RESEARCH SEMINAR IN INTERNATIONAL ECONOMICS

School of Public Policy
The University of Michigan
Ann Arbor, Michigan 48109-1220

Discussion Paper No. 474

CHILD LABOR: THEORY, EVIDENCE AND POLICY

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August 17, 2001

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ABSTRACT

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There is a growing theoretical and empirical literature concerning the causes and consequences of child labor. The objective of this paper is to evaluate the policy initiatives targeted on child labor in light of the newly emerging theoretical argumentation and empirical evidence. We focus in particular on programs to address child-labor practices, and we attempt to evaluate these programs, given the empirical evidence concerning the primary determinants of when and why children work. Throughout, we find it instructive to evaluate the policies that have been adopted with the intent of reducing overall child labor in terms of the impact they are likely have on the welfare of children.

Keywords: Child labor
Labor standards

JEL Subject Code:
J2 Employment Determination
F13 Commercial Policies

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I. Introduction

Over the past decade, child-labor practices in developing countries and their implications for international trade have become a focus for attention in the international arena. Pursuant to these concerns, some developing countries have adopted innovative programs designed to discourage the worst child-labor practices and to provide families and communities with incentives to reduce child labor and increase educational attainment. Additionally, some industrialized countries have considered a range of policy options, both punitive and non-punitive, intended to reduce imports of goods produced by children and to provide incentives and financial support to reduce child labor in traded and non-traded sectors. Given the increased attention to child labor and the threat of trade sanctions by industrialized countries for weak child labor protections, it is instructive to evaluate the policies that have been adopted with the *intent* of reducing overall child labor in terms of the impact they are *likely* have on the welfare of children.

There is a growing theoretical and empirical literature concerning the causes and consequences of child labor. The overriding objective of this paper is to evaluate the policy initiatives targeted on child labor in light of the newly emerging theoretical argumentation and empirical evidence. We will focus in particular on programs to address child-labor practices, and we will attempt to evaluate these programs, given the empirical evidence concerning the primary determinants of when and why children work.

Particular attention will be given to the causes of child labor above and beyond poverty. It is widely accepted that child labor declines as per capita income rises. However, the process of economic development is a slow one, and many developing countries have lost ground over the last decade both in terms of their standard of living and progress made in reducing child labor. Therefore, we would like to focus particularly on the other causes of child labor distinct from poverty and the policy remedies that theory and evidence suggest.

In Section II, we begin with some of the theoretical arguments concerning family decision-making and the determinants of child labor. We then turn in Section III to the empirical evidence concerning the determinants of child labor and their implications for the types of policies that are likely to influence household decision-making in a manner that reduces the incidence of child labor and increases educational attainment. Section IV is devoted to a review of the traditional methods for reducing child labor. Section V provides an overview and discussion of the likely effectiveness of recent initiatives targeting child labor by developing country governments and initiatives underway by international agencies such as the World Bank and International Labour Organization. In Section VI, we examine some of the motivations for including child labor on the international trade agenda and the likely implications of doing so. Conclusions follow.

II. Theories of Child Labor: Models of Household Decisions

The purpose of this section is to touch briefly on theories of household decision-making with regard to the employment of children. Greater emphasis will be placed on the more recent literature that addresses the role of market failure, particularly in the capital market, and its relationship to poverty. The ultimate objective of the review is to identify the household characteristics that ought to emerge in empirical analysis as statistically significant determinants of child labor.

Neoclassical models of household decision-making are commonly employed in the analysis of child labor and are typically derivative of Becker (1964). Models of household bargaining fall into two broad categories: those in which children have no bargaining power and those in which children have some intrinsic value in the family. In models in which children have no bargaining power in the household, parents make decisions that serve their own interests, without regard for the impact on the child. This class of models lends analytical support for public policies that constrain the choices that parents are allowed to make for their children, eg., compulsory schooling, minimum age of work, a ban on bonded child labor, etc.

Children as Household Assets

In this context, children are viewed strictly in terms of their value as assets. Parents first must choose the number of children they will have. They then weigh whether to invest in the quality of the child or to extract a current stream of services. Becker and Lewis (1973) argue that in the quality-quantity tradeoff, parents who choose a large number of children are less likely to invest in quality schooling. That is, the number of children and investment in the human capital of children are substitutes. Or, parents may choose to have a large number of children in order to diversify risk, formally educating some and putting the others to work

Initial empirical analysis was quite supportive of both the quality-quantity trade-off and the diversification hypothesis. Rosenzweig and Wolpin (1980) find that an exogenous increase in fertility lowers child quality, and Hanushek (1992) finds a trade-off between family size and educational attainment in the United States. Indeed, there is considerable evidence that, on average, children in larger families in both developed and developing countries receive less schooling, perform more poorly on intelligence tests, and are less well nourished (Patrinos and Psacharopoulos, 1997). Closely-spaced children receive the least investment (Powell and Steelman, 1993).

However, Montgomery, Kouame and Oliver (1995) find contradictory evidence for Ghana and Cote d'Ivoire. Further, Patrinos and Psacharopoulos (1995) do not find that the number of siblings of Paraguayan children affect the level of enrollment. Nor is there a strong sibling effect in Brazil (Psacharopoulos and Arrigada, 1989; Levison, 1991). Chernichovsky (1985), studying schooling choice in rural Botswana, actually finds that family size raises educational attainment. Levison (1991) suggests that the positive correlation between family size and schooling may occur because there are decreasing returns in household production. With a large number of children available to engage in household work, the opportunity cost of education for any one child may be quite low.

Not only are child assets viewed in relation to one another, the labor of children may also be seen as a complementary input to other household capital. For example, the investment in physical capital to launch a family enterprise may be optimizing only if it can be combined with the labor of the household's children.

In fact, exploiting a household's assets may frequently require the inputs of child labor. One of the most well documented cases of complementarity concerns the work and school habits of girls whose mothers have marketable skills. Tapping the mother's human capital in the formal labor market may require her daughters to replace her contribution to home work. Thus, human capital embodied in a mother is complementary with more home work and less education for her daughters.

The Poverty Hypothesis

Although parental selfishness may play a role, it is a very commonly held view that child labor is fundamentally a by-product of poverty, strongly suggesting that policy should focus on economic development and increasing income (Nardinelli, 1990). Krueger (1996) notes a steep cross-country negative correlation between GDP per capita and the employment rate of 10-14 year olds in 1995. An important implication of the poverty hypothesis is that policies that focus

on compelling parents to deviate from their optimizing choices may, in fact, make children worse off.

Although the poverty/child-labor link may seem obvious, Baland and Robinson (2000) formalize this idea, thus helping to isolate the precise nature of the mechanism. They take as a point of departure that all families make child-labor decisions to maximize the present discounted value of the household's income. In making child-employment decisions, parents weigh the present discounted value of the future income of an educated child against the foregone income while the child is in school. Child labor is only chosen if the return to education is not high enough to compensate families for the lost income of their children.

The obvious question then becomes "what is it about being poor that lowers the present discounted value of an education relative to current work?" In a world with perfectly functioning capital markets there are two possibilities: (1) poor people are impatient; that is, they discount the future more heavily than other families; and (2) the return to education for a poor child is lower than for children generally. A low return to education for poor children will occur if schools are far away, inadequately staffed, lack educational supplies and materials, etc. The return to education may also simply be unappreciated if the parents themselves are not educated.

A third possibility emerges when the parent's initial endowment is low relative to their child's future income (whether or not they are educated). In this case, parents would like to engage in consumption smoothing. That is, they would like to borrow against the household's future wealth to increase current consumption while lowering future consumption, thereby evening out the consumption profile of the family over time. Parents are particularly highly motivated to engage in consumption smoothing when the household's survival is threatened by a period of unemployment, drought, etc.

In such a case, parents could offer the child a deal whereby the parent borrows on behalf of the current household, expecting the child to provide the funds to repay the loan out of the income they will earn as an educated adult. The problem is that a child cannot pre-commit to

compensate the parents from future income. Thus, the only option parents have for increasing current household consumption at the expense of the future is to put the child to work.

Baland and Robinson note that this type of bargaining failure occurs when the optimal bequest is negative. That is, over time, it is optimal (from some point of view) to transfer resources back in time from the future of the household to the present, rather than from the present to the future. Implicit in the Baland-Robinson analysis is the fact that child labor is a device for transferring income from the future into the present. A child who works today at the expense of acquiring an education will contribute to family income today at the expense of future productivity.

Evidence of intra-household bargaining problems of the sort raised by Baland and Robinson (2000) are found by Parsons and Goldin (1989) and Andvig (1997). Both studies find that children leave the household after receiving an education, making it difficult for parents to internalize the benefits of investing in their children. Further, and perhaps more to the point, Parsons and Goldin (1989) find from their analysis of the U.S. 1900 Census, that working children received little of their earnings in the form of bequests. Child wages only raised current household consumption. One way to interpret this result is that working children were transferring income back to their parents. That is, the optimal bequest was negative, which is precisely the situation in which Baland and Robinson expect to observe working children.

It is important to note that while Baland and Robinson find an analytical role for poverty as a source of child labor, their analysis does not suggest that we should rely exclusively on economic development as a strategy for eradicating child labor. Rather, as we will see below, government policy can play a significant role in solving the intra-household bargaining problem.

Market Failure and Multiple Equilibria

A second wave of models assumes that parents are altruistic and focuses on the interaction between market characteristics and child labor that point to certain market

manipulations as a remedy. For example, Basu (1999) examines the case in which rigidities in the market for adult labor drive child labor. He considers a market in which the adult wage is downward rigid, giving rise to adult unemployment. For those families with an unemployed adult, children must work. A policy aimed at restoring wage flexibility and improving labor-market function might lower child labor, as would a subsidy to the household during a period of unemployment.

Grootaert and Kanbur (1995) focus attention on the external benefit of an educated child on the general population. In this case, an education subsidy will help internalize the externality and may have the added benefit of reducing child labor.

Basu and Van (1998) analyze the case in which benevolent parents withdraw their children from the labor market once the adult wage reaches a critical level. Such a labor market may have two equilibria: one in which both children and adults work, giving rise to a large labor supply and low wages, and one in which only parents work, giving rise to a low labor supply and a high adult wage. A ban on child labor may have the effect of helping the high-wage, no-child-labor equilibrium emerge, thus redistributing income towards the supplying families and away from owners of other factors.

Hirshman[1] also suggests the possibility of multiple equilibria emerging when parents who put their children to work suffer a social stigma for doing so. The stigma is greater, the smaller the number of other children in the community who are working. Thus, as with Basu and Van, there may be two equilibiria: one with many children working and a low social stigma attached to work and one with few children working and a high social stigma. Hirshman's analysis also suggests that a policy banning child labor might bring about the low child-labor/high social-stigma equilibrium.

The most recent developments focus on capital market failure. Baland and Robinson (2000) extend their approach discussed above, introducing the possibility that households might

be liquidity constrained. Thus, they emphasize the importance of capital-market failure as a contributing factor to inefficient child labor.

Capital-market failure can emerge in several different guises. Consider first the case in which the present discounted value of an education is greater than the current value of a child's labor. In this case, it is clearly optimal for a family to borrow against the child's future income to finance the child's education. Or, to be more specific, it is in the interest of the child to make any requisite contribution to household income by borrowing against future income, thus freeing the child to attend school rather than work. Baland and Robinson note that the inability of the child to access the capital markets, or the inability of the child to pre-commit to repay education loans obtained by the parents on the child's behalf, may give rise to inefficiently low educational attainment.

To the extent that such intra-family bargaining failure is contributing to inefficient educational attainment, it is possible for government policy to correct the failure with properly configured educational loans to poor families. A government loan that is tied to the child's educational performance and becomes the liability of the child, rather than the parent, allows the child to access the capital markets to meet required contributions to the family. Such a loan is Pareto improving provided there is some reason to believe that the child would have voluntarily undertaken the loan if he/she had the cognitive ability to analyze the choices like an adult.

However, if parents treat their child's future as a contributing factor to their own sense of well-being, they may be willing to borrow against their own assets or future income in order to finance their child's education. In this case, a lack of collateral will prevent parents from accessing the capital markets, thus again giving rise to an inefficiently low level of education.

The dynamic implications of capital market failure have been studied by Ranjan (2001), with similar conclusions reached by Basu (1999). Ranjan considers, in particular, very poor families who would choose to educate their children if they had access to a capital market, but fail

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[1] See Basu (1999)

to do so due to capital-market failure. Such families produce poor, uneducated children who repeat the cycle for the next generation. In this model, a concerted effort to educate one generation of such children will pull the family away from the income level at which they depend on the labor of their children for survival. Thus, subsequent generations of the family will be able to educate their children, permanently enjoying a higher standard of living and educational attainment.

The central policy lesson of the Ranjan and Basu models is that government intervention is required for only one generation of children. For, once an educated child's future income is raised above a threshold level, the newly created parent will be able to choose education rather than child labor for the next generation.

III. Empirical Evidence on the Determinants of Child Labor

The purpose of this section is to review the empirical evidence on the determinants of child labor. The theoretical models considered above suggest several potential motivations for putting children to work. As noted in each case, knowing the cause of child labor is fundamental to making effective policy.

Evidence to support a view of selfish parents is provided by Burra (1995) and Parsons and Goldin (1989). Moehling (1995) also finds that the bargaining position of the children in the household varies with the child's contribution to income. Gupta's (1997) analysis of working children in West Bengal, India, suggests that children have very little bargaining power in the household. Thus, there is some evidence of at least a little *play* in the resources that a family can devote to the welfare of their children. At the margin, properly configured policy may push some families to increase the investment they make in their children.

Household Decision-Making and Child Labor

In order to disentangle the conflicting determinants of child labor and to assess the relative importance of each of the factors influencing child-labor decisions, it is necessary to empirically estimate household decision-making in the context of a formal analytical model.

