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IZA DP No. 2606

## Child Labor

Eric V. Edmonds

February 2007

# Child Labor

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*Dartmouth College,  
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February 2007

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## ABSTRACT

### Child Labor<sup>\*</sup>

In recent years, there has been an astonishing proliferation of empirical work on child labor. An Econlit search of keywords "child lab\*r" reveals a total of 6 peer reviewed journal articles between 1980 and 1990, 65 between 1990 and 2000, and 143 in the first five years of the present decade. The purpose of this essay is to provide a detailed overview of the state of the recent empirical literature on why and how children work as well as the consequences of that work. Section 1 defines terms commonly used in the study of child time allocation and provides a descriptive overview of how children spend their time in low income countries today. Section 2 reviews the case for attention to the most common types of work in which children participate, focusing on that work's impact on schooling, health, as well as externalities associated with that work. Section 3 considers the literature on the determinants of child time allocation such as the influence of local labor markets, family interactions, the net return to schooling, and poverty. Section 5 discusses the limited evidence on different policy options aimed at influencing child labor. Section 6 concludes by emphasizing important research questions requiring additional research such as child and parental agency, the effectiveness of child labor policies, and the determinants of participation in the "worst forms" of child labor.

JEL Classification: J13, J22, O15

Keywords: child labor, human capital, time allocation, schooling

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## 1. Introduction

Few issues in developing countries draw as much popular attention as does child labor. The purpose of this chapter is to provide a detailed overview of the state of the recent empirical literature on why and how children work as well as the consequences of that work. A less detailed overview of recent developments in the child labor literature can be found in Edmonds and Pavcnik (2005a), and an older review with a more theoretical focus is Basu (1999).

Child labor has received considerable attention in economics throughout the discipline's history. Early writings tended to focus on child labor solely through the lens of labor demand. Adam Smith emphasized the value of children in labor shortage societies as motives for fertility. Friedrich Engels wrote extensively on the conditions of working children in the early industrial revolution, and to Marx, child labor was created by the industrial revolution. In his view, machines replaced the need for muscle power, allowing children to do the work formerly performed by men. Though his views on labor supply are not transparent, in *Das Kapital* he seems to assume that parents and capitalists inevitably exploit all opportunities to employ children. Interestingly, one exception to this assumption that working parents will take all opportunities to have children work is in Malthus. He argues that the prevalence of child labor in the late 18th century is evidence that families were unable to meet their most basic needs.

Modern writings on child labor are largely based on the human capital theory as developed by T.W. Schultz, Gary Becker, and others. In thinking through the determinants of investments in education, Schultz (1960) emphasized the importance of foregone earnings in human capital accumulation. Investors (parents, children) weigh the return on additional education investments against the costs such investments entail which includes the foregone economic contribution of children. Becker (1965) extended this argument to emphasize that non-wage uses of time are apt to be an equally important influence on the opportunity cost of child time in school. Rosenzweig and Evenson (1977) appear to be the first published study to apply this framework explicitly to analyze child labor in a developing country context.

In recent years, there has been an astonishing proliferation of empirical work on child labor. An Econlit search of keywords "child lab\*r" reveals a total of 6 peer reviewed journal articles between 1980 and 1990, 65 between 1990 and 2000, and 143 in the first five years of the present decade. This rise in interest appears driven by three factors. First, child labor has drawn considerable policy and public attention over the last decade. This public interest seems to be motivated by a concern about child labor as a human rights issue and its implication for long-run growth and development through its interaction with education. The rise in interest in recent years may owe to rising trade and globalization more broadly. They have both raised awareness about the pervasiveness of child labor and elevated concerns among rich country residents about their role in its perpetuation. Second, concurrent with this rise in public interest is a booming theoretical literature on why children work. Prominent theoretical publications such as Basu and Van (1998, section 3.4 below) and Baland and Robinson (2000, section 4.3 below) have spurred a large battery of empirical research. Third, large-scale, nationally representative household surveys from developing countries have become increasingly available over the last fifteen years. This has both lowered the costs of working on child time allocation and increased the complexity of the types of questions that can be addressed empirically.

Any study of child labor must begin with a definition of what the researcher means by child labor. The next section surveys different definitions used in the existing literature and discusses some examples from a variety of countries about how children work. The types of activities popularly viewed as child labor are not usually the focus of empirical studies of child labor. Often, academic studies of child labor are better viewed as child time allocation studies, and it seems clear that research must consider as wide a scope of activities as data permits in order to understand the dynamics of child time allocation. Data sources and data problems such as children that are hard to observe with randomized surveys are also discussed.

Section 3 considers the case for attention to the types of work activities that are most common in low income countries. Historically, activists sought to move children out of work so that children could enjoy their childhood, and the Progressive Era's "sacralization" of childhood (to quote Zelizer 1985) persists in contemporary, anti-child labor resolutions such as the 1989 UN Convention on the Rights of the Child. Part of the reason for viewing working child work as a moral issue is that parents may make decisions for children about whether and how children work without fully internalizing the costs of such activities. Research on child labor tends to avoid moral arguments about how children should spend their time by focusing on quantifying the costs of working. Human capital theory generally post-dates the anti-child labor movements in developed economies, but most of the academic interest in child labor today is because of its consequences for human capital accumulation. Many studies examine whether specific types of

work or groupings of activities of common forms of work appear to affect education, physical and mental health, or nutritional status of working children. This begs the question of why focus on child labor as anything other than something to explain schooling or health changes. Several answers to this question are posited in the literature, and they are discussed in section 3.

Section 4 reviews the accumulating evidence on why children work. This literature is of academic interest in its own right for all the same reasons that adult labor supply is of interest to research. Moreover, studying the determinants of common forms of work also can be informative about the case for attention to common activities. That is, how the common forms of work are affected by changes in the family's broader economic and social environment can reveal how family decision-makers view the most common forms of work in low income countries. Policies aimed to influence how and where children work can be useful for understanding by the causes and consequences of working, and section 5 discusses the minimal evidence that exists on how policies influence child labor supply. Section 6 concludes with a summary of the critical issues that have yet to be addressed in the literature.

A simple analytical model will be helpful to fix ideas in this chapter and can illustrate most of the basic points that have been emphasized in existing research on child labor. This model is presented in the remainder of this introduction. This model is meant to be heuristic. Cigno and Rosati (2005) present a more general child labor model that can incorporate most of the important recent theoretical contributions in the child labor literature.

Consider a household with one parent, one child, and two time periods: the child's youth when the parent decides how to allocate the child's time and the child's future (the parent has no future in this model). The parent's labor supply is inelastic and yields an exogenous income  $Y$ . Parental preferences are over the family's current standard of living,  $S$ , and the child's future welfare  $V_k$ .  $u(S, V_k)$  is the utility representation of parental preferences. The child's time is allocated between education  $E$ , leisure and play  $P$ , work outside of the household  $M$ , and work inside of the household  $H$ . Work inside the household can be in the production of goods or services that might be resold to the market (market work) or it can be in similar activities that are important for the family in converting purchased inputs into a standard of living (domestic work).  $E+P+M+H=1$ .

The standard of living is produced by a linear homogenous production function and depends on purchased inputs  $c$  and the input of child time  $H$ ,  $S = F(c, H)$ . The child's future welfare depends on the positive, diminishing marginal product production function,  $V_k = R(E, P)$ . Leisure and play is likely complementary to schooling in the production of child welfare, but such statements about cross-partial derivatives are not necessary for the present discussion. Importantly, time spent in education is not necessarily limited to time in the classroom. Also, beyond the opportunity costs of education inherent in the time constraint, schooling entails direct costs,  $e$ . Direct costs are assumed to be increasing in the time spent in education. Thus, direct schooling costs entail  $eE$  in foregone consumption today. Work outside of the household is freely available in the formal labor market and brings an exogenous wage  $w$ . This income combines with non-child income  $Y$  to purchase inputs used in the production of the standard of living:  $c = Y + wM - eE$ . In this setting, the parent's problem is:



$$\begin{aligned} & \max_{E,P,M,H} u(F(Y + wM - eE, H), R(E, P)) \\ & \text{subject to: } E + P + M + H = 1, E \geq 0, P \geq 0, M \geq 0, H \geq 0 \end{aligned} \quad (\text{eq. 1.1})$$

This set-up emphasizes several points that will be raised in sections 2 and 3. First, the residual claimant on child time outside of work is not schooling, and there is a return to leisure that parents may value and could be important for the child's future welfare. Second, if one is interested in child labor because of its impact on schooling, there is no theoretical reason to focus on work outside of the home alone. Consider a child that does not attend school. What are the possible explanations for this?

$$E = 0 \Rightarrow \frac{\partial u}{\partial V_k} \frac{\partial R}{\partial E} \leq \lambda + \frac{\partial u}{\partial S} \frac{\partial F}{\partial c} e \quad (\text{eq. 1.2})$$

The family's marginal utility from the foregone consumption caused by schooling costs plus the marginal utility of time  $\lambda$  is at least as large as the family's marginal utility that comes through improving child welfare from additional education. The marginal utility of time will depend on how the family values the contribution of play to child welfare, the marginal utility of the standard of living, and how time spent in the wage market and in household production affects the standard of living. There is no reason to presume that the wage contribution is more likely to dominate schooling than is the household production contribution. In fact, most children work at home rather than in the wage labor market. This implies that for most children the return to time in household production is at least as large as the value the family places on the child's wage contribution. The idea that studies of child time allocation should consider as broad a definition of child work as the data permits is a main theme in section 2. Of course, there are many reasons to be interested in why children work beyond its implications for schooling. Section 3 reviews the literature on the short term and long term consequences of child work.

This setting also implies several key reasons why children work. First, poverty is a key influence on child labor supply. It influences the family's valuation of child time in household production and the formal labor market, and it may affect the production function for future child welfare. Some researchers have emphasized that the influence on child labor of exiting poverty may differ from the effects of additional income, and this will be discussed in section 4.

Second, the relative return to child time in schooling may be an important factor. The relative return depends in part on the returns to education as well as the returns to play, the return to child time in home production, the return to formal labor income, and the direct costs of schooling. Schooling improvements, labor demand factors including trade, technological change, and labor regulations all potentially affect child labor through these mechanisms. Similarly, living arrangements, fertility, and market imperfections in credit, land, or goods markets may all influence child labor through their impact on the relative return to child time.

Third, parental preferences play a key role in child time allocation decisions. In this set-up, preferences do not drive differences in the allocation of child time between the formal labor market and household production, but they affect the family's valuation of child time in work activities relative to non-work activities. For example, a child engages in wage work and does not attend school if:

$$\frac{\partial u}{\partial V_k} \frac{\partial R}{\partial E} \leq \frac{\partial u}{\partial S} \frac{\partial F}{\partial c} (w + e). \quad (\text{eq. 1.3})$$

The marginal utility from the child's contribution to the production of the standard of living (through wage income and the lack of educational expenditure) is at least as large as the marginal utility from the return to education. To the extent that preferences are important, then questions of intrahousehold allocation such as how household decisions are made and who makes these decisions become important in understanding child labor supply.

With so many influences on child labor, what types of policies will be useful in reducing it? Section 5 concludes with a discussion of different policy options that have been used to influence the activities of children. There is very limited evidence to suggest that anything other than long-term poverty reduction and development is likely to substantially alter the child labor picture although some findings from conditional cash transfer programs are encouraging. However, it is important to note that the general lack of evidence reflects a lack of scientific research more than a failure of programs. Moreover, very little is known about why children participate in some of the worst forms of child labor, where human rights issues are most relevant, and very little formal analysis has been done on the policies being pursued to help these most vulnerable children.

## 2. What is Child Labor?

Any discussion of child labor must begin with a precise description of what the term means. The phrase "child labor" conjures images of children chained into factories, sold as slaves, or forced into prostitution. Fortunately, while many children work in the developing world, few experience such atrocities. The International Labor Organization (ILO) is the international body charged with country child labor, and it estimates that in 2004 there are 218 million child laborers in the world (ILO 2006). Most of these working children labeled "child laborers" are helping their family at home, on the family farm, or in the family business. Economics research on "child labor" tends to focus on these more commonplace activities, both because of their greater prevalence and the relative ease in collecting data on the typical types of activities children perform. There is controversy about whether the types of activities that children typically participate in are harmful or beneficial to children and others. That discussion is reviewed in section three.

