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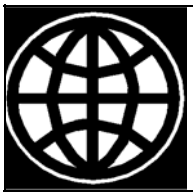

Social Protection Discussion Paper Series

Child Labor, Schooling, and Poverty in Latin America

Guilherme Sedlacek
Suzanne Duryea
Nadeem Ilahi
Masaru Sasaki

May 2005

Social Protection Unit

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One of the challenges in designing policies to combat child labor is the puzzling finding from Chapter 1 that as economic growth progresses, the pace of reductions in child labor appears to slow down. Consequently, policies that raise per capita income may not, by themselves, lower the incidence of child labor. If they do lower child labor, the reductions may only occur over a period of decades. This appears to be the current challenge to reducing child labor in Latin America, where per capita income is now high enough that child labor has become relatively insensitive to further income gains.

Many countries have policies restricting child labor in the belief that reducing child labor is complementary with a policy goal of increasing educational attainment. Two issues regarding the relationship between child labor and education warrant a policymaker's attention. First, research establishing the nature of the relationship between child labor and education is surprisingly limited. For instance, it is not clear whether child labor discourages school attendance or if it only lowers the quality of school attainment. This distinction is not trivial because the policy tools aimed at increasing enrollment are different from those aimed at raising the productivity of time spent in school. This issue is particularly relevant in Latin America where most working children are enrolled in school. Previous research has not established whether a child's time in work adversely affects the productivity of his or her time in school. Second, child labor and its effect on education do not operate in a vacuum. Both are outcomes of complex household-level decisions. Both child labor and education are intimately related to other factors affecting households, including the number of children in the household, the household's access to income, and the parents' interest in schooling. Once further improvement in child labor has become insensitive to overall economic growth, policies will need to alter incentives to send children to work. It is therefore important that an analysis that explores the association between child labor and education incorporate these household-level factors.

This chapter shows that in Latin America, child labor does have a negative and significant effect on educational enrollment. However, it has an even larger adverse effect on

the pace of progression through school and the quality of attainment through attendance. These results are stronger for the poor. Thus, targeted conditional cash transfer programs for human development, such as PROGRESA (now Oportunidades) and Bolsa Escola, are correct in requiring that beneficiary children actually attend school rather than concentrating on school enrollment.

Stylized Facts on Child Labor and Schooling in Latin America

Employment rates for eighteen Latin American countries for children aged 10 to 14 are shown in figure 1. The data are taken from the most recently available surveys: 2000 for Costa Rica, Mexico, Panama, Peru, and Uruguay; 1999 for Argentina, Bolivia, Brazil, Colombia, Honduras, and Venezuela; and 1998 for the rest of the countries. Child employment rates range widely from 1% in Chile to 36% in Ecuador. The average is 12.5% across all eighteen countries, roughly equal to the worldwide child labor participation rate. Whereas employment rates in Chile and Argentina are among the lowest rates of all developing countries, employment rates in Bolivia, Ecuador, and Peru are among the highest.

Figure 1 also reports that 90% of the children aged 10 to 14 in the eighteen countries are enrolled in school. There is an apparent inverse relationship between school enrollment and child labor. Of the nine countries with above-average child employment rates, six have below-average enrollment rates. The simple cross-sectional correlation between enrollment and employment rates is -0.4. The relationship is hardly definitive. Brazil, Bolivia, and Peru have above-average enrollment rates despite having above-average child employment rates. In fact, across these countries, 63% of the children aged 10 to 14 reported as working also are reported as being enrolled in school.

While one of the potential consequences of early entry into the labor market is that the child's education will be cut short, past empirical evidence of child labor's impact on education is mixed. Child labor actually may enhance educational opportunities by raising household income and thus the ability to afford education. As Ravallion and Wodon (2001) argue, working and schooling are not mutually exclusive for children. Patrinos and Psacharopoulos (1997) found evidence suggesting that child labor and enrollment were complementary activities. While in all eighteen countries, enrollment rates for working children are lower than for children who are not working, it is clear that working and

schooling are not mutually exclusive. This presents one of the challenges for our analysis that follows: if child labor does not remove children from school, does it actually lower the human capital production of poor children? If it does not, then policies that limit opportunities for child labor are almost certainly counterproductive.

Not only is there a wide distribution of child employment rates across these countries, but there also is a wide variety of time paths of employment rates. Figure 2 reports the trends in employment rates for 10- to 14-year-olds in seven Latin American countries for which time series information could be obtained. Labor force participation rates in Honduras and Venezuela rose over the last decade. In Mexico, child labor initially rose from 6% to 9% but has fallen since 1998. Child labor in Uruguay has remained stable at around 1% to 2% from 1981 to 2000. Meanwhile, child labor has been falling in Brazil, Colombia, and Costa Rica. The diversity of experiences represents another challenge for researchers to explain the variation in success in combating child labor. The timing of improvements in child labor rates in Brazil and Mexico corresponds roughly to the installation of government policies to combat child labor, suggesting that government intervention may provide an effective avenue for addressing the problem.[1]

Figure 3 illustrates an indication of one source of variation in schooling investments across Latin American countries. Enrollment rates are traced for different ages and income groups. Enrollment rates peak at 10 years and then begin to drop off. The pattern occurs even in the wealthier households, but is particularly pronounced for poor children. Children in the poorest income groups in Latin America are slow to enter school and quick to exit. Enrollment rates in the wealthiest families are more than 90% for children aged 6 to 15. For

[1] The timing of the decline in child labor rates corresponds to implementation of PROGRESA, a targeted transfer program designed to combat child labor. See the chapter by Skoufias and Parker for a detailed evaluation of the PROGRESA program. Similarly, decreases in child labor rates after 1994 in Brazil correspond to the initiation of the Bolsa Escola and PETI programs evaluated later in the book.

the poorest children, enrollment rates do not rise above 90% until age 8, and fall below 90% again by age 12. While the enrollment gap across income groups is only a few percentage points for children aged 8 to 11, about 15% of the poorest children already have spent one or two fewer years in school by age 8 than children in the wealthiest households. In addition, those poorest children begin to drop out of school in large numbers after age 11. For children aged 14 to 16, the difference in enrollment rates between rich and poor grows from 20 to 34 percentage points. Consequently, the small differences in enrollment rates across income groups for 8- to 11-year- olds masks large differences in past and future acquisitions of human capital between income groups. This suggests that enrollment rates may yield misleading information on the extent of the differences in human capital investment in the children of the poor and the wealthy.

