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# The Global Child Labor Problem: What Do We Know and What Can We Do?

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The problem of child labor has moved from a matter of regional and national concern to one of international debate and possible global persuasion and policy intervention. In crafting policy for mitigating this enormous problem of our times, it is important to start with a proper theoretical and empirical understanding of the phenomenon. What gives rise to child labor, and what are its consequences? What interventions might end child labor without hurting children? A well-meaning but poorly designed policy can exacerbate the poverty in which these laboring children live, even leading to starvation. The article surveys the large and rapidly growing literature on this subject, focusing mainly on the new literature based on modern economic theory and econometrics. It also looks at some of the broad policy implications of these new findings, with the objective of contributing to better informed discussion and policy design.

From at least as far back as 1802, when Robert Peel's Factories Act was passed in Great Britain, societies have made serious efforts to root out child labor. In the 200 years since then, the world has seen economic growth and prosperity that, even until fairly recently, would have been beyond human imagining. Yet despite that, at the time of the second centenary of the Factories Act, the world has an estimated 186 million child laborers—5.7 million in forced and bonded labor, 1.8 million in prostitution, and 0.3 million in armed conflict—a failure of stunning proportions.[1]

1. The estimates are for 2000, the latest for which global data are available (ILO 2002). A more detailed discussion of these statistics is in section III.

The period of activism and economic progress in the 19th and early 20th centuries saw sharp reductions in child labor in industrial nations. What may not have been realized then was that some part of this problem had merely been exported to developing economies, which already had their own child labor problem. Partly because of the difficulty of collecting data on child labor, and partly because most child labor is integrated with other family work, its dimensions remained unknown for a long time. In the 1990s, following the Convention of the Rights of the Child (1989) and a confluence of factors from globalization to the systematic collection of statistics by the International Labour Organization (ILO), the World Bank, and individual nations, the world became aware that from a global perspective the child labor situation was not much better than it had been during the Industrial Revolution. Large numbers of children were working shockingly long hours in factories and sheds that were frequently poorly lit, squalid, and a hazard to health.

This awareness gave rise to a flood of research and writing about child labor that has dramatically increased understanding of the phenomenon and the consequences of alternative policy interventions. This raises hope of the possibility of a time-bound plan for putting an end to child labor and raising the level of well-being of children the world over. This article pulls together the recent research as an aid to thinking about policy for dealing urgently with this preventable problem of our times.

## I. THEORY

This section and the next review some of the theory behind the empirical investigations and the assumptions that underlie the theory. Two crucial assumptions underlie some of the early models (see, for instance, Basu and Van 1998; Swinnerton and Rogers 1999) and have been used in a wide range of analyses, from dynamics to the modeling of social norms: the luxury axiom and the substitution axiom.

### The Basic Model: Poverty, Substitution, and Social Stigma

The luxury axiom asserts that households send their children to work only when driven to do so by poverty. In other words, child nonwork (typically schooling and leisure) is a luxury good. Households whose adult incomes are very low cannot afford to keep children out of some productive activity. Only when adult incomes begin to rise do households take children out of the labor force. Implicit in this assumption is an altruistic view of the household: parents or guardians do not like to make their children work unless compelled by circumstances. The evidence seems largely to confirm this axiom (Edmonds 2001; Admassie 2002; Wahba 2002; Grootaert and Patrinos 1999, 2002), though there will be exceptions or what look like exceptions. These are discussed in section III.

The substitution axiom asserts that adult and child labor are substitutes, subject to some adult equivalency correction. More specifically, it means that adults can do what children do. There used to be a presumption in the folk literature that children were better than adults at certain tasks. Expressions like "nimble fingers" to describe child labor tended to perpetuate this belief. The substitution axiom expresses a contrary view. A careful study of the technology of production involving children by Levison and others (1998) lends strong support to the substitution axiom. They show that adults in India are as good as (if not better than) children at producing hand-knotted carpets. So from a purely technical point of view it is possible to replace child labor with adult labor. But of course, adults cost more, and for that reason firms may be reluctant to make the transition to adults-only labor.
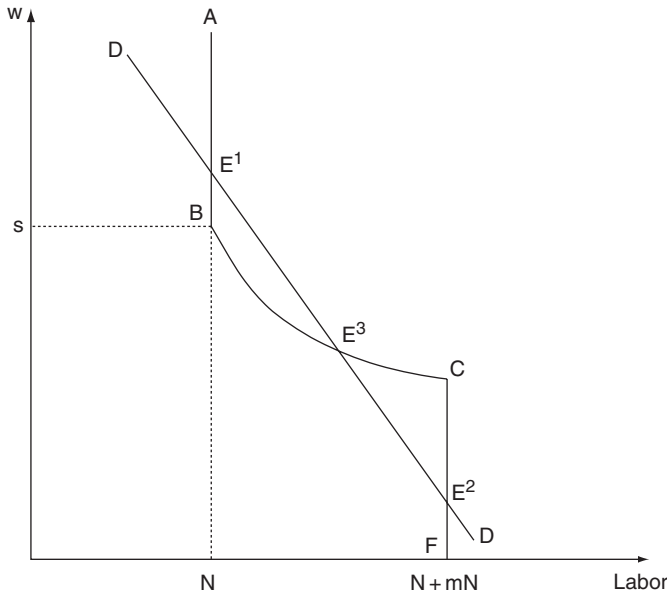
The basic idea behind the theory that emerges from these axioms is simple. Suppose, for simplicity, that the economy consists of $N$ households and that each household consists of one adult and $m$ children. Production takes place using labor alone. By doing a full day's work, each adult can supply one unit of labor and each child $\gamma(\neq 1)$. This assumption formalizes the substitution axiom. Child labor is a substitute for adult labor, subject to an equivalent scale correction. Let the wage rate for a full day's work by an adult be $w$ and the wage rate for a full day's work by a child be $w^c$, so that $w^c = \gamma w$.

Each household decides on the minimum tolerable level of household consumption, here called subsistence consumption, $s$, though it may well embody social notions of what is considered an acceptable level of consumption. Adults work full-time. Only if adults work full-time and income falls short of subsistence consumption are children sent to work (the luxury axiom).

