concerns. A household's decision to increase the number of family members in the labor market implies that mothers might have to give up vital household and childcare activities, and children might have to sacrifice their education in order to participate in income

generating activities. When the poor depend on their children's labor rather than invest in their future by educating them, they risk perpetuating poverty from one generation to the next (Moser 1996). It is important to understand the trade-offs that households make between child labor-market participation and other vital time allocation decisions such as schooling and household work. Such understanding will improve the design of development programs and policies to reduce poverty.

The evidence briefly summarized here shows a lack of consensus on the causes of child labor and suggests that its determinants may vary across geographic regions. It also casts doubt on the notion that child labor is primarily determined by poverty. This paper, using household survey data from three geographic regions (Africa, Asia, and Latin America), investigates the factors driving child labor by collecting cross-country evidence on labor force participation and child education-related decisions important for development policy. It also examines urban-rural differences in child labor and schooling decisions by emphasizing differences in livelihood strategies and approaches in urban and rural areas.

This paper specifically asks questions such as: Does child labor mainly arise as a response to low income, lack of access to credit, an improved labor market, or poor school quality? What affects the level of participation in the labor force once the decision to participate has been made? Are there differences in Sub-Saharan Africa,

Latin America, and Southeast Asia? Are urban-rural differences important?[3] Empirical models that simultaneously consider labor participation and schooling decisions and the level of participation once such decisions are made while taking into account the potential differences in urban and rural areas are scant in development literature. Yet these factors are of paramount importance to targeted policy and program designs to address poverty. The paper empirically investigates these questions using nationally representative data from urban and rural areas of three developing countries in Africa, Asia, and Latin America.

2. Theoretical and Conceptual Framework

The conventional welfare economics approach provides a useful framework for integrating determinants of child labor and schooling decisions. The starting point is the household decisionmaking process for allocating children's time between labor and nonlabor activities such as schooling and leisure, taking into account the private returns to each. There are two main household decisionmaking models. In unitary neoclassical household labor supply models, the family is assumed to make a joint decision regarding household consumption and labor supply of its members. The decision is guided by utility maximization determined by household consumption and leisure of household members, under household budgetary constraints. More recently, collective models,

[3] Unlike their rural counterparts, who directly produce for their consumption needs and depend on the surrounding natural resources, most urban households depend on wage employment for income, markets for food supply and other livelihood needs, affordable social services, and government services for family safety nets. Such differences may well be reflected in child labor and schooling decisions.

whereby the decisions and the outcomes in the household are results of a bargaining process among members, have received considerable attention.[4]

The latter models require information on what happens within the household and the knowledge of bargaining-power share structure among household members. To date these models are commonly applied to husbands and wives. This paper confines itself to the case in which child labor and schooling decisions are an outcome of a unitary household decisionmaking process. A unitary model appears relevant in the case since decisions about child labor-force participation and hours of work, leisure, and schooling are typically made by an adult, not by children themselves (Ray 2000b; Bhalotra 2000b).[5]

Assume first that a representative household is composed of one parent and one child.[6] Further assume that the household maximizes a two period (t) utility function:

$$V_t = U(C_t, L_{p,t}, L_{c,t}, S_{c,t}, X_t), \tag{1}$$

where U is a well defined concave utility function over joint consumption (C), child schooling (S_c),[7] parent, and child leisure times (L_p, L_c), and a vector of individual and household characteristics ($\boldsymbol{X}$). In the first period, the parent decides whether to send his child to school or work. If the decision to send the child to school is made, the decisionmaker decides how much schooling the child will get through a household time

[4] See, Alderman et al. (1995) for a good description of the collective model of household decisionmaking.

[5] However, the gender of household head is included as well as male and female wages and educational levels separately in the empirical estimation. This will help account for potential differences in preferences between father and mother over child labor and schooling choices.

[6] Households with more members can be considered without loss of generality.

[7] Including child schooling in the parent's utility function assumes that education is both an investment and consumption good for parents (Becker and Lewis 1973).

allocation process. Assume that the parent decides to send his child to work in the first period; the child earns wage W_c (a child wage) in the first period and W_u (unskilled adult wage) in the second period. If the parent instead decides to send his child to school, the child earns 0 wage in the first period and a W_s (a skilled adult wage) in the second period. It is safe to assume that $W_c \leq W_u \leq W_s$.

Thus, the household's total resources depend on the parent's decision to send the child to work or to school in period t. In period $t + 1$, the consumption and leisure of the child depends on child's wage (whether it is W_u or W_s), which in turn depends on whether the child is educated or not and the amount of time spent on schooling (S_c). The goal of the household decisionmaker, then, is to maximize utility at equation (1), subject to time, and these resource constraints at each period:

$$C_t + W_t(L_{p,t} + L_{c,t} + S_{c,t}) = \Omega_t + W_t T, \tag{2}$$

where W_t is a vector of wage rates for parent and child; T is total time available for the household (i.e., $T = T_p + T_c$, where T_p and T_c are total parent and child time, respectively); Ω_t is nonwage income, and the price of joint consumption, C_t, is assumed as the *numeraire*. This is a standard budget constraint where the left-hand sides are the outlays and the right-hand sides constitute the various income sources. Note that Ω_t includes profits from self-employment in farm and nonfarm activities (Π), interest income from household assets (A_t), transfers, and from all other incomes nonlabor sources:

$$\Omega_t = \Pi_t + \delta A_t + Y_t \tag{3}$$

where δ is the interest rate and Y_t comprises all other nonlabor income.

In addition to equation (2), the household decisionmaker is subject to a child-time constraint. In a typical developing country, child time may be allocated to three broad activities—schooling, paid labor, and leisure, including unpaid household domestic work:

$$T_c = L_{c,t} + S_{c,t} + E_{c,t}, \tag{4}$$

where $E_{c,t}$ is child time spent working on wage- and nonwage-earning employment.

Since child schooling and work decisions have intertemporal implications for the household, consider an intertemporal version of the budget constraint in equation (2). Following Bahlotra (2000a), the time path of household assets (A) can be defined as follows:

$$A_{t+1} = (1+\delta)A_t + \{\Pi_t + Y_t + W_t E_{c,t} + W_t(T_p - L_{p,t}) - C_t\}, \tag{5}$$

where A_t is total asset holding at the initial period; and the second term on the right-hand side accounts for savings (dissavings, if negative) from period t income after that period's consumption. Using equations (2)–(5) and solving for Ω_t, we have

$$\Omega_t = (A_{t+1} - A_t) + \{C_t - (W_t E_{c,t} + W_t(T_p - L_{p,t}))\} \equiv \Delta A_t \ . \tag{6}$$

Equation (6) implies that an intertemporally consistent measure of nonwage income amounts to asset accumulation or de-cumulation, which allows agents to save or dissave (Bhalotra 2000a). This measure of nonwage income, which basically excludes income

generated by children by virtue of its definition and the fact that child income is generally assumed to originate from wages, could be used as a exogenous poverty measure in the estimation of child schooling and work decisions.[8]

Now assume the decisionmaker maximizes household welfare, equation (1), subject to a budgetary constraint, equation (6), and child time-constraints, equation (4), which mainly constitute time allocation decisions. Maximizing household welfare subject to budgetary and time constraints implies that a parent's decision on child schooling or work depends on the market price for composite consumption good (assumed as *numeraire*); wage rates for child, unskilled, and skilled labor; household asset holding; and nonwage income.

Other factors, denoted by vector $\boldsymbol{X}$ in the utility function, such as perception of the value of education, accessibility of and expenses for school, the government's education policy, and the availability of educational infrastructure, play a role in schooling decisions. Family characteristics, such as whether the parent is a father, could also play a role in such decisions. Many studies observe that mothers tend to give greater weight to child education than do fathers (e.g., Kassouf 1998). Following Becker's (1964) theory that parents invest in children's schooling up to the point where marginal costs equal marginal benefits, the opportunity cost of schooling, which is reflected by the going wage rate for children's labor (W_c), the expected return on education (W_s), and uneducated adult labor (W_u), will affect the amount of time parents allow children to spend at school.

8 In the empirical section, potential endogeneity of nonwage income is tested. Presented results are based on using it and its valid instrument (i.e., direct measure of household asset ownership).

Taking these into account, an indirect utility function of a household under child schooling alone, schooling and work, and work alone decisions can be constructed. An indirect utility function represents the maximum utility a household receives, conditioned on the choices it makes. To construct one, first consider that the household maximizes equation (1), subject to equations (4) and (6) by allocating child time for schooling, work, or both. Solving this problem would lead to a vector of optimal choices that are functions of prices, wages, household characteristics, income, credit constraints, and other factors,

$$\Gamma^*(W_t, \Pi_t, A_t, Y_t, X_t, \Psi), \tag{7}$$

where Ψ constitutes all community-level observed and unobserved characteristics that likely affect the parents' decision on child schooling and work such as credit opportunities, accessibility to school, school fees, and other factors. The indirect utility function is now obtained by substituting the vector of choices in equation (6) into the utility function in equation (1) to define the maximum utility households receive once decisions are made optimally,

$$V = \mathrm{U}(\Gamma^*(W_t, \Pi_t, A_t, Y_t, X_t, \Psi)). \tag{8}$$

Schooling is a form of human capital enhancement, so an indirect utility function under schooling decision can be defined as

$$V_s = U(\Gamma^*(W_s, \Pi_t, A_t, Y_t, X_t, \Psi)). \tag{9}$$

Parents decide to send children to school instead of work at time *t* if they are better off with the enhanced human capital, i.e., if and only if

$$V_s - V_u \geq 0, \tag{10}$$

where V_u is the indirect utility under the no child schooling decision,

$$V_u = U(\Gamma^*(W_u, \Pi_t, A_t, Y_t, X_t, \Psi)). \tag{11}$$

3. Data

Data from Nepal, Peru, and Zimbabwe provide the key determinants of child labor participation and schooling decisions, focusing on the similarities and differences between the results of urban and rural areas from these countries. Data from three countries are used to examine child schooling and work decisions across three developing continents. Since the structure and the coverage of the data sets are nationally representative, reasonable comparisons can be made. In line with the objectives of the paper, results based on more than one country will help solidify or weaken the presumption that poverty drives child labor. Furthermore, this approach disaggregates households into urban and rural sectors to examine whether and how child work and schooling decisions differ by area of residence.