In the most careful of such studies, households are assumed to use a sequential process for making child-labor decisions. In the first stage, parents decide whether a child should work. In the second stage parents decide whether the child will work part-time or full-time. In the third stage, the type of work is chosen. Sequential probit analysis is undertaken on household survey data to identify the family characteristics that are determining the probability that a child works, the probability of schooling, and the type of work.

Typically, such analysis will begin with the specific characteristics of the child such as age and gender. Parental characteristics such as educational attainment, age, and employment status are also included.

Household characteristics include, first and foremost, some measure of household income. Due to problems with endogeneity of income, most analysts include measures of household capital, welfare, poverty status, total expenditures or expenditure on food, in lieu of household income.

Household assets are also important in the absence of access to formal capital markets. Households that want to borrow against the future may be able to tap internal assets. The presence of the father in the household, the presence of an older sibling in the household (particularly a brother), the capacity of the mother to engage in market work, or property associated with a family enterprise can all be thought of as assets that can be drawn upon even if the family has no access to formal capital markets. For this reason, the presence of such household assets might be expected to lower child labor. Consequently, gender, birth order, the presence of older siblings, the mother's work opportunities, and the presence of a family

enterprise are also important determinants of whether a child works, the type of work undertaken, the number of hours worked, and whether part-time schooling is an option.

The availability of schools in terms of quality, proximity and cost will also affect child labor and schooling choices. Household expenditures on schooling are typically available from survey evidence. However, measuring school quality is extremely difficult. At best, some studies have evidence on the integrity of the school structure, whether or not the school is open most days of the week, and other services available to the general community such as running water or electricity.

Nearly every study includes some other characteristics such as region of the country, urban vs. rural, and other cultural characteristics including religion.

Determinants of Work and School

Consider first the decision as to whether children should work at all. Empirical results for Colombia, Bolivia, and Peru are reported in Table 1. Each study uses a slightly different set of explanatory variables. Those significant at the 10% level are listed in the corresponding columns. Regression results reported in Table 2 are probability derivatives evaluated at the mean of the explanatory variables.

Cartwright (1999) analyzes 1993 survey data for rural and urban children in Colombia. As we will see below, gender usually plays a significant role in work and school decisions, but the role of gender varies across continents. In the case of Colombia, rural boys are 9% more likely to work than are girls. The age of the child is also significant in virtually every country studied. In Colombia, the probability of work increases by 8 percentage points for each year a child ages. As the child ages and becomes more productive, the opportunity cost of education rises, making work more attractive

Poverty also plays a substantial role in driving children to work. For a one percent increase in household expenditure in Colombia, the probability of work declines by 0.11 percentage points for a rural child and 0.19 percentage points for an urban child.

Also, as expected, household assets are an important determinant of whether children work, although the direction depends on the nature of the asset. The presence of a household enterprise for rural families makes it easier to draw children into work. Children in rural Colombia whose families operate a household enterprise are nearly 8 percent more likely to work than other rural children. The fact that the mother is working may also make child labor in the household necessary. Rural children are 7 percent more likely to work and urban children are 4 percent more likely to work if their mothers also work. These are household assets that are most effectively tapped when children in the household work. Thus, for these two household assets, the asset and child labor are complementary.

The role of siblings is particularly interesting. There is little evidence that siblings increase child labor supply. The presence of younger siblings does not affect the probability of working, so older children do not appear to be engaged in childcare. However, the presence of other siblings in the same age range plays a significant role in *lowering* the probability of work, and the presence of older children in the household also lowers the probability of any one child working.

These results certainly provide very little evidence for a diversification in the investment in children. Siblings within an age-range, 10-15 years old, increase the probability that each other are in school. This is far more consistent with the notion of decreasing returns to household production than diversification.

One possible way to preserve the diversification hypothesis is to assume that parents with a single child diversify by having the child work part-time and in school part-time. Once additional children are born, diversification can be accomplished by putting some children to work exclusively and some in school exclusively. If this is the case, the presence of additional

siblings should have the twin effects of increasing the probability of full-time schooling and increasing the probability of full-time work. That is, the larger the family, the less likely we are to observe a work-school combination.

However, as we will see below, the presence of other siblings in the household also typically *lowers* the probability of full-time work. The negative impact of other siblings in the household on full-time work is particularly notable for urban Colombia. The only exception is that very small brothers in rural Colombian households *increase* the probability that their older siblings will work full-time. Cartwright was somewhat skeptical of this result because the presence of very young sisters *lowers* the probability of full-time work for older rural Colombian siblings. She was unable to account for the distinction.

Nor does there appear to be evidence of a quantity-quality tradeoff. The only possible way to interpret the results in favor of the trade-off hypothesis is that parents are putting their first-born to work and then investing in formal education for the younger children. However, this configuration defies conventional wisdom. Hanushek (1992) and others argue that appearing high in the birth order has significant advantages. Parents typically invest in the first child since first-borns have a higher probability of being in a small family than subsequent children.

It seems far more compelling to interpret the presence of older siblings in the household as evidence of household capital on which the parents can draw in lieu of tapping formal capital markets, making it possible to keep younger children in school full-time. This is an important conclusion because it lends support for the notion that improved access to capital markets for families with limited household assets might reduce the incidence of child labor.

Furthermore, the evidence also suggests that increasing the size of each cohort of children in the family, thereby increasing sibling density, lowers the probability of child work. We would expect the opposite if parents with a large number of closely spaced children were planning to put them to work rather than in school. Thus, we have far more evidence of decreasing returns to

household production rather than a quality-quantity tradeoff. Children with a large number of similarly aged siblings share household chores and then also attend school.

We will also find that parental education plays a persistent, powerful and negative role in the family's decision to put a child to work. The more years of school both mothers and fathers have, the more likely they are to devote their children's time exclusively to school, even controlling for household income. This effect is more ubiquitous than any other in determining child labor. In the case of Colombia, as noted in Table 1, the parental education effect is particularly pronounced. Each year of *each* parents' education lowers the probability that their child will work full time by 2 percentage points in rural Colombia.

Note that the parental education effect exists above and beyond the contribution that the educated parent's human capital makes to family income. Thus, when parents become educated, this appears to impart some informational externality that affects the decisions that parents make for their children.

Finally, the cost of schooling in Colombia has a negative effect on child labor. That is, the more expensive school is, the less likely it is that the child will work. Cartwright suggests that the cost of schooling in this case is a proxy for school quality.

Results for the second stage of the estimation are reported Table 2. The second stage includes only those children who are working and attempts to determine which of these children work full-time.

For children who work, the decision to work full time depends on many of the same variables as the decision whether to work at all, although there are some important exceptions and nuances. For example, even though boys are more likely to work, girls are more likely to work full-time, both in market work and household production. Further, there is some evidence that when children are taken out of school to work full-time, they are caring for very young male siblings.

It is also important to note the subtle role that a family enterprise and mother's work have on children in Colombia. Both of these household assets are complementary with some child labor. However, they also appear to make it possible to combine work and school. So, children in families with a household enterprise and/or a mother who works are more likely to be working than other children, but they are not put to work full-time. A household enterprise gives the family some flexibility in when and how hard their children work and also allows parents to supervise their children themselves. In such cases, child labor may not seem so egregious and may more readily be combined with formal schooling.

Cartwright and Patrinos (1999) find somewhat similar results for Bolivia as shown also in Tables 1 and 2. Poverty plays a central role in driving child labor. The effect of poverty is mitigated only by a mother's educational attainment and the presence of other older siblings in the household. However the cost of schooling is also key. The more expensive schooling the more likely children are to work, as one would expect.

But, for Peru, as analyzed by Patrinos and Psacharopolous (1997), we have a dramatically different story. As can be seen from the last column of Table 1, boys are more likely to work than girls, and the father's education has a small negative impact on the decision to work. There is also some evidence that older children are caring for younger children, but this effect does not appear to be driven by the mother's employment.

What is noteworthy in Peru is that *none of the potential measures of household assets or income appear to play a significant role*. This is quite a surprising result in light of the strongly held popular notion that child labor is most importantly a consequence of poverty. (Similar results for Peru are found by Ray (2000)).

In order to tease out the more subtle aspects of Peruvian child labor, Patrinos and Psacharopolous also try to determine why a child fails to advance in school. They use as a dependent variable a measure of the age-grade distortion, which indicates the extent to which a

child is failing to advance through school with his/her cohort. Results are reported in the last column of Table 2.

Neither family income *nor whether the child is employed* played a role in success in school. Neither of these variables is statistically significant in explaining the age-grade distortion. The only income or asset variable that does appear to be important is the number of rooms in the home. Children who fall behind in school have a large number of siblings who are also in school. Thus, child labor and educational attainment do not appear to be connected in Peru, with only one exception. Older Peruvian children are, in some cases, taken out of school to care for younger children. Otherwise, the type of work engaged in by Peruvian children does not appear to be a competitor with schooling for a child's time or intellectual energy. Consequently, it is not surprising that income and household asset variables play little role in driving the decision to work.

Patrinos and Psacharopoulos hypothesize the reason that Peruvian children can combine work and school without ill effect is that work makes it possible to afford to attend school. However, it is equally possible that these results point to the poor quality of school. Perhaps the value of schooling is so low that parents do not see school attendance in financial terms.

The role of poor school quality should not be understated. Peru provides a particularly striking example. The deficiencies in the facilities, supplies, teacher salaries, and training seriously undermine the value of the time that children spend in school. A third of all schools have only one teacher, a problem most common in rural areas. In rural Amazon, it is typically the case that there is only one teacher to handle 50-60 students in 4-6 different grades. The poorest schools may not have even the most fundamental educational supplies such as books. In rural areas, 83 percent of schools have no running water, electricity or indoor plumbing. Even in metropolitan Lima, only 60 percent of schools have electricity (Ministerio de Educacion, 1993).

Given the deficiencies in the public education system, some children work for the explicit purpose of earning the tuition for *private* education. For example, in Ecuador, one in ten working children studies in a private school.

It is also important to note that the weak impact of child labor on academic performance in Peru is not evident elsewhere. For example, Psacharopoulos (1997) finds that a working child in Bolivia is 10 percent more likely to fail a grade than an unemployed child. Similar results are obtained for Venezuela.

Turning to evidence from Africa, we find several differences, one of which is that the cultural attitudes toward gender, work and school vary across continents. Canagarajah and Coulombe (1998), analyzing the work and school choices in Ghana, find that girls are more likely to work than boys and less likely to attend school, as can be seen from the first column of Table 3. The differential rate is directly attributable to homework performed by girls. However, as with Peru, household income does not play a strongly positive role in whether children work. In fact, the correlation between income and child labor follows an inverted-U shape. Thus, child labor falls with income only in the upper range of the income distribution. This relationship is confirmed by Bhalotra and Heady (1998) and Levison (1991).

We do see evidence that family assets influence school and work decisions. The presence of a *non-farm* family enterprise and older women in the household lower the probability of work for younger children. However, children are more likely to work if the parents are self-employed farmers. Years of parental education and the presence of older siblings also lower the probability of work and raise the probability of some schooling.

Interestingly, school fees increase both the probability of work and the probability of school attendance. This strongly suggests both that children need to work to pay school fees, but that more expensive schools are higher quality.

Given the indication that household assets, as distinct from income, are playing a role in child labor decisions, it would be useful to have some more direct evidence from financial assets

rather than simply trying to draw inferences from the presence of human capital. Jensen and Nielsen (1997) include several asset measures in their study of schooling decisions in Zambia. Results are presented in the last column of Table 3. As in Ghana, girls are less likely to be in school than boys. This is particularly the case for girls who are married.

We also see some other familiar results. For example, educated fathers are more likely to school their children. Families with a wage-earner are also more likely to school their children. However, children in households with more than one family member working other than the child are considerably less likely to be in school.

Income, again, has a strong positive effect on schooling, as do financial assets and household capital. However, if the family holds its assets in the form of land, children are less likely to be in school. Land and child labor appear to be complementary inputs in Zambia. Note, though, that children in the rural sector and whose family members work in the agricultural sector are more likely to be in school. It may be that such families have more flexibility in combining agricultural work and schooling. However, Jensen and Nielsen also suggest that rural schools may be of higher quality than urban schools, thus making schooling a more attractive choice for agricultural families.

Much of the same character of child labor in Zambia is evident for Cote d'Ivoire, as well. Grootaert (1999) uses sequential probit and bivariate techniques to analyze the sequence of child labor decisions for children aged 7 to 17. Results for urban children are reported in the middle columns of Table 3. Grootaert first isolates the household characteristics for families that send their children to school only. Next, of those children who do some work, children are sorted between those who combine work and school and those who work only. Finally, of those who only work, children are divided between market/family enterprise workers and home-workers.

Several of the standard results are in evidence in Grootaert's estimates. Girls are 30 percent less likely to be in school full-time and are also less likely to combine work and school and less likely to work in the market than boys.

Educated parents are more likely to send their children to school full-time or to combine work and school than to put children to work only. Each year of a father's education lowers the probability of dropping out of school by 1.8 percentage points, and each year of a mother's education lowers the probability of dropping out by 3.5 percentage points. In fact, parental education is more important than any other variable in deterring full-time employment by children. For rural children the impact is even more pronounced. (See original manuscript for rural results). Each year of a father's education lowers the probability of dropping out by 7 percentage points and each year of a mother's education lowers the probability of dropping out by 3 percentage points. However, in both cases, the effect is weaker for girls than for boys.

Poor families are less likely to send their children to school or combine school with work. Urban families in the lowest income quintile are nearly 9 percent less likely to send their children to school full-time and over 12 percent less likely to have children combine school with work rather than drop out completely.

Grootaert argues that his results suggest a strong role for income in determining child labor. However, he does not enter income directly into the equation due to problems with endogeneity, preferring instead to rely on measures of household capital. Coulombe (1998), evaluating a similar data set, finds that income, corrected for endogeneity, plays only a small role. Each one percent increase in household income lowers the probability of child labor by 0.3 percent.

The impact of household assets on child work, once again, depends on the nature of those assets. In Cote d'Ivoire, the presence of a family enterprise lowers the probability of school only and the probability of a work-school combination. One possible explanation is that a family that decides to invest in a family enterprise is doing so with the expectation that the children will work in the family enterprise and thus will not need an education.