The present section aims to describe the different definitions of child labor and child work that are prevalent in the literature and overview how children typically work in low income countries. It should be clear from the discussion in the introduction that if one is ultimately interested in influencing the allocation of child time to a particular activity such as some form of work or schooling then researchers need to consider as broad a set of activities as possible. Children do not typically participate in the formal wage labor market. When children do not participate in the formal wage labor market, the shadow value of child time ( $\lambda$  in the analytical model) is determined by the child's involvement in chores, the family business, schooling, etc. Hence, focusing on a limited set of activities can bias a researcher's understanding of the dynamics of child time allocation. Of course, a broad focus on child time allocation overall inevitably means that a paper on "child labor" will consider types of work that are very different than the popular use of the term.

## 2.1 Terminology

### *Market and domestic work*

In both research and policy discussions, there is extraordinary heterogeneity in how child labor is defined and in what words are used to describe the different categories of work in which children participate. The purpose of this subsection is to review how words are typically defined in the literature, but there is no consensus. There is currently work underway to define statistical standards and develop a fixed terminology (see Guarcello et al 2005) that is the basis for much of this section, but that work is still in its infancy. Both producers and consumers of research need to be careful to define exactly what is being studied in a particular research paper.

Table 1 presents a list of commonly used phrases to describe aspects of how children work. Activities are organized by whether the activity involves the direct production of economic goods and services that fall under the United Nations System of national Accounts (SNA). According to the SNA, "the production of economic goods and services includes all production and processing of primary products whether for the market, for barter, or for own consumption, the production of all other goods and services for the market and, in the case of households which produce such goods and services for the market, the corresponding production for own consumption" (ILO 2000 p1). The production of economic goods and services will include wage employment, self-employment, participation in agriculture, milling, handicrafts, construction as well as water and wood collection.

Aggregate statistics of child employment typically cover the economically active population. Economically active is defined as being involved in economic activity, and it includes wage workers, employers, own-account workers, members of producer cooperatives, unpaid family workers, apprentices, members of the armed forces, and the unemployed. Economic work or market work is used similarly to economically active individuals, except the unemployed are excluded. Participants in market work are sometimes separated by whether their work is for the consumption of others (market oriented work) or their own family (non-market oriented work). One can imagine how this distinction is important in national accounts, but there is no clear reason why this distinction is important in studying child time allocation. Wage work is a subcategory of market oriented work, and many authors focus on studying wage employment alone. One unique challenge in classifying children engaged in market work outside of their own household is that children are not always paid directly in wages. They either receive pay in-kind (goods and services) or their labor is contracted for a fixed fee. Typically, these children are grouped with those paid in cash under "wage work", but some studies separate them, labeling them unpaid out of household market or economic work.

Child involvement in non-SNA activities is studied infrequently in child labor studies. A February 2005 review of empirical papers on child labor indexed in EconLit and published in peer reviewed economics journals since 1995 found that all but two considered wage work, half additionally considered other forms of market work such as work in the family farm or business, and 10 percent considered work that would fall outside the SNA definition of economic activity. The phrase non-economic work is sometimes used to denote participation in the provision of goods and services to family members or other members of the community that fall outside of the scope of the official definition of economic goods and services. This includes for example

community service work that helps build or maintain local schools. It also includes domestic chores such as caring for family members, cooking, cleaning, or shopping. The phrase "housework" is sometimes in place of domestic chores or it is used to refer to domestic chores excluding shopping. Finally, "domestic work" is used in reference to non-economic work exclusive of community service and volunteer work.

The use of the word "economic" in the SNA is confusing as economists since the early 1960s have emphasized the activities that the SNA defines as non-economic as critical to the household's standard of living. Moreover, non-economic can be interpreted to imply that the associated activities are inelastic with respect to economic factors, an assumption that is not born out by the data. Many writers avoid using the phrases "economic" and "non-economic" work. Instead, they classify work into market work and domestic work. The remaining classification of work, community service and volunteer work, is rarely studied and poorly understood. There are two obvious problem with using this market and domestic work lexicon. First, market work and market oriented economic work are apt to be confused. Second, domestic work performed for compensation outside of the child's own household is considered a type of market work and is often referred to as domestic service or domestic work. The safest solution is for researchers to be explicit in how they are defining the activities under study.

Two commonly used terms to be avoided are child work and household work. Child work is typically used synonymously with market work. However, asserting that a child who works in substantive hours in the provision of services to their home is not working is difficult to justify. One could make the case for defining child work as covering both domestic and market work, but simply using the phrase "work" to refer to these activities together is apt to generate the least confusion given child work's common use as market work. Household work is often used as a synonym for domestic work. However, this is confusing, because market work most often occurs within the household.

### *Child labor*

Researchers often avoid labeling any one activity as child labor. Official definitions of child labor vary. Some countries officially define child labor as wage work (e.g. Pakistan) or market work that is harmful to the future well-being of children (e.g. Vietnam). This later standard is based on the precedent of the International Labor Organization's (ILO) C138. C138 on the Minimum Age for Admission to Employment was passed in 1973 and has been signed by 135 countries to date. Signatories agree to pursue a national policy to abolish "child labor" and to increase the minimum age of employment to "a level consistent with the fullest physical and mental development of young persons" (C138, Article 1). Neither "child labor" nor "employment" is defined in the convention, but the age appropriateness of various activities depends on consideration of their effects on the health and development of the young. In general, the minimum age of employment is the minimum age of completion of compulsory schooling or at least 15 years old, although 14 can be consistent with the convention in very poor countries. Light work that is deemed consistent with schooling attendance and unlikely to be harmful to health and development is consistent with the convention in children as young as 12.

For statistical purposes, defining whether an activity is harmful to a child's health or development is a challenge, because whether an activity is harmful depends on what the child

would be doing in the absence of work. The ILO's Statistical Information and Monitoring Program on Child Labor (SIMPOC) is the international body charged with tracking child labor around the world. Their definition of what exactly is "child labor" varies over time, in part because of controversy over what can be considered harmful. At the time of writing, a child laborer is defined by SIMPOC as an economically active child under 12 that works 1 or more hours per week, an economically active child 14 and under that works at least 14 hours per week or 1 or more hours per week in activities that are "hazardous by nature or circumstance," and a child 17 and under that works in an "unconditional worst form of child labor" (trafficked children, children in bondage or forced labor, armed conflict, prostitution, pornography, illicit activities, ILO 2002). The ILO (2006a) estimates that there were 218 million child laborers in the world in 2004 under this definition.

Some researchers that choose to define an activity status as child labor adopt this SIMPOC definition, but others are also present in the literature. By far, the most common thing to do is to define children in wage work as child laborers. Others define child labor as market work. A few researchers also define child labor by adding in domestic work. Typically, an arbitrary cutoff in hours is employed in classifying some domestic workers as child laborers and others as not just as the SIMPOC definition arbitrarily classifies as 13 year old working 14 hours per week as a child laborer while the 13 year old working 13 hours per week is not. Given that "child labor" carries a particular connotation in the popular imagination, the safest course is likely for researchers to avoid labeling any one class of activities child labor.

"Light work" is sometimes used to refer to market work that is not deemed child labor. That is, market work which is for some reason viewed as unlikely to be harmful to health, development, and does not affect school attendance, participation in vocational training, or the child's ability to benefit from any instruction received. Of course, it is not obvious how would know whether work could be harmful in any of these senses without establishing the counterfactual of what children would be doing absent this light work.

#### *Worst and hazardous forms of child labor*

While the general phrase "child labor" is poorly defined, some specific activities are labeled as a "hazardous form of child labor" or a "worst form of child labor". The minimum age convention, C138, places special emphasis on activities that "jeopardise the health, safety, or morals of young persons" (Article 3 - section 1) and defines 18 as the minimum age of employment for activities that can be described as such. In 1999, C182 on the Worst Forms of Child Labor asks signatory countries to clarify what types of activities fall under this label and to develop specific plans for their eradication. C182 has proven less controversial than C138 on the minimum age of employment. To date, C182 has 151 signatories.

While it is up to the individual country to identify "worst forms" in their own country, Article 3 of C182 contains several guidelines for what types of activities are to be considered for persons under the age of 18. These include all forms of slavery and "practices similar to slavery." This later clause is noted to include the sale and trafficking of children, debt bondage, serfdom, and forced or compulsory labor including for the purposes of armed conflict. Children in prostitution, pornography, the production or processing of drugs are also noted as being in "worst forms" of child labor. Article 3 (d) is the most ambiguous part of the convention as it

allows worst forms to include "work which, by its nature or the circumstances in which it is carried out, is likely to harm the health, safety, or morals of children." Article 4 of the convention is explicit that it is up to individual countries to define what types of work are considered "worst forms" of child labor under this clause. Activities labeled "worst forms" under Article 3(d) of C182 are often labeled as "Hazardous forms of child labor." The companion recommendation document for C182, R190 Worst Forms of Child Labor Recommendation, suggests that these hazardous forms of child labor include:

"(a) work which exposes children to physical, psychological, or sexual abuse; (b) work underground, under water, at dangerous heights, or in confined spaces; (c) work with dangerous machinery, equipment and tools, or which involves the handling or transport of heavy loads; (d) work in an unhealthy environment which may, for example, expose children to hazardous substances, agents or processes, or to temperature, noise levels, or vibrations damaging to their health; (e) work under particularly difficult conditions such as work for long hours or during the night or work where the child is unreasonably confined to the premises or the employer."  
(R190, Section II.3.a-e).

It is worth noting that, unlike the more general child labor definitions discussed above, these hazardous forms of child labor are defined based on the characteristics of the work rather than relying on understanding what the child might do in the absence of work. Hence, the labeling of specific activity as a worst or hazardous form does not carry the same assumptions about the impact of that work as does the phrase child labor, and a specific country's policy definition of hazardous work or worst forms of child labor can guide researchers in the use of those terms.

## **2.2 Sources of Data**

### *Available data*

Sources of data on child labor are increasing almost daily, and with them, our understanding of child labor should continue to increase accordingly. Unfortunately, it does not appear that much work is being done to validate the types of surveys and data collection methods that are being used extensively. Hence, there is considerable scope for work on how to measure the activities that children participate in.

Many early studies of child labor relied on cross-country data. Cross-country estimates of economic active populations come from the ILO's LABORSTA database although the most recent release (fifth edition) omits the 10-14 age group.<sup>1</sup> These LABORSTA estimates of economically activity populations are generally believed to understate the extent of work, because data on work inside the household (even market work) are often not collected. Moreover, although the LABORSTA data are available over time, very few low-income countries have multiple data sources on child labor over time. Much of the intertemporal variation in child labor in the LABORSTA data must thus be driven by the imputations and

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<sup>1</sup> <http://laborsta.ilo.org/>. The fourth edition data (used herein) is available from UNSTAT as well.

adjustments done for LABORSTA rather than independent observations on child labor. As a result, the LABORSTA data is not reliably useful for analyzing changes in child labor over time.

When the ILO's Statistical Information and Monitoring Program on Child Labor (SIMPOC) computes global estimates of the incidence of child labor, it does not rely on the LABORSTA data. Instead, it works wherever possible off available household surveys that facilitate a more complete picture of how children work and are free from LABORSTA's imputations. Understanding Children's Work (UCW) is a joint effort of the World Bank, UNICEF, and the ILO to coordinate studies relevant to child labor, and they maintain a thorough listing of labor force, child labor, and multi-purpose household surveys with information useful for studying how and why children work. Many dedicated child labor surveys assisted by SIMPOC are freely available for download from their website, and there are a variety of multi-purpose household surveys that can be downloaded for research purposes.<sup>2</sup>

This chapter draws extensively from UNICEF's Multiple Indicator Cluster Surveys (MICS) from 2000 and 2001.<sup>3</sup> They include a child labor module which asks children 5-14 whether they work outside of their household in the last week and the last year as well as how many hours they worked outside the household in the last week. The surveys also collect hours in the last week for work in domestic chores and in the household business (separately). No information is available on industry of employment, type of employer, nor compensation. An appealing feature of the MICS data is that survey instruments are nearly identical in each country. That said, questions are likely to be interpreted in different ways based on local context.<sup>4</sup>

#### *Limitations of household surveys and missing children*

Several issues arise in using household survey data to examine child labor supply. First, there is the general question about who to ask about the child's labor supply. A great deal of attention has been directed by agencies such as SIMPOC and UCW towards what types of activities should be monitored, but it is difficult to find detailed analysis of how this information should be collected. It seems likely that measurement error in hours worked is a first order problem with this data while participation is perhaps less difficult to gauge.