Across Latin American countries, the simple correlation between levels of per capita income and child labor is -0.44. Worldwide, this is roughly half the correlation between the two factors, which indicates that Latin American countries are positioned in the flat region of the tradeoff between income and child labor described in chapter 1. It also is comparable to the correlation between child labor and school enrollment in Latin America. Consequently, policies to combat child labor in Latin America may not be very effective if they rely on raising income or school enrollment alone. The chance of success is enhanced if the policy aims to raise income and increase time in school.

Detailed Descriptive Data on Child Labor and Schooling

Four Latin American countries have conducted recent household surveys that allow a much more detailed investigation of the determinants of child labor and schooling. The data sets include the Living Standards Measurement Surveys (LSMS) of Ecuador (1995), Nicaragua (1998), and Peru (1997), as well as the 1996 edition of the Brazilian national household survey (PNAD). All LSMS surveys follow a similar design, so there is a high degree of data comparability across surveys. Comparisons with Brazil need to be made more carefully because the wording of the questions may differ from that of the other countries. Nevertheless, the key questions on child labor force participation and child time in school are similar across all four surveys.

These four countries are broadly representative of the region. Brazil is in the upper middle-income category. There, child labor has been declining but it remains high for an upper middle-income country.[2] Peru and Ecuador represent the majority of the countries in the region, i.e., those in the lower middle-income category. Both of these countries have relatively high levels of child labor. Nicaragua represents the low-income countries, but has child employment rates at the median of the countries in the region.

The incidence of child labor force participation for children aged 10 to 14 by country, urban-rural residence, and gender is reported in table 1.[3] The patterns are similar across all four countries. Child labor is more common in rural than in urban areas. Rural child labor participation rates are four times higher than urban rates in Brazil and Peru, 2.7 times higher in Nicaragua, and 1.6 times higher in Ecuador. Boys are more likely than girls to work in all four countries. While some of this difference may be because girls may be more likely to perform household chores without pay, perhaps the more important point is that girls' employment rates are high in their own right. Consequently, child labor is not just an issue for young boys, but for young girls, as well.

Child labor is viewed as a problem in part because it is seen as limiting the human capital and, ultimately, the earning potential of children. Table 2 relates how child labor interacts with child enrollment rates. Child labor rates range from 11% in Nicaragua to 36% in Ecuador; however, the two countries have identical enrollment rates. Of these four countries, Peru has the highest enrollment rates, even though 29% of Peruvian children are working. Although working children in all these countries are 5 to 29 percentage points less likely to be in school than their nonworking counterparts, clearly, child labor and education can coexist.

However, working children may not perform as well in school. The more children have to work, the more tired they will be when in school and the less time they will have for

[2] The classification of countries into low, lower-middle and upper-middle are based on 1997 GNP per capita figures reported in the World Development Report 1998-99.

[3] In table 1, the incidence of child labor is higher than the ILO estimates used in chapter 1. The difference is that the ILO only reports full-time work, while the survey data reports full- and part-time work.

study. Consequently, work may have an adverse effect on learning while in school, even if it does not have a large effect on enrollment.[4] The distribution of hours worked per day for children aged 10 to 14, shown in table 3, suggests that a high proportion of working children work too many hours to be successful in school. More than half the working children in Nicaragua work over five hours per day, as do just under half of the working children in Brazil. The proportions in Ecuador (34%) and Peru (15%) are modest in comparison, but still high enough to suggest a problem.

A later chapter will quantify the impact of child labor on student learning as indicated by student performance on achievement tests. This chapter uses a less direct indicator—whether the child's years of completed education is at the level expected for the child's age. If child labor limits the amount of time a child can devote to study, working children would be expected to fail in greater proportions than would students whose attention is not divided between work and school.

As shown in table 4, it is common for children in Latin America to lag behind in school. The percentages vary from 31% in Peru to 56% in Ecuador.[5] Girls are more likely to be promoted than boys, but even so, 30% or more of the girls are behind their age-appropriate grade level.

A high proportion of children who are not working are behind grade level; children who are working while attending school are even further behind. With the exception of Ecuador, children who are only working are even further behind, so it appears that enrolled children who work are still making academic progress. However, that progress is markedly slower than that of children who are not working. This suggests that even if school and work are not mutually exclusive activities, working children will complete fewer years of schooling than will children who do not work.[6] Estimates of returns per year of schooling suggest that there is a significant loss of lifetime earnings for each year of schooling loss. Psacharopoulos (1985) estimated that the private returns to a year of primary schooling in

[4] Evidence supporting that conjecture has been found by Akabuyashi and Psacharopoulos (1999).
[5] The actual rate for Ecuador is higher than that reported in table 4 because lag rates could not be estimated for Ecuadorian children over age 12.
[6] Psacharopoulos' (1997) analysis of data from Chile and Peru found that early entry into the labor market led to two fewer years of schooling completed.

Latin America averaged 61%, so even a few years of schooling sacrificed to gain current child earnings could lower lifetime earnings significantly.

Tables 1 through 4 suggest a working hypothesis that while the majority of working children are enrolled in school, child labor hinders academic achievement per year spent in school. Consequently, each year that a child avoids entering the labor market will result in some increased earnings as an adult, either because the child will make more rapid progress through school or because the child will complete more years of schooling. This hypothesis will be tested rigorously in later chapters and found to be consistent with the data.

Statistical Analysis

The four household surveys for Brazil, Ecuador, Nicaragua, and Peru support regression analyses of household decisions and child schooling outcomes. The dependent variables in this analysis are measures of child labor, schooling, and educational attainment. Child labor is defined as child time spent on income-generating activities, whether in a family enterprise or in wage work for others. Work that does not generate income, such as household chores, is not considered work by this definition. Consequently, some forms of child labor, particularly forms that are most important for girls, are likely to be under-reported.

Child schooling is measured whether or not the child is currently enrolled in school. This does not capture intensity of schooling, as would a measure of schooling attendance. However, attained schooling, which is an outcome measure that should capture variation in the intensity of schooling, is reported in all data sets. The measure of schooling attainment is based on the number of years a child lags behind the level that would represent normal progress for the child's age. This inverse estimate of grade-for-age is computed by:

$$IGFA = 100\left[1 - \left(Grade \big/ Age - 6\right)\right] \text{ ; Age} > 6$$

An *IGFA* of zero implies the child's attained years of schooling equal the expected level for the child's age. An *IGFA* score of 100 implies the child has never completed a year of schooling.

The household-level variables, which will be used to explain the variation in the dependent variables, include the child's age and gender, number of members in the household, and number of children less than 5 years of age. Parent information includes the age, gender, and educational attainment of the household head. The remaining measures include a series of dummy variables indicating progressively higher income quintiles and a dummy variable indicating rural residence.