Grootaert suspects that the household enterprise is a proxy for poverty, as most household enterprises in Cote d'Ivoire are run by very poor families. However, some corroborating

evidence of the complementarity between child labor and household assets is offered by Coulombe (1998). In rural Cote d'Ivoire, the probability of working increases and the probability of school attendance decreases with the number of acres of land owned by the household.

The family enterprise also interacts in an unusual way with the work of mothers and daughters. In Cote d'Ivoire, it appears to be the case that mothers who work in a family enterprise draw their daughters in, working side-by-side both in the enterprise and in household production. Otherwise, unlike in some other studies, a working mother *increases* the probability of full-time schooling.

In Cote d'Ivoire we see another by now familiar result. The presence of other work-age children in the household increases the chances of schooling and lowers the probability of work at all stages of decision-making. The distance to school also plays a role for rural children. The absence of a school in the local community increases the probability of dropping out for rural children by 18 percentage points.

Several studies above have pointed to the importance of school quality as a determinant of child labor. However, few studies incorporate any measure of school quality. Dreze and Kingdon (2000), in their study of child labor in India, do not have measures of school quality, but they do have some indication of desirable school characteristics that might be correlated with school quality, such as whether the building's roof is waterproof. They also include evidence as to whether the community has made a commitment to building infrastructure, such as whether homes have electricity, piped water and phone service. The impacts of these variables on probability of enrollment for boys and girls are reported in the first two columns of Table 4. (Similar results are found for Pakistan by Ray (1998)).

Although factors such as school quality and village characteristics do not impact schooling decisions for boys, they are quite important for girls. In addition, the availability of a school-lunch program, which increases the short-term return to school attendance, and a positive attitude toward school attendance both increase the probability of school enrollment for girls.

Glewwe and Jacoby (1994), in their analysis of Zambia, also find an important role for school quality. For example, they find that repairing classrooms in schools that are unusable when it rains is more valuable than providing additional instructional material. Hanushek and Lavy (1994) find that Egyptian students attending higher quality schools tend to stay longer in school and complete more grades. Finally, San Martin (1996) finds that labor-force participation (LFP) rates for children aged 10-14 rise with the primary-school, student-teacher ratio across countries.

The Demand for Child Labor

Up to this point we have focused on the supply side of child labor. On the demand side, it is sometimes argued that the demand for children derives from their special characteristics that make them indispensable for production; the so-called "nimble fingers" argument. Some employers claim that only children with small fingers have the ability to make fine hand-knotted carpets, pick delicate jasmine flowers, or scramble through narrow tunnels. However, like the argument that children work because parents are selfish, analysts have lost interest in the "nimble fingers" hypothesis. It is almost certainly the case that if employers had to pay the true social cost of employing children, they would find technological innovations to replace child workers. In fact, Levison et al. (1996) and Anker and Barge (1998) find that children are not necessary for the Indian carpet industry. Both authors argue that it is more likely that children are attractive employees in spite of their low productivity because they are less aware of their rights and more willing to take orders, do monotonous work, and are less likely to steal.

We can draw other bits evidence on the demand side as well. For example, Parsons and Goldin (1989) note that the LFP rates for children did not vary across sectors, as would be expected if children had some special characteristics that made them particularly valuable to industry. First, a cross-state analysis of the U.S. 1900 Census of Population reveals that the LFP rates for males 10-15 was not significantly higher in manufacturing and mining than in

agriculture, although, it should be noted that the LFP rate for girls aged 10-15 was higher in industry. However, those industries in which one would expect the special features of children to place them in high demand, such as textiles, boots and shoes, paper, and clothing, did not employ substantially more children than iron, steel, and mining. Rather, the industry in which a child was employed was overwhelmingly determined by the industry in which the parent was employed.

Concluding Remarks on the Determinants of Child Labor

1. Parental education plays a persistent and significant role in lowering the incidence of child labor, above and beyond the impact on family income. The results presented on this are quite robust, as reviewed by Strauss and Thomas (1995). In some cases, such as Cote d'Ivoire, the parent's level of education overwhelms all other family characteristics.

Several theoretical contributions on the determinants of child labor emphasize the importance of educating a single generation of parents and its long-term implications for decision-making for future generations. The theoretical mechanism draws attention to the impact that an education has on the parent's human capital and income. That is, educated parents earn enough income to afford to educate their own children.

However, the empirical evidence very strongly suggests that a parent's education affects future generations above and beyond the impact on household wealth. There are several possible explanations. For example, educated parents have a greater appreciation for the value of an education or uneducated parents may simply want to believe that the human-capital decisions made by their own parents were correct. In any event, cost-benefit analysis of programs that concentrate on educational attainment must look beyond the impact that an education has on a future parent's income stream and incorporate the implications for human-capital formation by subsequent generations.

2. Several studies point to the importance of school quality as an important determinant of schooling and work. However, school quality is virtually never measured directly in any of the

studies discussed. It is quite possibly the case that when a family poised to move children out of the work force and into school fails to do so, the culprit is poor schools. Poor school quality is found to be weakly important in rural Ghana (Lavy, 1996) and very important for Africa generally (Bonnet, 1993). It should be noted though that even if poor school quality lowers the value of formal education, there is an abundance of empirical evidence across Latin America, Africa and Asia that the return to education is still quite high and more than offsets the foregone income of children in school.

3. The role of household income in determining child-labor decisions needs further study. Clearly, there is a very strong cross-country negative correlation between child labor and per capita GDP. However, the role of family income is not so predominant in explaining variations within a community. We did observe, for some but not all countries, that household expenditures play a central role in child labor decisions. This evidence suggests that there are some external effects across families that make it difficult to put children in school even as income rises or, equally, difficult to put children to work when income is critically low. In particular, none of the studies does a very good job of measuring school quality. The role of cost of schooling, when this is measured, suggests that it may be acting as a proxy for quality. In this case, parents who have the financial ability to forgo the income from the children may still not choose schooling if the quality of schools is very poor.

It is also the case that regional dummies and cultural characteristics such as religion or caste have some significance, suggesting a nontrivial role for cultural factors.

Finally, it is important to reconsider when economic theory tells us to expect poor parents to put their children to work. Recall that, as argued by Baland and Robinson, child labor is a device for transferring resources from the future into the present. Children who work do not invest in human capital that will make them more productive in the future. A family will choose to make this inter-temporal shift in household resources when current income is low *relative* to future income. Thus, it is not the absolute level of family income that matters for the child labor

decision but, rather, the current level *relative* to future income. There may be families that are quite poor and do not have any reason to expect any change in the future. Such families have no reason to attempt to consumption-smooth by putting their children to work.

4. Household assets play an important role in the child-labor decision. One might expect that the more assets a family has, the lower the probability of child labor. However, there are a number of assets that require a complementary input of labor, and families may expect to get that labor from their children. Tapping the human capital of mothers in the family also requires an increase in child-labor inputs in home production. Thus, a strategy of increasing access to capital markets may not always lower child labor, at least in the short run.

Nevertheless, the significant role of household assets lends some evidence to the possibility that incomplete credit markets give rise to inefficiently high levels of child labor. For example, the presence of older children in the home considerably reduces the probability of child labor. Note that there is a measurable impact *above and beyond* the contribution that older siblings make to family income. This is particularly the case for older brothers, who embody the greatest human capital. In addition, a parent's education reduces child labor for reasons other than the impact of education on the parent's productivity. It is possible that a parent's education is viewed as a marketable asset, or it may be a reflection of the informational externalities associated with the value of formal education.

What is not clear is why family assets matter. On the one hand, households with assets can more readily weather adverse events. That is, these assets provide the household with the ability to manage uncertainty and, as a consequence, child labor is not required for this purpose. However, families with assets may also have more access to capital markets or can, themselves, fund a child's education without a formal loan. That is, household assets help families transfer household income intertemporally.

In either case, expanding access to formal capital markets to families who otherwise lack collateral may lead to a reduction in LFP rates for children. However, it is also the case that

placing constraints on household decision-making, such as mandatory schooling, may at least inhibit the family from turning to internal assets that can be accessed only if children work more. Providing working mothers with firm-level child care may also help reduce the reliance on older daughters to care for their younger siblings.

5. It is clear that older children are more likely to work than younger children. As children grow older and acquire skills, the opportunity cost of schooling rises. This is particularly the case for adolescent boys, who are increasingly able to perform physically demanding tasks as they approach maturity. Thus, it appears to be the case that it will be more challenging and costly from a policy point of view to induce older male children to remain in school.

6. The role of siblings in the household does not appear to be a major deterrent to schooling *once we control for other household characteristics.* The only exception is that there is some evidence that in some cases, mid-aged children are caring for younger siblings.

When evidence that older children are caring for younger children is combined with the fact that the presence of an older sibling in the house generally raises the probability of schooling, it is possible to make a case that parents are diversifying their human-capital investments in their child assets. The oldest children acquire human capital in the form of on-the-job training and the youngest children receive formal education. However, this interpretation of the evidence does not accord well with the other significant result: the presence of siblings in the same age range tends to *raise* the probability of school and lower the probability of work.

Rather it seems more natural to, first, view children in the middle age range, 10-14, as complements, sharing housework and schooling opportunities. Second, when we observe older children making schooling possible for their younger siblings, this is likely evidence that older siblings help relax the liquidity constraint in the presence of capital-market failure. Third, when we observe mid-aged children caring for younger siblings, it is to help the family make optimal use of the mother's human capital in the form of marketable skills. Thus, policies that focus on lowering fertility may not be particularly effective in reducing child labor.

To the extent that parents diversify their child assets, this appears to occur along gender lines. In Latin America, parents are more likely to engage in the formal schooling of their daughters whereas in Africa parents are more likely to school their sons.

7. Finally, we see little evidence that child labor is driven by the needs of industry. Children are far more likely to be working in a rural setting rather than an urban setting where factories are located. In addition, LFP rates rise with a child's age, strongly suggesting that the productivity of a child increases, the larger and stronger the child is. If child workers were valued for their small stature and tiny fingers, we should have observed the opposite. To the extent that child labor is a demand-side phenomenon, it appears to occur primarily within the household. Families with a household enterprise or a large tract of land tend to want to put their children to work. That is, the household's physical assets are most efficiently employed when the child's time is used as a complementary input.

IV. Traditional Policies Targeting Child Labor and Education

We now turn to an examination of some traditional strategies for reducing child labor and increasing school attendance. As discussed in Engerman (2001) in this colloquium, the initial strategies for circumscribing child labor in industrial England included limits on hazardous work, hours of work, minimum age of work, a prohibition against night work and minimum educational attainment for working children, and strategies to promote general economic growth.

Promotion of Economic Growth

Given the strong correlation between economic growth and the decline in child labor, some have argued that policies targeted explicitly on child labor are ill-conceived. There is certainly an abundance of evidence both that household income is an important determinant of whether and how much children work in developing countries, as well as a strong negative correlation between per capita GDP and income growth both across countries and across time.

However, while economic growth undoubtedly offers the greatest promise for helping children in the long run, the well-being of today's children and perhaps even economic growth itself may depend on getting children out of jobs and into schools today.

Minimum Age and Compulsory Education

In the international arena, child-labor practices are also regulated by ILO Convention 29 that calls for the abolition of forced labor and Convention 138 that provides for a minimum age of employment. According to the language of Convention 138, children should not enter the labor market before having completed compulsory education or having reached the age of 15. Additional provisions allow for light work beginning at age 13 and hazardous work beginning at age 18. Furthermore, developing countries may permit light work at the age of 12 and non-hazardous work at age 14. Indeed, regulating minimum age and compulsory education has become the most common strategy globally for limiting child labor. Typically, children are required to attend school until the age of between 14 and 16 and are permitted to begin working at the age of 14.

There are several theoretical justifications for compulsory schooling and minimum age of work laws. Certainly if there is evidence that parents are overly selfish when making decisions concerning investing in the human capital of their children or if there is an external effect of education of the sort argued by Grootaert and Kanbur (1995), then requiring parents to provide for more education than they would freely choose can be justified on both equity and efficiency grounds. We might also be able to justify constraining family choice if parents are making school/work decisions to diversify the human-capital investment in their children. It may be legitimate to prevent parents from schooling some of their children and putting others to work on equity grounds if on-the-job training is less valuable than formal schooling once the child grows to adulthood.

In addition, Basu and Van's (1998) multiple-equilibrium argument in support of a ban on child labor can be implemented by establishing laws regulating minimum age of work with monitoring by examining school-attendance records. Finally, to the extent that labor standards in the international arena require countries to control child labor, presumably all countries attempting to be in compliance with international standards would pass and attempt to enforce compulsory schooling and minimum age-of-work laws.

Minimum age of employment and years of compulsory education are reported for a selection of countries in Table 5. We also report labor force participation rates for children covered by the legislation. Needless to say, many families in developing countries do not comply with the law. In Latin America, the LFP rate for children aged 5-14 is 17 percent even though in nearly all countries children are not legally permitted to work until the age of 14. A similar situation exists throughout Asia, in which the LFP rate for children aged 5-15 is 21 percent. In Africa, over 40 percent of 5-14 year olds are working even though the minimum age of employment is typically 14 years or even higher. Although these age ranges overlap somewhat with the ages of legal work, these numbers nonetheless indicate a good deal of illegal child employment.

Similarly, Krueger (1996) presents evidence from the 1990-91 waves of the World Values Survey[2] in which respondents are asked for the age at which they completed (or will complete) full-time education. His results are reported in Table 6 for individuals born between 1959 and 1974 for a select group of countries. These results clearly indicate that while compliance is the norm in high-income countries, compulsory-education laws have little discernible effect in low-income countries.

In the United Kingdom, the law was changed in 1947, raising the age from 14 to 15, and then again in 1973, raising the age from 15 to 16. For each cohort, the modal age at which

[2] The World Values Survey is undertaken by the European Values Systems Study Group.

children left school coincided with the legal requirement and no more than 5 percent of children left school before the legal age.