Second, measurement of compensation is particularly complicated. Most children do not work for wages, so strong modeling assumptions are required even in detailed data to gauge their compensation. Moreover, it is not obvious that even in wage work any one respondent will be fully aware of the child's compensation. For example, a parent may be paid an amount that the

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<sup>2</sup> At the time of writing: UCW's data archive can be found at <http://www.ucw-project.org>; SIMPOC's archives are <http://www.ilo.org/public/english/standards/ipecc/simpoc/microdata/index.htm>; World Bank assisted multi-purpose household surveys are available from <http://www.worldbank.org/lsmis/>. The most recent Indonesian family life survey contains rich detail on how children spend their time: <http://www.rand.org/labor/FLS/IFLS/>. Several of the Demographic and Health Surveys also contain information on child time allocation: <http://www.measuredhs.com/>.

<sup>3</sup> <http://www.childinfo.org/MICS2/MICSDataset.htm>

<sup>4</sup> For example, 38 percent of children 5-14 in Niger answer that they work in unpaid work outside of their family. The average across all countries is 6 percent. It could be that this labor arrangement is much more frequent in Niger, or it may be that respondents are interpreting the question in a different way than are respondents in other countries.

child is not aware of for the child's services, but an employer may also compensate the child to reduce moral hazard problems.

Third, estimates of the incidence of any type of work will be sensitive to the recall period used. It is not unusual for children to work intermittently, and it is not obvious what the "right" recall period is for any analysis. For example, in agricultural communities, one often observes high participation rates in market work during harvest seasons but little other than domestic work at other times of year. Systematic evidence on the dynamics of child labor is extremely rare. Levison et al (2003) is an exception. Brazil's urban, monthly employment survey follows approximately 35,000 household for fourth months (the survey is set up as a rotating panel). Levison et al use this data to document the intermittent nature of market work participation in urban Brazil from 1982-1999. In their sample, they observe that the percent of children employed in any given month is roughly half the number of children employed in at least one of the four months. Moreover, depending on the city, between 20 and 40 percent of children 10-14 experienced 2 or more employment transitions in a four month period. Hence, not only are child labor measures sensitive to the types of work considered, but they should also be assumed to be sensitive to the recall periods used to assess employment status. This raises particular problems for child labor measures based on the intensity of the child's work.

Fourth, some of the most vulnerable children may be impossible to capture with surveys. Either they do not reside in households or their situation is sufficiently rare that the probability that they are sampled in a randomized survey is effectively zero. Moreover, there is often little reason to assume that selection into these activities (relative to other more easily measured forms of work) is random. To get at these rare or hard to find groups of children, researchers often employ contaminated sampling procedures, but it is hard to draw inferences with this data when children outside of the activity are unobserved although this is an active avenue of research (for example: Edmonds 2006c).

There are two approaches that can be taken to gauge the problem of missing children. Both have severe limitations. First, enumerators can collect complete fertility histories and then account for all of the children. In general, this approach may be biased by errors of omission if children in particular circumstances are also omitted from fertility histories. Alternatively, this fertility history based approach may overstate the extent of missing children, because children that set up independent households or that are fostered in to other households should appear in those household rosters and would not be excluded from any analysis using representative data.

Table 2 presents an example of this approach. A subset of the MICS countries include fertility histories for women 15-49, and Table 2 lists the mean total births, number dead, and number absent for women in these countries in this age range that report having given birth in the last 15 years. Unfortunately, the data do not identify the timing or age of each birth child. It is impossible to decipher the extent to which differences in adult mobility rates are driving differences in number of absent children or how many of the absent children would be captured in other households in a study of children 10-14 (for example). In many countries, a negligible number of children are missing from the mother's household: less than a percent in Vietnam, Uzbekistan, Tajikstan, Azerbaijan, and Albania. However, nearly 20 percent of living births are absent in Sierra Leone and Swaziland. 15 percent are absent in Gambia and Guinea Bissau. Altogether, 10 percent or more of births are absent in 9 of 22 countries. It is impossible to tell



whether these missing children would be relevant for an analysis of child labor supply or schooling. It is also impossible to identify how many of these children would appear in other households in nationally representative randomized survey. However, there seems to be ample potential for a substantive problem in some settings.

The problem of missing children is most acute in panel data, because children that exit a panel household who would be captured in a representative survey are unlikely to reappear in other panel households. However, panel data permits a second approach to evaluate the scale of missing children. Many household panels collect information on individuals, including missing individuals over time. This data can be tabulated to gauge the scale of missing children for work. Extrapolating from this tabulation to representative data overstates the problem of missing children as many children that exit panel households would be captured in a survey of non-panel households, but it is an accurate reflection of the incidence of missing children in panel households.

Table 3 contains counts of missing and recaptured children in two household level panel datasets from Nepal and Vietnam. A comparison of missing children in the two panels is illustrative, because the questionnaires regarding attrition are very similar, both datasets are World Bank assisted Living Standards Measurement Surveys (LSMS), and at the start of each panel, the two countries have similar living standards as measured by GDP per capita. The counts in Table 3 are only for recaptured household and are not relevant for assessing child attrition in households that are not in the panel for each country. In the Vietnam data, 93 percent of boys and girls are recaptured. Of the missing children, 7 percent of boys and 8 percent of girls are potentially missing from the Vietnam data because of work or schooling (this includes children whose absence is not explained). This corresponds to less than a percent of the boys and girls that would be expected to appear in the second round of the panel in the Vietnamese data.

While out-migration for work or school is then unlikely to be a significant source of bias in the Vietnamese data (at least for recaptured households), it appears to be a much more substantive issue in the Nepali data. 78 percent of boys and 75 percent of girls are recaptured in panel households in the Nepali panel. Of the missing, 44 percent of boys and 13 percent of girls are potentially missing for work or school. These missing children constitute 10 percent of the boys and 3 percent of the girls expected to be in the household for the second round of the panel. Hence, while the data from Vietnam suggest that missing children is unlikely to be a substantive problem in that data, there is considerably more scope for problems in the Nepali data. Specific country contexts must be considered in discussing biases owing to missing children.

### *Idle children*

Most household surveys of children capture a large number of children that neither work nor attend school. For example, the 2000 Indian National Sample Survey classifies 13 percent of rural children 10-14 in India as neither working nor attending school. These children are typically labeled "idle," and the exact interpretation of their status is controversial. Biggeri et al (2003) discusses the interpretation of idle status in household surveys from six different countries. They argue that measurement error in activities (especially mismeasurement of domestic work), unemployment, and unobserved health issues are responsible for a significant

part of the "idleness" status. Measurement issues may be particularly important in cross-country comparisons as understandings of "work" may vary from country to country.

Idleness is not necessarily simply measurement error in work. Idleness can be fully rational in a time allocation model with schooling costs such as that of section 1. Equation 1.2 specifies that a child does not attend school when the marginal utility associated with the returns to education is less than the foregone utility caused by schooling costs and the shadow value of child time. When children also do not work ( $H=0$ ,  $M=0$ ), the shadow value of child time is simply the marginal utility associated with the return on leisure for the child's future welfare. Thus, idle status occurs when:

$$\begin{aligned} \{E = 0, M = 0, H = 0, P > 0\} \Rightarrow \frac{\partial u}{\partial V_k} \frac{\partial R}{\partial E} &\leq \frac{\partial u}{\partial V_k} \frac{\partial R}{\partial P} + \frac{\partial u}{\partial S} \frac{\partial F}{\partial c} e \\ &\frac{\partial u}{\partial S_k} \frac{\partial F}{\partial c} \leq \frac{\partial u}{\partial V_k} \frac{\partial R}{\partial P} \\ &\frac{\partial u}{\partial S_k} \frac{\partial F}{\partial H} \leq \frac{\partial u}{\partial V_k} \frac{\partial R}{\partial P} \end{aligned} \quad (\text{eq. 2.1})$$

That is, true idleness occurs when the marginal utility associated with additional leisure is at least as large as that of the contribution of the child's work to household welfare. Is this ever plausible unless the parents put substantive weight on child leisure? There is no empirical evidence to inform this question, but it could occur when there are not wage employment options open to children ( $M=0$ ), and the shape of the home production function  $F(-)$  is such that the marginal product of child labor can become non-positive. This might occur if, for example with young children, there were some tasks children could do but then afterwards, they were more destructive to output (perhaps distractive to adult labor) than helpful. Whether the prevalence of idle children reflects the economic reality of the country or problems in how we collect child time allocation data is not yet answered. Interestingly, Edmonds, Pavcnik, and Topalova (2007) find that the poverty elasticity of idleness in Indian data is greater than is the poverty elasticity of market or domestic work. Hence, even if idleness reflects measurement error, it might not be classical measurement error.

## 2.3 Background on the Activities of Working Children

### *Types of activities*

Table 4 presents participation rates in various categories of activity for 34 countries included in UNICEF's MICS project. The questionnaires are nearly identical in all the countries in Table 4. The data present a unique opportunity to examine child labor across countries in as comparable a manner as possible (little can be done for cultural differences in the interpretation of the questions). Participation rates in schooling, market work, market work for wages, other market work outside of the household, market work inside the household, domestic work, any work, work without schooling, and no work and no schooling are reported in Table 4. Note that while there is considerable variation in schooling, schooling rates are surprisingly high. This reflects the structure of the questionnaire. It asks whether a child has attended school in the last year while the labor questions refer to the last week.

Several important properties of how children work are apparent in table 4. First, work outside of the household is the least prevalent work category in every country except Azerbaijan, Kenya, and Venezuela. In these three countries participation rates in market work inside and outside of the household are similar. Altogether, 8 percent of children in the MICS data work outside of their household, and only 2 percent work in paid work outside of the household. It is unclear what the 6 percent of children who work outside their house without pay are doing in the MICS data, but in other datasets, they are often observed working in labor exchanges on neighboring farms, working in schools in exchange for materials or a reduction in fees, helping a relative with their work, etc.. Domestic work is the most prevalent type of work. Across countries, 65 percent of children 5-14 report working in domestic work, compared to 23 percent in market work.

Second, the countries with the lowest school attendance rates have the highest incidence of "idle" children that neither work nor attend schooling. Work is not the residual claimant on child time outside of school. Moreover, work is not especially prevalent in these countries with high rates of idleness. They do not have the highest rates of work outside of the household or work in market work. This is consistent with the idea that no single indicator of activity will give a particularly complete idea of child time allocation, and research needs to take a comprehensive view of child time in order to understand how it is influenced.

Third, countries with the highest prevalence of work outside the household also have the highest prevalence of work inside the household. Sierra Leone has the highest rate of work outside the household, and the second highest rate of work inside the household. Niger is second with 43 percent of children working outside the household, while it has the fifth highest rate of market work inside the household. In section 4.1 below, we discuss the weak nature of the evidence linking child's market work status and employment opportunities outside of the household, and the high correlation between work inside and outside the household are consistent with the idea that children are not working solely because wage labor market factors draw children away from their homes.

Fourth, participation in market work is highest in countries where domestic work is most prevalent. This positive correlation in participation rates for market and domestic work also appears in hours worked. However, the positive correlations between hours in various categories of work mask a more nuanced view - that participation in various activities is positively correlated when children work a small number of hours in each activity (as is typical) but not with extreme hours. This is evident in Figure 1 which presents the joint distribution of hours worked in market and domestic work for all children 10-14 in the MICS data. Figure 1 is a contour map of the joint density of hours in market work and hours in domestic work for children 10-14 in the pooled MICS data. Each contour on the map is a given density. Thus each point on a given contour is equally likely. Density is increasing in color intensity.