Now consider figure 1, where the adult wage is represented on the vertical axis. If this wage is greater than $s$, only adults supply their labor. Assuming, for simplicity, that adult labor supply is perfectly inelastic, then AB is part of the labor supply. As $w$ drops below $s$, children are sent to work in an effort to reach the target acceptable level of income. Hence, as $w$ drops further below $s$, total labor supply increases. This continues until there is no further labor to supply. Then labor supply becomes inelastic once again. This explains the shape of the supply curve ABCF.

The essential feature of the supply curve here is its backward-bending section. Beyond this, there are many possible variations under different assumptions. The stretch BC can be a segment of the rectangular hyperbola under the assumption that the household uses child labor to achieve exactly a total income of $s$. This may not be reasonable, however, if just a small amount of child labor makes it impossible for the child to go to school. In that case, once a child is made to work the household may decide to make the child work quite a bit, thereby making the BC segment more elastic.

FIGURE 1. Effect of Subsistence Consumption on Child Labor



But as long as there is a backward-bending segment, the possibility of the demand curve for labor intersecting the supply curve more than once is a reality.[2]

That possibility with a standard downward-sloping demand curve for labor is illustrated in figure 1. In this case the labor market has three equilibria, $E^1, E^2$, and $E^3$. Of these, $E^1$ and $E^2$ are stable, and they are the focus here. At $E^1$ wages are high and there is no child labor, and at $E^2$ wages are low and there is a high incidence of child labor. The same economy can get caught in any of these equilibria.[3] If such an economy is stuck at the "bad equilibrium" with high

2. How plausible is this multiple equilibria in reality? It is arguable that in many nations, such as China or India, where child labor is so small a percentage of adult labor that a ban is unlikely to raise adult wages sufficiently to make parents voluntarily withdraw their children from the labor force. Though this may indeed be so in China or India, there are several nations, such as Ethiopia or Nepal, where child labor is a much higher percentage of adult labor (about four times that of China or India). In such countries the effect on adult wages of a ban on child labor may not be negligible. Moreover, in reality neither households nor firms are identical. This becomes evident that the multiple equilibrium result will not obtain as cleanly in reality as in the model, where all households are identical. But if child labor is considered as a percentage of total unskilled adult labor (which is what child labor competes with), the ratio is higher. So a ban on child labor can have a fairly substantial effect on the wage rate of totally unskilled workers. In other words there may be a segment of the heterogeneous economy in which the effect is large.

3. A different kind of coordination problem and multiple equilibria are explored in Dessy and Pallage (2001). In their work the failure of coordination is between parents' decision about child education and the decision of firms to adopt a suitable technology. In their model, unlike this one (see Basu 2002), the equilibria are Pareto ranked.

child labor, it pays to have a legal intervention banning child labor, for this will deflect the economy to the "good equilibrium."

This does not automatically amount to a case for legal intervention any time there is child labor. In a very poor economy it is entirely possible that the demand for labor is so low that the only intersection of the demand curve with the supply curve occurs on the segment CF. In that case a ban on child labor can backfire, leaving the children and their parents impoverished and risking starvation.

In this model child labor is driven by poverty. That is not to deny that it can have other causes, some even beyond economics. There are important analyses, notably by Zelizer (1985), that point to the changing social conception of childhood and, relatedly, of the value of the child.[4] How important are these social factors in explaining child labor? Zelizer is right in asserting that in the 19th century, child labor was often commended as necessary for building character and discipline and valuable for industrial competition. However, one must be cautious in not interpreting all opposition to legislation banning child labor as reflecting such views and supporting child labor. Even in contemporary times many economists oppose coercive legislation (in some contexts, so do we), but this usually reflects their view of how the labor market works and how legislation is likely to affect children. It *need not be* an indicator of any normative difference or any difference in the conception of childhood and the worth of children.

What one can take away from Zelizer is that social norms matter, sometimes in very concrete ways, as demonstrated by Lopez-Calva (2003), following the models of Lindbeck and others (1999). In a nutshell the argument is as follows. For simplicity, assume that each household $i$ has one child and that the child wage rate is fixed at $w^c$ and that the benefit from having the child work is given by $w^c$. To decide whether child labor is worth it, the cost of having the child work needs to be deducted from the benefit. Let $c(i)$ be the leisure cost of child work as perceived by household $i$. Without loss of generality, assume that $c(i)$ rises monotonically with $i$.

Now suppose that there is another cost of sending the child to work, the social cost or the stigma cost, $\theta$. Following standard arguments (for example, Granovetter and Soong 1983), assume that this cost depends on how many others send their children to work, so that the stigma cost of sending a child to work is given by $\theta(n)$, where $n$ is the number of children expected to be working and $\theta'(n) < 0$, suggesting that one becomes more brazen the more other people are doing the same. Hence, household $i$ will send its child to work only if $w^c - \theta(n) \geq c(i)$.

Now define $\iota(n)$ as the critical household that will send its child to work when it is expected that $n$ children are working in the aggregate. Hence,

4. Indeed there are persuasive historical accounts of how child labor was often valued and technology that could use child labor was advertised as such (Tuttle 1999). There is also the possibility, unlike in the above model, of a child being the autonomous decision-maker concerning child labor, as emphasized by Iversen (2002).

$w^c - \theta(n) \equiv c[\iota(n)]$. When $n$ is the expected size of aggregate child labor, all households $i \leq \iota(n)$ will send their children to work. It follows, therefore, that the actual amount of child labor will be equal to $\iota(n)$. Evidently, $n^*$ is an equilibrium amount of child labor (in the sense of rational expectations) if $n^* = \iota(n^*)$.

Hence, child labor can depend critically on social norms, in particular on the stigma costs of sending a child to work. It is also easy to see that $\iota(n)$ is a monotonically increasing function. Hence, social norms can be compatible with multiple equilibria. Two innately identical societies can socially engineer themselves into different levels of child labor, which, once in place, tend to persist. Also, because the social stigma may vary depending on the type of labor—whether a child works in a factory, farm, or at home, for example—the extent of different kinds of child labor may vary in urban and rural areas and between factories and homes.

It is possible to go beyond poverty and social stigma and look for even more causes of child labor. It could depend on the quality and availability of schools and the transactions cost involved. These variables can in turn be further disaggregated. Moreover, there is evidence that some of these variables affect fertility (Tzannatos and Symons 1989), which would make $m$, the number of children in a household, endogenous. Relatedly, the incidence of child labor will respond to government incentives to make schooling more attractive, such as giving children food for attending school or giving parents of schoolgoing children cash transfers.