However, when the law is somehow inconsistent with the equilibrium level of education, there is little effect. For example, Brazil increased the compulsory school age from 11 to 14 in 1971. Yet 85 percent of children still left the work force before reaching the age of 14 whether or not they were covered by the revised regulation.

Furthermore, the evidence of compliance is corroborated with evidence from earnings, at least in the United States in the period 1960-1980. Angrist and Krueger (1991) and Harmon and Walker (1995) find that the earnings payoff to years of compulsory school is higher than for years of optional schooling.

Clearly, the casual empirical evidence does not suggest that laws regulating compulsory education and minimum age of work are very effective in controlling child labor in those settings in which child labor is problematic. In order to gain a sense of how laws regulating minimum age of work and compulsory education might operate in a developing country, it is instructive to analyze the effects of such laws during the period in which child labor was declining rapidly in industrialized countries.

Several studies look at the historical events surrounding the decline in child labor in Western Europe and North America throughout the 19th and into the 20th centuries. Scholliers (1995) studied child labor in Ghent, Belgium and concluded that the incidence of working children under the age of 12 declined substantially by the middle of the 19th century *without* legal intervention. Brown, Christiansen and Philips (1992) draw similar conclusions for the U.S. fruit and vegetable canning industry between 1880 and 1920. While legislation played some role, economic forces dominated the decision to remove children from this sector. By contrast, Bolin-Hort (1989) argues that legal restrictions played a substantial role in the removal of child workers from the cotton mills in Manchester, England.

Thus, it is useful to consider some of the more careful statistical analysis of the impact of laws regulating entrance to the labor market and compulsory schooling. Angrist and Krueger (1991) develop a "natural experiment" type statistical technique for evaluating the impact of compulsory schooling laws on school attendance. The 1960-1980 U.S. censuses collected information on the "quarter of birth" and "school attendance as of April 1." Angrist and Krueger argue that if compulsory school laws are effective, teenagers who are 16 years old as of April 1 and live in a state that requires students to remain in school only until they are 16 are less likely to be attending school at the time of the census than 16 year old teenagers who live in states with a mandatory school age of 17 or 18. They find a statistically significant effect of compulsory schooling laws for 1960 and 1970, thus supporting the hypothesis that laws affect schooling behavior.

Acemoglu and Angrist (1999) perform similar analysis on the same data looking for the impact of child labor laws on school attendance. They find, for example, that boys born in states that required 9 years of school before entering the work force spent 0.26 more years in school than boys born in states requiring 6 or fewer years of schooling.

The Angrist-Krueger technique was then applied to earlier periods in U.S. history. Margo and Finegan (1996) analyze the schooling choices of 14 year-olds reported in the1900 federal census. In this study, 14 year-olds are broken into two groups: (1) those teenagers who are already 14 at the beginning of the 1900 school year; and (2) those who are not yet 14 at the beginning of the school year. Margo and Finegan hypothesize that if mandatory school laws are effective, the younger 14 year-olds living in a state with a compulsory schooling law should be more likely to be in school than older 14 year-olds. However, no such difference should exist for 14 year-olds in states without compulsory schooling laws. Margo and Finegan find that compulsory school laws have a positive and statistically significant impact on the decision to obtain *some* schooling for younger 14 year-olds. However, the laws have no discernible effect on the probability of full-time school attendance.

They then consider the impact of compulsory school laws combined with laws that regulate the minimum age of work. The addition of child-labor restrictions is likely to have an additional effect on school attendance because child labor laws were more aggressively enforced than mandatory education laws at that time. In this case, the combination of laws has a statistically significant impact on school choice. Young 14 year-olds were 18 to 21 percent more likely to obtain *some* schooling if their access to the labor market was legally restricted. However, the laws did not significantly increase the probability of being in school *full-time*.

The statistical evidence presented here has been criticized, most notably by Moehling (1999). She argues that the laws mandating school attendance are, themselves, endogenous and tend to follow the decline in child labor rather than precipitate it. That is, cross-state differences in technology, immigration and real wages are driving both the change in educational attainment and the laws regulating school attendance. Thus, despite the fact that compulsory education laws, child labor laws and school attendance are correlated, it is not a causal relationship.

Moehling looks at occupation rates – the proportions of youth who identify some form of employment as their main use of time, as opposed to school. Then, in order to control for differences in the economic conditions across states that might be driving both the legislative process and schooling choice, she first looks at the difference in occupation rates for 13 and 14 year-olds in each state *prior* to the introduction of compulsory schooling laws. This gives a baseline against which to compare the difference in occupation rates for 13 and 14 year-olds after some states passed compulsory education laws. Moehling also included a number of other economic and demographic variables that have been shown to play a significant role in child labor decisions, as discussed above.

Moehling finds that the probability a 14 year-old boy would be working fell substantially between 1890 and 1900 in states with newly enacted compulsory education laws. However, she observes a statistically similar decline in labor force participation in states without such laws. Similarly, the labor force participation rates for 13 and 14 year-old girls in states that *did* pass

compulsory education laws also fell between 1880 and 1990. By contrast, 13 and 14 year-old girls in states that *did not* pass compulsory education laws had *increased* labor-force participation (LFP) during the decade. Thus, for girls, there is a negative correlation between the passage of laws and the LFP rates for girls.

However, there is no differential effect on girls covered and not covered by the law. That is, the employment choices by 13 year-old girls covered by compulsory education laws is mirrored by 14 year-old girls in the same state not covered by the law. *From this, Moehling infers that the failure of some states to pass laws requiring 13 year old-girls to attend school, and the increase in the employment of 13 year-old girls in these same states, are being simultaneously driven by other economic factors.*

Moehling then goes on to consider Margo and Finegan's hypothesis that schooling is affected by the combination of child labor and compulsory education laws. Once again, the laws do not seem to be driving behavior. The only case in which 13 year-olds behave differently than 14 year-olds occurs for boys in states with no legislative change. In states with no laws regulating either compulsory education or minimum age of employment, the LFP rate for 14 year-old boys rose between 1890 and 1900, whereas the LFP rate for 13 year-old boys declined during the same period. Thus, the results are running precisely counter to the expectation that laws affect behavior!

In response to the rising LFP rates for girls in the last decade of the 19th century, there was a burst of legislative activity shortly after 1900. In 1900, 24 states had laws regulating minimum age of employment. By 1910, 43 states had such laws. Perhaps more importantly, by 1909, 34 states had enacted legislation providing for inspectors assigned to enforce child labor laws.

Moehling then applied her statistical technique to the 1900 and 1910 censuses. In this case, the estimated effect of legal restrictions on school attendance, at least, appears to be positive

but statistically insignificant for some groups. However, the impact is small relative to the time-series change.

What can we conclude from this evidence? First, the more carefully executed the statistical analysis, the weaker is the evident effect of legal restrictions on child schooling and labor decisions. Second, it does appear that for carefully crafted laws, such as those enacted in the last quarter of the 20th century in England, there is some impact of legislation on behavior at the margin. However, when the age limits specified by the laws are substantially at odds with optimizing decisions by households, they have little effect. For example, the laws written in the United States around 1900 tended to specify 14 years as the cut-off between schooling and work. However, Moehling's evidence clearly suggests that 14 years of age was not viewed as a significant work-school boundary for many U.S. households at that time. Similarly, recently enacted laws regulating work in Brazil have had no effect on household decisions. Thus mandatory school laws and minimum age of employment are at best, a complement to other policies designed to alter the family's perception of the appropriate age at which children should begin working.

Finally, the results of Margo and Finegan on the one hand, and Moehling, on the other, are not as inconsistent as they may at first seem. Margo and Finegan focus on the 1900 census because it not only asks whether a child views school as the main occupation but also whether the child is in school at all. Moehling, by contrast, looks at several decades of data and, so, is only able consider whether the laws are affecting a child's perception as to whether school is the main occupation. Neither study finds an impact of compulsory schooling laws or child-labor laws on the child's perception of his/her main occupation. That is, neither study finds that the legal restrictions increase the probability of full-time schooling.

V. Recent Policy Initiatives in the Addressing Child Labor

Although the empirical results discussed in Section III are by no means conclusive, they are certainly suggestive of the types of policies that might be effective in reducing the incidence of child labor. We turn now to consider some of the policy initiatives that have recently been undertaken in some developing countries.

Recently, several governments have implemented a range of positive strategies designed to improve compliance. For a more thorough description see U.S. DOL (1998) and World Bank (2001), from which much of this section draws. See also Anker and Melkas (1996) for an overview of programs relying on economic incentives, worldwide. The programs include improvements in educational infrastructure, programs targeted at children who have fallen or are likely to fall behind in school, financial incentives and sector-specific programs. We discuss some of these below.

Educational Infrastructure

Increased spending on books, supplies, buildings, and teacher training have been pursued by several governments. Brazil has been one of the most aggressive in this regard. Beginning in 1997, the *Livro Didactico* project has provided $142.5 million for textbooks. The TV program *TV Escola* is targeted at raising the skill levels of teachers in rural areas. The program also includes the distribution of kits that contain instructional materials. Funds have also been made available to raise the wages of extremely low paid teachers and to build and improve public-school facilities.

The Mexican government also uses telecommunications to improve education quality for rural communities. By virtue of the Telesecundaria program, rural seventh, eighth and ninth graders can view educational programs broadcast by the Mexican Ministry of Education. The central government provides a teacher, television set, satellite dish, decoder, instructional material and books for qualified schools.

Some poorer countries have had to rely on the one-room schoolhouse model in order to extend educational opportunities to all children. For example, The Ministry of Education in Egypt built 8,500 new one-classroom schools in rural communities during the mid-1990s and increased investment in teacher training. Similarly, the government of the Philippines established 1880 "incomplete" elementary schools, along with 900 elementary schools, thereby halving the proportion of *barangays* (political divisions of municipalities or cities) without a primary school.

The Turkish Ministry of Education has built 670 new primary schools and appointed 1,930 new teachers in order to implement a new compulsory school law requiring eight years of schooling. Nevertheless, many communities in Turkey still lack most of the items essential to a school, such as chalk, blackboards, teachers, books, etc.

Remedial Teaching and Flexible Schedules

Working children, given the competing work and school demands on their time, are particularly likely to fail to complete each grade with their cohort. Some empirical evidence discussed above suggests that greater flexibility in school schedules would help working children remain in school. Nicaragua's remedial education program, *Extra Edad,* targets older children who have failed to complete the primary grades by the age of 14. Classes are offered after work in order to allow the child to continue to earn an income while pursuing an elementary education. Guatemala has also introduced a strategy of flexible schedules to keep working children in school. Classes begin after market work is completed and students make up missed schoolwork with independent study. Children of migrant workers are also offered a more flexible school calendar, allowing students to resume school attendance as soon as they are able. Mexico provides flexibility by allowing the children of migrants to attend school in whichever district they happen to be currently residing. Peru offers classes in three shifts throughout the day. This school schedule allows each student to combine work and school in a manner consistent with the requirements of the employer. Lapu-Lapu City in the Philippines offers a work-study program in

which children attend school in the morning and then report for work in the afternoon. Child workers are directed toward less dangerous work and monitoring of working conditions is intensified in hazardous occupations such as firecracker assembly.

The state of Andhra Pradesh in India launched a program in 1997 targeting children who have left school or were never enrolled with two-month school camps. Typically eligible children are bonded child laborers, domestic servants and those from lower castes. Camps are comprised of 100 children and 5 teachers each. The pilot program was particularly successful as a stepping-stone to formal education. Of those children enrolled in the first year of the program, 74 percent subsequently enrolled in formal school. The Andhra Pradesh program is particularly attractive in light of the fact that 60 percent of children aged five to 14 never attend school.

Financial Incentives

Governments rely on a wide array of financial incentives either to make school more attractive or even to make school attendance feasible for families. Among the most popular are school meal programs. Such aid programs are distinctive because they tie the aid to school attendance. Brazil launched *Marenda Escolar* in 1997, spending $453.4 million on breakfast and lunch. Urban Brazilian families who are likely to put their children to work also receive food baskets from the Foundation of Childhood and Adolescence. Like food distributed at school, the food baskets are contingent on school attendance. Mexico provides approximately 4 million breakfasts a day to poor children attending school. All Egyptian children are also given one meal/day in school. Similarly, the government of South Africa provides meals for five million children who attend school.

While food aid may make school more attractive, it may not be a sufficiently strong incentive to induce families to give up the income earned by children. As a consequence, some governments have instituted cash stipends or in-kind gifts for children attending schools. For example, the poor families in Bangladesh receive 15 to 20 kg of wheat per month if their children

are attending school. In 1996, the program reached 1.14 million families. ILO-IPEC (1998a) finds that the program has a significant impact on enrollment, attendance and drop-out rates.

In Brazil, *Bolsa Escola* pays a monthly stipend to each family with an unemployed adult in the Federal District that keeps all of its children aged 7 to 14 attending school. In addition, the program makes a deposit equivalent to one month's salary into a savings account after each year of completed school through the eleventh grade. Funds are forfeited if the child fails to advance to the next grade.

Mexico introduced a similar, though not identical, program in 1997. The Program for Education, Health and Nutrition (PROGRESA) targets over 2.5 million families whose children are not attending school. The program pays a bimonthly stipend to the families of children who maintain an 85 percent attendance record. The stipend ranges from $7 to $63, depending on the age and gender of the child. The program also provides families with funds to purchase school materials and supplies, a basic package of primary health-care services, and food supplements for children and mothers. The health-care provisions of the program are tied to routine visits to medical facilities.

Although the Mexican and Brazilian programs appear similar, some key aspects are likely to make the Mexican program more effective at lowering child labor. The Brazilian subsidy to families with an unemployed adult has features that repair some of the effects of capital-market failure. In the absence of the program, families without access to capital markets are forced to turn to the labor of their children in order to survive periods of economic adversity, such as an unemployed adult. Thus, this program must be seen primarily as a program to deter child labor that occurs as a form of family insurance against income uncertainty. Children who work as a consequence of poverty proper may not be affected.