The data are from the 1990/91 Zimbabwe Income Expenditure Consumption Survey (ZICES), the 1994 Peru Living Standards Measurement Survey (PLSS), and the

1995 Nepal Living Standards Survey (NLSS). The respective governments and the World Bank conducted the PLSS and NLSS surveys jointly as part of the LSMS carried out in a number of developing countries, while the Central Statistical Office of Zimbabwe was responsible for conducting the ZICES.[9] These three surveys are nationally representative, lending themselves for comparison on individual-, household-, and community-level characteristics. The PLSS covers about 3,623 households; the NPLSS, 3,373 households; and the ZICES, over 14,000 households. The Nepal and Zimbabwe surveys report child schooling and employment data for 3,617 and 15,467 children ages 10–17, respectively. The Peru sample contains child labor and child schooling information for 5,191 children ages 6–17.[10] These large-scale household surveys provide information about children who work or do not work and those who attend or do not attend school, thus providing a model of child labor and schooling decisions.

Before discussing the descriptive results, it is important to describe how child labor supply is measured. The measurement of child labor depends on how it is defined and by ethical and cultural views. For some, all non-school, nonleisure activities of children constitute child labor. Others define it only as only full-time employment in economic activities or as "bad" child labor such as backbreaking work in quarries or mines. This paper defines child labor as hours in both wage and nonwage activities, as

[9] There was access to both the1990/91 and 1995/96 Zimbabwe ICES data. The pre-drought and structural adjustment data, the 1990/91 ZICES, is used for this paper, since it is a better representation of normal times in Zimbabwe than the data following the economic instability due to drought and structural changes in the early 1990s (see Alwang, Ersado, and Taruvinga 2001 and Ersado, Alderman, and Alwang 2002). This will improve the comparability among the three countries and their respective data sets.

[10] To facilitate comparison among countries, only Peruvian children ages 10–17 (about 3,599 children) are considered in this paper.

reported by these multipurpose, countrywide household surveys that are used to make up the child labor supply variable. This is in line with Skoufias and Parker (2002), who argue that such a broad measure provides a more accurate estimate of the household preferences toward leisure. Killingsworth and Heckman (1986) also claim that relying on hours of wage work only is likely to yield estimates that reflect substitution away from work at home as well as leisure.

Child Schooling and Employment Distribution by Age

Tables 1–3 show child employment participation and school enrollment rates for Nepal, Peru, and Zimbabwe by age, sex, and location. While nearly all children in Peru and Zimbabwe appear to be enrolled in school, about a quarter of Nepalese children have never been to school. For all age groups, current school attendance rates are lowest in Nepal (64 percent), followed by Zimbabwe (86 percent) and Peru (92 percent). Lower enrollment rates for Nepalese children may reflect a lack of access to good schools, but those enrolled appear to stay in school more than both Zimbabwean and Peruvian children.

The data from all countries show lower enrollment and higher employment rates in rural areas compared to urban areas. Disaggregating by age and sex shows that enrollment rate difference by gender grows wider with age in Zimbabwe than in either Peru or Nepal. Most of the decrease in enrollment rates for older age groups in Zimbabwe is due to more girls dropping out of schools than boys. While this is the case

Table 1—Enrollment and employment rates among Nepalese children in 1995/96

	Enrollment						Employment					
	Urban			Rural			Urban			Rural		
Age	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
10	85.7	79.2	82.6	77.7	52.8	65.3	7.1	13.2	10.1	20.6	31.6	26.1
11	86.8	87.9	87.3	78.3	64.3	71.0	5.3	0.0	2.8	26.8	34.5	30.8
12	85.9	77.3	82.4	71.4	48.5	61.1	12.5	15.9	13.9	38.5	48.5	43.0
13	85.1	71.8	79.1	75.2	50.3	64.5	17.0	20.5	18.6	40.2	49.7	44.3
14	80.7	69.1	75.0	64.8	46.4	54.8	19.3	18.2	18.8	50.6	53.1	52.0
15	79.6	75.5	77.6	56.1	35.5	46.5	24.5	18.4	21.4	55.6	66.3	60.6
16	54.2	73.3	63.4	49.5	34.3	42.1	33.3	26.7	30.1	58.7	63.2	60.9
17	73.8	65.8	70.0	42.4	33.3	37.9	31.0	18.4	25.0	59.7	66.7	63.2
Total	79.3	74.7	77.1	65.5	46.1	56.1	18.5	16.9	17.7	42.9	50.8	46.7

Table 2—Enrollment and employment rates among Peruvian children in 1994

	Enrollment						Employment					
	Urban			Rural			Urban			Rural		
Age	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
10	96.8	95.7	96.3	94.7	91.2	92.8	9.5	6.0	7.8	55.8	35.4	44.7
11	99.3	96.6	98.1	94.4	90.7	92.4	12.5	8.5	10.7	62.2	37.4	48.7
12	96.9	96.3	96.6	88.6	91.3	90.0	10.9	8.9	9.8	71.4	48.1	59.8
13	97.1	91.0	93.9	89.7	80.4	84.7	14.0	11.1	12.5	61.5	50.0	55.3
14	95.6	91.3	93.3	75.0	78.3	76.5	26.3	14.3	19.8	76.0	62.7	69.9
15	88.8	85.2	87.0	78.2	67.1	72.5	31.3	14.1	22.7	78.2	61.0	69.4
16	84.9	77.1	81.1	71.4	58.1	63.8	29.5	18.6	24.1	89.3	59.5	72.3
17	61.2	59.6	60.8	60.0	37.7	49.0	39.3	16.3	27.0	82.5	44.2	63.7
Total	91.9	88.3	90.1	84.5	82.4	83.4	15.1	9.2	12.1	56.6	40.1	48.0

Table 3—Enrollment and employment rates among Zimbabwean children in 1990/91

	Enrollment						Employment					
	Urban			Rural			Urban			Rural		
Age	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
10	98.4	99.3	98.9	95.7	95.6	95.7	0.4	1.1	0.8	3.0	2.6	2.8
11	98.7	98.6	98.6	95.1	96.4	95.8	0.9	0.0	0.5	3.1	2.7	2.9
12	99.0	96.5	97.8	94.6	93.5	94.0	0.5	1.5	1.0	5.1	4.4	4.8
13	97.5	98.6	98.1	92.1	91.6	91.8	1.0	1.4	1.2	4.9	6.5	5.7
14	94.8	91.0	92.6	89.7	83.3	86.7	1.1	5.6	3.7	7.9	13.5	10.5
15	97.0	78.6	87.5	81.9	67.4	75.1	1.5	14.1	8.0	13.9	24.5	18.8
16	88.9	70.9	78.5	76.0	60.3	68.4	2.4	18.4	11.6	17.4	32.6	24.7
17	75.8	54.1	64.2	64.8	51.3	58.5	3.2	25.5	15.1	27.4	39.7	33.1
Total	93.9	85.4	89.4	87.1	82.0	84.6	1.3	8.8	5.3	9.7	14.1	11.8

for both urban and rural areas in Zimbabwe, rural areas of Peru and Nepal show the biggest disparity in enrollment rates between boys and girls. This evidence is indicative of more favor for schooling of boys than girls in rural areas, while school enrollment rates in urban areas do not appear to show a significant gender bias.

On the other hand, child employment rates go in an opposite direction to enrollment, possibly suggesting that dropping out of school is at least partly driven by employment decisions. In all countries, labor force participation grows with age. In urban areas overall, employment rates are higher for boys than for girls in Peru and higher for girls than for boys in Zimbabwe. In rural areas, female employment rates appear to be higher than they are for boys in Zimbabwe, while the opposite is the case in Peru. For all age groups and in both urban and rural areas, child employment rates are highest in Peru, closely followed by Nepal, and the lowest in Zimbabwe. This is particularly true in rural areas: while nearly half of Peruvian and Nepalese children are engaged in some kind of employment activity, less than 12 percent of Zimbabwean children claim to be so. It will be of great interest to see what household, community, and regional characteristics determine employment and schooling decisions in these countries.

Child Time Allocation by Residence and Sex

Table 4 presents child time allocation to schooling, employment, or both, by residence and gender. A large proportion of Peruvian children undertake both schooling and employment activities simultaneously. Interestingly, however, the proportion of

children who both work and go to school is higher than that of those who are employed only. In all three countries, rural children are more likely to go to school and work than are their urban counterparts. With regard to gender, fewer girls than boys attend school full-time, and more girls than boys are employed full-time and combine employment with schooling.

Table 4—Children's time allocation into employment, schooling, and/or both

	Nepal			Peru			Zimbabwe		
	All	**Rural**	**Urban**	**All**	**Rural**	**Urban**	**All**	**Rural**	**Urban**
					(percent)				
By residence									
Schooling	52.4	46.6	75.8	64.6	42.4	78.7	87.0	85.9	90.9
Employment	26.8	30.8	10.6	5.6	10.1	2.8	8.3	10.0	2.8
Both	11.8	13.6	4.6	20.3	37.7	9.4	0.4	0.3	0.5
Neither	9.0	9.0	9.1	9.5	9.8	9.2	4.3	3.9	5.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Boys		**Girls**	**Boys**		**Girls**	**Boys**		**Girls**
					(percent)				
By sex									
Schooling	59.5		44.9	67.2		62.0	89.8		84.2
Employment	21.2		32.6	4.7		6.6	6.1		10.6
Both	14.5		9.1	15.5		25.4	0.3		0.4
Neither	4.8		13.4	12.7		6.1	3.8		4.8
Total	100.0		100.0	100.0		100.0	100.0		100.0

The Role of Children in the Household

The means of selected household and community characteristics variables are presented in Table 5. At the household level, men's share of household income is highest in Nepal, followed by Zimbabwe and Peru. In all countries, women and children's share of household income grows, while the corresponding share for men's tends to shrink in urban areas. Children's share of household income is largest in Nepal, while there is a