The relation between child labor and schooling can be captured theoretically in a somewhat different way with a political economy model. Such models are new in this area, and their full implications remain to be evaluated. A brief account of such a model is provided next.

### Child Labor, Schooling, and Political Economy Models

Political economy models, though still rare (Krueger and Tjornhom 2001; Doepke and Zilibotti 2002; Tanaka 2003), provide interesting insights into child labor and schooling, endogenously explaining why some nations ban child labor and others do not.

In Tanaka's model, government does not legislate against child labor. Instead, it collects taxes and runs schools and, by providing good schools, tries to wean children away from labor to education. In this model, as long as a household does not send its children to school, rising tax rates make it worse off. But once the schools are good enough for households to decide to take the children out of the labor market and send them to school, its welfare responds to the tax rate like an inverted U, because an increase in the tax rate improves the quality of schools.

Households differ from one another, but the broad contour of their preferences is as just described. This means that preferences are not single-peaked, but they are nevertheless of the kind that may satisfy the conditions for the use of

the median voter theorem (Epple and Romano 1996; Glomm and Ravikumar 1998). Tanaka then imposes the necessary technical restrictions and uses the median voter theorem to predict the tax rate (and therefore the quality of schooling) that the government will choose. This in turn determines the incidence of child labor in the economy. In his model a rise in the tax rate results in a decline in child labor. But in the end the tax rate itself is deterministic. He shows that if inequality is high, in the sense of the median income being much lower than the average income, then the tax rate will be low and child labor will be high. Like in the model of Swinnerton and Rogers (1999), inequality is closely related to the incidence of child labor, though the causation is very different.

In an elegant model calibrated to fit Great Britain's experience in the 19th century, Doepke and Zillibotti (2002) endogenize the very act of restricting child labor. In their model, households with many children and less wealth tend to oppose legal restrictions on child labor (for reasons similar to the ones already investigated). Doepke and Zillibotti recognize, however, that the number of children and the amount of human capital in a household depend, in turn, on whether there are legal restrictions on child labor. They first model the steady state in the presence of legal restrictions and in the absence of restrictions. In the presence of restrictions the steady state is characterized by greater equality and more social mobility.

The most interesting feature of their model is the endogenous explanation of the ban. They show that there can be multiple steady-state equilibria in the economy. There can be an economy in which fertility is high, per capita wealth is low and poorly distributed, and opposition to legal restrictions is so high that government does not legislate against child labor, so these conditions persist through time. Alternatively, the same economy could be caught in a steady-state equilibrium in which household size is low, equality is high, and public opinion strongly favors legal restrictions. One exogenous change that can shift an economy from the first equilibrium to the second is a rise in the productivity of education.

### Dynastic Traps, and Other Theoretical Extensions of the Model

In most of the discussion so far, dynamics have received little attention. Once there is an interest in dynamics and in what happens to children when they grow up, it becomes essential to, minimally, break up children's activities into three categories: leisure, schooling, and work. This permits exploration of what happens to human capital formation over time and whether child labor helps or hurts in the accumulation of human capital. Also, there are important questions to ask about the relation between child labor and schooling. If all of a child's time is devoted to labor and schooling, a rise in child labor will, by definition, imply a fall in schooling. But bringing in leisure as a separate category allows for an examination of more complicated relations between labor and education. Finally, explicit modeling of schooling enables exploration of changes in child labor over time.

There is now a small body of literature that analyzes the dynamics of child labor (Basu 1999; Dessy 2000; Razzaz 2001; Hazan and Berdugo 2002; Emerson and Souza 2003; Bell and Gersbach 2001). It assumes that a person who receives more education as a child grows up to have higher human capital. It is possible to add qualifications to this by noting that child work can take the form of apprenticeship, which enables the child to learn some craft or acquire some other form of human capital, or that in acquiring human capital it is not only the amount of time spent on schooling that counts but also the amount of money spent on education. Though these are possible, it seems reasonable to assume a positive link between amount of schooling and human capital acquired.

Under normal conditions in capital and labor markets, higher human capital will mean a higher labor income. Hence, a person who supplies more labor and gets less education as a child will grow up to be poorer as an adult. Following the logic of the basic model, this person's child will also be sent to work, thereby perpetuating child labor across generations. Child labor can thus be thought of as a dynastic trap. A child laborer tends to grow up to have children who are child laborers by virtue of their family history. Likewise, a child who manages to go to school, which will typically mean escaping labor, will likely have a larger income as an adult and therefore have no need to send any children to work.

Again, there is the possibility of multiple equilibria: Of two otherwise identical dynasties, one can be caught in the dynastic child labor trap, whereas the other is not. This gives rise to a host of possible policy interventions, including the provision of loans or subsidized schooling, bans on child labor, and information campaigns about the adverse effects of certain types of child labor (this could raise the awareness of the parents, so that they weigh the long-run costs of child labor more heavily, which amounts to increasing the benefits of schooling in their perception). The interaction between child labor and the nature of the capital market has been studied in a multiperiod model by Baland and Robinson (2000), who construct a model in which it is Pareto efficient to ban child labor.[5]

It is possible to develop this sketch of dynamics further by explicitly modeling the household's fertility decision. Hazan and Berdugo (2002), building on the work of Galor and Weil (1996), show how economies can be caught in a trap where fertility and child labor are high and output per capita is low. Technological progress increases the wage differential between adults and children, lowering the benefit from child labor and leading to lower fertility. In their model, banning child labor hastens the transition to low fertility and sustained growth steady-state equilibrium, which is Pareto dominant.

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5. See also Ranjan (1999) and Cigno and others (2002). A cross-country study by Dehejia and Gatti (2001) lends support to the thesis that lack of access to credit contributes to child labor. Households use child labor as an instrument for coping with income variability (Jacoby and Skoufias 1997).

In recent years theoretical analyses of child labor have been extended in various directions, analyzing the formation of social norms and the role of "tipping points" (Chaudhuri 1997; Lopez-Calva 2003), the relation between child labor and trade (Ranjan 2001; Jafarey and Lahiri 2002; Brown 2000; Dixit 2000; Brown and others 2002), the relation between income distribution and child labor (Swinnerton and Rogers 1999; Rogers and Swinnerton 2001), the effect of minimum wage legislation on child labor (Basu 2000), the worst forms of child labor (Dessy and Pallage 2002; Basu and Chau 2002), efficiency wage and child labor (Genicot 2000), Nash bargaining and child labor (Gupta 2000; Iversen 2002),[6] and the connections between child labor and fertility (Levy 1985; Basu 1993; Bardhan and Udry 1999; Chaudhuri 2000; Fan 2002; Brown and others 2002).