The educational savings account is even more deceptive. The family can access the account only after the child has successfully completed eleven years of education. Therefore, the savings account cannot serve as collateral for education loans, nor can the family access the

account to pay ongoing expenses. In addition, the child cannot pre-commit to surrender the proceeds to repay their parents even if the parent could access the capital markets on behalf of the child. As a consequence, none of the problems with capital market failure are remedied with the Brazilian savings-account program.

The only impact the loan has is to raise the present discounted value of an education relative to current income. The increased return to education may affect the calculus in a family that is able to borrow in order attend school, but it cannot help families without access to capital markets.

By contrast, the Mexican program buys out the labor contract of the child from the parent. Participating children receive a stipend that partially replaces the income the child could earn by working in exchange for school attendance. Thus, all of the problems with capital-market failure and their implications for inefficient child work are sidestepped. Issues of collateral and intra-family bargaining are no longer relevant. Nor do policy-makers need to be concerned that providing access to capital markets will lead families to purchase assets that they intend to combine with the labor of their children.

Subsidy programs that replace the child's income boast some of the highest success rates. Between 1995 and 1996, the official dropout rate in the Brazilian Federal District fell from 11 percent to 0.4 percent, although the extent to which this should be attributed to any particular program is unknown. Similarly remarkable success is reported for the Brazilian Child Labor Eradication Program (PETI). Begun in 1996, PETI targets nearly 900,000 Brazilian children aged 7 to 14 working in the most harmful conditions in rural areas. Under the program, mothers in families earning half the minimum wage per capita receive a monthly stipend equal to US$13.50 per month for each child attending school and after-school programs full-time. Children in school also receive three meals per day. An equal amount of money per child in the program is paid to the local municipality to finance salaries, materials and meals. In return, the municipality must pay 10 percent of the cost of the schools' infrastructure. Monitoring of school

attendance is undertaken by teachers. The total cost of the program through 2006 is estimated to be on the order of $2 billion.

Anecdotal evidence suggests that PETI is profoundly successful. The town of Conceicao do Coite, a Brazilian sisal-producing community located in Bahia, provides a striking example. Children working in sisal harvesting are commonly permanently injured by both the sharp sisal stalks and the tools used for cutting. Evaluation of PETI undertaken by UNICEF suggests that child labor in Conceicao do Coite has been virtually eliminated.

One of the distinctive features of the PETI program is that it combines stipends to families that replace the child's earnings with financial support to develop and fund educational opportunities, all of which are embedded in a vigorously active local community committed to eradicating child labor. In addition, PETI, like Bolsa Escola, is a means-tested program targeting the very poor. Finally, the educational subsidy is quite large in comparison to the family's income. Although the size of the benefit and the income cut-off have varied over the life of the program, the educational subsidy has in some cases been equal to the income earned by the parents.

However, it is difficult to judge the quality of the reported evidence. The teacher's report on school attendance is required to receive the subsidy and also serves as the basis for school-attendance statistics. Teachers may have an incentive to misreport, either because of bribes or concern for the welfare of the child.

Both Brazil and Mexico have designed additional income-support programs targeted at specific sectors. The Mexican government targets children working in the fruit and vegetable sector in the northeastern state of Sinaloa. Aid is paid in the form of food packages worth about 30 percent of an adult's monthly salary. As with the income supplement, families are required to demonstrate a substantial school-attendance record of their children. Local growers are required to contribute 30 percent of the cost of the food. Growers may also construct and furnish local schools. In such cases, the government provides teachers and supplies.

The ILO's International Program on the Elimination of Child Labor (IPEC) furnished seed funding to start a program sponsored by the Union of Rural Workers in Retirolandia in Brazil to provide families with assets that they could use to support their children in school rather than send them to work. The *Goat-to-School* program provides each eligible family with a goat and information on tending and rearing goats. Beneficiary families are required to use the milk to feed their children and to repay the program in goats without interest. This unique program provides families with the assets they need to find safer alternative employment for their children that does not interfere with schooling.

The *Goats-to-School* program is not very significant, however, in terms of the number of children covered. Between 1996, when the program was begun, and 1998, 60 goats were distributed to 30 families affecting 100 children. The incentives and constraints built into the program are quite sensitive and responsive to the evidence currently available as to why children work and in what occupations. Clearly the program provides families with an asset that produces an income stream that the family can rely on rather than on the labor services of their children. That is, poor families are able to acquire capital that allows them to fund current education for their children, thus eliminating inefficient child labor associated with incomplete capital markets. In addition, the loan can be repaid through the efforts of the children tending the goats since the loan is repaid simply by returning one baby goat to the program for each adult goat received. Thus, the intra-family bargaining problem that arises because children cannot pre-commit to repay loans taken out on their behalf is eliminated because the children, through their efforts tending the animals, are able to repay the loan on their own.

Furthermore, the children tend the goats, thereby continuing to make some current contribution to the family. However, the times at which the goats need tending do not conflict with schooling, thus providing each child with sufficient flexibility in their work schedule to combine school and work. Nor is the work so onerous that the children are too exhausted to complete their schoolwork. Finally, receiving the benefit is contingent upon school attendance.

As a consequence, the program provides a strong incentive to substitute education for work even if the family is far from the income level that would place them near the work-school margin. Thus, it is not necessary to wait until income reaches some critical level at which parents start withdrawing children from school and the implicit subsidy does not have to be so large as to raise income to the poverty line to be effective.

To the extent that *Goats-to-School* has a design weakness, it is the absence of time consistency. Families receive the asset based on a commitment to place their children in school. However, there is no mechanism for enforcing ongoing compliance other than the social pressure that might be brought to bear by the union implementing the program. The income subsidies described above that make a payment only after the teacher certifies attendance may prove to be more effective in lowering the level of child labor for a given level of expenditure.

Another interesting feature of the *Goats-to-School* program is that it is self-sustaining. Animals repaid become assets for new families entering the program. Although IPEC provided the original funding, the program is now self-financing.

Some programs that provide financial support are specifically targeted at replacing the contribution that the working children make to household income. Others are targeted at helping families defray the cost of education. For example, the Egyptian government pays a grant equal in value to about US$4.17 to cover uniforms, books and supplies for families earning less than about US$29.41 per month.

Programs to Reduce Child Labor in Targeted Sectors

Conditions for working children in some sectors are sufficiently hazardous that programs have been tailored to the specifics of the relevant sector. Cultural factors may be sufficiently complex that simply relying on financial incentives may be ineffective. Examples include the Vale dos Sinos Project initiated in 1996 to reduce the employment of children in the Brazilian footwear industry and the HABITAT project initiated in 1998 to reduce child labor in the stone

quarries of Guatemala. Both projects have a public-education component designed to sensitize parents, employers and the community to the risks to children employed in these sectors. Program objectives also include improved working conditions, medical services and flexible school options. The government of Peru has also targeted children who work turning bricks in the Huachipa brick fields outside of Lima. In addition to mentoring and tutoring young children, the program provides health care and small business loans to start a family enterprise.

Providing alternative employment opportunities has also been used as a strategy to draw children out of the quarries of Carabayllo, Peru. Mothers who agree to keep their children out of work receive financial and other help in establishing a micro-enterprise making plastic bags. Families are provided with equipment, raw materials and technical advice on beginning the business.

A similar program has been developed in Turkey. It is a common practice in the mountain villages of the Duragan district of Sinop to auction off male children aged nine to 15 to help during the harvest season on the farms of affluent families. The Development Foundation of Turkey has launched a program to train families in small-scale agricultural projects, such as bee-keeping and turkey-breeding, that allows the child to work productively while remaining at home. Children can, in some cases, earn more in these newly-created family enterprises than as rented labor.

Several programs are targeted at raising awareness of the negative effects of work on children. For example, the African Network for the Prevention and Protection Against Child Abuse and Neglect on the tobacco and tea plantations in Tanzania uses drama and theatre to mobilize communities and educate. Teachers report increased attendance and some employers have begun to provide financial help to schools for the purchase of supplies and school meals.

Children who have been formerly bonded frequently perform poorly in a formal education setting. In Nepal, rehabilitation is undertaken by the Informal Sector Service Center,

providing nine months of remedial training in language and arithmetic. Children are then channeled into elementary schools.

Several communities have reached formal agreements with employers to not employ children and to return currently employed children to school. For example, the Bangladesh Garment Manufacturers Association (BGMEA) signed a Memorandum of Understanding in 1995, which provides for removing children currently working if they can be placed in school. In addition, no under-age children should be newly employed. Children presenting themselves for employment shall be directed to NGO-run schools where they can receive a monthly stipend equal in value to about US$6.88 for attending school.

The program appears to have been fairly successful. In 1995, 10,546 children were working in BGMEA factories. About 43 percent of member factories employed children. This figure fell to 32 percent in 1997 and 13 percent in 1998 (ILO-IPEC, 1998).

Several U.S. importers of soccer balls have signed the Partners' Agreement to Eliminate Child Labor in the Soccer Ball Industry in Sialkot, Pakistan. The program aims to provide children removed from employment and their younger siblings with informal education, alternative income-generating opportunities, formal schooling and awareness training for parents.

The weakness of this program occurs in the monitoring component. It is commonly the case in Sialkot for women and their children to stitch soccer balls in between other household chores. In order to prevent families from putting their children to work stitching soccer balls, work has been moved from homes to stitching centers. However, as has been noted in a previous section, mothers who work outside of the home place their daughters at risk for full-time home-work. However, when mothers work in a household enterprise, such as soccer ball stitching, daughters can more readily combine home-work with schooling. As a consequence, this program has the potential to undermine the efforts that Pakistani families are making to educate their daughters.

A rescue and rehabilitation program was initiated in 1995 by the National Society for Protection of Environment and Children in the Nepalese carpet industry. The program attempts to provide informal education for children removed from work but also conducts classes for children in the carpet factories. Children removed from work are either returned to their family or placed in youth hostels where they receive other skills training.

Empirical Evidence on Program Effectiveness

Although programs that provide incentives to replace work with schooling seem like they ought to be effective, there is very little careful empirical analysis of these programs. Anker and Melkas (1996) surveyed administrators of 68 income-replacement and substitution activities in Africa, Asia, and Latin America. Respondents generally thought that their programs were effective. However, the authors doubted the value of such self-reporting and noted that none of the programs had evaluated the impact on the incidence of child labor either short-term or long-term.

Nevertheless, the survey provided some useful insights.

1. A package of school-based incentives, remedial education, income-generating activities for families, and awareness training for parents is more effective than any one of these components individually.
2. School-lunch programs themselves do not provide a sufficient incentive to draw children out of work and into school. As a consequence of the low financial value of the meal combined with the poor quality of schools, school-lunch programs do not generally alter the parents' calculation of the value of school relative to work. Children covered by the survey typically contributed 20-25% of the family's income, an amount that is far in excess of the value of a single mid-day meal.
3. Many respondents were concerned that cash grants could be misused and so preferred aid in-kind. However, it is also the case that cash provides families with flexibility

that is sometimes essential to the effectiveness of the program. Most respondents preferred programs that had elements of both.

4. Programs that provided apprenticeships, school-work combinations, or "safe work" alternatives and other informal education were particularly effective in helping children leave dangerous or onerous occupations. This is partly a reflection of the very poor quality of schools that families frequently regard as irrelevant to their situation.
5. Several respondents raised concern with dependency and the role that incentives might play in luring children into work in order to qualify for benefits.

Although the survey evidence cited above is of some value, some programs have been carefully evaluated using statistical techniques. Ravaillion and Wodon (1999) evaluate the Food-for-Education (FFE) program in rural Bangladesh. Participating households receive a food ration of rice as long as their children attend school. In 1995-96, 2.2 million Bangladeshi children benefited from the FFE program. The national government targets economically underdeveloped areas for benefits. Local community groups then select participants based on idiosyncratic local information. Children are required to maintain an 85% attendance rate. Monitoring and food distribution are handled by each school's headmaster.

Based on the 1995-96 Household Expenditure Survey undertaken by the Bangladesh Bureau of Statistics, the typical participating household received 114 kg of rice per year. Using information on the local cost of rice, average family size, and local wages, Ravaillion and Wodon calculate that the FFE stipend is the equivalent of 13 percent of the average monthly earnings of boys and 20 percent of that for girls.

Ravaillion and Wodon estimate the determinants of the probability of work and school. A working child is one who regarded work as his/her "normal activity" in the previous week. The level of education is measured by the reported educational status for children 5 to 16 who

have not completed primary school. Explanatory variables include distance to school, the type of school, school-quality variables, parental education, community religion, household demographics, land ownership, the child's age, and the size of the FFE stipend.

Ravaillon and Wodon find that the stipend has a strong and statistically significant impact on both the probability of work and the probability of schooling. In particular, they find that a FFE stipend of 100 kilos of rice increases the probability that a boy will be in school by 17 percent and that a girl will be in school by 16 percent. Thus, there is some evidence from household survey data that corroborates the enrollment data provided by school administrators on the impact of education subsidies on school attendance.

However, the impact on child labor is much smaller. An extra 100 kg of rice lowers the probability of working as the main activity by 4 percent for boys and only 2 percent for girls. Therefore, of the children newly in school, only a quarter of the boys and one-eighth of the girls are switching from work as the primary activity to school as the primary activity.

Of course, it may be the case that some children newly in school were formerly working only part-time, in which case the subsidy has had a positive impact on school attendance. Thus, the subsidy appears primarily to increase school attendance at the expense of the child's leisure rather than work. These results strongly suggest that school quality or a failure to appreciate the value of school, rather than each family's need for their child's income, are deterring formal schooling. By contrast, for those children who are making a financial contribution to the family, a stipend that replaces less than 20 percent of the child's earnings is not sufficient to alter the family's calculation of the value of school relative to work.

Children nevertheless benefit from the program. On average, the total impact of the subsidy raises family income. The average loss in child wages as a consequence of the subsidy is only 19 percent of the average value of the subsidy. Furthermore, Wodon (1999) finds that completing primary school in rural Bangladesh increases per capita consumption by nine percent.