A. Econometric Determinants of Child Labor

Probit regressions indicating how various factors affect the probability of child labor are reported in table 5. For ease of interpretation, coefficients have been converted into derivatives of the probability of child labor with respect to the exogenous variables. Two specifications, including and excluding the income quintiles, are reported for each country. Except for Brazil, the income quintiles add significantly to the explanatory power of the regressions, so discussion will concentrate on the fuller specifications. The estimated effects are consistent across all four countries in both sign and magnitude. Consequently, it appears that similar forces drive the decision to send children to work in all four countries.

Child labor appears to respond to market opportunities. As a child ages, the probability of working rises, consistent with the presumption of rising child wages with age. With the exception of the improbably large marginal effect at age 11 in Ecuador, the probability of child labor rises monotonically with age. As children age from 10 to 14, the probability of working rises 14 to 24 percentage points depending on the country. Child labor is significantly greater in rural areas where demand is greatest. The rural-urban differential is only 6 percentage points in Nicaragua, but it is larger elsewhere. Rural children are about 20% more likely to work than urban children in Brazil and Ecuador and 34% more likely to work in Peru.

Girls have a significantly lower probability of working for income than do boys; the effect varies from -8% in Peru to -16% in Ecuador. Child labor is not particularly sensitive to the composition of the household or the attributes of the household head. Only in Peru does the presence of young children in the household affect the probability of work for the older children; there, child labor probability rises 4 percentage points for every young child in the household. The impact of overall household size is small in all countries and has

consistent signs. If one reason for child labor is that some children need to work to raise income sufficiently to allow their siblings to go to school, these results suggest that the impact is very small in all of these countries.

The age and gender of the household head have no appreciable impact on the probability that children will work. However, parental education has a strong negative effect on the probability that the children will work. Parental education consistently lowers the probability of child labor in all countries. For every year of parental schooling attainment, the probability of child labor falls 0.3 to 0.8 percentage points.

The effect of poverty on the decision to work is explored through the use of income quintiles.[7] For each country, two regressions were run: one that includes quintile dummies and one that does not. This is because income quintiles can be endogenous, in that they can be affected by the behavior being measured in the dependent variable (i.e., whether or not the household sends children to work). If household income is endogenous, then the regression coefficients on the other regressors will be biased. The use of quintiles rather than income levels mitigates the problem somewhat in that child labor may alter income insufficiently to cause quintiles to change. A comparison of the estimated coefficients between regressions with and without quintiles reveals that if simultaneity bias exists, it is small.

A positive relationship between child labor and poverty is confirmed in only Ecuador and Peru. There, children in each progressively higher quintile have a lower probability of working. The data for Brazil and Nicaragua reveal no particular pattern between household income level and child labor. The implication from table 5 is that income transfers that raise household income may not alter child labor, although they may have the desired effect in Peru and Ecuador. In all countries, however, income-earning opportunities for children corresponding to age, rural residence and gender appear to have a significant impact on child labor force participation. Altering returns to child labor may have a larger effect.

B. Economic Determinants of School Enrollment

Table 6 lists the results of enrollment regressions, with and without income quintiles. The null hypothesis that income quintiles do not affect enrollment probability is rejected in

every country. Coefficients are robust to the inclusion or exclusion of the income quintiles, so we concentrate our discussion on the specifications including income quintiles.

The results show that despite high enrollment rates in all four countries, there are clear associations between some of the explanatory variables and enrollment. First, there is a monotonic decline in the propensity for enrollment with age. For instance, 14-year-olds exhibit significantly lower enrollment in school compared to 10-year-olds. Second, rural children show significantly lower enrollment than their urban counterparts by about 3% to 11%. Third, girls exhibit higher enrollment rates, but the estimated coefficients are statistically significant only in Brazil and Nicaragua.

All of these effects are opposite to their marginal effects on child labor: factors that tend to raise enrollment tended also to lower child labor. Comparing coefficients in table 5 with their counterparts in table 6, opposite signs are found in fourteen of fifteen cases in all four countries. The cases in which signs were the same across the tables were those in which one or both coefficients were insignificantly different from zero. It is apparent that school enrollment and child labor have opposite responses to household attributes and measures of child market opportunities.

Household size has small effects of mixed signs. Where significant, the presence of children under the age of 5 lowers enrollment probability by 1 to 2 percentage points, which suggests that older children are withheld from school to help raise their younger siblings. However, there is no strong evidence that larger families are less likely to send children to school, or alternatively, that some children are withheld so others can attend school.

The age and gender of the household head have small effects of mixed signs. However, the education of the head has a consistently positive effect on child enrollment with that probability rising 0.2 to 1.6 percentage points per year of schooling attained. An added year of parental education lowers child labor by roughly the same amount as it raises school enrollment.

Measures of household income have much stronger effects on school enrollment than on child labor, although the effects may seem surprisingly small. In Brazil, children in the

[7] The inclusion of the head's highest educational attainment in the regression is an excellent proxy for the permanent income of the household; thus, the income decile can be regarded as capturing more transitory spells or unpredicted income deviations.

highest income quintile are only 4% more likely to enroll than are children in the lowest income quintile. The comparable estimates are 8% and 12% in Ecuador and Nicaragua respectively. In Peru, the effect is less than 2%.

C. Economic Determinants of Lagging School Attainment

Although child labor may not significantly lower enrollment, it may affect grade attainment through its effect on attendance. Table 7 provides the results of a regression for lagging behind in school, defined here as the difference between actual and optimal grade-for-age. The specifications mimic those above except that age is excluded because it is already incorporated into the dependent variable. A general finding from a comparison of the signs and significance of the coefficients in tables 5 and 7 is that factors that raise the probability of child labor also cause a child to lag behind in school.[8] Therefore, the inverse relationship between allocating child time to work and a child's educational attainment is confirmed.

Girls are less likely to lag behind in school than boys. Rural children are more likely to lag behind than their urban counterparts. These results are consistent with the impact of the variables on probability of child labor. Household composition measures have consistent impacts on lagging behind. Children in larger families and with siblings under 5 years of age significantly lag behind in all countries. Parental attributes also matter. Younger parents are more likely to have children who lag behind in schooling, as are less educated parents. Gender of the household head has inconsistent effects.

The role of income is strong and consistent. Children in the lowest quintiles lag 5% to 22% behind those in the highest quintile, depending on the country. As children's positions in the income distribution improves, their probability of lagging in schooling attainment falls. The impact of household income on probability of lagging in school is stronger than the income effect on either child labor or enrollment.

To the extent that it is school attainment rather than enrollment that is important, the finding that child labor and attainment are inversely related further strengthens the notion that one can fight child labor through increased incentives to invest in schooling. This

[8] The one exception is that in Peru, household size has a negative and significant effect on child labor but a positive and significant effect on falling behind in school.

explains the phenomenon that countries with relatively high child labor rates still can exhibit high enrollment rates (see figure 3) but with lower quality of actual attainment.