Rather than entering these myriad subfields of inquiry, the next section surveys some of the empirical findings of the rapidly growing literature on child labor and then examines what has been learned about policymaking in this area.

## II. DEFINITIONS AND ESTIMATES

According to the latest ILO estimates, 211 million children aged 5–14 years are "economically active" and 186.3 million are "child laborers" (further discussion of these terms comes later). These figures have to be treated with caution, however, because there are problems with both undercounting and overcounting.

The ILO collected the data by tracking children's work status over the previous week. It is now well-known, as documented by Levison and others (2002), that children's work is notoriously intermittent (for example, seasonal or as needed). Children take up and leave jobs much more frequently than do adults. So the fact that a child did not work the previous week does not mean that the child did not worked during the previous month or year. To correct for this, Levison and others worked out intermittency multipliers, which allow them to use the estimated number based on one week's record to derive the number of children who do some work. Their work using Brazilian data shows that the real number will be 72–94 percent higher. Applying the intermittency multipliers to the ILO estimate gives a figure of economically active children somewhere between 365 million and 409 million.

There is also the problem of undercounting the labor of girls. The ILO clarifies that, as with most organizations engaged in collecting data on child labor, it ignores the unpaid and not-for-market work that is done in the household, such as household chores. It is not surprising that boys turn out to be doing more labor

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6. These can be of two kinds—those in which the bargain is within the household and those in which the parent bargains with an employer about a child's pay, treating the child as simply an input for generating wealth.

TABLE 1. Participation in Labor Activities and Schooling in India by Children Aged 6–16, by Gender, 1994 (percent)

| Gender | Agricultural work | Nonagricultural work | Household work | Total work | School enrollment |
|---|---|---|---|---|---|
| Boys | 5.2 | 2.3 | 5.3 | 12.8 | 71.5 |
| Girls | 4.5 | 1.7 | 10.5 | 16.6 | 57.0 |
| All | 4.9 | 1.9 | 7.7 | 14.6 | 64.7 |

*Source:* Cigno and Rosati (2001), based on the Human Development of India Survey, conducted by the National Council for Applied Economic Research, New Delhi.

than girls, not only in this new ILO data but in 19th-century British data as well.[7] Girls do a disproportionate amount of household work—often for such long hours that schooling is impossible. Ignoring this work thus underestimates girls' work. As Burra (1997, p. 204) points out in her exhaustive study of child labor in India, much of female child labor appears "invisible to the casual observer."

But when child work is carefully estimated, including unpaid household work, it turns out that girls do more work than boys. Burra (1997) provides evidence of specific industries and rural work in which girls easily outnumber boys.[8] Research by Cigno and Rosati (2001), using data collected by the National Council of Economic Research that include statistics on household work, shows that girls do 33 percent more work than boys (table 1).

Ignoring household work thus encourages gender injustice and gives an erroneously low figure for the incidence of child labor. If this correction of 33 percent is made to the adjusted estimate of economically active children, the number goes up to somewhere between 425 million and 477 million. This would mean close to 40 percent of the world's children are economically active.

Though this number seems high, both corrections are reasonable. Countering this, however, is the problem of overcounting. The ILO treats as economically active any child who did one hour or more of work in the previous week. Such a generous definition would tend to include too many children—and not only in developing economies but in industrial ones as well, where children often deliver newspapers and babysit and, at times, work in agricultural activities.

For this reason it may be preferable to use ILO's estimates on "child labor" instead of economically active children. ILO defines a "child laborer" as follows: for ages 5–11 it is treated as synonymous with "economically active"; for ages 12–14 it includes children who do 14 hours or more of nonhazardous work per week or 1 hour or more of hazardous work per week. This yields the estimate of

7. According to the census of England and Wales, in 1861, 36.9 percent of boys aged 10–14 years were working and 20.5 percent of girls (Cunningham 1996). For historical accounts of child labor and the related debate on international labor standards, see Goldin (1979), Weiner (1991, chapter 6), Cunningham and Viazzo (1996), Moehling (1999), Engerman (2003), and Humphries (2003).

8. Jayaraj and Subramanian (2002) have created an index of disadvantage for working children, and find that girls are more disadvantaged than boys in Tamil Nadu, India.

TABLE 2. Global Child Labor, Aged 5–14, 2000

| Gender | Total no. of children (millions) | Child labor (millions) | Child labor participation rate (%) | Children in hazardous work (millions) | Hazardous work participation rate (%) |
|---|---|---|---|---|---|
| Boys | 616.4 | 97.8 | 15.9 | 61.3 | 9.9 |
| Girls | 583.1 | 88.5 | 15.2 | 50.0 | 8.6 |
| All | 1,199.4 | 186.3 | 15.5 | 111.3 | 9.3 |

*Source:* Authors' calculations based on ILO (2002, tables 1, 6, and 8).

186.3 million child laborers already mentioned (table 2). Though there are some difficulties even with this calculation,[9] they are small in terms of net effect. Thus in this article, the data in table 2 are taken as the summary description of current global child labor.[10]

## III. The Determinants and Consequences of Child Labor

Over the past 10 years, thanks to a large number of multipurpose household surveys, a few surveys explicitly focused on child labor, and a substantial amount of econometric research based on these statistics, economists have begun to map the causes and determinants of child labor and acquire an understanding that is far-reaching though incomplete.[11] Some of the findings on the causes of child labor corroborate what many may have expected intuitively. But some findings are unexpected, and some touch on issues that had not been given much attention previously.

### Poverty

One of the most expected but nonetheless contentious determinants of child labor revealed by these studies is poverty. This notion was introduced here as the luxury axiom. The role of poverty has been the cornerstone of much of the thinking about child labor.[12] Casual empiricism seems to confirm its significance. Even in very poor nations, where child labor is widespread and human

9. It is, for instance, not clear that even for children below the age of 12 years, 1 hour of work per week (about 10 minutes a day) should have a child count as a child laborer.

10. In recent times policymakers and academics have tried to take a more nuanced stance on child labor, paying special attention to the worst forms of child labor, which includes hazardous work and forced labor. This has been reflected in conventions, such as ILO Convention 182 and certain laws, like the Sander's Amendment in the United States (see discussion in Basu 2001). For this reason the ILO estimates of hazardous child labor are included in table 2.