Nevertheless, these results point more to school quality, an under-appreciation of the value of education, or direct school costs as the most important deterrents to schooling, rather than poverty and child labor.

Similar evidence has emerged for Thailand. Tzannatos (1996) finds that Thai children under the age of 12 do not initially leave school in order to work. Rather the direct cost of schooling, such as uniforms and supplies, relative to its value deters parents from keeping children in school. Uneducated Thai children do not begin to enter the labor force until they are 12 to 15 years old.

The importance of the physical presence of school buildings in a community in raising each family's perception of the value of education is further supported by Duflo (2000). Between 1973 and 1978, the Indonesian Government built over 61,000 primary schools at a cost of US$5 billion. She finds that children aged 2 to 6 in 1974 received 0.12 to 0.19 more years of schooling for each school constructed per 1,000 children. Duflo also finds a measurable impact on wages. Each school built per 1,000 children also raised wages by 1.5 to 2.7 percent.

PROGRESA, a school subsidy program operated in Mexico, was specifically implemented with the purpose of providing data that can be used to rigorously analyze the program's effectiveness. Design and implementation of the analysis was executed by the International Food Policy Research Institute (IFPRI, 2000). At the inception of the program in 1997, households in seven states[3] were randomly assigned to control and treatment groups. Of the 506 communities initially targeted, 320 were designated for treatment and 186 as control communities.

Before the program was implemented, PROGRESA surveyed rural households in the targeted states in order to determine their socio-economic status. Employing the program's selection criteria, 78 percent of households were deemed eligible for benefits. Households were then surveyed in March 1998 before benefits were received and then again in October 1998, June

1999 and November 1999. Families were queried on their family background, assets brought to marriage, schooling, health status, parental attitudes, aspirations for their children, food and nonfood consumption, and time allocation for all household members and self-employment activities. Schools provided supplemental survey evidence on student achievement test scores.

In Mexico, completion of primary school is fairly comprehensive. The enrollment rate for primary school is about 93 percent. However, rural children typically leave school after completing the sixth grade, at which point the national enrollment rate drops to 55 percent. A second decline in enrollment occurs at the tenth grade at which point only 58 percent of those qualified to continue do so.

Benefits under the program are paid to the mother every two months. The size of the stipend varies with the age of the child and the child's gender, with higher stipends for girls. In addition, financial aid for school supplies is paid twice each year.

Enrollment rates for treatment and control groups were then compared, controlling for family and community factors. The impact of the program was found to be positive and statistically significant. At the primary level, at which enrollment rates are already 90 to 94 percent, PROGRESA stipends increase attendance for boys by between 0.74 to 1.07 percent and for girls by 0.96 to 1.45 percentage points.

The impact on secondary enrollment, however, is much more distinctive. Prior to the beginning of the program, the enrollment rate in secondary school was 67 percent for girls and 73 percent for boys. Considering children in grades one through nine, the PROGRESA subsidy increased the enrollment rate for girls by between 7.2 to 9.3 percentage points and by 3.5 to 5.8 percentage points for boys, as found by Schultz (2001). These preliminary results suggest that PROGRESA will increase overall educational attainment for poor rural children in Mexico by about ten percent, thereby raising adult income by eight percent.

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[3] Guerrero, Hidlago, Michocacan, Puebla, Queretero, San Luis Potosi, and Veracruz.

The impact of PROGRESA is largest for children making the transition to junior secondary school. Enrollment rates for girls of this age receiving the education subsidy are 20 percent higher for girls and 10 percent higher for boys as compared to the control group.

As a byproduct of the empirical analysis, which examined other determinants of child labor, the study also produced estimates of the effect of increasing the density of schools. In the sample, 12 percent of children travel more than four kilometers to a junior secondary school. If enough schools were built so that all children traveled less than four kilometers to their junior secondary school, secondary-school enrollment for boys would rise by less than one-half of one percent and enrollment for girls would rise by about one-third of one percent.

While PROGRESA has a substantial impact on most indicators of child welfare including food consumption, physical stature, illness, school attendance and future income, the impact on child labor is disappointing. There is only a modest decline in labor force participation rates for children in the program, falling primarily on unpaid activities (Parker and Skoufias, 2000). Neither do enrolled children in the program spend more time on schoolwork at home nor exhibit higher achievement test scores than similar children who do not receive the stipend.

The efforts being made on behalf of children in the programs reviewed here are impressive and encouraging, even if the results are sometimes mixed. For the most, however, little has been done to compare the benefits from these programs to their costs. An exception is Schultz (2001), who calculates the rate of return on the resources put into the PROGRESA program. He finds a rate of return of 8% that is above and beyond both the role of the program in reducing current poverty and any consumption benefits from education.

VI. Labor Standards Initiatives in the International Arena

In the international arena, it is commonly argued that countries with poor labor practices with regard to children should be sanctioned in some manner. Advocates are generally motivated either by concern for the impact of low cost child labor on wages in industrialized countries or by

humanitarian concern for exploited children. We turn first to empirical evidence as to whether child labor practices affect export performance or comparative advantage. We then turn to the impact that trade policies are likely to have on the welfare of children.

Do National Labor Standards Alter Exports, Competitiveness or Comparative Advantage?

It is arguably the case that child labor may lower the wages of unskilled workers in industrialized countries. A large volume of cheaply produced, unskilled-labor intensive exports made possible with labor of children may have the effect of depressing the demand for such goods produced in industrialized countries and, thereby, lower the wages of unskilled workers. To the extent that child labor practices in developing countries have implications for industrialized country workers, industrialized countries may seek reform or redress.

In order to determine whether child labor practices affect trade performance, several researchers have examined a simple correlation between the existence and/or observance of core-labor standards and various measures of trade performance. For example, Mah (1997) analyzes the trade performance of 45 developing countries and finds that each country's export share of GDP is strongly negatively correlated with rights to nondiscrimination, negatively correlated with freedom-of-association rights and weakly negatively correlated with the right to organize and collective bargaining.

However, such a correlation can have many reasons, and to gauge the marginal contribution of core labor standards, one must compare each country's trade performance against a baseline expectation as to what such a country should be trading given its factor endowments and other determinants of trade. Rodrik (1996) provides an excellent example of how such analysis can be undertaken.

He first considers the impact of core-labor standards on labor costs per worker in manufacturing. He does this by calculating a regression using labor cost as the dependent variable and per capita income and various measures of labor standards as the independent variables. In this

framework, per capita income is being used as a proxy for productivity in the economy. Labor standards are measured in a variety of ways: total number of ILO conventions ratified; number of ILO conventions ratified pertaining to labor standards; Freedom House indicators of civil liberties and political rights; statutory hours worked; days of paid annual leave; the unionization rate; and an indicator of child labor.

Rodrik finds that for the period 1985-1988, labor costs are overwhelmingly determined by labor productivity. However, the number of ILO conventions ratified, Freedom House indicators of democracy and the index of child labor are large and statistically significant, with laws regulating child labor playing a particularly important role in statistically explaining labor costs.

Rodrik then turns to the determinants of comparative advantage in labor-intensive goods. He uses the fraction of textiles and clothing exports in total exports as a proxy for measuring comparative advantage in labor-intensive goods. As a theoretical matter, comparative advantage is primarily determined by factor endowments. Therefore, the comparative advantage variable is regressed on the independent variables of population-to-land ratio (a measure of the labor endowment), average years of schooling in the population over 25 (a measure of the stock of human capital) and the labor standards variables. The population and human capital variables have the expected signs and are statistically significant. However, generally the labor standards variables, while having the expected sign, are not statistically significant. The lone exception is statutory hours worked. The longer the workweek, the stronger is the comparative advantage in textiles and clothing.

Overall, the link from low labor standards in low-income countries to the wage of unskilled workers in industrialized countries is not especially strong. Child labor practices in developing countries are, at best, a secondary factor in determining comparative advantage and trade performance.

Labor Protections and Humanitarian Concerns

While there may be some legitimate concern with the impact of labor practices on industrial country workers, we may be equally motivated by humanitarian concerns for children. However, while it is undoubtedly the case that voters in high-income countries are genuinely concerned with the welfare of foreign children, it is not at all clear that these concerns can be constructively addressed by applying trade disciplines. To understand the role that trade policy might play in mediating humanitarian concerns with the process of production, it is important to distinguish between two different forms in which these moral concerns might manifest themselves.

First, moral distaste may be a private good. For example, a consumer might prefer not to consume goods produced by children or under poor working conditions. In this case, consumers ought to have an opportunity to avoid goods produced in this manner, provided that they are willing to pay the additional cost of production. In some cases, this might be accomplished by attaching a product label detailing the conditions under which the good was produced (Freeman, 1994). But if moral distaste is also a public good, consumers preferring that their fellow citizens also refrain from such consumption, then one can make a case that countries that wish to do so should be allowed to state a broad definition of immoral working conditions and, acting as a country, refuse to import such goods.

However, this particular moral stance focuses only on alleviating the bad feeling that consumers may have knowing they have consumed a good produced under unpleasant circumstances. The welfare of the foreign workers themselves is not necessarily at issue. But if consumers in high-income countries can exhaust their moral commitments simply by avoiding consumption of goods produced in ways that they dislike contemplating, without regard for the welfare of the children involved, then the humanitarian argument begins to lose some of its moral gravity.[4] If, by contrast, humanitarian and moral concerns focus on the welfare of the children

[4]Product labeling does sometimes include provisions for improving the well-being of children who are displaced from jobs as a result. For more on this see Brown et al. 2001.

themselves, rather than on the discomfort of the consumer, then the ability of trade sanctions to address these concerns is highly limited.

In fact, trade sanctions in the face of weak child protections are as likely or even more likely to harm children as they are to improve conditions. Maskus (1997) provides a detailed discussion of this point. Consider the problem of child labor in the case of a small open economy in which the export sector is adult labor-intensive, the import sector is capital-intensive, and a nontraded intermediate input to the export sector is produced using child labor. The child's labor supply is increasing in the child's wage and decreasing in the adult wage. The marginal child worker is the youngest, since the opportunity cost in terms of foregone education falls as the child ages. In this setting, a foreign tax imposed on goods produced by children can lead to the social optimum in the sense of internalizing the external effect of child work on the well-being of western consumers. Those children no longer working who receive an education may also be better off, although the fact that they or their parents chose for them to work before makes this questionable. However, if, as a consequence of the tax, the newly unemployed children live in a household with lower income, less nutrition, and otherwise diminished life alternatives, the trade sanction has probably been counter-productive. Children who continue to work after the imposition of the tax are definitely worse off, since the firms who employ children have to pay a tax. In a small open economy, a tax must lower the after-tax wage of the working child.

One might wonder whether trade sanctions could be effective in the multiple-equilibrium context of Basu and Van (1998), moving a country from a low-wage equilibrium to a high-wage equilibrium that could then be sustained without the sanctions. Leaving aside the daunting empirical question of how one could ever be sure that such multiple equilibria were present, Basu (1999) is explicit in rejecting this as a basis for trade sanctions, arguing only that coordinated enforcement of labor standards across countries might be appropriate. In fact, trade sanctions tend to reduce the demand for labor in poor countries, not increase it, and if anything this would move a country to a lower equilibrium, not a higher one.

The threat of sanctions will be particularly ineffective if the targeted country simply lacks the resources to respond to the threat. For example, Rogers and Swinnerton (1999) estimate that if GDP per worker falls below $5,020, families are so poor that they cannot survive without contributions to family income from children. Thus, no matter how intense the demand for a reduction in child labor, child labor practices will continue.

Furthermore, trade sanctions do little to address the underlying market failure that gives rise to offending child labor practices. For example, as discussed above, capital market failure arguably lies at the heart of the most egregious forms of child labor exploitation. If parents had access to capital markets, they would school their children while transferring wealth from the future to the present by borrowing against their own future income or the future income of their children. However, lacking collateral and facing other capital market pathologies, the only device that parents have available to them is to put their children to work. The end result, of course, is inadequate human capital formation.

VII. **Conclusions**

Concern for the welfare of working children has taken on a new importance in the international arena over the last decade. While some participants in the global discussion focus on the implications that working children might have on the rights and wages of workers in industrialized countries, there is little evidence to support this concern. Although there are on the order of 250 million children working worldwide, the value of their output is so small that it is unlikely to have much of an effect on the international wage structure. Furthermore, most children work in the informal sector or in home-work and, therefore, are not in direct competition with unskilled workers in industrialized countries. Neither of these reasons means that child labor has no effect at all on wages of other workers elsewhere, but those effects are surely small compared to the effects on the children themselves. For this reason, much of the discussion with regard to children focuses on the children, rather than on the implications for others.

When establishing policies with regard to children, it is essential therefore to have reasonable confidence that policies put in place will actually improve the lives of the intended beneficiaries. However, this is difficult to do given the wide array of factors that are affecting parents and the work-school decisions they make for their children. For this reason, recent policy initiatives have focused on providing incentives for families to choose education rather than punishments. Attempts to use legal restrictions to affect household decisions take away options that families are exercising and may leave children with worsened alternatives. By contrast, incentive schemes open up new and improved alternatives to families without taking away existing choices. Thus, if, in the presence of the incentive schemes, families choose less child labor than in their absence, there is reason to believe that the policy has been effective in improving the lot of children.

Although at this point the evidence is not clear that such incentive schemes will succeed in significantly reducing the incidence of child labor, they still currently represent the best hope for helping working children, while minimizing unintended negative effects. They deserve an opportunity to succeed. Recent policy innovations are receiving earnest support from the World Bank, the International Labour Organization, UNICEF and UNESCO, but they are in need of further financial assistance, technical support and rigorous empirical evaluation.

The question then is which of the myriad policy configurations appears to have the greatest potential to improve the lot of working children? First and foremost, both theory and empirical evidence point very strongly to the role of capital-market failure in giving rise to inefficient child labor. From a theoretical perspective, families without access to capital markets may not be able to invest in their children even if it is optimizing for the family to do so.