D. Direct Effect of Child Labor on Schooling Outcomes

While the results above are consistent with the presumption that child labor and schooling outcomes are inversely related, they do not prove that presumption. This section reports on a direct test of that presumption by examining how exogenous increases in child labor supply associated with more lax compulsory schooling regulations across countries affect school enrollment and grade attainment of children in those countries.

Duryea and Arends-Kuenning (2003) and Rosati and Rossi (2003) have shown that for the cases of Brazil, Pakistan and Nicaragua respectively, the decisions to attend school and to work are made under simultaneous conditions, with these decisions influenced by unobserved factors. When modelled as a bivariate probit, the error terms of the schooling and employment equations are negatively correlated, suggesting that there is a tradeoff between the activities.

However the correlation of unobservables from the two equations cautions one from measuring the direct effect of child employment on schooling outcomes since some portion of the relationship may be driven by outside factors. We attempt to explore the effect of child labor on schooling outcomes after purging the "contaminated" correlation from a regression through the application of an instrumental variables technique. That is, rather than use children's actual employment status in the regression we will predict their employment using the exogenous variables in the schooling equation as well as instrumental variables that are correlated with employment but not with schooling.

In their paper, Angrist and Krueger (1991) recognized that individuals with late birthdays have an exogenous reason to remain in school according to US compulsory schooling laws. Here the identification comes from cross-country variation in education policy; as reported by UNESCO (2002). Countries differ in the official age for beginning first grade and in the age at which children can leave school legally. These differences in compulsory schooling laws are exogenous to the household's decision making process. The official ages for beginning first grade vary from age 5 in Colombia; age 6 in Bolivia, Costa Rica, Chile, the Dominican Republic, Peru, Ecuador, Mexico, Paraguay, Uruguay,

Venezuela; and age 7 in Brazil, El Salvador, Guatemala, Honduras and Nicaragua. The corresponding ages for terminating compulsory schooling are age 12 in Nicaragua and Honduras; age 13 in Bolivia, Chile, the Dominican Republic, and Paraguay; age 14 in Brazil, Colombia, Ecuador, Mexico, and Uruguay; age 15 in Costa Rica, El Salvador, Guatemala and Venezuela; and age 16 in Peru.

We can illustrate that these legislative restrictions on truancy are indeed correlated with child time use. Figure 4 plots the average years of schooling attainment for youth ages 16-18 in the countries examined above. The countries that have late official ages of entering first grade, as reported by UNESCO (2002), are clustered at the lowest end of performance, while countries that officially start first grade at earlier ages have better average attainments for 16-18 year olds youths. For example, schooling attainment for youth in Brazil is under 7 years while peers in Ecuador, Mexico, Bolivia and Peru have attained over 8 years of schooling. A similar pattern exists among older generations of adults, implying that education policies permitting or promoting late entry to school have costly and non-reversible long run-effects.

We combine the information on legal school starting and leaving ages with household survey data circa 2000 for all 16 countries for children ages 10-16. Table 8 shows the results from a two-stage least squares regression model. The first two columns show the model for school attendance in which the exogenous variables include the child's age, sex, region of residence (urban or rural),number of children in the household younger than age 6, total household size, age and schooling of the household head and whether the household is headed by a female.

The instruments for child work include both schooling policy variables – the age at which first grade begins and the modal age at which compulsory schooling is designed to end. The child's age is also interacted with the policy variables. Since the individual level observations do not vary across the policy level variables we have controlled for heteroskedasticity by estimating Huber-White standard errors.

After controlling for other family characteristics as well as country dummies, children who work are significantly less likely to attend school than their peers. Reducing the probability of working by 10% results in an increase in the probability of attending school by

7%. Child labor also has a cost in terms of lost attained schooling. The fourth and fifth columns of Table 8 present a two-stage least squares regression in which the dependent variable is being at least 2 years behind the appropriate grade for age in school. Controlling for endogeneity, children who work are significantly more likely to lag in school than their peers. Reducing the probability of working by 10% reduces the probability of lagging behind in school by 12%. The identification from the policy level variables suggest child labor is not only a symptom of unobserved stresses on the family but a direct negative influence on schooling outcomes in and of itself.

Policy Implications

In some Latin American countries, household income does not have a strong effect on child labor because as incomes rise, child labor becomes less sensitive to further increases in income. Thus, it is doubtful that child labor can be eliminated solely by increases in income. Policies may need to address other factors that influence the incidence of child labor, particularly the strength of demand for child workers.

Two findings from the empirical work merit additional emphasis. Past research has not been able to answer whether child labor just discourages enrollment or if child labor discourages both enrollment and school attainment. This distinction is not trivial because the policy tools involved in increasing enrollment (say, by increasing access to schools) are different from those that improve school attainment (say, by increasing enforcement of truancy laws or improving school quality). The findings clearly indicate that child labor reduces both school enrollment and educational attainment in Latin America. Factors that raise the probability of child labor consistently lower school enrollment and grade-for-age. Furthermore, exogenous increases in child labor lower school attendance and increase the probability of lagging behind grade level. Thus, policy efforts geared toward increasing enrollment are not enough. Policy makers in Latin America need to explore how children can be induced to attend school more regularly, as well.

The findings demonstrate that choices regarding child labor and education are intimately related with each other and with household attributes. These choices are particularly sensitive to factors affecting the child's market opportunities and the household's

income level. Policies that do not affect both household income and the value of a child's time in school relative to work, may fail to address the problem.

Interventions that address child labor and low educational attainment such as the new breed of targeted conditional transfer programs for human development (such as PROGRESA in Mexico and Bolsa Escola in Brazil) may offer the right solution. First, these programs target poor families with children. Second, they make cash transfers to the beneficiaries on the condition that their children regularly attend school, raising the returns of child time in school relative to the values of child time in the labor force. While these programs do not explicitly require or monitor a reduction in child labor, their critical design feature (i.e., children attend school up to a minimum number of days) is likely to be effective in both lowering child labor and increasing school attendance. These conjectures are tested formally in chapters 8-11 of this book.

References

Angrist, Joshua and Alan Krueger. 1991. "Does Compulsory School Attendance Affect

Schooling and Earnings", *The Quarterly Journal of Economics*, vol. 106 (4): 979-1014.

Duryea, Suzanne, and M. Arends-Kuenning, (2003) "School Attendance, Child Labor and Local Labor Market Fluctuations in Urban Brazil", *World Development* (Vol. 31, Number 7).