11. For a comprehensive overview of the state and causes of child labor around the world see U.S. Department of Labor (2000). For a more eclectic review, mainly of the World Bank's research in this area, see Bhalotra and Tzannatos (2002).

12. See Jayaraj (1993), Basu and Van (1998, 1999), Basu (1999a), Swinnerton and Rogers (1999), Freije and Lopez-Calva (2000), Ray (2000a, 2000b), Bhalotra (2000), and Nagaraj (2002).

beings of all ages are subject to the same laws, the children of doctors, lawyers, professors, and in general the middle classes are not found to be laboring. A recent study by Nagaraj (2002) of the *beedi* industry in Tamil Nadu and Karnataka, India, finds that the number of children aged 5–14 attending school rises monotonically as monthly household per capita expenditures rise from less than 120 rupees to 455–560 rupees, passing through nine intermediate categories. In the absence of other data, Nagaraj treats schooling as a kind of complement of child labor. This may not be completely valid, as mentioned, but the study does seem to broadly confirm the hypothesis that rising income takes children away from work and into schooling.

At a more macro level, it is clear that as nations become richer, the incidence of child labor tends to fall. In China the sharp decline in child labor began in the 1970s, when gross domestic product growth began to accelerate, and has persisted until now. During 1985–95, when Thailand experienced average annual growth of 9 percent, the labor participation rate of children aged 14–15 (for whom comparable information exists) was halved, to 21 percent (Tzannatos 2003). In India also, the labor participation rate of children has declined since the 1970s, though less sharply than in China (ILO 1996). Like China, India had a higher growth rate through the 1980s and 1990s than in previous decades, though not as high as in China.

Although all this suggests that the luxury axiom is probably valid empirically, these broad-brush descriptions cannot be taken as proof. For that, however, there are now micro studies that seem to reinforce the role of poverty.[13]

Vietnam witnessed rapid growth through the 1990s. During that time there were two household surveys, one in 1992/93 and one in 1997/98. Of the 4,800 households covered in the first round, 4,305 were part of the second survey, thereby creating a convenient panel data set. During the five years between the two surveys Vietnam's gross national product (GNP) per capita grew at the rate of 6.5 percent a year and child labor (ages 6–15) fell 26 percent. In a recent study Edmonds (2001) analyzes 3,436 of the households that were classified as rural to determine whether the decline in child labor can be attributed to the rise in standard of living. Urban households were excluded because the great heterogeneity in types of labor by children added considerable complexity to the analysis and because urban children make up a much smaller proportion of the nation's total child labor.

Many alternative explanations are considered, and different kinds of child labor are explored, such as in agriculture and family business, as well as child labor in the aggregate. The decline in child labor seems unequivocal and to cut across all age groups and kinds of child labor (table 3).

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13. Some early research found that the effect of adult income was often negative but small (and at times insignificant) after controlling for other variables. Most likely this is the result of measurement errors, failure to take into account the role of wealth (especially land), inappropriately controlled endogeneity, and arbitrary functional forms used in the estimation (Bhalotra and Tzannatos 2002).

TABLE 3. Probabilities of Child Labor Participation in Vietnam, 1992/93 and 1997/98

| | 1992/93 | | | | 1997/98 | | | |
|---|---|---|---|---|---|---|---|---|
| Age | Work | Outside house | Agriculture | Family business | Work | Outside house | Agriculture | Family business |
| 10 | 0.31 | 0.00 | 0.29 | 0.03 | 0.17 | 0.00 | 0.16 | 0.00 |
| 11 | 0.36 | 0.01 | 0.33 | 0.04 | 0.27 | 0.00 | 0.26 | 0.02 |
| 12 | 0.46 | 0.03 | 0.38 | 0.07 | 0.34 | 0.00 | 0.32 | 0.02 |
| 13 | 0.54 | 0.03 | 0.47 | 0.06 | 0.42 | 0.02 | 0.39 | 0.05 |
| 14 | 0.67 | 0.05 | 0.56 | 0.11 | 0.49 | 0.04 | 0.42 | 0.07 |
| 15 | 0.77 | 0.09 | 0.66 | 0.09 | 0.61 | 0.04 | 0.52 | 0.10 |

*Source:* Edmonds (2001), based on data from the Vietnam Living Standards Surveys.

Edmonds (2001) develops a new, nonparametric variation of the Blinder-Oaxaca decomposition approach to determine the extent of the decline in child labor that can be attributed to the decline in poverty. He first runs a nonparametric (locally linear) regression to map the cross-sectional relation between the incidence of child labor and household income (measured by household expenditure per capita) using the 1992/93 data. This cross-sectional relation is then used to predict the amount of child labor in 1997/98, taking account of the large increase in per capita expenditure during this interval. He finds strong corroboration of the hypothesis that rising living standards cause child labor to decline. He finds that increased household income can explain 94 percent of the decline in child labor for households at the poverty line.

### Critiques of the Poverty Axiom

The axiom that poverty causes child labor has, however, not gone unquestioned. There are empirical studies (for example, Ray 2000a, in his study of Pakistan) that have failed to find a positive relation between poverty and child labor. But it is arguable that the income that a household targets as the minimum acceptable may not coincide with the nation's or region's official poverty line. So using a poverty headcount ratio based on the official poverty line may not explain the incidence of child labor.

Another critique of poverty-based explanations of child labor comes from Bhalotra and Heady (2003), who have tried to show, using data for Ghana and Pakistan, that households that own (or operate) larger amounts of land tend to make their children work more. Because a larger landholding would typically mean greater wealth, this seems to suggest that greater poverty does not lead to greater child labor.

The main reason that greater land ownership may contribute to higher child labor is, as Bhalotra and Heady recognize, that labor market imperfections mean that owning or controlling land amounts to having the opportunity for more productive use of the household's labor, including child labor. So if two households are equally disinclined to send their children to work but one has

more land, that household may choose to make the children work simply because such a household finds that child labor is more rewarding than the other household does. It is not surprising, then, that land ownership makes a difference on the margin.