As an empirical matter, it is generally the case that families with some household assets such as older children, a mother with marketable skills, and assets associated with a household enterprise are more likely to choose some education for their children than families without assets. However, providing access to capital markets is a double-edge sword. While access to

capital markets may lead some families to borrow to finance an education for their children, there are at least some cases in which households borrow to finance assets that are then combined with more child labor. For this reason, those policies that offer assets in return for school attendance provide the liquidity that make schooling possible while cutting off the option of taking children out of school to work with household capital.

One of the striking results of the studies we have reviewed is that education subsidies that might normally be expected to draw children out of the work force and into school do, in fact, keep children in school. But we have very little statistically significant evidence that such subsidies alter the parent's decision as to whether the child should work. It is useful to consider why this might be the case. Several possible explanations are suggested by the evidence.

First, the education subsidy may not be large enough to replace the child's contribution to family income. In this case, even if parents would like to put their children in school, they are too poor to do so even given the subsidy. In the case of the Pakistani program, the subsidy was not even replacing 20 percent or a working child's earnings. This alone is enough to explain why very few families returned full-time-working children to school. By contrast, the Brazilian programs, PETI and Bolsa Escola, are means tested and provide subsidies that are typically quite large, enough to pull a beneficiary family up to the poverty line.

Second, the families who do respond to the subsidy appear to be those with idle children, neither working nor in school. The question, of course, is why are parents allowing their children to remain idle? One possibility is that school quality (or the perception of it) is so poor that parents see little point in going to the effort or expense of schooling their children. If school quality is in fact poor, attending school may earn the subsidy but will have little impact on the formation of the child's human capital. Certainly, both empirical and anecdotal evidence point to school quality as an important factor in a family's work-school decision.

The issue of school quality may also help us understand the somewhat disappointing impact that the PROGRESA program had on child labor in rural Mexico compared to the

stunning impact that PETI appears to have had on some working children in rural Brazil. Both programs combine education subsidies with other forms of support for children. PROGRESA emphasizes nutrition and health care. PETI emphasizes school structures and instructional materials. It may be the case that improving school quality is more important than is health care and nutrition for altering the family's work-school calculation. However, it may also be the case that the miraculous impact of PETI emerges in communities in which child labor is particularly pervasive or the work that children are undertaking is extremely dangerous. Without the type of careful empirical analysis applied to PROGRESA, it is difficult to draw conclusions.

Although the initial analysis of education subsidies appears to be disappointing, their performance is not worse and, in some cases, far better than laws that mandate minimum years of compulsory schooling and age of work. In fact, there appears to be very little evidence that such regulations have more than a marginal impact on the age at which children leave school and begin working. Therefore, a policy stance that requires the establishment and enforcement of child labor standards across all countries is unlikely to be effective or improve the lot of children.

Neither is it reasonable to believe that trade sanctions leveled against countries with a high rate of child labor are likely to make children better off. In fact, the threat of sanctions against non-compliant countries is all too credible because of political forces within industrialized countries that will promote them for a variety of reasons. But such threats are either disingenuous or misguided, because sanctions are very likely to harm children rather than help them.

REFERENCES

Acemoglu, Daron and Joshua Angrist. 1999. "How Large are the Social Returns to Education? Evidence from Compulsory Schooling Laws." NBER Working Paper 7444.

Andvig, Jens Chr. 1997. "Child Labor in Sub-Saharan Africa – An Exploration," *NUPI Working Paper* no. 585, October.

Angrist, Joshua and Alan Krueger. 1991. "Does Compulsory Schooling Affect Schooling and Earnings?" *Quarterly Journal of Economics* 106 (4): pp. 979-1014.

Anker, R. and S. Barge. 1998. *Economics of Child Labour in Indian Industries.* Geneva: ILO.

Anker, R and H. Melkas. 1996. "Economic Incentives for Children and Families to Eliminate or Reduce Child Labour." Geneva: ILO.

Baland, Jean-Marie and James A. Robinson. 2000. "Is Child Labor Inefficient?" *Journal of Political Economy*, vol. 108, no. 4, p. 662-679.

Basu, Alaka Malwade. 1993. "Family Size and Child Welfare in an Urban Slum: Some Disadvantages of Being Poor but Modern." In Fertility, *Family Size and Structure.* Cynthia B. Lloyd, ed. New York: Population Council.

Basu, Kaushik. 1999. "Child Labor: Cause, Consequence, and Cure, with Remarks on International Labor Standards." *Journal of Economic Literature* XXXVII (September): pp. 1083-1119.

Basu, Kaushik and Pham Hoang Van. 1998. "The Economics of Child Labor." *American Economic Review* 88 (3): pp. 412-427.

Becker, Gary S. 1964. *Human Capital.* New York: Columbia University Press.

Becker, G.S. and H. G. Lewis. 1973. "On the Interaction between the Quantity and Quality of Children." *Journal of Political Economy* 81: S279-S288.

Bhalotra, S. and C. Heady. 1998. "Child Labor in Rural Pakistan and Ghana: Myths and Data." *Working Paper*. Department of Economics, University of Bristol, UK.

Bolin-Hort, Per. 1989. *Work, Family, and the State: Child Labor and the Organization of Production in the British Cotton Industry, 1780-1920*. Lund: Lund U. Press.

Bonnet, M. 1993. "Child Labor in Africa." *International Labor Review* 132, pp. 371-389.

Brown, Drusilla K., Alan V. Deardorff and Robert M. Stern. 2001. "U.S. Trade and Other Policy Options and Programs to Deter Foreign Exploitation of Child Labor." In: *Topics in Empirical International Economics*, Magnus Blomstrom and Linda S. Goldberg (eds.). Chicago and London: University of Chicago Press.

Brown, Martin, Jens Christiansen and Peter Philips. 1992. "The Decline of Child Labor in the US Fruit and Vegetable Canning Industry: Law or Economics." *Business History Review*, 66 (4) pp. 723-770.

Burra, Neera. 1995. *Born to Work: Child Labor in India.* Dehli: Oxford University Press.

Canagarajah, S. and H. Coulombe. 1998. "Child Labor and Schooling in Ghana." Policy Research Working Paper no. 1844. Washington, D.C.: The World Bank.

Canagarajah, Sudharshan and Helena Skyt Nielsen. 1999. "Child Labor and Schooling in Africa: A Comparative Study, manuscript, World Bank.

Cartwright, Kimberly. 1999. *"*Child Labor in Colombia*,"* in *The Policy Analysis of Child Labor, A Comparative Study,"* edited by Christiaan Grootaert and Harry Anthony Patrinos, Washington, D.C.: World Bank.

Cartwright, Kimberly and Harry Anthony Patrinos. 1999. " Child Labor in Urban Bolivia," in *The Policy Analysis of Child Labor, A Comparative Study,"* edited by Christiaan Grootaert and Harry Anthony Patrinos, Washington, D.C.: World Bank.

Chernichovsky, D. 1985. "Socioeconomic and Demographic Aspects of School Enrollment and Attendance in Rural Botswana. *Economic Development and Cultural Change 32 (1)*, pp. 319-332.

Coulombe, H. 1998. "Child Labor and Education in Cote d'Ivoire." Background paper. World Bank: Washington D.C.

DeGraff, D.S., R.E. Bilsborrow, and A.N. Harriman. 1993. "The Implications of High Fertility for Children's Time Use in the Philippines." In *Fertility, Family Size, and Structure: Consequences for Families and Children*, C.B. Lloyd (ed.), Proceedings of a Population Council Seminar. New York, June 9-10, 1992.

Dreze, Jean and Geeta Gandhi Kingdon. 2000. "School Participation in Rural India." Manuscript, Oxford University, April.

Duflo, Esther. 2000. "Schooling and Labor Market Consequences of School Construction in Indonesia: Evidence from an Unusual Policy Experiment," NBER Working Paper 7860.

Engerman, Stanly L. 2001. "The History and Political Economy of International Labor Standards," mimeo.

Freeman, Richard. 1994. "A Hard-Headed Look at Labour Standards," in Werner Sengenberger and Duncan Campbell, eds., *International Labour Standards and Economic Interdependence.* Geneva, Switzerland: International Labour Office.

Garcia-Moreno, Mauricio. 1998. "Child Work and Education in Ecuador," in *Child Work and Education, Five Case Studies from Latin America*, edited by Maria Cristina Salazar and Walter Alarcon Glasinovich, Florence: UNICEF.

Glasinovich, Walter Alarcon. 1998. 'The Work and Education of Children in Peru," in *Child Work and Education, Five Case Studies from Latin America*, edited by Maria Cristina Salazar and Walter Alarcon Glasinovich, Florence: UNICEF.

Glewwe, P. and H. Jacoby. 1994. "Student Achievement and Schooling Choice in Low-Income Countries: Evidence from Ghana." *Journal of Human Resources* 29, pp. 843-864.

Grootaert, Christiaan. 1999. "Child Labor in Cote d'Ivoire." In *The Policy Analysis of Child Labor, A Comparative Study,"* edited by Christiaan Grootaert and Harry Anthony Patrinos, Washington, D.C.: World Bank.

Grootaert, Christiaan and Ravi Kanbur. 1995. "Child Labour: An Economic Perspective," *International Labour Review* 134(2), pp. 187-2003.

Gupta, Manash R. 1997. "Unemployment of Adult Labor and the Supply of Child Labor: A Theoretical Analysis," mimeo, Jadavpur U., Calcutta.

Hanushek, E.A. 1992. "The Trade-off between Child Quantity and Quality. *Journal of Political Economy* 100 (1), pp. 647-660.

Hanushek, E. A. and V. Lavy. 1994. "School Quality, Achievement Bias, and Dropout Behavior in Egypt." LSMS Working Paper #107, World Bank: Washington, D.C.

Harmon, Colm and Ian Walker. 1995. "Estimates of the Economic Return to Schooling in the U.K." *American Economic Review* 85 (5), pp. 1278-1286.

IFPRI. 2000. "Is PROGRESA Working? Summary of the Results of an Evaluation by IFPRI." International Food Policy Research Institute, Washington, D.C.

ILO-IPEC. 1998a. *Child Labour in Bangladesh: Its Context and Response to It.* Dhaka: ILO/IPEC, May.

ILO-IPEC. 1998b. *Update Factory Monitoring per 01/05/90*, ILO/IPEC, Memorandum to Members of the Informal Steering Committee, Dhaka, May 13, 1998.

IBGE (1992), "Criancas e adolescentes: indicadores sociais:, Rio de Janeiro: IBGE, v. 4.

Jensen, P. and H.S. Nielsen. 1997. "Child Labour or School Attendance? Evidence from Zambia." *Journal of Population Economics* 10, pp. 407-424.

Krueger, Alan. 1996. "International Labor Standards and Trade," in Michael Bruno and Boris Pleskovic (eds.)Annual World Bank Conference on Development Economics, (Washington, D.C.: The World Bank), pp. 281-302.

Lavinas, Lena and Maria Ligia Barbosa. 1999. "Combating Poverty by Increasing School Attendance: The Case Study of Bolsa-Escola in Recife, manuscript.

Lavy, V. 1996. "School Supply Constraints and Children's Educational Outcomes in Rural Ghana." *Journal of Development Economics* 51, pp. 291-314.

Levison, D. 1991. *Children's Labor Force Activity and Schooling in Brazil.* Ph.D. Dissertation, University of Michigan.

Levison, D., and R. Anker, S. Ashraf and S. Barge. 1996. *Is Child Labor Really Necessary in India's Carpet Industry?* Labor Market Paper No. 15. Geneva: ILO.

Levy, V. 1985. "Cropping Patterns, Mechanization, and Child Labor and Fertility Behaviour in a Framing Economy: Rural Egypt." *Economic Development and Cultural Change* 33: p777-791.

Lloyd, C.B. 1994. "Investing in the Next Generation: The Implication of High Fertility at the Level of the Family." *New York Population Council Working Paper* No. 63.

Mah, J.S., 1997. "Core Labor Standards and Export Performance in Developing Countries." *World Economy* 20, no. 6 (September), pp. 773-785.

Maskus, Keith. 1997. "Should Core Labor Standards be Imposed Through International Trade Policy?" World Bank Policy Research Working Paper No. 1817, August.

Moehling, Carolyn M. 1995. "The Intra-household Allocation of Resources and the Participation of Children in Household Decision-Making: Evidence from Early Twentieth Century America," mimeo, Northwestern University.

Moehling, Carolyn M. 1999. "State Child Labor Laws and the Decline of Child Labor." *Explorations in Economic History* 36: pp. 72-106.

Montgomery, M., A. Kouame and R. Oliver. 1995. "The Tradeoff between Number of Children and Child Schooling: Evidence from Cote d'Ivoire and Ghana." *LSMS Working Paper* 112, Washington, D.C.: The World Bank.

Margo, Robert A. and T. Aldrich Finegan. 1996. "Compulsory Schooling Legislation and School Attendance in Turn-of-the-Century America: A 'Natural Experiment' Approach." *Economic Letters*, 53, (October), : pp.103-110.

Ministerio de Educacion. 1993. "Censo Escolar", Lima: Ministerio de Educacion (unpublished).

Nardinelli, Clark. 1990. *Child Labor and the Industrial Revolution.* Bloomington: Indiana U. Press.

Nielsen, H.S. 1998. "Child Labor and School Attendance in Zambia: Two Joint Decisions." *CLS WP* 98-15. Centre for Labour Market and Social Research, Aarhus, Denmark.

OECD. 2000. *International Trade and Core Labour Standards*, Paris: OECD.

Parker, S. and E. Skoufias. 2000. "The Impact of PROGRESA on Work and Time Allocation." International Food Policy Research Institute, Washington, D.C., forthcoming.

Parsons, Donald O. and Claudia Goldin. 1989. "Parental Altruism and Self-Interest: Child Labor Among Late Nineteenth-Century American Families." *Economic Inquiry* 27(4): pp. 637-659.

Patrinos, H. and G. Psacharopoulos. 1995. "Educational Performance and Child Labor in Paraguay. *International Journal of Educational Development* 15 (1), pp. 47-60.