Table 5—Means of selected variables

	Nepal			Peru			Zimbabwe		
	All	**Urban**	**Rural**	**All**	**Urban**	**Rural**	**All**	**Urban**	**Rural**
Household size	5.59	5.28	5.67	5.38	5.31	5.50	5.03	4.32	5.43
Urban (yes)	0.19	--	--	0.61	--	--	0.25	--	--
Child Sex (female)	0.48	0.45	0.49	0.51	0.50	0.52	0.50	0.52	0.49
Child age	13.28	13.33	13.3	13.5	13.62	13.18	13.2	13.40	13.18
Man's share of total income	0.81	0.72	0.82	0.73	0.69	0.79	0.75	0.84	0.65
Woman's share of total income	0.12	0.23	0.10	0.24	0.28	0.17	0.20	0.16	0.25
Child's share of total income	0.06	0.03	0.07	0.04	0.03	0.04	0.02	0.002	0.04
Ratio of child's to man's labor hours	0.27	0.13	0.31	0.12	0.08	0.19	0.06	0.02	0.08
Ratio of child's to woman's labor hours	0.30	0.26	0.31	0.36	0.26	0.49	0.11	0.05	0.12
Child ever been to school (yes)	0.68	0.86	0.67	0.99	1.00	0.98	0.99	0.99	0.99
Child attending school (yes)	0.61	0.80	0.60	0.85	0.88	0.80	0.88	0.91	0.87
Child employed (yes)	0.40	0.13	0.42	0.26	0.12	0.48	0.08	0.03	0.10
Community-level characteristics									
School expenses[a]	82.9	217.2	66.1	106.5	137.5	42.8	28.4	65.19	18.07
Man's wage per hour	15.24	17.04	15.01	2.70	3.33	1.40	0.16	0.40	0.09
Woman's wage per hour	15.77	17.32	15.58	2.07	2.49	1.20	0.09	0.27	0.04
Child's wage per hour	9.37	8.56	9.47	0.93	1.05	0.67	0.05	0.10	0.04
Electricity (yes)	0.33	0.89	0.25	0.74	0.97	0.26	0.21	0.87	0.03
Water storage (1=best, 5=worst)	3.50	2.98	3.57	2.22	1.49	3.71	3.52	1.49	4.09

[a] Monetary figures are nominal and presented at the year of survey and using respective currency of each country (i.e., rupees for Nepal, sols for Peru, and Z$ for Zimbabwe).

negligible difference between Peru and Zimbabwe. Rural children in Zimbabwe contribute more to household income than do their urban counterparts. Similarly, in rural Nepal, children contribute a nontrivial 7 percent of household income, compared to only 3 percent for their urban counterparts. It should be noted that quantifying the share of child-generated welfare for a household would be difficult and may be easily underestimated, since children contribute in several ways that are not reflected in monetary terms. In addition, the data may be deficient due to a high likelihood of underreporting of the incomes generated by even gainfully employed and remunerated children (Basu 1999).

Table 5 also presents the ratio of children's labor hours to both men's and women's in the household. Child labor participation in all countries is closely related to their relative contribution to household income. Child labor participation is lowest in Zimbabwe, as is their share in overall household income. Urban-rural disparities are interesting: the ratio of child labor hours to both men's and women's is larger in rural areas in all countries, underscoring the abundance of child labor in rural household chores. However, the urban child-labor environment is still alarming, with the ratio of child-labor hours to adult-labor hours in excess of 1 to 10 in both Peru and Nepal. The descriptive statistics suggest that the rate of incidence of child labor varies from country to country and by urban and rural areas within countries, but all country evidence confirms that the number of children working is high enough to make the issue a matter of important concern.

4. The Empirical Model

A parent's decision to send a child to school, work, or both is a time allocation decision. Thus the decision whether a child works or goes to school is a joint one as both activities could be competing for child's time. An econometric specification that explicitly takes this interdependency into account can be obtained from equation (10). Rewriting equation (10) using a random utility function for $V_s(.)$ and $V_u(.)$, and restating the decision in terms of probabilities enables us to characterize child schooling and work decisions jointly. We use a bivariate probit model to test the likelihood of children

working and going to school conditional on varying individual, household, and community characteristics. A bivariate probit model allows for the existence of possible correlated disturbance between two probit equations. It also allows us to test whether the joint estimation has significantly more explanatory power compared to using univariate probit estimation for each decision.

Let y_1^* be the latent variable representing the decision to work and y_2^* represent the decision of schooling. Then, using the notations in equations (8)-(10), the bivariate probit specification will take the following general structure[11]:

$$
\begin{aligned}
&y_1^* = V_u + \eta_u, \qquad y_1 = 1 \text{ if } V_u > 0, \ \ 0 \ \textit{otherwise} \\
&y_2^* = V_s + \eta_s, \qquad y_2 = 1 \text{ if } V_s > 0, \ \ 0 \ \textit{otherwise} \\
&E[\eta_u]=E[\eta_s]=0, \ \ V[\eta_u]=V[\eta_s]=1, \ \ C[\eta_u,\eta_s]=\rho \qquad , \\
&[\eta_u,\eta_s] \sim BVN[0, \ 0, \ 1, \ 1, \ \rho]
\end{aligned}
\tag{12}
$$

where η_s and η_u are error terms with normal distributions, and ρ is the coefficient of correlation between the two equations; *E*, *V*, *C*, and *BVN* stand for expectation, variance, covariance, and bivariate normal distribution functions, respectively.

Explanatory Variables, Endogeneity Issues, and Empirical Strategy

In line with the objectives of the paper and the conceptual model presented in Section 2, an extensive list of explanatory variables was used to examine the relative role

[11] See Greene (1997) for a good description of bivariate probit model and Canagarajah and Coulombe (1998) for an application to child labor and schooling decisions.

of several individual, household, and community variables on both child schooling and work decisions. The explanatory variables include measures of labor market conditions, poverty, credit access, school availability and cost, and variables accounting for household domestic responsibilities. These variables are considered as main determinants of child labor in the literature, but there is no consensus as to which is most important. We anticipate that the role of these variables varies significantly between rural and urban areas. The following briefly discusses the rationale for the selection of the main explanatory variables and the steps taken to address potential endogeneity problems.

Child- and adult-labor market conditions are measured by average wage paid per hour at the community level, not wage rates derived at individual levels. Community-level average wages provide a better description of prevailing labor market conditions than individual-level wages, and they are based on wages reported by individuals who actually work. Furthermore, being community-level averages, they are less prone to endogeneity problems. Since incomplete pooling of resources among household members appears to be the norm (Strauss and Thomas 1995), adult female and male wage variables are included separately to capture the differential impact of both women and men's incomes on work and schooling decisions for their children. Explicit inclusion of separate wage educational-level variables for men and women thus relaxes the unitary modeling assumption and reflects differences in preference and bargaining power between mother and father.

Credit access is found to be very difficult to measure from Living Standard Measurement Surveys, which usually ask if a given household had a loan and bank accounts. Having a loan alone is not a good measure of access to credit since households who did not report receiving a loan might have access to credit but no need to borrow. Note also that credit constraints are more likely to bind for the poor since their incomes are low and more risky, thus making credit access potentially endogenous to schooling and work decisions. As a result, only access to a commercial branch bank at the community level is used as a proxy measure of access to the formal credit market. Since this still is not a significant measure of access to credit, the results should be interpreted with caution.

Other common determinants that figure predominantly in child labor empirical work, such as parent's educational level, head age, and sex, are among the explanatory variables. Also included is a measure of "domestic responsibilities" in terms of the number of very young children in the household. This may adversely affect child schooling decisions and may be even more detrimental of schooling of girls. It is widely accepted that girls are more likely than boys to help their mothers with housework and childcare. Gender disparities in education could also arise due to differences in expected earnings or remittance propensities among boys and girls. The inclusion of a child gender dummy will address these and other possibilities that lead to differential employment and enrollments rates among boys and girls. Another variable of interest is whether the mother works outside the home, which may be correlated with child working

decisions; a dummy variable that indicates if a mother works outside the home is used to capture this effect.

Some school-related variables at community level—the number of schools available and the cost of schooling per pupil—are included among explanatory variables.[12] School accessibility can affect schooling decisions to the extent that child-time spent going to and from school entails a significant opportunity cost to the parent. Educational expenses per pupil could be a good measure of educational resources available to students as well as their teachers in terms of facilities, tuition, books, and other school related expenses. Thus the cost of schooling is included because it could be an important determinant of the likelihood of child work. All right-hand side variables are carefully selected in such a way that consistent reduced-form estimation is achieved by excluding potential endogenous variables. The inclusion of regional dummies and community-level characteristics variables helps capture variation in productivity, labor demand, and differences in other aspects, such as culture and attitude.

Finally, in accordance with the theoretical model, the household-level poverty measure is based on nonwage income from various sources, such as profits from self-employment in farming and nonfarming activities, interest from household assets, and other nonlabor income sources. This measure takes into account the intertemporal nature of child schooling and work decisions as shown in equation (6). However, nonwage

[12] Specific household- or school-level variables are likely to suffer from endogeneity. For instance, household expenses on education are incurred only for children for whom the decision was made to enroll in school. Such variables are endogenous to child labor decisions. This problem is circumvented by averaging household-level, school-related variables over relevant geographic units in the survey, or by using community-level variables whenever possible.

income may be endogenous to child labor and schooling decisions, primarily due to the fact that children may contribute to nonwage income through involvement in family farming and nonfarming activities that do not pay wages.[13] But this measure is an improvement over most previous studies on child labor and schooling decisions that use total household income as an explanatory variable. It is anticipated that nonwage income suffers less from endogeneity problems compared to total household income, which includes both wage income and nonwage incomes.

The empirical strategy used to address the potential endogeneity of nonwage income is through an instrumental variable approach. Two regimes are estimated, using nonwage income as a measure of poverty, and an instrumental variable estimation in which household asset ownership are used as instruments for nonwage income. There is also testing for endogeneity using Smith and Blundell's (1986) exogeneity test. In this case, the test involves specifying that the exogeneity of nonwage income is under suspicion. Under the null hypothesis, the models are appropriately specified with all explanatory variables exogenous. Under the alternative hypothesis, the suspected endogenous variable, nonwage income, is expressed as linear projection of a set of instruments, and the residuals from those first-stage regressions are added to the model. Under the null hypothesis, these residuals should have no explanatory power. Once the standard order condition for identification of the model is met, the significance of the coefficient on the residual term is used to establish endogeneity of nonwage income.

[13] One might also argue that nonwage income represents the accumulation of assets related to labor income over the life cycle. However, this presents less of a problem when dealing with child labor income.