Edmonds and Turk (2002) found something similar in Vietnam. Households that start their own business are more likely to send children to work.[14] The reason must be the same. A household that starts its own business is like a household with a lot of land. It has greater opportunity to use its own labor more productively. This does not mean that poverty is not a determinant of child labor, simply that child labor, like all other inputs, also responds to incentives and opportunities. It seems likely that sufficiently disaggregated household data, ranging from households that own no land to those that have very large quantities of land, would show a nonlinear relation with child labor, which would first rise as land ownership rose and then eventually fall off. Beyond some point the wealth of the household would kick in as the dominant factor, causing child labor to decline.

### Human Capital Formation and the Dynamics of Child Labor

The story gets even more complicated as the relations between human capital formation and child labor and the intergenerational dynamics of child labor are explored. Consider the relations between child labor, schooling, and human capital formation.[15] Does child labor hurt education and the acquisition of human capital? Most middle- and upper-income parents take for granted that child labor is inimical to education and the growth of a person into a productive human being. But what such parents aspire to for their children is very different from what someone living on the edge of the poverty line could even conceive of (Appadurai 2002). It is entirely possible that for people living such a precarious life there is indeed a tradeoff between education and well-being, at least in their perception. For the child of a poor craftsman, the proposition that it is better to learn the parent's craft than go to school is not something that can be dismissed out of hand. Hence, there is a case for investigating what the data show.

The literature seems to support the view that, although some work can help children acquire human capital, by teaching them the skills and attitudes needed to function well as adults and at times by enabling them to earn the money needed to go to school (French 2002; Psacharopoulos 1997), in general child labor impedes the acquisition of education and human capital. This emerges clearly from an analysis of three rounds of data from the National Household Surveys in Brazil in 1982, 1988, and 1996. Emerson and Souza's (2002b) regression analysis using these data shows that starting to work at a younger

14. The same is confirmed by Canagarajah and Coulombe (1997). Kanbargi and Kulkarni (1991) found that in Karnataka, India, having a larger number of cattle can mean a higher incidence of child labor.

15. This is a topic with a rapidly growing literature. See, for instance, Rosenzweig and Evenson (1977), Maitra and Ray (2002), Ray (2000b), Deb and Rosati (2002), and Rosati and Rossi (2003).

age results in forgone earnings as an adult for both men and women. The loss of earnings is greatest for children who begin to work at the age of 9 or younger, then for those who start to work between 10 and 13 years, and finally for those who start to work between 14 and 17 years. For reasons that are not altogether clear, this study finds that starting work at an earlier age is relatively more costly for girls than for boys. This needs further investigation because another study (Swaminathan 1997) using data for Bhavnagar, Gujarat, finds the opposite result.

Are these forgone earnings caused by the fact that child labor interferes with schooling? Here an interesting difference shows up between those who start work as children (below the age of 13) and those who begin work as adolescents (aged 14–17). These two categories show different results when the regressions are run with and without a person's own education as an explanatory variable. Emerson and Souza (2002b) find that for the adolescents the forgone earnings are a direct outcome of education not acquired (that is, time spent at work and away from school). For children there are negative effects over and above the loss caused by lack of schooling. Child labor inhibits the acquisition of human capital through loss of education and through other channels, for instance, by damaging health or affecting attitudes (see Rosati and Rossi 2003).

An intriguing relation between child labor and education occurs across siblings. Thus although a particular child working cuts into education, work and education often seem to go together across siblings in poor families: one child's labor makes it possible for another child to go to school (see Morduch 2000 for a general discussion). Though this phenomenon of "sibling complementarity" seems obvious,[16] it has not received much attention in the literature. An exception is a study by Emerson and Souza (2002a) that, using 1998 National Household Survey data for Brazil, establishes systematic relations between birth order and propensity to go to school or work. The last-born boy is less likely to work than his older siblings. This observation seems universal. Almost as widespread is the observation that the first-born girl is less likely to attend school than her younger siblings.

This sibling complementarity shows up largely in households that are moderately poor, because in rich households all children will be out of work and in school; in very poor households the reverse will be true. What sibling complementarity suggests is that in moderately poor households some children are kept away from school (and sent to work or made to look after the household) to enable other children to go to school. This observation has important moral and policy implications, especially because birth order also seems to be tied to gender, with girls' labor often being used to enable younger male siblings to go to school. Not much more can be said about this, because not much more is known, but it is an important topic deserving further research.

16. *Complementarity* refers to the relation between child labor and schooling. For a single child these two are typically substitutes (though of course there are exceptions) but across sibling these are more likely to be complements. Hence, the terminology.

Finally, what of intergenerational dynamics? That poverty is transmitted from one generation to another and has been through the ages is well known and documented. Horrell and others (2001) find, in addition, that downward shocks not only leave families worse off but can impede the formation of human capital among descendants. They reach this conclusion by studying a very unusual 19th-century data set. The Marine Society, established in Great Britain in 1756 to recruit poor, unemployed boys for the navy, kept detailed records of the boys interviewed between 1770 and 1861, including information on their socioeconomic background. Horrell and colleagues use this data set to show that poverty in one generation transmits to future generations in the form of lower human capital, creating dynastic poverty traps. They also show that this pernicious effect of poverty can be mitigated by a systems of social security, such as Great Britain's Poor Laws.

Evidence of dynastic traps exists for contemporary times as well. Wahba (2002) analyzes the 1988 Egyptian Labor Force Sample Survey, a nationally representative sample of 10,000 households. Her analysis is based on 10,742 children aged 6–14 for whom full information on schooling, work, and parental characteristics is available. She finds that a 10 percent rise in the market wage rate for illiterate men results in a 22 percent decrease in the probability of child labor for boys and a 13 percent decrease for girls.[17] Wahba develops a bivariate probit model, allowing the decisions regarding schooling and work to be made simultaneously and interdependently. She finds that the child of a parent who was a child laborer has a higher probability of being a laborer than the child of a parent who was not a child laborer. The probability of a boy working rises 10 percent if his mother worked as a child and 5 percent if his father worked as a child.

The same phenomenon was modeled and empirically tested by Emerson and Souza (2003) using National Household Survey data for Brazil. They explored the further question of whether having worked as a child would boost the probability of that person's child working by more than the amount that can be explained by the fact that the person will be poor as an adult (because of having been a child worker). The answer is yes. They surmise the presence of social factors that cause the perpetuation of child labor through nonincome channels. It may be that having been a child laborer affects one's social norms and attitudes toward child labor (Basu 1999a; Lopez-Calva 2003), making one more prone to send one's child to work.[18]

17. It is worth noting as a digression that she finds strong support for the axiom that it is hardship that makes parents send their children to work.