Patrinos, Harry A. and George Psacharopoulos. 1997. Family Size, Schooling and Child Labor in Peru - An Empirical Analysis. *Journal of Population Economics* 10 (October): 387-405.

Psacharopoulos, George. 1985. Returns to Education: A Further International Update and Implications. *Journal of Human Resources* 20 (Fall):583-597.

Ravallion, Martin and Quentin Wodon. 2001. Does Child Labour Displace Schooling? Evidence on Behavioural Responses to an Enrollment Subsidy. *Economic Journal* 110 (March): C158-175.

Rosati, Furio and Mariacristina Rossi. 2003. Children's Working Hours and School Enrollment: Evidence from Pakistan and Nicaragua. The World Bank Economic Review, Vol. 17. No. 2.

UNESCO. 2002. Education Statistics 2001-Regional Report on Latin America. (http://portal.unesco.org/uis).

Figure 1: Employment and Enrollment Rates for Children Aged 10 to 14
(Employment rate solid, enrollment rate shaded)

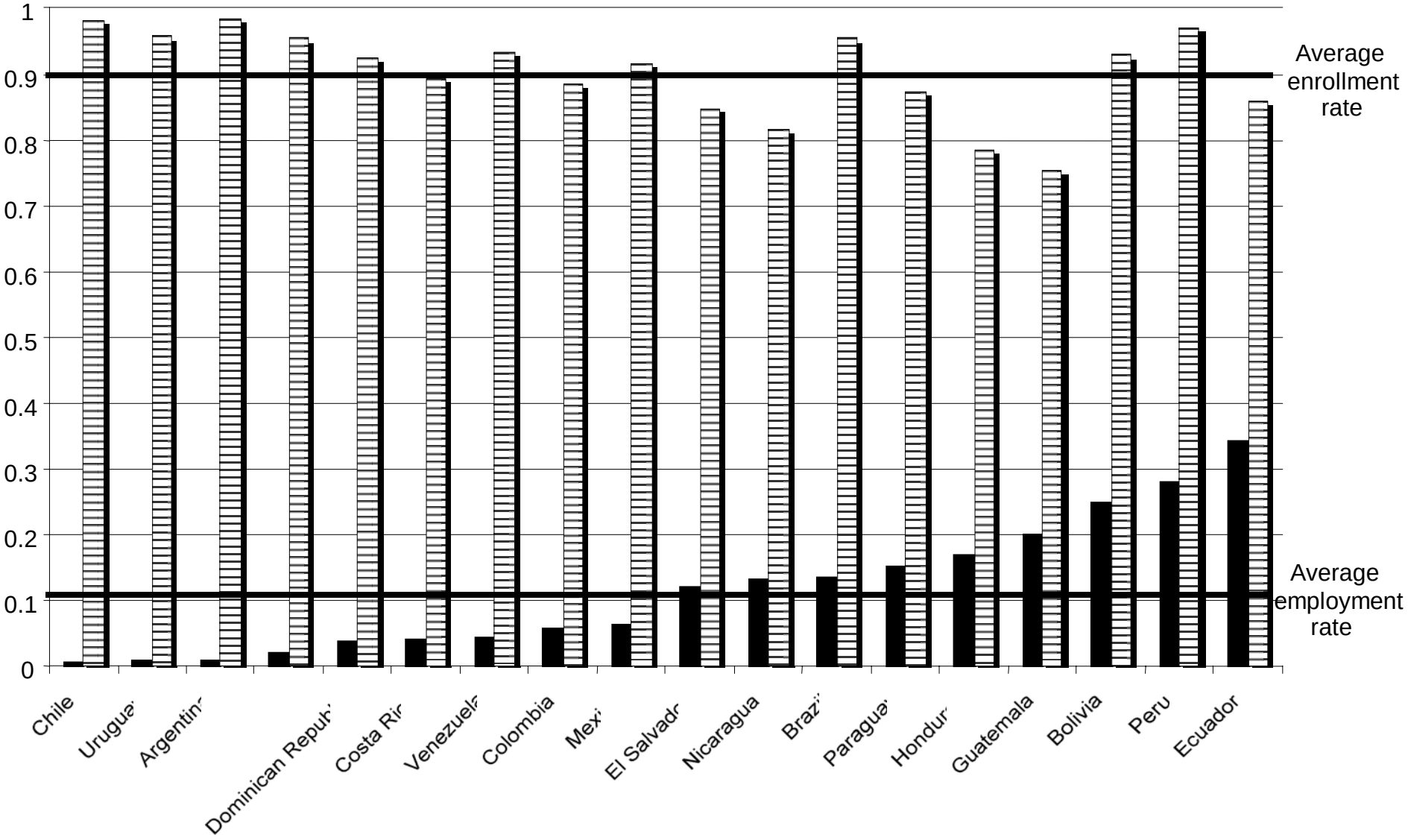


Figure 2: Trends in Employment Rates for 10- to 14-Year Olds, Various Countries

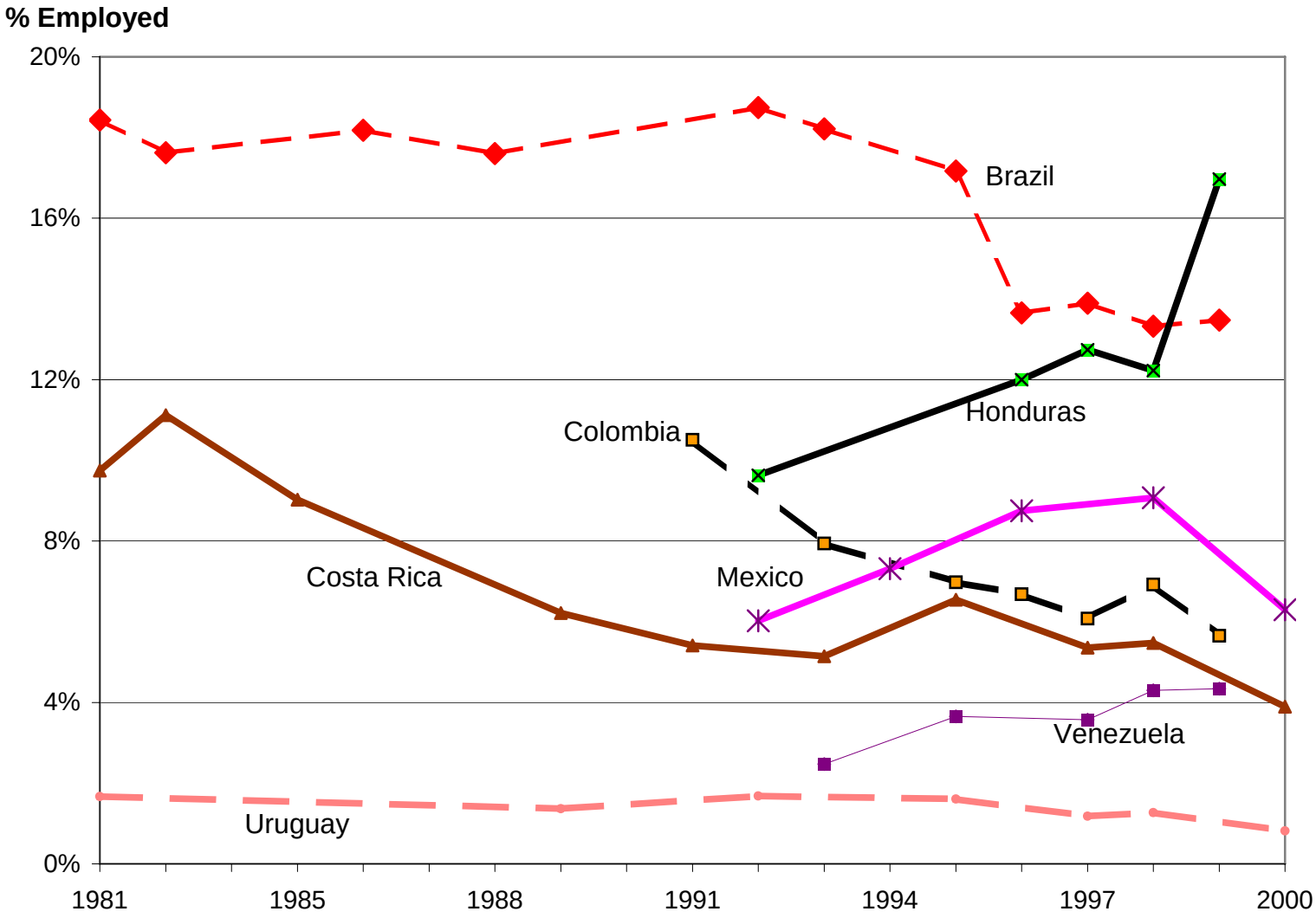


Figure 3: Average Enrollment Rates in 18 Latin American Countries by Household Income Level and Age, 1999

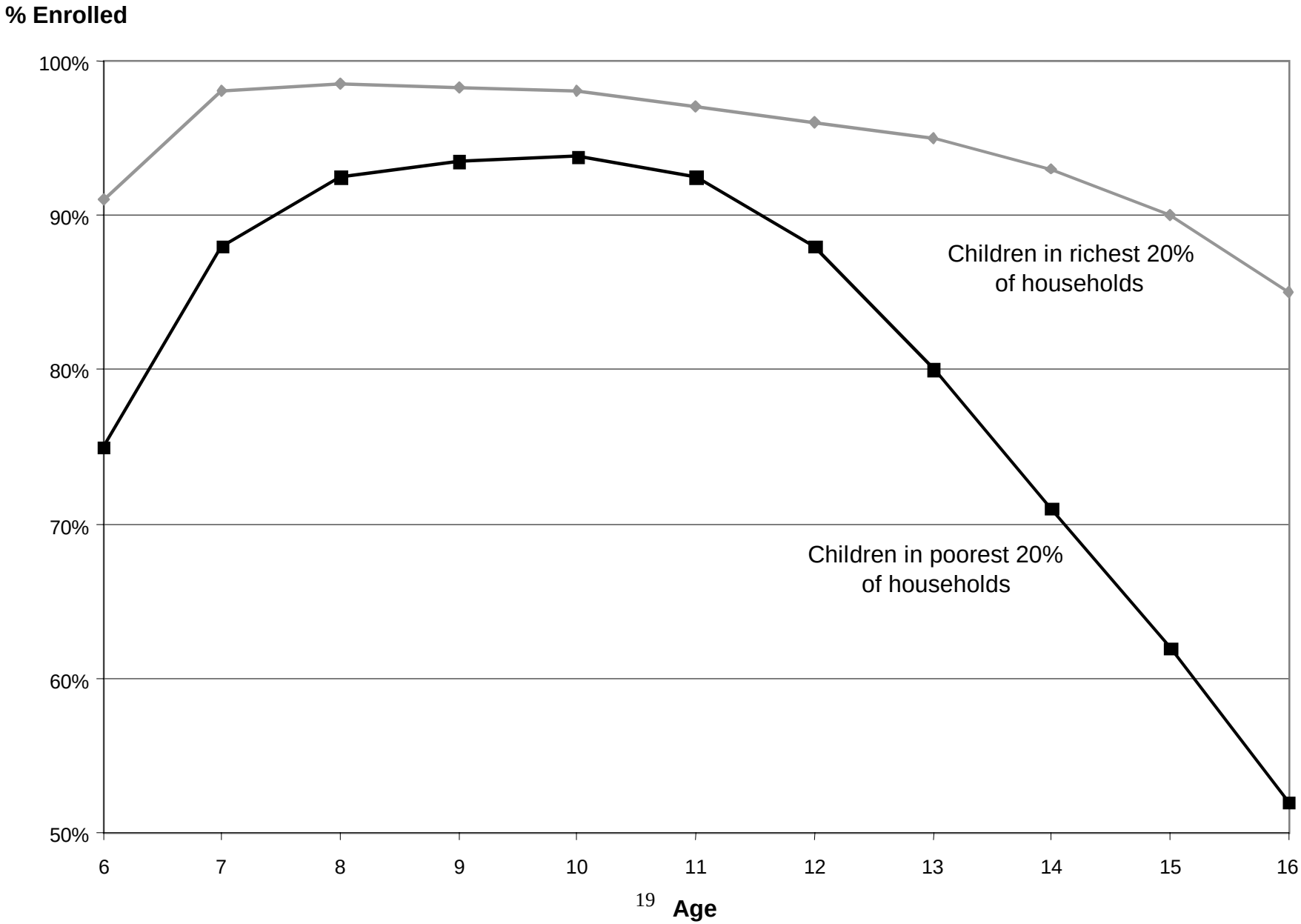
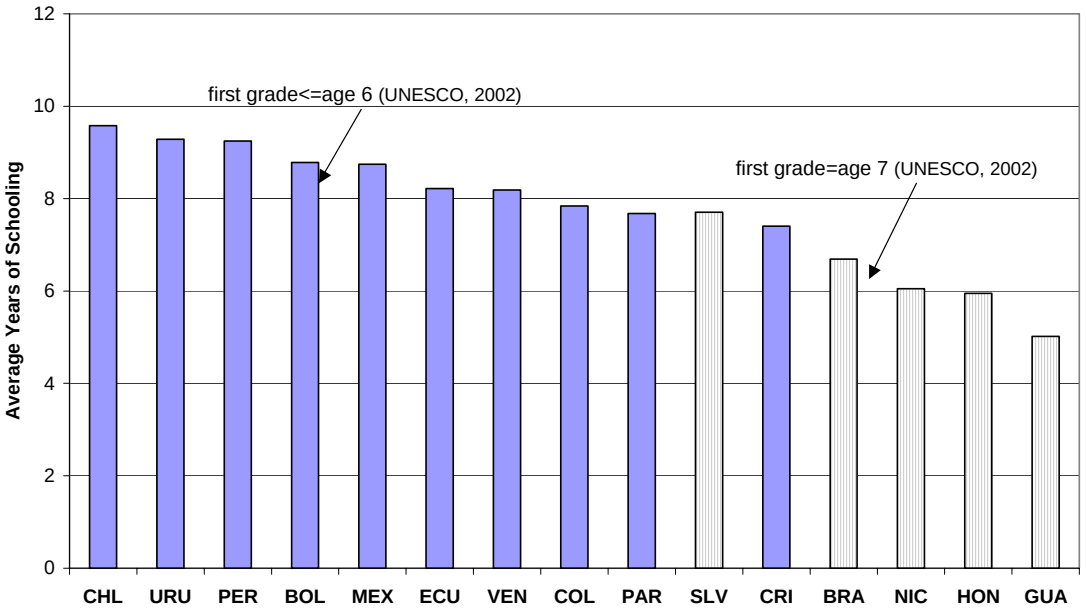