5. Empirical Results

The joint schooling and employment results are estimated with and without instrumenting for nonwage income, which is used as a measure of poverty. Instruments for nonwage income were the value of household asset holdings for Nepal and Peru, and a vector of asset holding indicator dummies for Zimbabwe.[14] Both results are reported. Appendix Tables 6 and 7 present bivariate probit model estimates of child labor and schooling decisions for rural areas, while Appendix Tables 8 and 9 do so for urban areas. In general, the coefficients on nonwage income appreciably reduces in its absolute magnitude after instrumenting, thus indicating an upward bias in the non-instrumented coefficient of household income.[15]

The joint estimation of schooling and work is appropriate as the likelihood ratio tests of the hypothesis that the correlation between the error terms (ρ) is zero are soundly rejected for all cases except for Peru.[16] A significantly negative ρ implies that some unobserved factors that increase the probability of attending school decrease the likelihood of working. Schooling and child labor are thus competing activities. On the

14 Asset values were not given for the Zimbabwe data. A set of dummy variables that indicate ownership of different asset types was used as instruments for Zimbabwe.

15 See Psacharopoulos (1997), Patrinos and Psacharopoulos (1997), Grootaert (1998), Grootaert and Patrinos (1998), Canagarajah and Coulombe (1998), and others for discussion on endogeneity of household income and potential upward bias in its coefficient. The upward bias may be due to the entanglement of substitution effects with income effects when some productive assets are used to proxy income (Bhalotra 2000b).

16 There is no definitive positive or negative correlation between child schooling and employment decisions in rural Peru. Compared to Nepal and Zimbabwe results, much less significant negative correlation exists between schooling and employment decisions on urban Peru as well.

other hand, schooling and working decisions appear rather noncompetitive in Peru, but there is insufficient evidence to claim these decisions are complementary.

The lack of significantly negative association between child schooling and work decisions in Peru is contrary to the common perception that child schooling is an inverse of child labor decisions. While the argument that anything that promotes school attendance is likely to dent child labor is quite sensible, the Peruvian case provides counterevidence that the two activities are not necessarily competitive. The descriptive statistics showed that the proportion of those children who work and go to school at the same time is highest in Peru.

The intensity of work also merits attention since the hours of work could exhibit substantial variability among the children who are reported to be in the labor force. The intensity of work—hours of work per week—is estimated as a function of the same set of variables employed in the joint modeling of schooling and work decisions using a Tobit and instrumental variables Tobit (IV Tobit[17]) estimators. The estimates of child labor supply are presented on Appendix Tables 10 and 11 for rural and urban areas, respectively. Factors that significantly affect child employment decisions continue to affect the number of hours children actually work in the same direction. As such, intensity of work results is discussed concurrently with the joint schooling and work estimation, and labor supply estimates only referred to when there are additional insights to be gained. In the next sections child labor and schooling estimates are discussed,

[17] See Smith and Blundell (1986) for a description of IV Tobit.

focusing on the similarities and differences between cross-country results, and separately for rural and urban areas.

Rural Child Labor and Schooling Decisions

Appendix Tables 6 and 7 present a bivariate probit and instrumental variables estimates for rural areas. The Smith and Blundell exogeneity test indicates that nonwage income is endogenous in the child labor and schooling decisions. Significance of instruments test shows strong support that household asset holdings are a relevant instrument for nonwage income (with p-value < 0.0001).[18]

All country results indicate that child schooling is negatively associated with age and female gender, as girls' and older children's school attendance rates are significantly lower than those for boys and younger children. Correspondingly, the probability of being employed rises significantly with age in all three countries. The likelihood of employment also increases with girls in Nepal and Zimbabwe, but in rural Peru, boys tend to have higher propensities for employment.

The impact of rural child labor market conditions on schooling and work, as measured by child labor wages at the community level, is effectively zero for all countries except the non-instrumented estimates for rural Nepal, casting doubt on the hypothesis that improved labor market conditions drive child labor, at least in rural areas. In rural Nepal, the non-instrumental estimates indicate that higher wages for child labor

[18] Bound, Jaeger, and Baker (1995) suggest that the *F* statistic of the identifying instruments in the first-stage is a useful indicator of the quality of the IV estimates.

lead to higher enrollment rates, lower probability of employment, and significantly fewer hours of work per week for those children who work. This outcome, although it appears counterintuitive from the viewpoint that higher wages should lead agents to work more hours, is quite plausible if subsistence constraints are binding. In other words, if households are very poor and they risk falling below subsistence requirements in the absence of child earnings, a decrease in child wages must be compensated for by an increase in child work hours or by bringing more children to the work force in order to meet the subsistence target.[19] On the other hand, evidence exists that improved labor market conditions for other adult household members lead to higher enrollment rates and less employment for Nepalese children, and lower employment rates for Peruvian children. Also, higher wages for adult women in rural Zimbabwe are associated with a low prevalence of child labor.

In rural Nepal and Zimbabwe, there is supportive evidence, from both instrumental and non-instrumental estimates, for Basu and Van's (1998) luxury axiom that states—"A family will send the children to the labor market only if the family's income from nonchild-labor sources drops very low." While poverty reduces the probability of child schooling, it increases the probability of child employment and intensity of work significantly. The labor supply estimates in Appendix Table 10 show that if a Nepalese household had its nonlabor assets increased by 100 rupees, it would

[19] This result is similar to Bhalotra's (2000a), who finds significantly negative wage elasticity for boys in rural Pakistan. She finds that if the wage rate drops, boys work more hours to make up for the loss in earnings. On the other hand, a higher wage rate is associated with less work. Indeed, her *poverty hypothesis* is based on the outcome that the wage elasticity is negative.

decrease child labor hours by about 5.76 hours per week. Zimbabwean households would decrease child work hours by about 4.90 hours per week if there were a temporary positive shock (an increase of 100 Zimbabwe dollars) that would make liquidity constraints less binding. In annual terms, these are significant reductions in child labor hours, as would be predicted by Basu and Van's (1998) model. If the household's decision to send children to work stems from survival concerns, as the evidence from rural Nepal and Zimbabwe indicates, the adult labor market results make it reasonable to expect that parents would not send their children to work if their own wages were higher or employment opportunities wide enough to enable them to pass beyond the subsistence threshold. In rural Peru, nonwage wealth appears to have no impact on child labor and schooling decisions, thus providing neither support for nor evidence against the notion that poverty drives child labor.

Other household-level variables, such as the educational levels of both the highest educated man and woman in the family, significantly improve child education and decrease the likelihood of employment and intensity of work in all three countries. This finding reinforces the universally accepted notion that parental education is the most consistent determinant of child education and employment decisions. Higher domestic responsibilities in terms of the number of young children under age 5 do not lead to an increase in the likelihood that their older siblings work in rural areas. However, mothers working outside the home means a higher probability of children working in Nepal and Peru, although it also appears to improve child schooling in rural Nepal. The positive effect on child schooling of the mother working outside the home in rural Nepal may be

explained by a higher income effect, which makes it possible to pay for daycare and domestic help, so children are not necessarily taken out of school when their mothers work. But for lower income families, it is likely the case that a mother working outside the home means less schooling and more work for children.

Rural infrastructure and school-related community-level variables significantly affect schooling and work decisions in all countries. Higher average educational expenses at the community level appear to improve school enrollment rates and correspondingly decrease child employment and intensity of work in rural Nepal and Zimbabwe. Similarly a higher number of schools in a given community leads to higher enrollment and lower employment rates and work hours per week in Nepal. Thus, to the extent that the number of schools and school-related expenditures in terms of tuition, books, teacher salaries, fewer students per teacher, etc., are indicators of school accessibility and quality, improving the availability of good schools could lead to less child labor and more child schooling.

In rural Nepal and Zimbabwe, access to a commercial bank has a positive effect on schooling and a negative impact on employment. Credit access appears to have higher negative effect on employment than its corresponding positive effect on schooling. This may imply that credits are sought more to smooth consumption risks and other household needs than for child schooling purposes. Rural credit needs are driven by incidental risks and for temporary shocks, more so than a long-term goal of child schooling. This may imply that in the absence of such credit schemes, child labor may become part of a strategy to minimize the risk of interruption of income stream, for example, a risk of

failed harvest, etc. This finding is in concurrence with Jacoby and Skoufias's (1997) and Sawada's (1999) empirical evidence that children are taken out of school in response to household income shocks in rural India and Pakistan, respectively. In both rural Nepal and Zimbabwe, there is evidence that credit access reduces child labor and improves child school enrollment, thus supporting Ranjan's (1999) and Lahiri and Jaffrey (1999) argument that an incomplete credit market could be driving child labor. In rural Peru, on the other hand, access to loan and banking services appears to increase employment and decrease schooling.

Urban Child Labor and Schooling Decisions

Appendix Tables 8 and 9 present the results for urban areas. Although the Smith and Blundell test rejects the exogeneity of nonwage, the evidence is weaker for urban areas. As discussed below, the reason for this weak evidence might be due to the fact that, unlike in rural areas, poverty is not a good determinant of schooling and work decisions in urban areas. Significance of instruments test supports that household asset holdings are a relevant instrument for nonwage income (with p-value < 0.0001).

Similar to rural cases, it is clear that in urban areas, older children are less likely to go to school and girls are less likely to stay in school than boys in all three countries (see Appendix Tables 8 and 9). One can argue that as children grow older and acquire skills, the opportunity cost of schooling rises. Child age continues to be positively correlated with the likelihood of employment and number of hours worked. However, the impact of gender on employment is mixed in urban areas: boys (girls) are more likely

to be employed in Peru (Zimbabwe) and gender is insignificant in urban Nepal. Improved child labor markets provide strong incentives for child employment in urban Peru. The Peruvian result is comparable with findings in other Latin American countries that suggest improved market conditions drive child labor (see, for instance, Levison, Moe, and Knaul 1999 and Binder 1999). Peru, among all three countries examined in this paper, has the largest proportion of children who are both working and going to school at the same time (see Table 4). The fact that child wage is positively associated with the employment decision may imply that some children work for the purpose of earning educational expenses. The number of hours children work also increases significantly with child labor wages in urban areas of Peru and Zimbabwe.

Sufficient evidence from urban areas of all three countries for Basu and Van's (1998) luxury axiom that poverty drives child labor is not found. Similar analysis done separately for boys and girls by Ray (2000a) also shows no evidence for the luxury axiom in Peru. Although the theoretical literature on child labor such as the seminal paper by Basu and Van (1998) tends to lead many to believe that poverty is the primary cause of child employment, this result shows that poverty does not appear to be the main culprit in determining child labor in urban areas. While studies that lump together urban and rural areas obscure these differences and their results become hard to interpret, examining urban and rural child labor responses separately thus enabled a scrutinizing of the validity

and applicability of the luxury axiom. More evidence for it exists in rural areas and less or no evidence for it in urban areas.[20]

Household educational level variables, especially woman's education, continues to significantly reduce the probability of child labor and improve the likelihood of children being in school in all cases. Parental educational level has been critical in improving household livelihood and food and nutritional status of children (Ruel et al. 1999; Strauss and Thomas 1995). The urban result is similar to the rural and the results from other studies that underline the importance that parental, especially mother's, education on children's human capital development.