Patrinos, H. and G. Psacharopoulos. 1997. "Family Size, Schooling and Child Labor in Peru: An Empirical Analysis." *Journal of Population Economics* 10, pp. 387-405.

Powell, B. and L.C. Steelman. 1993. "The Educational Benefits of Being Spaced Out: Sibship Density and Educational Progress. *American Sociological Review* 58, pp. 367-381.

Psacharopoulos, George. 1997. "Child Labor Versus Educational Attainment, Some Evidence from Latin America." *Journal of Population Economics* 10, pp. 377-386.

Psacharopoulos G. and A.M. Arriagada. 1989. "The Determinants of Early Age Human Capital Formation: Evidence from Brazil. *Economic Development and Cultural Change* 37(4), pp. 683-708.

Ranjan, Priya. 2001. "Credit Constraints and the Phenomenon of Child Labor." *Journal of Development Economics* 64, pp. 81-102.

Ravallion, Martin and Quentin Wodon. 1999. "Does Child Labor Displace Schooling? Evidence on Behavioral Responses to an Enrollment Subsidy," Washington, D.C.: The World Bank.

Ray, Ranjan. 2000. "Analysis of Child Labour in Peru and Pakistan: A Comparative Study." *Journal of Population Economics* 13, pp. 3-19.

Rizzini, Irene, Irma Rizzini and Fernanda Rosa Borges. 1998. "Brazil: Children's Strength is not in Their Work," in *Child Work and Education, Five Case Studies from Latin America*, edited by Maria Cristina Salazar and Walter Alarcon Glasinovich, Florence: UNICEF.

Rodrik, Dani. 1996. "Labor Standards in International Trade: Do They Matter and What Do We Do About Them," in *Emerging Agenda For Global Trade: High Stakes for Developing Countries,* edited by Robert Z. Lawrence, Dani Rodrik and John Whalley. Overseas Development Council Essay No. 20, Washington, D.C.: Johns Hopkins University Press.

Rogers, Carol Ann and Kenneth A. Swinnerton. 1999. "Inequality, Productivity, and Child Labor: Theory and Evidence," mimeo, Georgetown University.

Rogers, Carol Ann and Kenneth A. Swinnerton. 1999. "Inequality, Productivity, and Child Labor: Theory and Evidence." Mimeo, Georgetown University.

Rosenzweig, M.R. 1981. "Household and Non-Household Activities of Youth: Issues of Modelling, Data and Estimation Strategies." In: *Child Work, Poverty and Under-Development*, G. Rodgers and G. Standing (eds.), Chapter 8, Geneva: ILO.

Rosenzweig, M.R. and K. Wolpin. 1980. "Testing the Quantit-Quality Fertility Model: The Use of Twins as a Natural Experiment." *Econometrica* 48, pp. 228-240.

Sakellariou, Chris and Ashish Lall. 1999. "Child Labor in the Philippines." In *The Policy Analysis of Child Labor, A Comparative Study,"* edited by Christiaan Grootaert and Harry Anthony Patrinos, Washington, D.C.: World Bank.

San Martin, Orlando. 1996. "Child Labour and Socio-Economic Development." In Bjorne Grimsrud and Arne Melchior, (eds.) *Child Labour and International Trade Policy,* Paris: OECD-DNMEs Workshop).

Scholliers, Peter. 1995. "Grown-ups, Boys and Girls in the Ghent Cotton Industry: The Voortman Mills, 1835-1914." *Social History* 20(2), pp. 201-218.

Schultz, Paul T. 2001. "School Subsidies for the Poor: Evaluating a Mexican Strategy for Reducing Poverty." International Food Policy Research Institute, FCND Discussion Paper No. 102, March.

Spindel, Cheywa Rojza. 1985. *O menor trabalhador: um assalariado registrado,* Sao Paulo: Nobel.

Strauss, J. and D. Thomas. 1995. "Human Resources: Empirical Modeling of Household and Family Decisions," in J. Behrman and T.N. Strinvasan (eds. *Handbook of Development Economics Volume 3*, Amsterdam: North-Holland.

Turvay, Catalina and Elvia Maria Acuna. 1998. "Child Labour and Basic Education in Colombia," in *Child Work and Education, Five Case Studies from Latin America*, edited by Maria Cristina Salazar and Walter Alarcon Glasinovich, Florence: UNICEF.

Tzannatos, Zafiris. 1996. "Child Labor and School Enrollment in Thailand in the 1990s." Social Protection, Human Development Network. The World Bank, Washington, D.C.

U.S. Department of Labor. 1998. By the Sweat and Toil of Children, Efforts to Eliminate Child Labor, vol. 5, Washington D.C.

Wodon, Quentin. 1999. "Cost-Benefit Analysis of Food for Education in Bangladesh," Policy Research Working Paper, World Bank, Washington, D.C.

World Bank. 2001. *Spectrum.* Winter.

Table 1
Sequential Probit Analysis for Selected Countries in Latin America
Stage 1: Probability that a Child Works
Variables Significant at the 10% Level

	Colombia		Bolivia	Peru
	Rural	**Urban**		
Year	1993	1993	1993	1991
Statistical Technique	Sequential Probit			Logit
Population Sampled	7-17 years	12-17 years	7-17 years	7-18 years
Child Characteristics				
Age	7.72	7.16	1.76	
Male	9.03	10.86		3.62
Parent Characteristics				
Age Head of HH	1.98			
Father's Education	-1.98	-1.02		-0.40
Mother's Education	-1.95	-1.79	-0.37	
Mother Working?	7.30	3.84		
HH Characteristics				
Log Expenditures	-10.81	-18.68	-4.63	
Rural				15.08
Indigenous				7.76
Family Enterprise	7.77			
Siblings				
Aged 0-6				2.70
Sisters 10-15	-13.53	-14.58	-4.76	
16+	-4.88	-8.91	-0.29	
Brothers 6-9	-6.69			
10-15	-16.72	-17.26	-3.96	
16+	-5.15	-8.77		
Cost of Schooling	-8.41	-7.59	6.16	
Observations	1829	9821	4730	1727

Entries are probability derivatives at the mean of the explanatory variables.
Sources: Adapted from Cartwright (1999), Cartwright and Patrinos (1999) and Patrinos and Psacharopoulos (1997).

Table 2
Sequential Probit and Logit Analysis for Selected Countries in Latin America
Stage 2: Probability of Full-Time Work
Variables Significant at the 10% Level

	Colombia		Bolivia	Peru
	Rural	**Urban**		
Year	1993	1993	1993	1991
Statistical Technique	Sequential Probit			Logit
Dependent Variable	Probability of Fulltime Work	Probability of Fulltime Work	Probability of Fulltime Work	Age-Grade Distortion
Population Sampled	7-17 years	12-17 years	7-17 years	7-18 years
Child Characteristics				
Age	6.78	4.59	3.64	22.20
Male	-31.35	-13.75		2.67
Parent Characteristics				
Father's Education		-1.10		-1.53
Mother's Education		-1.21	-3.10	
Mother Working?	-12.95	-8.25	-33.48	
Father Union Member			-30.47	
HH Characteristics				
Log Expenditures	-8.56		-34.88	
Family Enterprise	-14.11			
No. of Rooms				-2.84
Rural				11.11
Indigenous language			-27.42	-9.05
Siblings				
Sisters 0-5 years	-10.71			6.15*
10-15			-12.87	2.55*
16+		-5.70	-9.54	2.84*
Brothers 0-5 years	12.89	-7.06		
10-15		-3.90		
16+		-1.02	-21.49	
Cost of Schooling	8.51	8.92		
Private School				-6.93
Observations	624	1915	590	1727

*Brothers and sisters.
Entries are probability derivatives at the mean of the explanatory variables.
Sources: Adapted from Cartwright (1999), Cartwright and Patrinos (1999) and Patrinos and Psacharopoulos (1997).

Table 3
Probability of Child Work and Schooling for Selected Countries in Africa
Variables Significant at the 10% Level

	Ghana		**Cote d'Ivoire**			**Zambia**
Year	1991-1992		1993			1993
	Probability of		Probability of			
Dependant Variable	Some Work	Some School	School Only	School and Work	Work Only	Probability of School
Sample Population	7-14 year olds		Urban 7-17 year olds			7-14 year olds
Statistical Method	Bivariate Probit		Sequential Probit and Bivariate Logit			
	Beta-Coefficient		Probability Derivatives at the Variable Mean			Beta-Coefficient
Child Characteristics						
Age	0.85	0.66		21.05	9.33	-0.20
Female	0.23	-0.37	-29.80	-16.40	-15.58	-0.22
Grade						0.30
Married						-2.94
Parent Characteristics						
HH Head Age			2.91	2.73		
Father's Education	-0.29	1.26	1.48	1.84		0.06
Mother's Education		0.75		3.54		
Mother Working?			10.63			
Girl with Working Mother					18.25	
Father in Formal Sector						0.15
Proportion of Non-Head Working						-1.59
Father in HH		0.32				
Head Not Working						-0.29
HH Characteristics						
Log Expenditures/capita			0.28			1.55
Assets						0.16
Savings						0.06
Land						-0.36
Family Enterprise	-0.22		-10.04	-12.62	9.22	
Protestant	0.26	0.61				
Catholic		0.46				
Other Christian		0.40				
Muslim		0.17				
Agriculture/Animals		-0.34			29.22	0.55
Rural		-0.26				0.30
Rain Forest	0.45	0.62				
Poor			-8.63	-12.51		
Other HH Members						
Boys 6-9				4.6		
10-15			3.65			
16-17				13.93		

Girls 6-9					6.33	
10-15		0.12	4.39	9.02		
15+	-0.21					
Aged 60+		-0.11				
Cost of Schooling	0.16	0.11				
Distance to School						-0.03
Households	3811		1177			6372
Sources: Canagarajah and Coloumbe (1998), Grootaert (1999) and Nielsen (1998)						

Table 4
Sequential Probit Analysis for Selected Countries in Asia
Variables Significant at the 10% Level

	India		Philippines
	Boys	**Girls**	
Year			
Statistical Technique	Binary Logit		Sequential Probit
Age of Sample Population	5-12 years old		10-17 years old
Dependent Variable	Probability of Enrollment		Probability of Work
Child Characteristics			
Age			0.024
5 years old	-0.233	-0.317	
8 years old		-0.101	
10 years old		-0.117	
11 years old		-0.131	
12 years old		-0.175	
Parent Characteristics			
Age Head of HH			
Father's Education	0.009	0.020	
Mother's Education		0.025	
Mother Working?			0.011
Mother of Girl Working?			0.019
HH Head of Girl Working?			-0.020
Female HH Head Working?			0.029
HH Characteristics			
Poor			0.038
Rural			0.024
Member of Caste or Tribe	-0.044	-0.119	
Other Backward Caste	-0.042	-0.116	
Believe Girls Should be Educated	0.097	0.303	
Male Head of HH			0.031
Married Head of HH			-0.027
Assets		0.006	
Family Enterprise			0.278
Cow/Goat		-0.011	
Siblings			
#children/#adults in HH		-0.050	
School Characteristics			
School Lunch Program		0.149	
Building Waterproof		0.146	
School Open Previous Week		0.111	
Village Characteristics			
Elect., P.O., Water, Phone		0.036	

Women's Association		0.102	
Observations	1405	1067	23062

Entries are beta-coefficients of the explanatory variables.
Sources: Adapted from Dreze and Kingdon (2000) and Sakalariou and Lall (1999).

TABLE 5
CHILD LABOR AND EDUCATION
LABOR FORCE PARTICIPATION RATES, MINMUM AGE OF WORK AND COMPULSORY EDUCATION

Region	Child Labor Force Participation		Minimum Age for Work		Compulsory Education Ages
	Age Range	Rate	Basic	Hazardous	
Africa	5-14	41.0			
Egypt	6-14	12.0	14	15-17	6-13
Kenya	10-14	41.3	16	16-18	
South Africa	10-14	4.3	15	18	7-15
Tanzania	10-14	39.5	12-18	18	7-13
Asia	5-14	21.0			
Bangladesh	5-14	19.1	12-15	18	6-10
India	5-14	5.4	14	14-18	
Nepal	5-14	41.7	14	16	
Pakistan	5-14	8.0	14	14-21	
Philippines	5-14	10.6	15	18	6-11
Thailand	10-14	16.2	15	18	6-11
Latin America	5-14	17.0			
Brazil	5-14	12.8	14	18-21	7-14
Guatemala	7-14	4.1	14	16	6-15
Mexico	12-14	17.3	14	16-18	6-14
Nicaragua	10-14	9.9	14	18	7-12
Peru	6-14	4.1	12-16	18	6-16
Europe	5-14				
Turkey	6-14	12.6	15	18	6-13

Source: Adapted from U.S. DOL (1998).

TABLE 6
PERCENT OF CHILDREN LEAVING SCHOOL BY AGE FOR SELECTED COUNTRIES
1959-74 BIRTH COHORT

School Leaving Age	Mexico	Argentina	Brazil	Nigeria	Chile	India	Portugal	Britain	USA
12 or younger	25.2	6.6	80.2	4.2	2.4	40.5	17.4	0.0	0.6
13	1.3	5.9	5.8	2.0	2.0	4.2	7.4	0.4	0.2
14	1.8	5.9	3.7	7.5	2.7	5.1	10.7	0.0	0.0
15	5.1	3.5	3.5	8.6	3.7	3.2	4.6	5.3	1.8
16	4.0	4.5	2.1	6.4	5.2	3.6	5.4	50.1	2.6
17	3.8	10.8	2.1	6.6	12.3	4.3	4.6	10.3	15.0
18	7.8	16.0	1.0	14.3	21.9	6.5	7.8	11.2	29.7
19	5.3	8.0	0.7	7.8	10.4	4.9	0.0	0.0	4.4
20	6.5	4.2	0.4	8.5	8.1	4.5	10.6	7.4	4.9
21 or older	39.1	34.5	0.4	34.1	31.3	23.3	31.6	15.2	40.8

Adapted from Krueger (1997).