Figure 4. Average Years of Completed Schooling for 16-18 Year Olds
Household Survey Data*



Surveys are nationally representative except in the case of Uruguay where the survey covers urban areas only.

Table 1: Employment Rates for Children Aged 10 to 14, by Country, Urban or Rural Residence, and Gender.

	Urban				Rural				Total			
	Brazil	**Ecuador**	**Nicaragua**	**Peru**	**Brazil**	**Ecuador**	**Nicaraqua**	**Peru**	**Brazil**	**Ecuador**	**Nicaraqua**	**Peru**
Total	8%	22%	6%	13%	32%	36%	16%	51%	14%	36%	11%	29%
Boys	11%	25%	8%	14%	44%	44%	27%	59%	19%	44%	17%	33%
Girls	5%	18%	5%	12%	20%	28%	6%	44%	9%	28%	5%	26%

Data sources: Brazil, PNAD 1996; Ecuador, LSMS 1995; Nicaragua, LSMS 1998; Peru, LSMS 1997.

Table 2: Employment and Enrollment Rates for Children Aged 10 to 14, by Country and Labor Market Status.

	Brazil	Ecuador	Nicaragua	Peru
Employment Rate	14%	36%	11%	29%
Enrollment Rate	91%	81%	81%	95%
Not Employed	93%	93%	85%	97%
Employed	79%	75%	56%	92%

Data Sources: Brazil, PNAD 1996; Ecuador, LSMS 1995; Nicaragua, LSMS 1998; Peru, LSMS 1997.

Table 3: Distribution of Daily Hours Worked By Children Aged 10 to 14, by Country and Gender.

	Brazil			Ecuador			Nicaragua			Peru		
	Boys	**Girls**	**Total**	**Boys**	**Girls**	**Total**	**Boys**	**Girls**	**Total**	**Boys**	**Girls**	**Total**
Under 5 Hours	51%	51%	51%	63%	70%	66%	39%	62%	44%	83%	87%	85%
5-10 Hours	43%	43%	43%	36%	25%	31%	50%	28%	45%	15%	11%	13%
Over 10 Hours	6%	6%	6%	1%	5%	3%	11%	10%	11%	2%	2%	2%

Data Sources: Brazil, PNAD 1996; Ecuador, LSMS 1995; Nicaragua, LSMS 1998; Peru, LSMS 1997.

Table 4: Percentage of Children Aged 10 to 14 Lagging Behind Expected Grade Level, by Country, Gender, and Labor Market Status.

	Total				Boys				Girls			
	Brazil	**Ecuador[a]**	**Nicaragua**	**Peru**	**Brazil**	**Ecuador[a]**	**Nicaragua**	**Peru**	**Brazil**	**Ecuador[a]**	**Nicaragua**	**Peru**
School Only	42%	47%	35%	28%	45%	49%	38%	28%	40%	45%	32%	29%
School & Work	54%	55%	45%	36%	54%	55%		38%	49%	55%	38%	34%
Work Only	69%	54%	79%	43%	73%	50%	81%	42%	61%	62%	64%	45%
Total	46%	56%	42%	31%	50%	59%	46%	31%	43%	54%	38%	30%

[a]Note that Ecuadorian children aged 13 to 14 years are excluded due to a lack of data on the highest grade for those children.
Data Sources: Brazil, PNAD 1996; Ecuador, LSMS 1995; Nicaragua, LSMS 1998; Peru, LSMS 1997.

Table 5: Econometric Determinants of Child Labor.

	Brazil		Ecuador		Nicaragua		Peru	
Age=11[1]	0.041**	0.041**	0.616**	0.586*	0.084**	0.082**	0.022	0.018
Age=12[1]	0.091**	0.091**	0.124**	0.118**	0.076**	0.077**	0.039	0.039
Age=13[1]	0.139**	0.139**	0.254**	0.246**	0.135**	0.134**	0.131**	0.127**
Age=14[1]	0.209**	0.208**	0.238**	0.228**	0.154**	0.154**	0.143**	0.139**
Female	-0.089**	-0.089**	-0.164**	-0.161**	-0.103**	-0.102**	-0.081**	-0.079**
Rural	0.191**	0.192**	0.206**	0.266**	0.060**	0.064**	0.342**	0.344**
Number of Children Under 5	0.002	0.002	-0.021	-0.013	0.002	0.003	0.038**	0.045**
Household Size	0.005**	0.005**	0.011**	0.022**	0.001	0.001	-0.021**	-0.015**
Household Head's Age	-0.001**	-0.001**	-0.002**	-0.002**	-0.001**	-0.001**	-0.003**	-0.003**
Household Head is Female	0.002	0.003	-0.016	-0.003	-0.002	-0.002	0.023	0.023
Household Head's Highest Education	-0.008**	-0.009**	-0.003	-0.006	-0.007**	-0.007**	-0.007**	-0.011**
Quintile 2[2]	-0.004		-0.062**		0.013		-0.061**	
Quintile 3[2]	0.002		-0.127**		-0.015		-0.069**	
Quintile 4[2]	-0.006		-0.138**		-0.022		-0.147**	
Quintile 5[2]	-0.002		-0.211**		0.007		-0.115**	
Observations	37,343	37,343	2,831	2,831	3,114	3,114	2,341	2,341
LR Chi2(15):	5283	5281	467	418	274	267	516	488
Predicted Probability.	0.096	0.096	0.324	0.326	0.081	0.082	0.253	0.256

Notes: [1] Age=10 is the reference dummy.