A measure of domestic responsibilities, number of young children under age 5, plays a critical role by keeping children away from school and forcing them into work. This result is contrary to the rural result that showed insignificant impact for the number of young children in the household. The urban result is consistent with the findings of Cochrane, Kozel, and Alderman (1990), who report the presence of children under five in the household significantly reduces the educational participation of girls. Similarly a positive likelihood that a mother works outside the home drives child employment decisions in all countries. This urban-rural differential in the impact of domestic responsibilities and mother working decision may be due to the availability of extended family and kin members to help in childcaring activities in rural areas more so than in urban areas. Rural mothers may also have greater control over their time allocation for

[20] Empirical work by others, such as Canagarajah and Coulombe (1997) for Ghana, also finds that poverty is not a major determinant of child schooling and work decisions.

childcare and work due to the nature of their job, such as working on own agricultural fields, while the urban workingwomen could be working in factories and under supervision of employers. Moreover, it may be easier to combine childcare with work in rural than urban areas. The availability of alternative childcare options such as providing working mothers with firm-level childcare for working mothers will likely have more impact in urban areas in terms of lessening the responsibility born by school-age children in taking care of their younger siblings while mothers are away for work. It would also significantly free them up to go to school, as the evidence from these countries suggests. It has been observed that the presence of a daycare center decreases the likelihood that children engage in work at home (DeGraff, Bilsborrow, and Herrin 1993; Goonesekere 1993). Also note that having a working mother does lead to significantly more hours of work in urban areas of all countries (see Table 1).

Urban infrastructure and school-related community-level variables do not factor in schooling and work decisions in urban Nepal and Zimbabwe, unlike in the rural areas. However, in urban Peru, educational expenses at the community level appear to improve child school enrollment rates. Similar observations were made for another Latin American country by Brown (2001), who states that "…an increased cost of schooling is associated with a lower probability of work by Colombian children." Brown also suggests that, at least in the Colombian case, the cost of schooling is a proxy for school quality. The deficiencies in facilities, teacher salaries, and other educational supplies are reported to be pervasive in both rural and urban Peru (Brown 2001). For instance, citing the Ministry of Education of Peru, Brown points out that even in metropolitan Lima, only

60 percent of schools have electricity. If school-related expenditures in terms of tuition, books, teacher salaries, etc., are plausible indicators of school quality in Peru, our empirical results suggest that improving school quality would likely keep more children in school.

6. Summary and Policy Implications

The literature in child labor and schooling is voluminous and continually growing. However, studies are scant that simultaneously examine the various factors impacting child labor and schooling, such as poverty, credit access, labor market conditions, household domestic responsibilities, school expenditures, and parental educational levels, along with community characteristics important in such decisions. One of the main aims of this paper is to examine the impact of one factor while controlling for others at the same time. It is hoped that such an approach will help shed light on the debate over the correlates of child labor.

This paper also examines urban and rural decisions separately, with the anticipation that urban-rural differentials in livelihood strategies and opportunities could be reflected in child employment and schooling decisions. Aggregating urban and rural child labor, as is commonly done in some empirical studies, could obscure the differential impact of some factors on urban and rural child schooling and work decisions. The simultaneous examination of a list of determinants of child schooling and employment decisions will enable us to identify the factors that are more important than others while

investigating their pertinence across countries and urban and rural areas within a given country.

In all three countries and urban and rural areas alike, adult educational levels are essential factors in child employment and education, with a significant contribution to reduction of child labor and improvement in the likelihood that children stay in school. In concurrence with empirical evidence from other Latin American countries, improved child labor market conditions in terms of higher wages per hour increases both the probability and intensity of work in urban Peru and Zimbabwe, with no appreciable effect in rural areas. Improvement in labor market conditions for adult labor leads to a lower probability of child labor and a higher probability of schooling. Bolstering adult wages may thus help curb child labor participation and increase the probability that children stay in school.

While poverty drives child work and schooling decisions in rural areas, it does not appear to significantly influence schooling and work participation rates in urban areas. In rural areas, policies such as trade sanctions or a ban on child labor thus could have an adverse effect on both the household and the children because child labor decisions are more likely in response to poverty and subsistence requirements. The rural evidence thus is in line with the seminal paper on the economics of child labor by Basu and Van (1998).

Credit access, albeit measured imprecisely by access to a commercial bank, is likely to improve enrollment rates and decrease employment rates in rural areas of Nepal and Zimbabwe, in convergence with the theoretical results forwarded, for instance, by Ranjan (1999) and Lahiri and Jaffrey (1999). Credit constraints are more likely to be

bound for the rural poor since their incomes are lower and more risky. Thus with credit access, the rural poor in Nepal and Zimbabwe may find it a viable option to use credit to send their children to school and thus help cut the transmission of poverty across generations. However, credit access does not play a similar role in urban areas of these two countries. Access to credit may have actually enabled rural Peruvian parents to overcome entry barriers and venture into their own entrepreneurial activities in which child labor may be utilized when there are incomplete labor markets.

Household domestic responsibilities in terms of the number of young children under 5 and the likelihood that mother works away from the home have more significant impact on urban child labor and schooling decisions than on those of rural areas. This implies that the availability of alternative childcare options would be more critical for working urban mothers compared to their rural counterparts.

Summing up, the evidence from Nepal, Peru, and Zimbabwe indicates that the impact of poverty on children depends on location. While there is strong evidence that poverty drives child labor in rural areas, there is a general lack of support for a poverty hypothesis in urban areas. Similarly improving credit access has greater potential for alleviating child labor and enhancing school enrollment in rural than urban areas, particularly in Nepal and Zimbabwe. Finally, the evidence from all three countries and both urban and rural areas indicates that the availability of good schools, and efforts to bolster adult educational levels and wages, will help curb the prevalence and intensity of child labor and improve the likelihood that children stay in school.

Appendix Tables

Table 6—Joint child and schooling decisions in rural areas

	Nepal		Peru		Zimbabwe	
	(1) Schooling	(2) Employment	(3) Schooling	(4) Employment	(5) Schooling	(6) Employment
Sex (female)	-0.679	0.172	-0.273	-0.624	-0.326	0.329
	(12.87)***	(3.44)***	(3.14)***	(8.63)***	(9.94)***	(9.50)***
Age	-0.153	0.200	-0.244	0.088	-0.262	0.244
	(12.69)***	(17.07)***	(12.09)***	(5.43)***	(32.97)***	(29.45)***
Child wage	0.037	-0.036	0.071	0.195	-0.165	-0.027
	(2.20)***	(2.40)***	(0.33)	(1.13)	(0.39)	(0.06)
Man's wage	0.009	-0.006	0.467	-0.680	-0.090	0.475
	(3.36)***	(2.40)***	(1.30)	(2.93)***	(0.25)	(1.24)
Woman's wage	-0.005	0.005	0.054	-0.253	0.460	-0.933
	(1.56)	(1.81)	(0.31)	(1.73)	(0.97)	(1.81)*
Nonwage income	.711	-0.306	0.507	-0.297	1.386	-1.624
	(10.67)***	(4.97)***	(0.73)	(0.49)	(4.05)***	(4.48)***
# Young children	-0.023	0.046	-0.043	-0.063	-0.036	0.049
	(1.13)	(2.35)*	(1.07)	(1.80)*	(2.55)**	(3.33)***
Head sex (female)	-0.155	-0.174	0.237	0.280	0.129	-0.115
	(1.79)*	(2.03)*	(1.58)	(2.11)**	(3.30)***	(2.80)***
Head age	0.041	-0.021	-0.050	0.020	-0.025	0.021
	(1.84)*	(0.98)	(1.25)	(0.58)	(1.95)*	(1.57)
Man's education	0.063	-0.034	0.166	-0.143	0.065	-0.069
	(8.89)***	(5.22)***	(2.49)*	(2.64)***	(6.52)***	(6.56)***
Woman's education	0.063	-0.048	0.154	-0.116	0.144	-0.111
	(5.28)***	(4.53)***	(2.36)**	(2.19)**	(12.82)***	(9.45)***
Mother works outside home	0.294	0.166	0.261	0.659	-0.340	0.403
	(3.43)***	(1.99)**	(2.22)**	(6.01)***	(3.72)***	(3.89)***
Community-level variables						
Educational expenses	0.011	-0.016	1.550	0.375	1.257	-2.029
	(1.96)*	(2.92)***	(1.31)	(0.40)	(4.05)***	(6.20)***
Access to a bank (1=yes, 0=no)	0.081	-0.270	-1.959	2.870	0.289	-0.382
	(1.03)	(3.61)***	(1.30)	(2.57)*	(2.97)***	(3.71)***
Number of schools	0.052	-0.024				
	(5.80)***	(2.84)***				
Water storage (1=best, 5=worst)	-0.151	0.137	0.258	-0.132	0.238	-0.071
	(3.83)***	(3.72)***	(1.26)	(0.82)	(5.82)***	(1.58)
Electricity	0.096	-0.097	0.878	-0.846		
	(1.34)	(1.43)	(1.28)	(1.78)*		
Sewage disposal (1=best, 5=worst)			0.182	0.026		
			(0.87)	(0.16)		
Regional dummies						
Rural West-Hill	0.188	0.049				
	(2.40)*	(0.65)				
Rural East-Hill	0.241	0.174				
	(2.87)***	(2.18)*				
Rural-West Tera	0.145	0.148				
	(1.58)	(1.68)*				
Siera North			-0.288	-0.251		
			(2.07)**	(2.11)**		
Siera Central			0.329	0.265		
			(2.10)**	(2.36)**		
Selva Alta North			-0.697	-0.205		
			(3.84)***	(1.23)		
Selva Alta South			0.289	-0.406		
			(0.89)	(1.54)		
Selva Baja			-0.675	0.331		
			(4.76)***	(2.75)***		
Coastal North			-0.156	-0.377		
			(0.86)	(2.44)**		
Coastal South			-0.458	-0.685		
			(1.22)	(1.66)*		

(continued)

	Nepal		Peru		Zimbabwe	
	(1) Schooling	**(2) Employment**	**(3) Schooling**	**(4) Employment**	**(5) Schooling**	**(6) Employment**
Mashonaland N					-0.135	0.146
					(2.08)**	(2.14)**
Mashonaland E					0.028	0.016
					(0.36)	(0.19)
Mashonaland W					0.141	-0.304
					(1.98)**	(3.94)***
Matabeleland N					-0.179	0.165
					(2.16)**	(1.92)
Matabeleland S					-0.247	0.311
					(3.30)***	(3.98)***
Midlands					0.175	-0.134
					(2.73)***	(2.01)**
Masvingo					-0.136	0.104
					(2.14)*	(1.56)
Constant	1.325	-2.400	1.542	-0.321	3.625	-4.217
	(4.27)***	(8.18)***	(1.07)	(0.31)	(15.52)***	(16.55)***
ρ	-0.760		0.025		-0.980	
Wald test	$X^2(40) = 907.0$***		$X^2(48) = 457.5$***		$X^2(44) = 1{,}548.6$***	
Likelihood ratio test: ρ = 0	$X^2(1) = 661.9$***		$X^2(1) = 0.1804$		$X^2(1) = 4{,}013.8$***	
Observations	2,879	2,879	1,395	1,395	11,523	11,523

Notes: Absolute value of Z statistics in parentheses. * is significant at 10 percent; ** is significant at 5 percent; *** is significant at 1 percent.