Several key points are evident in figure 1. First, at the peak of the density, children work more hours per week in domestic work than market work. Ignoring domestic work would frequently understate total hours worked by a child by a factor slightly greater than 2. Second, children working a large number of hours in market work are more likely than not to spend additional time in domestic work. This is evidence by the humps in the market work direction. No such humps are evident with hours in domestic work. Third, as hours per week in domestic

work increase, it becomes less likely to observe the child doing significant time in market work. This is evident in the increasing slope of contours as one heads up the domestic hours worked distribution.

The joint distribution of hours worked in Figure 1 illustrates the problem with "child labor" definitions that focus on market work alone, especially definitions based on the intensity of hours worked. For example, suppose a researcher decided to be concerned about children that worked more than 20 or more hours per week. If only work outside the household was considered, this would be 8 percent of the MICS 10-14 sample. If market work inside the household is also included, 23 percent of children work more than 20 or more hours per week. When domestic work is also considered, 38 percent work 20 or more hours per week and 17 percent work 40 or more hours per week. Hence, ignoring domestic work may seriously understate estimates of total hours worked and thereby the incidence of child labor if hours worked is used to define it.

### *Occupation and industry of economically active children*

In table 4, it is clear that most working children participate in domestic work. Among children engaged in market work, most of that work is inside the child's household. The industrial and occupational composition of employment in market work is not available in the MICS data. Comparable cross-country estimates of the industrial and occupational composition of child involvement in market work do not appear to exist. One possible source of this information is that most SIMPOC child labor surveys use similar questionnaires, and they tend to collect information on occupation and industry. In this section, we tabulate available information on industry and occupation for economically active children as reported in downloadable, English language SIMPOC reports.

Table 5 shows the industrial composition of economically active populations for available countries.<sup>5</sup> In almost every listed country, a majority of children economically active children are involved with agriculture, forestry, or fishing industries. The exceptions are the 5-17 populations of Costa Rica, Panama, and the Ukraine where these industries are still the largest employers of children. In most countries, the combination of hotel and restaurants and wholesale and retail trade are the next most important industrial sectors for economically active children. When they can be disaggregated, wholesale and retail trade tends to have a larger share of economically active children than does the hotel and restaurant sector. Manufacturing tends to be small relative to agriculture related and wholesale and retail trade sectors, but it employs a larger share of children than does mining or construction in every country in the table. Interestingly, private households are large employers of economically active children in Kenya, Tanzania, and Zambia. Many of these children are child domestic workers, and the phenomena

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<sup>5</sup> Of the MICS countries from table 4, only Kenya and the Philippines also have child labor surveys. It is interesting to note, that MICS estimates of participation rates in market work differ from estimates of the economically active population in the SIMPOC surveys for these two countries. The difference in the Philippine data is small. 16 percent of children are involved in market work in the MICS data, 11 percent in the SIMPOC survey. However, the differences in the Kenyan data are large. 3 percent of Kenyan children 5-14 are involved in market work in the MICS surveys, but the SIMPOC surveys report an economic activity rate for this population of 15 percent. It is not clear why these estimates differ.

of child domestic workers in Africa and elsewhere is infrequently studied in detail within economics.

The comparability of industry classifications in the SIMPOC surveys across countries is not as complete as one would like. Nor are the classifications particularly detailed. The 2002/03 Bangladesh Child Labor Survey is unusual in the incredible detail it provides on the industrial classification of economically active children. Table 6 tabulates the 4 digit industrial distribution of the economically active populations of children 5-17 in Bangladesh. Only sectors with at least 0.5 percent of economically active children in either rural or urban areas are reported in Table 6. In examining the detailed industrial composition of employment in Bangladesh, it is important to remember that there is no reason to believe that Bangladesh is representative of other low-income countries. There are an estimate 7.5 million economically active children 5-17 in Bangladesh. This corresponds to 18 percent of children 5-17.

The useful information within the detailed classifications of Table 6 is about what children within the aggregate sectors are doing. Children involved in agriculture and related industries are involved in the growing of cereals, vegetables, poultry farming, and inland fishing. Cereal cultivation is the largest single sector with 39 percent of all economically active children directly involved. In the retail trade industries, groceries and general stores are the largest employer of children. In manufacturing, wooden furniture and fixtures stand out. For construction, site preparation is relatively more important.

The disaggregated occupational composition of economically active children can provide further insight into what children do. Information at the 3 digit level is available in the Bangladesh child labor force survey, and these data are tabulated in Table 7. 46 percent of children 5-17 are farm crop workers. The next largest occupations are salesmen and shop assistants (7 percent), poultry farmers (5 percent), sales supervisors (4 percent), fisherman (3 percent), and non-motorized road vehicle drivers (3 percent).

### *Gender differences*

Gender differences in activities can be considerable in some countries. Boys generally have higher participation rates in market work than girls and lower participation rates in domestic work. For example, in the MICS countries, girls are 18 percent more likely to be involved in domestic work and nearly 30 percent less likely to participate in paid market work. Estimates of gender differences tend to be extremely sensitive to what types of activities are considered in a study. Studies such as Assaad et al (2003) for Egypt, Levison and Moe (1998) for Peru, Levison, Moe, and Knaul (2001) for Mexico have documented the misleading picture that omitting domestic work can create for analysis of the determinants of child work.

In both market and domestic work, boys and girls often participate in different tasks. This is evident in the large gender differences in the industrial composition of economically active children in Bangladesh (table 6). Boys are involved in a wider variety of industries. Boys are more likely to be engaged in the growing of cereal crops. Girls are more involved in growing vegetables and poultry farming. 14 percent of economically active girls are in poultry and 16 percent in vegetables while less than 2 percent of economically active boys are in each industry. Children involved in textile and sewing handicrafts and private household services are almost

entirely female whereas boys are more involved in fishing, wooden furniture manufacture, construction site preparation, retail trade of grocery and general stores (as sales assistants and sales supervisors, table 7), and transport (non-motorized vehicles, table 7). We should not extrapolate from Bangladesh to assume such distinct gender differences in other countries, but its example shows that these gender differences can be large.

Large gender differences in types of tasks can complicate researcher decisions about how to treat gender. Do differences in activities reflect a fundamental difference in how girl time allocation decisions will be made with respect to the household's economic environment? If so, this would suggest that boys and girls should be considered separately in research. Qualitative evidence from specific country contexts can help inform where girls should be considered separately from boys, but bifurcating data by gender seems a reasonable default position.

Substantive gender differences in tasks and determinants of work can be especially challenging for studies that rely on within household comparisons (household fixed effects) of children. Assume average birth spacing is two years, the probability an observed child is a girl is 0.5, and that gender draws are independent within parents. This implies that a household fixed effects study of working children 10-14 will rely on gender differences in activities and tasks for half its variation.

#### *Urban – rural differences*

The research challenges associated with gender also arise with urban-rural data. Children tend to work more and for longer hours in rural than urban areas. For example, Edmonds and Pavcnik (2005a) tabulate urban-rural differences in the MICS data used in Figure 1 and table 4. 31 percent of rural children 5-14 are engaged in market work in rural areas compared to 19 percent in urban areas. Domestic work also has a higher prevalence in rural areas although the difference is smaller (68 percent compared to 61 percent). 26 percent of children work 20 or more hours per week in rural areas compared to 14 percent in urban, and 9 percent work 40 or more hours in rural areas compared to 4 percent in urban.

If children only worked more intensely in rural areas, then researchers could pool urban and rural children in their analysis, but children also tend to work in different types of activities. For example, in the MICS countries, the prevalence of unpaid market work is nearly double in rural areas, and paid employment accounts for 50 percent larger share of all market work in urban areas. A careful look at the urban-rural differences in the detailed Bangladesh data is illustrative for why researcher's default assumption should be to treat urban and rural child labor decisions distinctly.

In general, employment is more concentrated in rural areas in Bangladesh. For boys, urban-rural differences in employment are similar to what one would expect with rural areas more weighted to agriculture. A majority of economically active boys in rural areas are farm crop workers (table 7) with most being involved in cereals (table 6). Salesman and shop assistants, fisherman, and non-motorized vehicle drivers are the next most prevalent occupations among rural boys. In urban areas, boys are most active in sales. 27 percent of boys in urban areas are working as sales supervisors, salesmen, shop assistants, and street vendors (table 7). Much of this appears to be in retail grocery and general stores (table 6) as well as tea stalls.

However, farm crop workers in cereals, fisherman, and non-motorized vehicle operators are also prevalent in urban areas.

Urban-rural differences in occupation and industry of the economically active population in Bangladesh are more pronounced for girls. A majority of girls in rural areas are involved in cereals, vegetables, or poultry farming. While poultry is the second largest industry of employment for urban girls, together these agricultural industries are less than a quarter of urban employment for girls (table 6). Spinners, weavers, knitters, etc. are unusual in rural areas, but 13 percent of economically active urban girls are in these occupations (table 7). Employment of girls in the manufacture of bidies or in private households is also much more prevalent in urban areas (table 6).

A difficulty in bifurcating data into urban and rural segments is that it presumes the two area types are segmented. In some contexts, there is no clear line either defining or separating urban and rural. In fact, there is an interesting literature that documents how household specialization changes with proximity to major urban areas (Fafchamps and Shilpi 2004) and that this in turn affects schooling and both market and domestic work (Fafchamps and Wahba 2006). Thus, it is difficult to draw generalities with regards to how and whether urban and rural areas should be treated differently by empirical researchers. Moreover, the example of Bangladesh illustrates that the extent to which urban and rural activities are comparable may differ by gender as well (Amin, Quayes, and Rives 2006 also make this point in data from Bangladesh).

#### *Age patterns*

C138 established the idea that whether an activity is viewed negatively for a child depends on the child's age, and this has been codified into SIMPOC's definition of child labor. The idea behind this is that what may be appropriate for a 14 year old might not for a seven year old. This is logical, but implicit in this discussion is that 7 year olds tend to do the same sorts of activities as a 14 year old. This does not appear to be the case in the limited available evidence.

Figure 2 pools the MICS countries and plots participation rates in various activities separately by age and gender. The four pictured categories are market work outside of one's own household, market work, any work (the difference between any and market work is children who only work in domestic work), and any work without also attending school. Participation rates in each of these categories looks smooth in age for boys until age 10 when there is a sizeable increase in participation rates in market and domestic work and again for age 12. Girls appear to experience discrete jumps at age 8, 10, and 12. The increase at age 8 for girls appears to be most dramatic in domestic work whereas most of the increase at age 10 and 12 for girls is in market work. Overall "any work" patterns for girls look smooth at ages 10 and 12, suggesting that the increase in market work and 10 and 12 for girls complements the domestic work that began increased substantively starting around age 8.

Moreover, within market work, there are changes by age in the types of industries in which children are employed. This is evident in the SIMPOC data tabulated in Table 5. When available, the industrial composition of employment is also broken down by age. There are some interesting differences across age. For example, in Tanzania, the fraction of economically active children employed in private households is decreasing in age whereas the fraction in agriculture

and related industries is increasing in age. However, the opposite is true for Kenya. Declining shares in agriculture and related industries with age is also present in Ethiopia, Ghana, Namibia, and Nicaragua. But the age patterns are ambiguous in Zambia and the Philippines. Hence, while there is no clear age pattern across countries in the industrial composition of employment, there appear to be patterns within countries that highlight how important age can be in the analysis of child labor.

The evidence in figure 2 and table 5 implies that researchers should be as flexible as possible in how they treat age in their analysis. A full set of gender interacted age effects seems reasonable for regression work. This is especially true for market work although a gender interacted polynomial in age may be suitable for some types of activities (such as participation in any work for girls above age 8 in the data used in figure 2).

A related issue concerns what ages researchers should consider. International organizations interested in child labor typically focus on children 6-14 for most activities but the under 18 are often considered in particularly abhorrent situations such as prostitution. However, C182 is careful to allow each country to set appropriated ages for different types of work, and individual country policies regarding work and schooling are useful for researchers in deciding what ages to consider and how to group those ages. While work laws tend not to be enforced in most current developing countries (more on this later), they are useful at providing insight into country specific views on the ages at which work is a concern. Researchers have to be careful, however, not to let subjective policy statements about "harmful" work drive what types of ages they consider as whether work is harmful ultimately depends on understanding why a child participates in it.