[2] Bottom quintile is the reference dummy.

Data Sources: Brazil, PNAD 1996; Ecuador, LSMS 1995, Nicaragua, LSMS 1998; Peru, LSMS 1997.

All coefficients have been transformed into marginal probabilities associated with the variable.

* Significant at the .10 level. **Significant at the .05 level.

Table 6: Econometric Determinants of Current Enrollment.

	Brazil		Ecuador		Nicaragua		Peru	
Age=11[1]	-0.011**	-0.011**	-0.039*	-0.040	-0.010	-0.012	-0.007	-0.005
Age=12[1]	-0.021**	-0.021**	-0.118**	-0.124**	-0.061**	-0.056**	-0.009	-0.009
Age=13[1]	-0.050**	-0.050**	-0.279**	-0.278**	-0.021	-0.015	-0.052**	-0.052**
Age=14[1]	-0.109**	-0.108**	-0.362**	-0.359**	-0.110**	-0.105**	-0.085**	-0.083**
Female	0.011**	0.012**	0.0005	0.002	0.034**	0.040**	-0.005	-0.005
Rural	-0.048**	-0.057**	-0.063**	-0.113**	-0.025**	-0.060**	-0.032**	-0.034**
Number of Children Under 5	-0.013**	-0.015**	0.001	-0.002	-0.017**	-0.025**	-0.003	-0.004
Household Size	-0.001**	-0.002**	-0.002	-0.010**	0.008**	0.003	0.001	-0.0002
Household Head's Age	0.0003**	0.0005**	0.001*	0.001*	0.0004	0.001*	-0.0004	-0.0003
Household Head is Female	-0.026**	-0.031**	-0.001	-0.010	0.034**	0.032**	-0.011	-0.011
Household Head's Highest Education	0.009**	0.011**	0.005*	0.007**	0.016**	0.022**	0.002*	0.003**
Quintile 2[2]	0.014**		0.031**		0.064**		0.014**	
Quintile 3[2]	0.023**		0.053**		0.091**		0.018**	
Quintile 4[2]	0.035**		0.082**		0.105**		0.027**	
Quintile 5[2]	0.042**		0.080**		0.119**		0.018	
Observations	37,334	37,344	2,831	2,831	3,107	3,107	2,341	2,341
LR Chi2(15):	2833	2716	494	411	432	335	105	95
Predicted Probability.	0.938	0.936	0.937	0.927	0.901	0.890	0.969	0.967

Notes: [1] Age=10 is the reference dummy

[2] Bottom quintile is the reference dummy.

Data Sources: Brazil, PNAD 1996; Ecuador, LSMS 1995, Nicaragua, LSMS 1998; Peru, LSMS 1997.
All coefficients have been transformed into marginal probabilities associated with the variable.
* Significant at the .10 level. . **Significant at the .05 level.

Table 7: Econometric Determinants of Falling Behind in School.

	Brazil		Ecuador		Nicaragua		Peru	
Female	-6.811**	-6.822**	-2.290	-2.348	-6.955**	-7.460**	-0.823	-0.784
Rural	7.102**	10.902**	0.311	3.647**	7.344**	10.929**	5.951**	6.171**
Number of Children Under 5	2.042**	2.993**	1.823*	0.773*	1.715**	2.670**	1.643**	1.948**
Household Size	1.570**	2.167**	0.124	2.294**	0.733**	1.316**	0.843**	1.098**
Household Head's Age	-0.055**	-0.119**	0.099	0.089	-0.272**	-0.330**	-0.127**	-0.152**
Household Head is Female	4.278**	6.051**	-2.500	-1.781	-2.607**	-2.297*	0.245	0.331
Household Head's Highest Education	-1.623**	-2.383**	-0.112	-0.346	-2.442**	-3.024**	-1.216**	-1.378**
Quintile 2	-10.760**		-4.286*		-13.225**		-2.950**	
Quintile 3	-16.125**		-8.090**		-16.014**		-4.650**	
Quintile 4	-18.813**		-10.378**		-17.735**		-6.183**	
Quintile 5	-18.877**		-11.572**		-21.988**		-5.235**	
Observations	37,315	37,315	1,602	1,602	3,105	3,105	2,316	2,316
F	1745	2209	6	6	108	146	40	59
Root MSE	*23.5*	*24.3*	*28.6*	*28.7*	*30.1*	*30.7*	*20.7*	*20.8*

Notes: [1] Age=10 is the reference dummy
[2] Bottom quintile is the reference dummy.
Data Sources: Brazil, PNAD 1996; Ecuador, LSMS 1995, Nicaragua, LSMS 1998; Peru, LSMS 1997
Note: Ecuadorian children aged 13 to 14 years are excluded due to a lack of data on the highest grade for those children.
All coefficients have been transformed into marginal probabilities associated with the variable.
* Significant at the .10 level. **Significant at the .05 level.

Table 8. Effect of Child Work on School Outcomes

Model: Two Stage Least Squares
with Huber-White Standard Errors

	Dependent Var.: School Attendance			**Dependent Var.: Lagging In Sch**		
	Coef.		Std.Err.	Coef.		Std.Err.
constant	1.291	*	0.051	0.704	*	0.060
child work (instrumented)[1]	-0.733	**	0.351	1.231	*	0.210
child's age	-0.017	**	0.008	0.008		0.007
female child	-0.061	***	0.032	0.061	**	0.028
rural	0.014		0.017	-0.024		0.048
num. kids < age 6	-0.023	*	0.007	0.017	*	0.005
total persons in hh	0.002		0.002	0.011	*	0.002
age of hh head	0.001		0.000	-0.001	**	0.000
female head	-0.010	**	0.005	0.025	***	0.014
schooling of head	0.006	*	0.002	-0.012	*	0.002
15 country dummies	included (not shown)			included (not shown)		
No. obs.	186,735			186,753		
No. countries	16			16		
Adj R-sq. [2]	0.169			0.188		

[1] Instruments include: the schooling policy variables (age at which first grade begins and modal age at which compulsory schooling ends), the child's age, sex, region of residence (urban or rural), age, sex and schooling of the household head. The child's age is also interacted with the policy variables.

[2] Does not includes share explained by country dummies.

* Significant at .01 level.
** Significant at .05 level.
*** Significant at .10 level.