Table 7—Joint child and schooling decisions in rural areas, IV estimates

	Nepal		Peru		Zimbabwe	
	(1) Schooling	(2) Employment	(3) Schooling	(4) Employment	(5) Schooling	(6) Employment
Sex (female)	-0.644	0.134	-0.257	-0.660	-0.328	0.356
	(12.17)***	(2.68)***	(2.61)***	(7.92)***	(8.18)***	(8.42)***
Age	-0.167	0.203	-0.234	0.072	-0.277	0.257
	(13.20)***	(16.72)***	(8.57)***	(3.14)***	(27.81)***	(24.87)***
Child wage	0.005	-0.008	-0.030	0.342	0.557	-0.073
	(0.27)	(0.48)	(0.11)	(1.55)	(0.99)	(0.12)
Man's wage	0.010	-0.005	0.527	-0.751	-0.328	0.662
	(3.52)***	(2.00)**	(1.42)	(3.12)***	(0.71)	(1.38)
Woman's wage	-0.003	0.004	0.022	-0.154	1.444	-1.840
	(1.07)	(1.47)	(0.12)	(0.98)	(2.39)**	(2.82)***
Nonwage income (predicted)	0.747	-0.184	-0.143	0.196	0.746	-0.602
	(5.16)***	(1.72)*	(0.54)	(0.85)	(7.51)***	(5.78)***
Residuals from first-stage regression	0.102	-0.042	0.156	-0.027	0.015	-0.023
	(3.20)***	(1.76)	(1.14)	(0.23)	(1.07)	(1.62)
# Young children	0.009	0.026	-0.102	0.019	-0.088	0.044
	(0.41)	(1.25)	(0.87)	(0.19)	(3.67)***	(1.78)
Head sex (female)	-0.157	-0.079	0.031	0.515	0.012	-0.016
	(1.84)*	(0.92)	(0.08)	(1.63)	(0.23)	(0.30)
Head age	0.085	-0.034	-0.035	-0.010	-0.012	0.021
	(3.88)***	(1.63)	(0.58)	(0.19)	(0.80)	(1.31)
Man's education	0.045	-0.030	0.198	-0.177	0.080	-0.084
	(5.15)***	(3.82)***	(2.09)**	(2.27)**	(6.57)***	(6.58)***
Woman's education	0.065	-0.051	0.217	-0.207	0.118	-0.079
	(5.57)***	(4.89)***	(1.72)*	(1.92)*	(8.56)***	(5.52)***
Mother works outside home	0.209	0.326	0.161	0.812	-0.089	0.157
	(2.45)**	(3.84)***	(0.81)	(4.54)***	(0.80)	(1.25)
Community-level variables						
Educational expenses	0.038	-0.026	1.462	0.500	-0.654	-0.511
	(6.49)***	(4.72)***	(1.20)	(0.53)	(1.47)	(1.09)
Access to a bank (yes)	0.088	-0.283	-2.455	3.327	0.243	-0.404
	(1.12)	(3.76)***	(1.48)	(2.61)***	(2.03)**	(3.18)***
Number of schools	0.075	-0.039				
	(8.23)***	(4.66)***				
Water storage (1=best, 5=worst)	-0.160	0.133	0.280	-0.177	0.334	-0.146
	(4.01)***	(3.62)***	(1.36)	(1.10)	(6.04)***	(2.43)**
Electricity	-0.002	-0.090	1.064	-0.867		
	(0.03)	(1.29)	(1.48)	(1.73)*		
Sewage disposal (1=best, 5=worst)			0.184	0.075		
			(0.86)	(0.45)		
Regional dummies						
Rural West-Hill	0.327	0.084				
	(3.94)***	(1.09)				
Rural East-Hill	0.433	0.095				
	(5.13)***	(1.18)				
Rural-West Tera	0.062	0.213				
	(0.67)	(2.39)**				
Siera North			-0.329	-0.185		
			(2.25)**	(1.48)		
Siera Central			0.436	0.166		
			(2.09)**	(1.02)		
Selva Alta North			-0.630	-0.273		
			(2.99)***	(1.45)		
Selva Alta South			0.382	-0.542		
			(0.99)	(1.68)*		
Selva Baja			-0.392	-0.021		
			(0.74)	(0.05)		
Coastal North			-0.201	-0.296		
			(1.07)	(1.83)*		

(continued)

	Nepal		Peru		Zimbabwe	
	(1) Schooling	(2) Employment	(3) Schooling	(4) Employment	(5) Schooling	(6) Employment
Coastal South			-0.062	-1.166		
			(0.08)	(1.67)*		
Mashonaland N					-0.194	0.242
					(2.44)**	(2.93)***
Mashonaland E					-0.297	0.246
					(2.81)***	(2.20)**
Mashonaland W					-0.118	-0.087
					(1.25)	(0.86)
Matabeleland N					-0.296	0.269
					(2.85)***	(2.51)**
Matabeleland S					-0.333	0.431
					(3.64)***	(4.54)***
Midlands					-0.096	0.086
					(1.12)	(0.97)
Masvingo					-0.427	0.360
					(4.76)***	(3.85)***
Constant	1.265	-2.703	1.932	-1.063	3.298	-4.043
	(4.00)***	(8.75)***	(1.14)	(0.84)	(10.43)***	(11.77)***
ρ	-0.769		0.031		-0.987	
Wald test	$X^2(42) = 871.7$***		$X^2(50) = 458.0$***		$X^2(46) = 1{,}119.2$***	
Likelihood ratio test: $\rho = 0$	$X^2(1) = 688.2$***		$X^2(1) = 0.275$		$X^2(1) = 2{,}835.0$***	
Test for relevance of instrument(s)	t-statistic = 13.99 P-value < 0.00001		t-statistic = 1.79 P-value < 0.074		F-statistic = 22.17 P-value < 0.00001	
Observations	2,884	2,884	1,387	1,387	8,654	8,654

Notes: Absolute value of Z statistics in parentheses. * is significant at 10 percent; ** is significant at 5 percent; *** is significant at 1 percent.

Table 8—Joint child and schooling decisions in urban areas

	Nepal		Peru		Zimbabwe	
	(1) Schooling	(2) Employment	(3) Schooling	(4) Employment	(5) Schooling	(6) Employment
Sex (female)	-0.312	-0.179	-0.176	-0.367	-0.315	0.536
	(2.42)**	(1.30)	(1.97)**	(4.72)***	(4.39)***	(5.05)***
Age	-0.160	0.215	-0.262	0.144	-0.321	0.220
	(4.95)***	(6.14)***	(11.84)***	(8.04)***	(16.62)***	(9.26)***
Child wage	0.097	0.052	-0.063	0.157	-0.155	0.670
	(1.45)	(0.85)	(0.99)	(2.59)***	(0.54)	(1.92)*
Man's wage	0.040	-0.003	-0.084	-0.096	0.745	-1.821
	(2.91)***	(0.23)	(1.59)	(1.73)*	(1.11)	(1.82)*
Woman's wage	0.013	-0.013	-0.158	0.088	0.048	-3.259
	(2.24)	(1.75)	(1.68)*	(1.02)	(0.04)	(2.19)**
Nonwage income	0.015	0.020	-0.731	-0.213	-0.025	-0.087
	(0.33)	(0.39)	(2.15)**	(1.40)	(0.12)	(0.33)
# Young children	-0.158	0.136	-0.040	0.021	-0.089	0.116
	(2.32)**	(1.74)	(0.76)	(0.49)	(2.31)**	(2.20)**
Head sex (female)	-0.194	0.123	0.080	-0.033	-0.337	-0.114
	(0.94)	(0.56)	(0.65)	(0.31)	(3.28)***	(0.73)
Head age	-0.164	-0.001	-0.099	-0.068	0.081	-0.130
	(2.95)***	(0.01)	(2.34)**	(1.78)	(2.40)**	(2.90)***
Man's education	0.051	-0.045	-0.034	-0.002	0.023	-0.052
	(3.29)***	(2.61)***	(0.61)	(0.04)	(1.05)	(1.72)*
Woman's education	0.053	-0.053	-0.083	-0.250	0.092	-0.128
	(3.26)***	(2.92)***	(1.48)	(5.14)***	(4.02)***	(4.13)***
Mother works outside home	-0.024	0.372	0.049	0.598	-0.597	1.150
	(0.17)	(2.32)**	(0.47)	(5.82)***	(4.87)***	(4.40)***
Community-level variables						
Educational expenses	0.005	-0.007	0.014	-0.001	0.241	-0.155
	(0.79)	(0.97)	(14.36)***	(2.56)**	(1.45)	(0.78)
Access to a bank (1=yes, 0=no)	-0.364	-0.151	0.026	-1.915	-0.119	1.080
	(1.53)	(0.65)	(0.03)	(2.32)**	(0.32)	(2.04)**
Water storage (1=best, 5=worst)	0.217	-0.125	-0.013	-0.445	-0.164	0.514
	(2.80)***	(1.55)	(0.06)	(1.88)*	(0.70)	(1.62)
Electricity	-0.068	-0.726	1.071	-1.803		
	(0.16)	(1.93)*	(1.41)	(2.31)**		
Sewage disposal (1=best, 5=worst)			0.181	-0.118		
			(1.03)	(0.66)		
Regional dummies						
Other urban-Hill	0.444	-0.127				
	(1.95)*	(0.56)				
Other urban-Tera	0.036	-0.240				
	(0.12)	(0.78)				
Lima North			0.201	-0.399		
			(0.94)	(1.90)*		
Siera North			0.207	0.503		
			(0.66)	(1.75)*		
Siera Central			0.695	0.259		
			(2.56)**	(1.07)		
Siera South			0.350	0.549		
			(1.36)	(2.36)*		
Selva Alta North			0.120	0.188		
			(0.38)	(0.63)		
Selva Alta Central			0.303	0.294		
			(0.73)	(0.93)		
Selva Alta South			-0.401	0.373		
			(1.31)	(1.22)		
Selva Baja			-0.425	0.704		
			(1.82)*	(3.13)***		
Coastal North			0.246	0.169		
			(1.04)	(0.72)		