Research needs to be particularly concerned about schooling ages, and grouping children based on the category of schooling they would normally attend for their age can be prudent (especially when drop out rates at schooling transitions are high). For example, observing a seven year old who worked without attending school in a country where schooling typically begins at age 8 might reflect something very different than if the child were at a country where schooling begins at 5. Likewise observing a thirteen year old out of school in a country where thirteen year olds are usually in primary school may imply something different than in a country where thirteen year olds are in secondary school. Moreover, in many settings, the elasticity of child time allocation to factors in the environment appears to be increasing in age at young ages, and explaining child time allocation at pre-school ages is a challenge. Hence, country specific attention to the appropriate age grouping of the data seems merited.

### *Worst forms of child labor*

The ILO's SIMPOC estimates that a total of 8.4 million children are involved in child trafficking, in forced or bonded labor, are soldiers, are prostitutes or involved in pornography, or participate in illicit activities (ILO, 2002). 68 percent of these children are in bonded or forced labor. Since hazardous activities are defined at the country level, cross country evidence on their extent is not available. Country level estimates are also typically not available. However, in implementing C182, the ILO has been active in assisting countries in assessing the prevalence of worst and hazardous forms of child labor as well as in developing plans for the eradication of these activities. Nepal was one of the first countries to initiate one of these "Time Bound



Programs," and the findings from the baseline work for this program are illustrative of the types of activities that governments label as hazardous and the prevalence of worst forms in a very poor country.

Estimates of the extent and incidence of worst forms of child labor in Nepal are in Table 8. These estimates are from ILO (2001). There are approximately 8 million children below the age of 16 in Nepal, and approximately 1.5 percent of these children work in these worst forms of child labor. Child porters and domestic works are the two most common types of "worst forms" of child labor. Among child porters, there are two main types: short distance porters that work in urban markets and bus parks and long distance that work in the countryside. The ILO estimates that typically long distance porters stay and work with their families while short distance porters have often migrated to find work. Estimates are that there are about 42,204 long distance porters and 3,825 short distance porters. 88 percent are boys. Domestic workers are most prevalent in high status urban households, though domestics typically come from rural areas. In Kathmandu, 1 out of 5 households employ children. The ILO estimates that 43 percent of employers of child domestics are government or non-government service holders. Domestics are believed to be evenly split between paid (to parents) and unpaid (more correctly, paid in a lump sum) workers. The other children included in Table 8 because of the nature of their employment are children in mines, in the carpet sector, and ragpickers, who pick rags and other rubbish out of garbage dumps for resale.

Bonded laborers and trafficked children both fall under worst forms of child labor as well. Bonded children in Nepal are in bondage either because parents took out debts against the child's future earnings or because they were used as collateral on loans. The ILO estimates that some 17,152 children in bondage in Nepal, although this estimate is controversial because it does not include children whose parents are bonded in a system of bonded labor that pervades western Nepal (Sharma et al 2001). Child trafficking is particularly hard to measure and evaluate. According to the ILO (2001), 12,000 girls are trafficked into the commercial sex industry each year in Nepal. By and large, these girls work in brothels in India. Unfortunately, because of the relative rarity of these activities and the challenges of capturing them in randomized surveys, little research exists on whether these activities are rightly viewed as a type of child work (where human rights is more obviously an issue) or whether they should be viewed as some other type of activity altogether.

One difficulty with classifying some activities as hazardous and including them as a worst form of child labor is that children can face hazards in the most common kinds of labor, too. Especially as children get older, they become active in all aspects of agriculture, and it is not unusual to see reports of injuries in operating farm machinery in child labor surveys. The self-reported injury rate from child labor surveys of children working in agriculture is actually higher, at 12 percent, than 9 percent level in manufacturing (Ashagrie 1997). Agriculture can also be hazardous for children because of exposure to dangerous chemicals such as chemical herbicides or pesticides, exposure to heat or weather, repetitive work injuries, and threats posed by animals, reptiles, insects, parasites, and some plants. Hence, even though in principal, the distinction between hazardous child labor and other types of activities seems less vague than the distinctions some draw between child labor and light work (where "child labor" is labeled as work that is somehow known to be harmful to the child), in reality, a case can be made for looking at some of the more common forms of child labor even if one is only interested in

activities that might fall under C182. The next section discusses the case for attention to child activities further.

### *Are worst forms different?*

In the following sections, this chapter reviews evidence on why children work. This evidence is culled almost entirely from work that would not be considered hazardous or a worst form of child labor under C182, because the relatively rare worst forms of child labor are difficult to capture with randomized surveys. Hence, before turning to that evidence it is worth reviewing theories as to why selection into worst forms might be different.

Three views about differences in the selection process into common forms and worst forms of child labor seem to dominate the academic literature. In one view, worst forms are no different than other types of work from the parent or child's perspective, and factors that drive children to select into worst forms are the same factors that drive them to work in the first place. A variation on this view notes that the work may be more unpleasant but this unpleasantness may be fully compensated through higher wages. In this case, the link between worst forms and income will be the same as that of more common forms of child labor, and the resulting policy prescriptions will be the same. In a second view, worst forms of child labor are partially compensated so that they pay more (Dessy and Pallage 2005). Thus, the entry process is similar to other types of work except that poorer households are more likely to select into worst forms, because the marginal utility for the additional income exceeds the disutility coming from the particular type of work. In a third view, children in worst forms of child labor enter because of poor information about what the work entails (Rogers and Swinnerton 2002). Thus, ex-ante children select into the work under the assumption that it is similar to other types of work, and there are barriers to exiting. This explanation is most often voiced to explain selection into prostitution, but it may be equally substantive for other worst forms of child labor. In reality, because of inference problems with rare events, we have little evidence on why children select into worst forms and whether selection is driven by characteristics that differ from those discussed below for more common forms of work.

## **3. The Case for Attention to Working Children**

Few issues in developing countries draw more attention in rich countries than child labor. This attention is typically motivated by human rights concerns. Horrific newspaper issues of children burned to death while chained to their job in garment factories in Bangladesh or forced into prostitution in Thailand drives much of this concern. These human rights concerns are well grounded, but, as most working children are from poor families and are helping in their family's activities, the typical working child is not in a situation where the human rights issues are obvious. As such, much of child labor related policy is not directed at worst forms of child labor but instead at the more prevalent forms of child labor in developing countries. This section considers the academic case for attention to the more prevalent forms of child labor.

### **3.1 Child Labor in International Policy**

Researchers for years have studied adult labor supply with great interest, but the research interest in child labor is augmented by policy's interest in the topic. Consumer boycotts and

student protests against products with some child labor component during production are relatively frequent occurrences. One often reads of protests in American universities over the involvement of children in the production of athletic clothing. Outrage over the involvement of children in producing soccer balls hit a fever pitch in the late 1990s when it was learned that FIFA licensed products contained a considerable child labor component. Beyond boycotts, labeling campaigns such as the Rugmark campaign to label hand-knit carpets as "child labor free" garner considerable popular support.

This consumer activism has been matched by legislative interest. For example, the U.S. Congress has repeatedly considered legislation that would prohibit imports into the United States of all products made with child labor. Under threat of such sanctions, export oriented garment factories in Bangladesh released more than 10,000 child workers under the age of 14 in the mid 1990s. More recently, the U.S. House of Representatives has deliberated the "Child Labor Elimination Act" that would impose general trade sanctions, deny all financial assistance, and mandate U.S. opposition to multilateral credits to 62 developing countries with a high incidence of child labor. This threat is implicit in a 2002 act of the U.S. Congress that mandated a study by the Department of Labor's Bureau of International Labor Affairs about the relationship between military and education spending in countries with a high incidence of child labor. Under current law, the U.S. can withdraw a poor country's eligibility for trade preferences under the Generalized System of Preferences (GSP) based on a country's poor record on child labor. Moreover, the 2000 Trade and Development Act restricts eligibility for trade benefits to countries that the Secretary of Labor certifies as showing progress towards eliminating the worst forms of child labor. This policy interest in child labor in developing countries is a relatively recent issue, and corresponding to it is growth in the academic literature that seeks to understand why children work and measure the short and long term consequences of work.

### **3.2 Work and Schooling**

*Is schooling attendance lower for working children?*

There are fixed number of hours in a day. As such, time spent working necessarily trades off with other uses of child time such as play, study time, or time in school. Despite their importance for child development, especially at young ages, very few researchers consider play and leisure in efforts to measure the opportunity costs of working (although concerns about play were at the forefront of concerns about child labor in early 20th century U.S.: Fuller 1922, Pangburn 1929). In contrast, the extent to which work affects schooling attendance, performance, and attainment is perhaps the second most researched question in the child labor literature (second, to the income elasticity of child labor supply). The Minimum Working Age Convention (C138) in part necessitates this interest in that it permits light work in children as young as 12 provided it does not interfere with schooling. When and how does work interfere with schooling?

The main challenge in this literature is that schooling and child labor decisions are joint outcomes out of a single time allocation problem. Hence, the interpretation of any found correlation between labor status and schooling is controversial. Do children work because they are not attending school? Do children not attend school because they are working? Do other economic or cultural factors simultaneously influence both schooling and work decisions?

Before turning to the problem of establishing causation, a simple description of the association between schooling attendance and work in the MICS countries will be useful

Figure 3 shows school participation rates by gender and the type of activity a child participates in for children 10-14 in the MICS data (all countries are pooled and the data are weighted by population). Several points stand-out in figure 3. First, children can work and attend school. In fact, in the under 10 population, working children have slightly higher schooling rates than non-working children although this reflects age trends in both the start of schooling and work. Second, of different categories of activity, schooling attendance rates are lowest among children in market work outside of their household. Third, children who work only in market work without any domestic work tend to have lower schooling rates than children who work in domestic and market work. These two pieces of evidence are often cited as justification for only looking at wage work or market work respectively, but they may proxy hours worked and have little further implication. Children who only work in market work without any domestic work are typically working substantive hours, and children that work outside the household tend to spend more time working than those who help in the family business.

Figure 4 shows average total hours worked in the last week by type of activity and gender for the same population as figure 3. Total hours worked are highest among children that work outside their household in market work and lowest among children that only perform domestic work. In general, girls work more than boys (despite having similar school attendance rates), except among children that participate in market work only.

If the lower schooling attendance rates of children who work in market work alone or work outside the household reflects hours worked, this would imply that the decline in schooling attendance with total hours worked should be steepest in the neighborhood of 30 hours worked as is typical for those who only work outside the household. Figure 5 plots gross school attendance rates worked for children 10-14 in the MICS data against total hours worked (market plus domestic) in the last week. 95 percent confidence intervals are also pictured. School attendance rates appear relatively flat with respect to total hours worked until about 8 hours worked. The probability of observing a working child attend school declines gradually between 8 and 29 hours, then the rate of decline increases dramatically starting around 30 hours per week. The derivate of the curve in figure 5 is greatest between 35 and 45 hours worked per week. This is not surprising as it implies that it becomes most difficult to work and attend school simultaneously when the child is working full time. Nonlinearities similar to that of figure 5 are also apparent in Ray and Lancaster's (2003) study of child labor and schooling attendance in 7 countries with child labor surveys administered by the ILO's SIMPOC.

One clear difficulty in assessing the tradeoff between hours worked and schooling attendance is that the tradeoff depends on how one defines work. Hours worked are largest and schooling attendance rates are lowest for children working outside of their home. However, a failure to consider work within the household or work in domestic work can create a misleading picture of the trade off between schooling and work, especially for girls. Assaad et al (2003) observes that the low attendance of Egyptian girls relative to boys appears to be associated with a substantial domestic work burden of girls. Because boys do not face the same work burden within the home, they face fewer barriers to schooling such that in the Egyptian data, they do not

observe a tradeoff between working and schooling attendance for boys. The sensitivity of attainment to work also depends on the definition of work. Levison and Moe (1998) using Peruvian data and Levison, Moe, and Knaul (2001) in Mexico document that whether there is a tradeoff between schooling attainment and work depends on whether work includes domestic work, especially for girls.