18. In a study of India that does not directly relate to child labor but is concerned instead with education, Behrman and others (1999) find that a greater amount of schooling for girls increases the human capital of the next generation and this effect is, at times, greater than that obtained directly through schooling. This is caused by home teaching. They find that children with literate mothers spend on average one hour more on study at home than children with illiterate mothers.

One may question whether there are genetic channels through which these propensities, such as the one to seek education, transmit from one generation to another. The answer seems to be no, based on a study by Lloyd and Blanc (1996) comparing orphans and nonorphans in Sub-Saharan Africa. They find that the guardians with whom a child lives matter more significantly than the child's biological parents. This reinforces the likelihood that it is social factors that Emerson and Souza are capturing in their study.

Two caveats are worth mentioning with respect to both the empirical results cited here and the policy generalizations that can be drawn from them. First, the empirical literature on child labor is relatively young. Many studies (some quoted in this article) report results that are at best preliminary. Although some of the shortcomings can be corrected through future refinements, some generic problems endemic to economic and social research may persist well into the future.

Second, cross-section estimates may fail to capture important life-cycle effects, and estimates more generally can be affected by endogeneity or identification problems.[19] Also, studies that include as explanatory variables the occupation of adults, land ownership, or other income variables may be tainted by multicollinearity. The results for control variables (such as household size, relationship of child to head of household, age of child, birth order) may be similarly affected. The omission of some variables from the estimation (because data are lacking) may also engender biases. Because many studies simultaneously examine the relation between child labor and education, there can be unobserved heterogeneity (for example, in the academic ability of children or their health or disabilities) that can be further conflated by the inclusion of parental education (a measure of tastes) or nonlinearities in the returns to education. Regional effects, community infrastructure (such as availability of water, electricity, and transportation), and local unemployment rates can prevent the results of different studies, even if in the same country and year, from being comparable. There are often disequilibrium effects (such as migration) that evade researchers. The use of dummy variables in estimation poses additional complications, as does the use of noneconomic variables (such as social norms), which can be proxied in different ways or altogether omitted from the estimation.

## IV. Some Policy Implications

Much of the early debate on child labor focused on whether policy intervention was even appropriate. In the heyday of laissez-faire many observers believed that if child labor was a product of the market, it must be efficient to have child

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19. For an extended discussion on each of these problems and their effects on estimation see Bhalotra and Tzannatos (2002).

labor. If one were committed to the efficiency of the market, the state had no reason to be involved in the market.

The flaws in this argument are obvious enough. Education involves externalities, and so a decision by an individual or a household may not be in the best interest of society. This argument was cogently summarized by Grootaert and Kanbur (1995) in an article that sparked considerable debate. Another problem is child agency. The decision on whether a child will work, study, or play is usually made by the child's parents or guardians, and the standard consumer sovereignty argument does not apply to cases where one person decides for another.[20]

Even recognizing these caveats, some would argue that the laissez-faire prescription of nonintervention while waiting for the benefits of growth to trickle down and end child labor is the best *available* strategy. This is the position of Nardinelli (1990), who reads the experience of the Industrial Revolution and its aftermath in Great Britain as evidence of how futile legal interventions are in the face of market forces that give rise to child labor. Moehling (1999) takes a similar line of argument, based on an econometric analysis of U.S. historical data.

It is possible to argue, however, based on an understanding of the modern theory and data, that government intervention to control child labor is both desirable and possible. Policies need to recognize the powerful market forces that give rise to child labor in the first place and that will doubtlessly respond to any intervention. They need to be aware of the many pitfalls and risks of backlash in this complex area of interaction between household economics and market structures.

An important ground rule can be that any policy for child labor (including the policy decision to do nothing) must be justified primarily by the interests of children. That leaves out arguments of the structure: "policy X concerning child labor will leave children worse off but is justified in the interest of boosting the country's exports and through that its GNP." In brief, the policy interventions presented here arise from a child-centric perspective. These policy interventions are of two kinds: collaborative measures and coercive measures.

### Collaborative Measures

Broadly speaking, collaborative measures are interventions that alter the economic environment of decisionmakers, rendering them more willing to let children stay out of work and spend more time on other activities, especially schooling. Such measures do not require coercion and may not even require any legislative backup. Thus a policy that improves the functioning of adult labor markets, so that adult incomes rise and unemployment falls, is always desirable

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20. A recent philosophical discussion of this and an examination of what exactly "voluntary choice" means in the context of child labor occurs in Satz (2003).

from the point of view of curtailing child labor. Given that parents typically want to keep children out of work and in school, parents who have enough income of their own to make child labor unnecessary will tend to withdraw children from work and put them in school.

Does this mean that simply giving unconditional income subsidies to poor households will curtail child labor? Though the answer may generally be yes, one has to be careful. Such subsidies could instead be used to buy land or open a business, which in turn could increase child labor by creating an easy production environment for employing children.

Closely related is the policy of improving credit and insurance markets, so that adults who fall on bad times can borrow on reasonable terms and so do not have to take their children out of school and send them to work to help the household ride out the rough patch. The link between credit markets and child labor has been noted in the literature (Baland and Robinson 2000; Ranjan 2001).

But by far the most direct collaborative measures are those that reward children who go to school instead of working. Many such interventions have been tried, and there is now a small body of empirical literature on the programs. Among the policy intervention that build in incentives for parents to send their children to school (or for children to go to school) are Bolsa Escola in Brazil (Bourguignon and others 2003; Lavinas and others forthcoming),[21] Progresa in Mexico (Schultz 2001; Skoufias and Parker forthcoming), Red de Protección Social in Nicaragua (Maluccio forthcoming), food for education programs in Bangladesh (Ravallion and Wodon 2000), mid-day meal schemes in India (Dreze and Kingdon 1999), school construction programs in Indonesia (Duflo 2000), and back-to-school measures in Indonesia following the financial crisis (Filmer and Sayed 1999).

Schooling has responded to such incentives in most of these programs. Dreze and Kingdon (1999) find that school participation among girls is 15 percent higher when the local school provides a mid-day meal and that girls' schooling responds more to such incentives than boys' schooling—an important finding for efforts to keep girls away from work, which, though often invisible, frequently involves more hours than boys' work.