(continued)

	Nepal		Peru		Zimbabwe	
	(1) Schooling	(2) Employment	(3) Schooling	(4) Employment	(5) Schooling	(6) Employment
Coastal Central			-0.112	0.662		
			(0.40)	(2.67)***		
Coastal South			0.196	0.326		
			(0.56)	(0.99)		
Bulawayo					-0.041	-0.057
					(0.23)	(0.24)
Mashonaland N					-0.099	-0.357
					(0.45)	(1.19)
Mashonaland E					0.124	-0.783
					(0.70)	(2.31)**
Mashonaland W					-0.063	-0.023
					(0.36)	(0.10)
Matabeleland N					0.226	-0.885
					(0.95)	(2.45)**
Matabeleland S					0.206	-0.166
					(0.91)	(0.56)
Midlands					0.034	-0.870
					(0.13)	(2.33)**
Masvingo					0.136	-0.484
					(0.51)	(1.39)
Constant	1.332	-2.607	4.234	0.151	5.978	-6.280
	(1.34)	(2.80)***	(3.50)***	(0.12)	(8.96)***	(7.21)***
ρ	-0.77		-0.1280		-0.87	
Wald test	$X^2(40) = 175.0$***		$X^2(58) = 566.8$***		$X^2(46) = 385.0$***	
Likelihood ratio test: ρ = 0	$X^2(1) = 78.3$***		$X^2(1) = 3.4479$*		$X^2(1) = 242.6$***	
Observations	700	700	2,203	2,203	3,492	3,492

Notes: Absolute value of Z statistics in parentheses. * is significant at 10 percent; ** is significant at 5 percent; *** is significant at 1 percent.

Table 9—Joint child and schooling decisions in urban areas, IV estimates

	Nepal		Peru		Zimbabwe	
	(1) Schooling	(2) Employment	(3) Schooling	(4) Employment	(5) Schooling	(6) Employment
Sex (female)	-0.313	-0.170	-0.273	-0.477	-0.348	0.604
	(2.43)**	(1.23)	(2.89)***	(4.78)***	(4.43)***	(5.15)***
Age	-0.161	0.215	-0.234	0.193	-0.340	0.234
	(4.98)***	(6.13)***	(9.52)***	(5.26)***	(15.30)***	(9.05)***
Child wage	0.097	0.055	0.008	0.225	-0.478	0.682
	(1.43)	(0.90)	(0.13)	(3.05)***	(1.32)	(1.73)*
Man's wage	0.040	-0.003	-0.030	-0.027	0.342	-3.163
	(2.90)***	(0.21)	(0.54)	(0.39)	(0.46)	(2.79)***
Woman's wage	0.013	-0.013	-0.072	0.205	-0.189	-4.557
	(2.24)**	(1.75)*	(0.75)	(1.82)*	(0.13)	(2.42)**
Nonwage income (predicted)	0.013	-0.007	-0.814	-0.879	0.029	-0.028
	(0.15)	(0.07)	(5.86)***	(1.59)	(1.03)	(0.75)
Residuals from first-stage regression	0.016	0.027	-0.252	-0.002	0.000	-0.012
	(0.32)	(0.48)	(5.77)***	(0.07)	(0.05)	(1.93)*
# Young children	-0.160	0.134	-0.147	-0.069	-0.050	0.123
	(2.33)**	(1.70)	(2.65)***	(0.92)	(1.09)	(2.00)**
Head sex (female)	-0.194	0.106	-0.073	-0.217	-0.306	-0.098
	(0.92)	(0.47)	(0.55)	(1.35)	(2.50)**	(0.55)
Head age	-0.166	0.005	0.038	0.074	0.092	-0.128
	(2.95)***	(0.08)	(0.76)	(0.76)	(2.24)**	(2.38)**
Man's education	0.051	-0.044	-0.087	-0.042	0.008	-0.059
	(3.24)***	(2.49)**	(1.45)	(0.76)	(0.28)	(1.45)
Woman's education	0.053	-0.052	0.048	-0.073	0.082	-0.111
	(3.13)***	(2.72)***	(0.74)	(0.62)	(3.25)***	(3.25)***
Mother works outside home	-0.024	0.362	-0.058	0.446	-0.592	1.033
	(0.16)	(2.24)**	(0.53)	(3.37)***	(4.44)***	(3.87)***
Community-level variables						
Educational expenses	0.005	-0.005	0.017	0.001	0.221	-0.226
	(0.73)	(0.70)	(13.71)***	(0.52)	(1.22)	(1.03)
Access to a bank (1=yes, 0=no)	-0.362	-0.166	-0.200	-2.305	-0.074	1.309
	(1.51)	(0.70)	(0.22)	(2.65)***	(0.16)	(2.04)*
Number of schools	0.075	-0.039				
	(8.23)***	(4.66)***				
Water storage (1=best, 5=worst)	0.216	-0.122	-0.159	-0.577	-0.277	0.532
	(2.78)***	(1.52)	(0.65)	(2.37)**	(1.06)	(1.52)
Electricity	-0.064	-0.759	1.689	-1.466		
	(0.15)	(1.99)*	(2.14)**	(1.71)*		
Sewage disposal (1=best, 5=worst)			0.434	0.102		
			(2.34)**	(0.45)		
Regional dummies						
Other urban-Hill	0.449	-0.116				
	(1.96)*	(0.50)				
Other urban-Tera	0.037	-0.223				
	(0.12)	(0.73)				
Lima North			0.173	-0.604		
			(0.78)	(2.56)*		
Siera North			0.348	0.335		
			(1.03)	(1.12)		
Siera Central			0.579	0.016		
			(2.06)**	(0.06)		
Siera South			0.506	0.535		
			(1.87)*	(2.26)**		
Selva Alta North			0.027	-0.009		
			(0.09)	(0.03)		
Selva Alta Central			0.396	0.275		
			(0.92)	(0.86)		
Selva Alta South			-0.357	0.215		
			(1.12)	(0.68)		

(continued)

	Nepal		Peru		Zimbabwe	
	(1) Schooling	(2) Employment	(3) Schooling	(4) Employment	(5) Schooling	(6) Employment
Selva Baja			-0.299	0.755		
			(1.25)	(3.24)***		
Coastal North			0.335	0.102		
			(1.37)	(0.42)		
Coastal Central			-0.192	0.511		
			(0.66)	(1.92)*		
Coastal South			0.624	0.708		
			(1.74)*	(1.68)*		
Bulawayo					0.052	-0.231
					(0.26)	(0.88)
Mashonaland N					-0.169	-0.504
					(0.65)	(1.45)
Mashonaland E					0.357	-0.929
					(1.69)*	(2.55)**
Mashonaland W					-0.192	0.070
					(0.64)	(0.17)
Matabeleland N					0.056	-1.008
					(0.15)	(1.90)
Matabeleland S					0.141	-0.239
					(0.58)	(0.77)
Midlands					-0.123	-1.112
					(0.30)	(1.97)*
Masvingo					0.187	-0.467
					(0.40)	(0.80)
Constant	1.360	-2.637	2.522	-1.604	6.743	-6.685
	(1.37)	(2.83)***	(1.96)*	(0.88)	(7.99)***	(6.17)***
ρ	-0.766		-0.160		-0.886	
Wald test	$X^2(38) = 175.1$***		$X^2(58) = 562.9$***		$X^2(48) = 345.7$***	
Likelihood ratio test: ρ = 0	$X^2(1) = 78.5$***		$X^2(1) = 4.89$*		$X^2(1) = 228.0$***	
Exogeneity test for nonwage income	t-statistic = 14.64 P-value < 0.00001		t-statistic = 9.42 P-value < 0.00001		t-statistic = 3.66 P-value < 0.0012	
Test for relevance of instrument (t-test)	t-statistic = 14.64 P-value < 0.00001		t-statistic = 9.42 P-value < 0.00001		t-statistic = 3.66 P-value < 0.0012	
Observations	701	701	2,170	2,170	3,218	3,218

Notes: Absolute value of Z statistics in parentheses. * is significant at 10 percent; ** is significant at 5 percent; *** is significant at 1 percent.