In fact, school attendance rates do not appear to vary significantly with whether hours worked are in market or domestic work. Figure 6 plots school attendance rates by hours worked in market and domestic work separately using the MICS data. 95 percent confidence intervals are also pictured, and there is significant overlap in the confidence intervals. Beyond 10 hours of work, the school attendance rates associated with time in market work are slightly below that of time in domestic work. However, the differences are never statistically significant, and the shape of both curves looks as would be expected from Figure 5 given that work in one type of activity (e.g. market work) is associated typically with some work in the other activity (e.g. domestic work).

In contrast to market and domestic work, schooling attendance rates associated with hours worked inside and outside of the household appear very different. Figure 7 contains a plot of school attendance rates by hours worked inside and (separately) outside the household. Between 12 and 53 hours per week, a child who is working a given number of hours outside of their household is less likely to attend school than is a child who is spending the same amount of the time inside of the household. A large part of the reason for this apparent difference between work inside and outside of the household is that children working outside of the household typically also work significantly more hours inside the household. In the MICS data, each hour in work outside of the household is associated with an additional nine-tenths of an hour work inside the household on average. In contrast, each hour in work inside the household is associated with one tenth of an hour work outside the household. Hence, the total hours worked for a child working 20 hours a week outside of the household is 38 hours. In Figure 5, a child working 38 hours has a school attendance rate of slightly above 80 percent, within the confidence interval of the observed schooling attendance for a child working 20 hours a week outside the household. Thus, the difference between schooling attendance rates for children working inside and outside of the household appears to owe more to differences in the resulting total hours worked by the child rather than something else intrinsic to work outside of home.

*Is schooling achievement and attainment lower for working children?*

If lower attendance is meaningful for human capital accumulation, it should translate into lower schooling attainment. Moreover, beyond attendance, work may undermine human capital accumulation by interfering with learning as evident in test scores or schooling completion rates. Panel data on child labor histories is rarely available, so studies typically compare current labor supply to current attainment. This is hard, because current work status necessarily depends on past education and work histories as these affect the value of child time and whether it's optimal for the child to work. This makes interpretation difficult, but studies typically find that attainment is lower for working children. Ray (2003) observes that an additional hour of wage work in Ghana is associated with more than a year's less completed educational attainment. Psacharopoulos (1997) notes that children in wage work in Bolivia have nearly a year less

completed schooling than non working children and that working children in Venezuela have almost 2 years less attainment.

Beyond the obvious challenges of inferring causation from these correlations, another difficulty in interpreting evidence on attainment is that standards for advancement vary across schools and may be correlated with factors of interest. For example, it is not difficult to imagine that passing in a poor quality school in a poor area might reflect a different knowledge level than passing in a very good school in a rich area. However, work is also correlated with worse performance in other measures of academic achievement. For example, Akabayashi and Psacharopoulos (1999) note that working children spend less time studying which is reflected in both math and reading test scores in their Tanzanian data. Heady (2003), using the same Ghana data as Ray, notes that despite the absence of a correlation in the data between wage work and school attendance, reading and mathematics test scores are substantially lower among wage working children than non working children.

*Is there a causal relationship between work and schooling achievement and attainment?*

Causal studies of the impact of child labor on schooling face the challenge of isolating some factor that affects child labor without simultaneously affecting schooling. This is difficult, because child labor, schooling, and leisure decisions are joint; it is hard to imagine how one can be affected without all other decisions being affected. Consider the analytical model of equation 1.1. Choices of schooling, leisure, and all types of work depend on the shadow value of child time which is, in turn, a function of choices of schooling, leisure, and all types of work. Hence, without directly observing the shadow value of child time, there is no way to identify a causal impact of one type of activity on another without additional assumptions.

Studies typically rely on either modeling assumptions like factors that alter the value of the child's time only directly affect child labor (that is, relative prices do not affect time allocation decisions) or on legal variation in child labor or schooling regulations, again assuming that they have no direct effect on child labor (see Orazem and Gunnarsson 2004 for a review). Even beyond the direct effect these types of factors have on time allocation or on the shadow value of child time in a simple household model, variation in the value of child time or regulation is apt to be correlated with latent socio-economic characteristics of the child's environment. Hence, authors estimating the causal impact of work on schooling face a considerable challenge.

Instrumental variables estimates of the effect of child labor on schooling tend to produce a stronger association between child labor and schooling than in the raw data (for examples: Booser and Suri 2001, Rosati and Rossi 2003, Ray and Lancaster 2003, Gunnarsson et al 2006). This is not surprising as the instruments typically capture variation in the child labor-schooling relationship that is more variable than the full variation in the data. For example, instruments that work through the value of child time are then using variation in child labor that owes to the families need for the child's contribution or the relative return to work rather than school. It is not surprising to learn that this variation leads to a greater elasticity of schooling with respect to child labor relative to alternative reasons for child labor such as social norms about working, the absence of accessible quality schooling, etc. Legal variation is likely correlated with institutional quality and thereby living standards. Hence, for similar reasons, as the value of child time, these

instruments, when valid, might be capturing variation in child labor which is inherently more apt to trade off with schooling.

*Do changes in the price of schooling affect child labor supply?*

Several studies implicitly consider the link between schooling and child labor by examining how child labor and schooling reply to a change in the relative price of schooling. In general, they find that cash or in kind transfers that are conditioned on school attendance increase schooling but have a much smaller effect on child labor. For example, Ravallion and Wodon (2000) consider market work participation and schooling attendance responses to the Food for Education Program (FFE) in Bangladesh in which families receive food rations as long as they send their children to primary school. They observe that households who participate in this program have higher school attendance. Market work participation declines with this school attendance although the decline in market work is about a third of the increase in schooling. A similar finding is in Cardoso and Souza (2004) who compare market work and schooling attendance in families that receive cash transfers as a part of Brazil's Bosca Escola program to similar families that do not receive the payment. Bosca Escola conditions cash transfers on school attendance, and Cardoso and Souza find larger increases in schooling than declines in market work. Endogenous program participation is a concern in any study that compares program participants to non-participants. Ravallion and Wodon address this by instrumenting for program participation with whether the program is present in a child's village, and Cardoso and Souza use propensity score matching to create a control group with similar observable characteristics to program participants.

There is a debate about the implications of the finding that changes in the price of schooling lead to larger changes in school participation than in work *participation*. Some argue that this implies the absence of a connection between either schooling and child labor or poverty and child labor. There are several reasons to doubt this interpretation. First, if one observed changes in the consumption of two goods (leisure and schooling in this case) with a price change in one of the goods, but the quantity of one good changed more than another, would one conclude that there is no budget constraint? Second, this finding might reflect that there is more of an intensive margin with work than school. School attendance is a rather discrete thing. That is, when a child attends school, that typically means they attend a full days of classes (which is often in the neighborhood of 4 or 5 hours a day). However, market and domestic work are much more flexible. A child in response to attending school for 4 hours a day could have a precisely corresponding change in total hours worked (indicating a 1 for 1 trade off) but yet still work. In fact, in a much smaller sample with detailed time use data, Arends-Kuenning and Amin (2004) document that the decline in hours worked among FFE participants is similar in magnitude to the increase in time in school. Third, if children are working because of poverty, schooling subsidies may induce a substitution away from play and leisure to schooling, rather than work. In fact, Arends-Kuenning and Amin (2004) argue that before the FFE program arose in Bangladesh, children on average were not working so many hours that their labor burdens prohibited schooling. The idea that children work because of the family's poverty does not imply that children can have no leisure, especially in a setting where parents care about their child's welfare. Hence, it seems difficult to argue that a movement into schooling without a corresponding change in participation in market work can be interpreted as evidence against a child labor-schooling connection.

### *Modeling the joint determination of schooling and other time allocation decisions*

Most researchers generally treat the analysis of schooling and work separately. That is, they estimate some limited dependent variable model (linear probability, logit, probit) for schooling and work separately. This is attractive for several reasons. First, it is transparent and the properties of these estimators are well understood. Second, it will lead to results that are consistent and comparable to studies that only consider schooling or only consider types of child work. However, because schooling and time allocation decisions are joint, studies frequently adopt empirical methods designed to model the correlation between schooling and work decisions.

The bivariate probit is probably the most common alternative to the single variable models. Conventionally, it is similar to a SUR regression in that it allows for correlations in errors between the schooling and child labor regressions. It can be efficient when bivariate normality of errors is correct, although this is not universally true when the same covariates are included in each regression. If there were viable exclusion restrictions, the model can be used to infer the effect of change in one endogenous variable on the other (that is, a type of work's effect on schooling), although there is still the difficulty of finding plausible exclusion restrictions. Moreover, there are several limitations that researchers need to consider. The bivariate probit has the standard probit problems (need to evaluate the cdf to compute a marginal effect that will vary with covariates, need for large samples per fixed effect to recover fixed effects, inconsistency under heteroskedasticity), and two important additional issues. First, when there are two outcomes of interest (child labor and schooling), computing the effect of a change in any covariate on child labor and schooling requires evaluating the joint density rather than the univariate density as in the standard probit. Second, when children are classified as either working or in school, the error distribution will become degenerate. Thus, the bivariate probit is not appropriate for data where most children either work or are in school so that the product of the two is zero in expectation. Hence, application of the bivariate probit approach requires some caution on the part of researchers.

Another frequent approach to modeling child labor and schooling is a multinomial choice model such as the multinomial logit (MNL) or probit (MNP). These models are especially attractive for structural models of time allocation. They are, however, inherently difficult for evaluating causal effects, because computing marginal effects of some covariate on the choice of schooling and work combination is not straightforward.

Typically, the different choices in a multinomial model are different activities that children may perform, and this approach seems broadly consistent with the simultaneous nature of decisions about time allocation. The computational simplicity of the MNL and the ease with which one can estimate fixed effects make it the more popular than the MNP. However, the MNL relies on the assumption of the independence of irrelevant alternatives (IIA). What does IIA mean in the case where children can participate in multiple tasks? Consider a setting where a child chooses between wage employment and the family farm. IIA implies that if a third choice is added (schooling or work in a family business), the third choice should not affect the probability the child chooses wage work over work on the family farm. IIA would be violated if the third choice drew children disproportionately out of either wage work or work on the farm.



For example, a family business might draw more from the family farm than wage work. Schooling might draw more from wage work than working in the family farm.

Alternatives to the MNL that do not rely on IIA are available. If choices could be ranked and ordered, a nested logit might be feasible. However, given the joint nature of time allocation decisions, this seems problematic. Perhaps it might be feasible in cultural settings where there is strong qualitative evidence to support a particular nesting in familial decisions. The multinomial probit (MNP) does not require a hierarchy of choices, nor does it require IIA. However, it is used less frequently for several reasons. First, the model needs to estimate the entire covariance structure. Hence, the number of parameters that need to be estimated can be extreme. This requires large sample sizes and the model often has difficulty converging. Second, the MNP is flat near its optimum, and this can lead to parameter estimates that are arbitrary but within the tolerance of the optimization routine and hence difficult to detect.

A hierarchical choice model such as the sequential probit (SEQP) is also popular. Modeling typically proceeds by first modeling the choice of whether to attend school or work, then proceeding to model the choice of different types of work, conditional on surviving the previous choice of types of work. That is, the SEQP is essentially a selection model where the researcher uses the results of lower sequenced choices as corrections for selection into higher sequenced choices. When the same covariates are used in each step of the sequence, the SEQP should be identical to the MNP (assuming no misspecification). Hence, the purpose of the SEQP is to allow different variables to affect different choices. The logic behind this approach is not obvious. The shadow value of time for the child reflects the opportunities open to the child, and hence it seems impossible to imagine a sensible exclusion restriction. Moreover, when the included variables differ in the sequence of choices of activities, estimates will depend on the order of the sequence in addition to the exclusion restrictions and functional form of the selection correction. Perhaps qualitative evidence can make the case for some ordering and a set of exclusion restrictions in a particular country context. Overall, though, given the difficulties with all of the alternatives, it is not surprising that univariate models are the predominant tools for examining work and schooling choices.