Mexico's Progresa (recently changed to Oportunidad) extends to some 40 percent of rural families and provides large incentives to schooling (as well as medical tests and nuitritional programs). For example, in poor areas a mother

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21. Brazil has another program, Programa de Erradicacao do Trabalho Infantil, that, like Bolsa Escola, provides an income subsidy but in the form of a rural targeted transfer program. Comparisons of schooling, child participation, hours worked, academic progress, and dangerous work in program households and control households indicate that the program increased academic performance and lowered child labor in participating households. Nonparticipating children worked longer hours after program implementation but no other adverse spillover effects are observed (Yap and others forthcoming).

receives a grant of 225 pesos if her daughter is enrolled in the ninth grade. The grant is equivalent to 44 percent of an average male day-laborer's wage or about two-thirds of what a child of this age would earn if she worked full-time. Schultz (2001) finds that the program's net effect on enrollment is positive and statistically significant. Skoufias and Parker (forthcoming) estimate that the labor force participation of children aged 12–15 is reduced 15–25 percent relative to preprogram labor force participation and that children in the program are much more likely to attend school and to spend more time on school activities. The estimated increase in the education achievement of children dominates the enrollment gains from increased provision of schools.

Nicaragua's Red de Protección Social is a conditional cash program modeled after Progresa. An evaluation of recipient households in a pilot program against a randomly selected group of comparable households shows that the program had a significant and substantial effect on school enrollment and led to a substantial reduction in child labor within the target population. In the Mexico case these gains occur even at the earliest ages, suggesting that a Progresa-type intervention may hold promise for the poorest countries with the worst educational outcomes in the region.

Bourguignon and others (2003) also find that such incentives increase schooling in Brazil's Bolsa Escola (although it is less successful in mitigating poverty). But is this increase in schooling accompanied by a decrease in child labor? Almost always the answer is yes and almost always by less than the increase in schooling. In some of the poorest regions, even with subsidies, schooling becomes possible for children only if they can also do a little work to finance their schooling and, presumably, their consumption.[22]

### Coercive Measures

Coercive measures have been hotly debated in international forums. Many people have proposed such policies as adding a social clause to the World Trade Organization framework, allowing it to take punitive action against countries whose exports are produced with child labor. There is not enough empirical work on such policies to draw firm conclusions, but the issue is too important to gloss over on those grounds. The best available theory and intuition will need to fill in until more empirical work is done.

Coercive measures have their place, but they need to be used much more carefully than collaborative policies. Hazardous labor ought to be banned outright. Although this may cause other forms of hardship to some very poor families in the short run, it makes little sense to allow such labor by children who cannot—or whose parents often cannot—properly assess the long-run

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22. Many observers, familiar with the ground realities of the poorest regions of the world, have made the case for making school and work more flexible so that children can combine school with a little bit of work (Siddiqui 2001, p. 19), which may well be the only way that they will be able to get any education.

damage that such labor can cause. Even for nonhazardous labor there may be scope for legislative bans. This is typically closely associated with the theory of multiple equilibria. In both static and dynamic models there are often multiple equilibria, with children typically doing better in the equilibrium in which children do not work or work very little. If there are such multiple equilibria, and an economy is settled into an equilibrium with high child labor, a legislative ban can deflect the economy to the superior equilibrium and may be justified on that ground.

Such action, however, needs to be preceded by careful empirical evaluation. If there are no multiple equilibria, then such laws can exacerbate children's suffering, depriving children of the work that is essential for their survival. Or, if the law is effective only in some sectors, it can drive child labor underground to sectors that may be more harmful. Finally, such laws are typically implemented by fining employers who violate the law, as with India's Child Labor Deterrence Act of 1986. Such laws can perversely have the effect of increasing the amount of child labor. By making the employment of children more costly to firms, such laws lower children's wage (otherwise it is not worthwhile for firms to employ children). Children who were working to meet some minimum tolerable income target (for instance, to escape abject poverty), now have to work longer hours and often harder to reach that target.

Partial measures are, in general, a bad idea, and that includes global actions to deter child labor, such as proposals for changes in international labor standards.[23] The two major problems for economists are, first, that once an instrument of global action is created that can impede the flow of goods from nations that violate minimal labor standards, it will be used as a protectionist instrument by industrial countries, as with other measures in the past (Bhagwati 1995; Srinivasan 1996) and, second, that international action to stop child labor in the production of traded goods will simply drive children into the nontraded sector, which could be worse for them (Fallon and Tzannatos 1998).[24] In a study of India's garment export industry Stahl and Stalmarker (2002) found little evidence of bonded labor and the worst forms of child labor, suggesting that the export sector is not where such practices occur.

There is evidence for both these concerns. Basu (2001) discusses how the Sander's Amendment to the Tariff Act in the United States, meant to prevent forced child labor, has been used to block imports into the United States and

23. See, for example, Collingsworth and others (1994), Bhagwati (1995, 2002), Bhagwati and Hudec (1996), Rodrik (1996), Krueger (1996), Maskus (1997), Basu (1999b, 2001), Bachman (2000), Chau and Kanbur (2000), Kabeer (2000), Santoro (2000), Fung and others (2001), Bardhan (2001), Bagwell and Staiger (2000), Brown and others (2002), Krueger (2003), and Singh (2003).

24. In addition, work is often subcontracted out to the home-based sector (Mehrotra and Biggieri 2002), and it is difficult to bring that work under the law. This makes overall monitoring very difficult. As Standing (2001, p. 17) observes, "Informalization has spread everywhere, including within so-called formal enterprises."

settle other scores. There is also evidence that initial attempts to stop child labor in export industries, such as in carpet production in Nepal, have driven children into prostitution (UNICEF 1995).[25] Conversely, there is evidence that market integration may lead to less child labor. Edmonds and Pavnick (2002) found that rice prices rose with the opening up of the Vietnamese economy, causing child labor to decline. Hence, although there is scope for coordinated action among developing economies to raise labor standards (to discourage international capital from fleeing from one country to another), policies that use punitive action, like trade sanctions, to enforce labor standards should be approached with great caution.

It is not surprising that there is no single simple policy measure to end child labor. Its persistence through two centuries is clear evidence that there is no easy solution. Yet today we have a much better understanding of the causes of child labor and thus the opportunity to craft policies that can sharply reduce and ultimately eradicate it.

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25. For an excellent study of the general problem of trafficking in girls in Nepal see the International Program on the Elimination of Child Labour study by KC and others (2001).

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