Table 10—Child labor supply in rural areas, Tobit estimates

	Nepal		Peru		Zimbabwe	
	(1) Tobit	(2) IV Tobit	(3) Tobit	(4) IV Tobit	(5) Tobit	(6) IV Tobit
Sex (female)	3.516	3.519	-12.598	-12.598	11.243	11.390
	(3.29)***	(3.30)***	(8.15)***	(8.05)***	(4.70)***	(4.73)***
Age	3.974	3.969	2.812	2.758	14.555	14.537
	(15.60)***	(15.50)***	(8.17)***	(7.90)***	(18.77)***	(18.74)***
Child wage	-0.387	-0.386	4.981	6.138	-5.570	-2.717
	(1.08)	(1.08)	(1.48)	(1.67)*	(0.16)	(0.08)
Man's wage	-0.132	-0.132	-16.506	-17.123	32.395	33.072
	(2.48)**	(2.48)**	(3.28)***	(3.34)***	(1.23)	(1.25)
Woman's wage	0.095	0.095	-3.801	-2.902	-134.026	-130.081
	(1.50)	(1.49)	(1.23)	(0.92)	(3.26)***	(3.12)***
Nonlabor income	-6.373		-2.749		-4.576	
	(4.93)***		(2.15)**		(1.93)*	
Nonwage income (predicted)		-5.757		2.588		0.544
		(1.65)*		(0.21)		(0.05)
Residuals from first-stage regression		-6.455		-2.742		-4.905
		(4.74)***		(2.13)**		(2.00)**
# Young children	0.449	0.472	-1.229	-1.010	1.635	1.823
	(1.00)	(1.02)	(1.68)*	(1.07)	(1.71)*	(1.78)*
Head sex (female)	0.418	0.475	0.616	1.265	-4.137	-4.689
	(0.23)	(0.26)	(0.22)	(0.40)	(1.47)	(1.56)
Head age	-0.784	-0.795	1.366	1.461	1.201	1.114
	(1.77)*	(1.78)*	(1.90)*	(2.02)*	(1.32)	(1.21)
Man's education	-0.762	-0.774	-2.656	-2.260	-2.627	-2.522
	(5.22)***	(4.86)***	(2.30)**	(1.77)*	(3.70)***	(3.42)***
Woman's education	-1.157	-1.170	-1.945	-2.562	-4.797	-4.780
	(4.84)***	(4.70)***	(1.71)*	(1.53)	(6.00)***	(5.97)***
Mother works outside home	3.374	3.404	11.216	12.834	10.861	10.005
	(1.78)*	(1.79)*	(4.61)***	(3.57)***	(1.39)	(1.26)
Community-level variables						
Educational expenses	-0.486	-0.496	-12.880	-18.221	-59.989	-62.867
	(4.19)***	(3.89)***	(0.90)	(1.06)	(2.61)***	(2.66)***
Access to a bank (yes)	-3.258	-3.297	70.519	73.559	-25.110	-25.694
	(1.97)*	(1.97)*	(3.03)***	(3.00)***	(3.56)***	(3.59)***
Number of schools	-0.718	-0.723				
	(3.91)***	(3.91)***				
Water storage (1=best, 5=worst)	2.789	2.772	-3.400	-3.795	3.772	3.672
	(3.43)***	(3.39)***	(1.07)	(1.18)	(1.08)	(1.05)
Electricity	-3.815	-3.833	-29.817	-29.633		
	(2.51)**	(2.52)*	(3.06)***	(3.00)***		
Sewage disposal (1=best, 5=worst)			2.495	2.388		
			(3.78)***	(3.59)***		
Regional dummies						
Rural West-Hill	5.308	5.318				
	(3.27)***	(3.27)***				
Rural East-Hill	4.976	4.859				
	(2.83)***	(2.61)***				
Rural West Tera	5.048	5.074				
	(2.61)***	(2.62)***				
Siera North			-1.747	0.641		
			(0.66)	(0.11)		
Siera Central			7.043	6.872		
			(3.14)***	(3.03)***		
Selva Alta North			-6.445	-6.513		
			(1.76)*	(1.77)*		
Selva Alta South			-12.380	-9.376		
			(2.06)**	(1.05)		
Selva Baja			6.390	6.581		
			(2.56)**	(2.62)***		

(continued)

	Nepal		Peru		Zimbabwe	
	(1) Tobit	(2) IV Tobit	(3) Tobit	(4) IV Tobit	(5) Tobit	(6) IV Tobit
Coastal North			-8.179	-5.445		
			(2.42)**	(0.91)		
Coastal South			-20.402	-22.800		
			(2.05)**	(2.00)*		
Mashonaland N					6.337	5.981
					(1.35)	(1.26)
Mashonaland E					-1.510	-1.594
					(0.27)	(0.29)
Mashonaland W					-24.118	-24.755
					(4.09)***	(4.11)***
Matabeleland N					8.532	8.566
					(1.41)	(1.42)
Matabeleland S					16.147	16.616
					(3.02)***	(3.06)***
Midlands					-2.893	-3.290
					(0.68)	(0.76)
Masvingo					9.209	9.421
					(2.09)**	(2.13)**
Constant	-51.614	-51.669	-18.781	-20.547	-286.284	-286.162
	(7.74)***	(7.74)***	(1.03)	(1.07)	(12.91)***	(12.90)***
Likelihood ratio test	$X^2(21)$ = 545.6***	$X^2(20)$ = 527***	$X^2(24)$ = 290.8***	$X^2(25)$ = 287.9***	$X^2(22)$ = 877.0***	$X^2(23)$ = 877.3***
Pseudo R^2	0.037	0.037	0.04	0.039	0.089	0.099
Observations	2,876	2,876	1,395	1,387	8,654	8,654

Notes: Absolute value of Z statistics in parentheses. * is significant at 10 percent; ** is significant at 5 percent; *** is significant at 1 percent.

Table 11—Child labor supply in urban areas, Tobit estimates

	Nepal		Peru		Zimbabwe	
	(1) Tobit	(2) IV Tobit	(3) Tobit	(4) IV Tobit	(5) Tobit	(6) IV Tobit
Sex (female)	-4.988	-5.068	-14.279	-17.754	30.488	30.960
	(1.01)	(1.03)	(5.03)***	(4.97)***	(1.73)	(1.76)
Age	7.434	7.447	5.733	7.185	22.870	22.913
	(5.49)***	(5.49)***	(8.41)***	(5.42)***	(3.57)***	(3.61)***
Child wage	-0.481	-0.496	4.800	6.891	156.900	153.625
	(0.23)	(0.23)	(2.22)**	(2.66)***	(2.04)**	(2.02)**
Man's wage	-0.194	-0.195	-2.850	-0.703	-79.338	-147.221
	(0.40)	(0.40)	(1.45)	(0.29)	(0.38)	(0.68)
Woman's wage	-0.319	-0.318	1.980	5.832	-133.829	-126.994
	(1.23)	(1.23)	(0.64)	(1.48)	(0.44)	(0.41)
Nonwage income	-0.318		-0.488		-6.134	
	(0.16)		(0.64)		(1.47)	
Nonwage income (predicted)		0.191		-28.672		-45.270
		(0.05)		(1.47)		(1.24)
Residuals from first-stage regression		-0.463		-0.301		-5.248
		(0.21)		(0.33)		(1.24)
# Young children	2.887	2.927	0.190	-2.748	8.107	13.002
	(1.09)	(1.10)	(0.12)	(1.05)	(0.94)	(1.31)
Head sex (female)	10.469	10.688	-2.227	-8.731	13.604	38.701
	(1.25)	(1.26)	(0.60)	(1.56)	(0.57)	(1.16)
Head age	-0.036	-0.096	-2.104	2.689	-8.344	-4.546
	(0.02)	(0.04)	(1.55)	(0.79)	(1.09)	(0.55)
Man's education	-1.659	-1.680	-0.937	-1.825	-6.871	-12.434
	(2.69)***	(2.67)***	(0.55)	(0.95)	(1.35)	(1.68)*
Woman's education	-1.966	-2.001	-8.488	-2.509	-12.310	-15.975
	(2.93)***	(2.85)***	(4.76)***	(0.61)	(2.12)**	(2.29)**
Mother works outside home (yes)	10.107	10.234	18.151	12.198	87.491	82.594
	(1.72)*	(1.73)*	(4.86)***	(2.63)***	(2.15)**	(2.05)**
Community-level variables						
Educational expenses	-0.270	-0.290	-0.060	0.008	76.688	84.990
	(1.09)	(1.06)	(3.11)***	(0.16)	(1.38)	(1.50)
Access to a bank (yes)	-0.387	-0.132	-54.749	-64.245	105.569	99.317
	(0.04)	(0.01)	(1.88)	(2.15)**	(1.25)	(1.18)
Water storage (1=best, 5=worst)	-4.569	-4.587	-12.419	-16.524	35.917	22.850
	(1.56)	(1.57)	(1.47)	(1.93)	(0.69)	(0.43)
Electricity	-18.572	-18.212	-59.921	-49.806		
	(1.41)	(1.37)	(2.16)**	(1.67)		
Sewage disposal (1=best, 5=worst)			-6.298	0.384		
			(0.96)	(0.05)		
Regional dummies						
Other Urban-Hill	-2.909	-3.153				
	(0.36)	(0.39)				
Other Urban-Tera	-5.871	-6.057				
	(0.55)	(0.57)				
Lima North			-15.098	-22.016		
			(2.02)**	(2.67)***		
Siera North			14.326	8.409		
			(1.39)	(0.80)		
Siera Central			7.420	-1.233		
			(0.86)	(0.13)		
Siera South			14.300	13.025		
			(1.71)*	(1.57)		
Selva Alta North			6.827	-0.009		
			(0.65)	(0.00)		
Selva Alta Central			9.879	8.776		
			(0.87)	(0.79)		
Selva Alta South			12.885	7.701		
			(1.19)	(0.70)		

(continued)

	Nepal		Peru		Zimbabwe	
	(1) Tobit	(2) IV Tobit	(3) Tobit	(4) IV Tobit	(5) Tobit	(6) IV Tobit
Selva Baja			20.910	21.734		
			(2.59)***	(2.66)***		
Coastal North			7.517	3.073		
			(0.92)	(0.37)		
Coastal Central			21.079	15.260		
			(2.38)**	(1.65)*		
Coastal South			4.507	16.100		
			(0.38)	(1.08)		
Bulawayo					2.983	-7.281
					(0.07)	(0.18)
Mashonaland N					30.468	11.931
					(0.64)	(0.24)
Mashonaland E					-12.518	-18.835
					(0.33)	(0.48)
Mashonaland W					-89.900	-90.869
					(1.06)	(1.06)
Matabeleland N					-47.859	-62.251
					(0.92)	(1.16)
Matabeleland S					42.767	11.443
					(1.04)	(0.23)
Midlands					-36.927	-52.831
					(0.64)	(0.89)
Masvingo					-113.551	-137.787
					(1.63)	(1.86)*
Constant	-83.446	-84.227	-14.304	0.902	-654.146	-682.860
	(2.46)*	(2.42)*	(0.32)	(0.02)	(3.38)***	(3.46)***
Likelihood ratio test	$X^2(18)$ = 115.8***	$X^2(19)$ = 115.4***	$X^2(28)$ = 263.3***	$X^2(29)$ = 261.2***	$X^2(23)$ = 67.2***	$X^2(24)$ = 74.1***
Pseudo R^2	0.087	0.087	0.070	0.070	0.119	0.131
Observations	692	692	2,203	2,170	3,218	3,218

Notes: Absolute value of Z statistics in parentheses. * is significant at 10 percent; ** is significant at 5 percent; *** is significant at 1 percent.

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