*Are there future consequences of working?*

Because of the conceptual difficulty in isolating some exogenous factor that affects either schooling or child labor, most studies of child labor and schooling tend to focus on economic factors that influence both child labor and schooling without explicitly trying to parameterize the path through which participation in one activity affects participation in the other. However, another alternative is to exploit timing differences in when the adult or older child is observed and when child labor occurred. Factors that have changed over time but were correlated with whether the individual worked as a child can be used as instruments.

Much of the work on the effects of child labor in childhood on adult labor market outcomes comes from Brazil, where the 1996, large-scale PNAD household survey asks individuals at what age they entered the workforce (which is likely interpreted as beginning fulltime market work) Ilahi et al (2000) observe that adults age 18 and older who started fulltime work before age 13 have adult wages that are 13-17 percent lower than adults who entered the workforce later. Emerson and Souza (2004) extend the analysis of Ilahi et al by addressing the

endogeneity of the age at which an adult started working as a child with state-time variation in the number of schools. Does the finding of lower adult wages for child laborers reflect anything more than lower educational attainment? It appears so. Early entry into the labor force lowers the return to a year of education by roughly 20 percent in Ilahi et al's data. Interestingly, in individuals with no education, they observe slightly higher wages for children that start working earlier conditional on the adult's age. This likely reflects an experience premium as without any education and conditional on age, earlier entry means more time to accumulate experience. Emerson and Souza (2004) speculate that the tradeoff between returns to experience and education depends on what sector the individual works in as an adult and child.

The tradeoff between additional experience and education is considered explicitly in Beegle, Dehejia, and Gatti (2005). Using panel data from Vietnam, they evaluate how the labor status of children influences their education, wages, and health five years after they are observed working. In their analysis, they focus on children who are enrolled in school and compare enrolled in school and participating in market work children to children enrolled in school without market work. They impose this sample selection rule in order to isolate the effects of market work itself without confounding the effects of working with the effects of not being in school. Thus, their attention is only on the effects of working per se; they do not capture how the future of children who work exclusively is affected by their work. When they correct for the endogeneity of market work participation as a child with economic conditions in the base year of their data, they find that each additional hour of work as a child while attending school is associated with a nearly 3 percentage point decline in the probability the child is in school 5 years out and a 0.06 year decline in grade attainment. The mean hours worked for a working child in the base year of their data is 24 hours per week in market work. Hence, going from 0 hours to the average is associated with a more than 90 percent decline in the probability the child attends school and a nearly 20 percent decline in completed schooling five years after the child is observed working while in school. They also observe that the probability the child engages in wage work and the child's wage earnings conditional on participating in wage work are increasing in the child's hours worked. Beegle et al calculate that over a relatively short horizon (as might be appropriate in poor, credit constrained families), the value of increased earnings and the return to experience will outweigh the opportunity cost of foregone education.

### **3.3 Work and Health**

*Is the health status of working children worse?*

The consequence of child labor may extend beyond schooling attendance and attainment. Woodhead (2004) surveys the psychological ramifications of work as a child, and it is not obvious how one should view the psychosocial impacts of child work. Research has focused more on the effects of child labor on child health. Much of the literature focuses on the injury and morbidity risks associated with the child's work environment. For example, Graitcer and Lerer (1998) list morbidity, injury, and hazard risks faced by children in different occupations and industries. While manufacturing draws a lot of popular attention, family work, including work on the farm, also poses risks. Moreover, Forastieri (2002) points out that the increased nutritional needs associated with arduous work may exacerbate malnutrition, leaving the child stunted and impairing the child's productivity into adulthood, and Parker (1997) emphasizes that children who start work at a young age will be exposed to environmental hazards in the work

place for longer, perhaps at time when the effects of these hazards on development are more substantive.

However, working does not necessarily impair a child's health. To the extent that child labor brings additional resources to the child, this may improve health and nutrition (especially in the destitute populations where child labor is most prevalent). The benefit of this additional income to the child may be greater than other sources of family income as the child may retain greater control over her own earnings. Further, the fact that the child is a productive, contributing member to the household may affect the child's ability to capture other family resources or influence how they are spent in ways that benefit the child. These types of gains to the child must be balanced against any lost education (and its returns to health) as well as the consequences for malnutrition, morbidity, and injury.

Several studies attempt to gauge the net effect of child labor on child health. Evidence that working children have worse health at the time of their work is generally absent from the literature. O'Donnell et al (2002) look at data from 18 developing countries and observe that across these 18 countries self-reported health status looks unrelated to whether the child participates in market work, is in school, both, or neither. Francavilla et al (2003) look at data from 6 developing countries and find no evidence of a connection between domestic work and self-reported morbidity or BMI either. It is unclear whether the absence of evidence reflects a lack of any relationship, the countervailing factors discussed above, measurement problems, or heterogeneity in the effect of working on health. For example, children working outside, in the family farm in the summer might be no worse off because of their work while children working 12 hours a day in a tannery might be substantially worse off. However, because the former is much more common than the latter, there is no apparent relationship on average in the data.

#### *Does child labor affect future adult health?*

There are two basic classes of mechanisms through which a child's labor status may influence adult health. First, physical injury at work may lead to health problems that survive into adulthood. Second, psychological stress or trauma at work in childhood may lead to health problems in adulthood. Speculation about this second mechanism owes to the psychology literature which shows a strong correlation between stress in childhood and the persistence of mental disorders such as depression, anxiety and panic disorders, and schizophrenia or even health problems such as diabetes, heart disease, and immune disorders (see Heim and Nemeroff 2001 for a review). There is a debate over the interpretation of this evidence as there is a strong correlation between severe stress in childhood and stressful life events in adulthood (Horowitz et al 2001), but some argue this association reflects that childhood traumas induces a vulnerability to the effects of stress later in life. Most of this research focuses on stresses like the loss of a parent and severe physical abuse at very young ages, so whether this evidence is relevant for typical child labor is an open question. Blattman (2006), for example, considers the psychological impacts of forced abduction into the military among children from northern Uganda, and he finds little evidence of sustained psychological distress after the end of conflict.

Three recent studies consider whether child labor impacts future adult health. Kassouf et al (2001) observes in Brazilian data that individuals who start work earlier have worse self-reported health status as adults. They observe that the younger a person starts working, the

greater the probability that the individual reports being ill as an adult. This finding may reflect something about the impact of child labor on child health and how that persists into adulthood, the impact of education on adult health, the impact of income on adult health, or something about the child or adult's environment associated with both youthful work and adult health. Two papers using Vietnamese panel data employ instrumental variable strategies to consider the effect of working as a child on young adult health outcomes five years later. O'Donnell et al (2002) compare the BMI, self-reported morbidity, and height in 1998 of children who worked in agriculture in 1993 to those that did not. They instrument for a child's participation in agriculture in 1993 with labor market and education conditions in the child's community in 1993. They find that children working in 1993 have higher self-reported morbidity rates in 1998. Using the same data but a different identification strategy and a subset of the sample, Beegle et al (2005) observe similar patterns to O'Donnell et al but the patterns are not statistically significant in Beegle et al. While O'Donnell et al looks at rural children 6-15 in 1993, Beegle et al considers rural children 8-13 who attend school in 1993. Beegle et al also relates self reported health status to variation in total hours worked, using a different source of variation. While the two papers are not directly comparable because of data and identification differences, it is not surprising that there don't appear to be detectable marginal effects of working one additional hour while working vs. not appears to have more substance for long-term health. Evidence on specific mechanisms through which child labor might propagate through to adulthood seems to be largely speculative.

### **3.4 Child Labor Externalities and General Equilibrium Considerations**

The ramifications of a child's working status may extend well beyond the child. There are three active research topics that consider the consequences of child labor that extend beyond the working child. First, as the working child is supporting the family and its members, there may be benefits to siblings of having a working child. Second, there may be intergenerational implications of a child's labor status, a so-called child labor trap. Third, they may be general equilibrium ramifications of a high prevalence of child labor that merit attention.

#### *Do working children support their siblings?*

When most working children are helping in their family, it is very difficult to quantify the economic contribution of working children to the household as their compensation is often not in monetary terms. Further, concerns about surplus labor or training aspects of the child's contribution to the household complicate distinguishing the child's marginal product from her average product. Nevertheless, efforts to value the child's contribution to family income typically guess it to be substantial. Psacharopoulos (1997) observes that income earned by working Bolivian 13 year olds amounted to 13 percent of total household income on average. Menon et al (2005) attempt to compute the value of child's own farm labor to largely subsistence farm households in rural Nepal. They estimate that children contribute roughly 11 percent of the value of total agriculture production in Nepal or about 9 percent of GDP.

To what extent do siblings benefit from the economic contribution of their siblings? There are several possible mechanisms. In poor households additional income or output, may help maintain the consumption of family members. A number of studies, discussed below, document a role for child labor in how households cope with shocks. Beyond shifting out the budget constraint, working older siblings may provide money that is directed explicitly towards

younger siblings. Alternatively, working older siblings may provide additional labor services to the household which lower the productivity of younger siblings, thereby encouraging their education.

Direct evidence on the influence of a child's income on the activities of siblings is rare. One often hears assertions, especially in the South and East Asian context, of older sisters working to support their sibling. Parish and Willis (1993) discuss this literature in detail, although they find little support for this hypothesis in Taiwanese data. Instead, they argue that early marriage is a more important channel through which older girls help their siblings. In contrast, Edmonds (2006b) finds some evidence that older siblings help their siblings through their work. He argues that one possible channel for this support owes to older siblings comparative advantage in working in both market and domestic work. In data from Nepal, he documents that older siblings are more likely to work than younger siblings, and their time allocation depends on the sex composition of younger siblings. In particular, time spent in market working is increasing in the number of younger boys in the household. Edmonds speculates that this additional market work is to help afford schooling and other investment expenditures that younger boys are more apt to command, but he lacks direct evidence of this.

Perhaps the most direct evidence of older siblings working to support younger siblings is in Manacorda (2006) who finds strong evidence of externalities towards siblings in early twentieth century U.S. He considers the relationship between a child's school attendance and participation in wage work and the fraction of co-resident children that are active in wage work. To address the obvious endogeneity concerns in correlating siblings' labor supplies, he uses state variation in the minimum age of employment laws and the age at which work permits become available. That is, consider a 10 year old child with siblings age 14 and 15. Across U.S. states in 1920, there is variation in whether 1, both, or neither sibling can work in the formal wage labor market. Thus, whether the older sibling is able to bring in wage income to the household will vary with the sibling's age and the state of residence. He finds considerable sharing of resources across children. The greater the fraction of siblings who works, the lower the child's own labor supply. Moreover, Manacorda observes a rise in schooling with the fraction of siblings who can work that is about equal to the decline in work and no substantive change in idleness. However, the benefits of having children work appear to largely accrue to children. He does not observe any substantive change in either the labor supply of mothers or fathers as the fraction of working children increases. One important note is that his identification strategy works off variation in wage work that is constrained by child labor laws. Hence, affected families are apt to be those where child income is most needed to support siblings. As such, it might be isolating variation where externalities are largest.

*Does child labor perpetuate across generations?*

Are working children more likely to have working children? The most obvious mechanisms for intergenerational persistence of child labor are through child labor's impact on education. Barham et al (1995) develop a model where financing for education is obtained from within the family. Hence, low educational attainment leads to lower income leads to lower educational investments in the next generation, an educational poverty trap. Beyond the effects of income, lower parental education might affect child health and nutrition which in turn feeds back to the relative productivity of schooling and work. Another option is that a parent's own

experience growing up affects their attitudes about child labor. In turn, then, work experience at a young age might cause a parent to feel that such work is appropriate.

As discussed earlier, several studies document an effect of child labor status on future adult income. Using the same Brazilian data as Ilahi et al (2000) used to examine the effects of child labor on adult income, Emerson and Souza (2003) look at whether the child labor status of a parent affects the child labor status of the child. 17 percent of children whose father began working before age 14 are employed. 6 percent of children are working whose father did not. Mother's child labor status shows similar patterns with differences that are slightly larger in magnitude. Further, this intergenerational correlation in child labor persists even when they control for the educational attainment of both parents and family income. Possible explanations for this include measurement error in both parental education and family income that is correlated with parental child labor status or omitted socio-economic factors that persist over time that would be correlated with past and current child labor supply. These factors might include local or family labor market conditions, school quality, latent relative talent for work or school, or social norms / parental attitudes that are correlated with child labor status. Lillard and Willis (1994) try to disentangle the reasons why educational attainment is correlated across co-resident generations in Malaysians. They estimate that about two-thirds of the impact of parental education on children's educational attainment is through direct and indirect effects of parental schooling. Omitted factors appear to account for the remaining third. However, more research is necessary to disentangle the mechanisms behind the observed intergenerational transmission of child labor.

#### *Does child labor promote high fertility?*

While the long-run implications of high population growth are often debated, a relatively common view is that high fertility rates are a source of long-run poverty traps. Emerson and Knabb (2003) for example is formal theoretical treatment of the idea that higher fertility can create a poverty trap, in their case through child labor: because families expect children to have to work, they have lots of children. Then because families have lots of children, they need them to work.

Do poor families have children in order to put them to work? The "wealth flows" theory of fertility posits that families have children, because they expect positive net transfers from the child, while the "evolutionary" view posits motives such as altruism, genetic survival, the consumption value of children, etc (Kaplan 1994). A necessary condition for the "wealth flows" view is that the net flows from child to parent are positive.

A number of studies find a connection between child employment opportunities and fertility. Rosenzweig and Evenson (1977), using data from rural India, find evidence of a connection between the economic contribution of children and fertility, child labor, and schooling decisions. Family attributes positively associated with the pecuniary returns to market work (size of landholdings, farm productivity, child wage rates) are negatively related to schooling and positively related to fertility and market work. Examining data from the U.S., Rosenzweig (1977) argues that the declining value of children as assets in agriculture is an important factor in declining farm birth rates for post war U.S.

A number of accounting studies attempt to directly compute whether the net return to children is large enough to motivate fertility. The most cited evidence from this is from Mead Cain (1977). In a village in north central Bangladesh, he estimates that male children become net producers as early as age 12 and compensate for their own cumulative consumption by age 15. However, whether his findings generalize is an open question. In subsequent work in other Asian countries, Cain (1982) found that the individual earnings of boys exceeded consumption at far older ages, and Kaplan (1994) in data from a forager-horticulturist group in Peru, finds that Cain's observation is not robust to considering a larger basket of consumption goods than Cain examined. In fact, a more common finding is that it seems unlikely that parents are repaid all of the costs associated with children (Mueller 1976, Lee and Bulatao 1983, Stecklov 1997, 1999, Lee, Kaplan, and Kramer 2002,). Stekelov (1999) for example finds that the annual rates of return on children in Cote d'Ivoire are between -6 and -10 percent. Two challenges throughout this work, however, are what discount rates to consider and whether and how to value the insurance value of children both as potential laborers in their youth and as sources of old-age security. Together, there appears to be little compelling evidence that variation in child labor opportunities can explain a large portion of the high fertility rates in developing countries.

*Does child labor affect local labor markets?*

In their seminal study, Basu and Van (1998) point out that if children and adults are substitutes in production (the "substitution axiom"), the prevalence of child labor depresses adult wages. Basu and Van focus on the implications of this depressive effect of child labor on the prevalence of child labor. In particular, they posit what they term the "luxury axiom:" children only work when parental income is below subsistence levels. With the combination of the luxury and substitution axioms, Basu and Van argue that child labor depresses adult wages which in turn makes child labor necessary. Multiple equilibriums in the labor market are then possible (see Basu 2001 for a general equilibrium treatment).

Because of this study's importance, a slightly more formal presentation is useful. A number of additional assumptions are necessary to keep the present exposition transparent. First, assume that the household consists of one parent and one child. The parent chooses whether the child works. Second, there are  $N$  one parent, one child households that may differ in what they perceive as their subsistence needs ( $s$  varies between  $\{s_L, s_H\}$ ). Third, parental labor supply is perfectly inelastic. The adult daily wage from working is  $m$ . Fourth, when children work, they earn a daily wage of  $w$ . Define an indicator  $c$  that is 1 if the child works. Household income can then be written  $m+wc$ . Finally, all household consumption is financed by adult and child labor. Households do not have assets that may contribute to household income and do not have access to credit markets.<sup>6</sup>

Define  $s$  as the subsistence level of expenditure, above which parents no longer have children work. The luxury axiom implies that if  $m > s$ , children do not work and household income is  $m$ . Effective labor supply for a household is 1 when children do not work. If parental income does not cover subsistence ( $m \leq s$ ), children work and household income is  $m+w$ . The

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<sup>6</sup> Swinnerton and Rogers (1999) also emphasize a distributional axiom. In an economy where child labor persists despite the country being sufficiently rich so as to eliminate child labor (the multiple equilibria case discussed below), the existence of child labor is the result of inequality in the distribution of assets.

substitution axiom implies a strong relationship between child and adult wages. Namely, if one child's labor is equivalent to a ( $a < 1$ ) units of adult labor, then the wage children are paid is  $w = am$ . Similarly, then, when children work, effective labor supply for a household is  $1 + a$ .

Figure 8 depicts the resulting market labor supply function written in terms of adult labor income and effective units of adult labor. Market labor supply is the sum of all individual household labor supply functions and is marked ABCD. When daily wages are above the highest subsistence level  $s_H$ , no children work, and the market labor supply function is defined by the segment AB. If wages are below the lowest subsistence level  $s_L$ , all children work. The segment BC is drawn to be downward sloping (rather than the discontinuous horizontal line that each household perceives) to acknowledge that the subsistence level of expenditure  $s$  may vary across households based on household and community attributes as we discuss below.

Market equilibrium adult (and thus child) wages are given by the price at which the supply of effective units of labor equals the demand for effective units of child labor. One possible labor demand curve is pictured in figure 8 and labeled LL. In the depicted equilibrium, labor demand is sufficiently high, that there is no child labor in the economy. Because adult wages are high, no children work. The effective employment in the economy is  $N$  and adult wages are indicated by  $m^*$ . Note that if labor demand is very low (so it intersects labor supply along the CD segment but not along the AB segment), the economy is very poor and all children work.

Does the prevalence of child labor depress adult wages? Evidence which is broadly consistent with the luxury axiom (Edmonds 2005) and the substitution axiom (Levison et al 1998) will be discussed in greater detail below. However, while this is a critical question in the child labor literature, direct evidence on whether child labor affects adult labor markets is scarce. The reason for a lack of evidence is the joint determination of adult and child wages, especially when the substitution axiom holds. However, it is reasonable to ask how plausible it is that child labor, which is mostly outside of the formal labor wage market, can suppress adult wages. In countries where children form a substantial share of the active labor force, this effect seems more plausible than countries where it does not. Figure 9 contains the plot of the share of the economically active population that is 10-14 against the fraction of children 10-14 that are economically active for countries where at least 1 percent of the population 10-14 is economically active using the LABORSTAT data (ILO 2000, see section 2.2). All numbers are in percentages – 0.01 is one hundredth of a percent. The size of the circles in the figure represents the 10-14 population in the country.

Two important issues are evident in Figure 9. First, children are a larger share of the economically active population when their economic activity rates are higher. This could be mechanical if population is independent of economic activity rates. That said, the positive gradient in figure 9 is not particularly steep – going from 0 children working to the largest observed economic activity rate of children is associated with a two thousandths of a percentage point rise in the share of the economically active population that is children. Second, children constitute a very small share of the total economically active population, even in countries where economic activity rates of children are very high. There are only two countries in the world where children are more than a hundredth of a percent of the economically active population. Is it possible that variation in the activities of less than a hundredth of a percent of the economically



active population can influence equilibrium wages in the labor market? Questions such as this are largely unanswered in the literature.

If child labor depresses adult wages in the local labor market, then the implications of child labor may extend much further than the working child. Ljungqvist (1992) for example develops a model where the prevalence of unskilled labor suppresses the wage of the uneducated workers relative to the educated. This causes the cost of education to be high relative to the labor earnings of an unskilled worker. Unskilled workers with few assets then choose not to obtain an education, because the marginal utility of foregone consumption during education is greater than the family's valuation of the return to education. Banerjee and Newman (1993) emphasize that depressed wages coupled with capital market imperfections can constrain entrepreneurship, leading to a stagnant, low wage economy. Thus, to the extent that child labor suppresses adult wages, this may have long run implications for growth and development.

#### **4. Determinants of Child Time Allocation**

The framework in equation 1.1 highlights several influences on child time allocation including the marginal utility of income, the parent's valuation of the child's future welfare, how education and play affect the child's future welfare, the productivity of the child in family activities, the costs of schooling, and the earnings opportunities available to the child. Academic research on the determinants of child time allocation is often categorized as either labor demand or labor supply. Loosely defined, labor demand is typically concerned with the availability of employment whereas labor supply focuses more on questions related to willingness or ability to work. The distinction between the two is often difficult in the context of adult labor in high income economies. Despite the absence of formal tests of the separation hypothesis (e.g. Benjamin 1992) for child labor, the general assumption among researchers is that distinguishing between demand and supply is especially arbitrary for child labor in low income countries where most children work with their parents in a family activity. Take for example, the literature on how household composition influences child labor. On one hand, the presence of younger children may raise the return on child time in domestic activities (labor demand), but on the other hand, younger children may also raise the marginal utility of income and thereby change labor supply. Should this research be classified as labor supply or demand?

Nevertheless, this section is organized by mimicking the labor demand and supply dichotomy. The first section focuses on what might be considered labor demand. What direct influence do local labor markets have on the activities of children? This includes evidence on how production technology, environmental factors, the industrial composition of local labor markets, the employer composition of local labor markets, and internal and international trade affects the employment opportunities open to children. The second section considers research on family factors that influence the activities of children. This includes research on agency problems, adult and child labor supply interactions, and the interaction of siblings. These factors are easily viewed as both labor demand and supply, and hence merit their own section.

The third and fourth sections consider issues that are typically considered as labor supply. Modern researchers tend to focus on returns to schooling as the main opportunity cost of work, and section 3 surveys the literature on the returns and costs of schooling affect on child labor.

No topic has garnered more attention than the relationship between child labor and poverty, and section 4 considers this literature.

#### **4.1 Local Labor Markets and Child Labor**

Most of the work on why children work focuses on why families send their children to work. Comparatively few papers consider child productivity in the family or the wage market. This lack of research reflects that very little child labor is in the formal labor market and that suitable data for examining labor demand in the formal labor market is extremely limited. Most researchers work with household surveys which are generally not suited to modeling the formal employment sector and which will rarely have power to analyze the comparatively rare event of wage employment. Establishment surveys with detailed data on child labor appear to be non-existent.

##### *Production technology*

How is child labor influenced by the technology used in production? Put another way, are there certain types of production that are especially apt to draw in working children? Marx argues that a supply of children and women is critical for the early stages of industrialization, because they are both cheap and suited to affine tasks that require little fingers. A similar argument is in Goldin and Sokoloff (1982). With data from early 19th Century U.S., they emphasize that comparative advantage appears to be the explanation for high female and child labor participation rates in early industrialization. The proportion of the northeastern manufacturing labor force composed of females and young males seems to have grown from about 10 percent at the start of the 19th century to 40 percent by 1932. The low relative productivity of women and children in the North's agriculture sector (hay, dairy, grains) kept the opportunity cost of their labor low relative to that in the South. In fact, Goldin and Sokoloff (1984) argue that this may partially account for why manufacturing industries were disproportionate in the northeast.

Because most working children are by their parent's side in the family farm or business, an emphasis on industrialization to explain the high rates of child labor around the world is clearly unsatisfactory. Moreover, in a contemporary setting, very few studies even document a link between changes in the activities of children and either the industrial composition of local labor market or the types of employer in a community. Edmonds (2003) is one exception. Using both cross-section and a household panel in Vietnam, he considers both the association between the activities of children and the types of industries and employers in the child's community. He observes that domestic is more prevalent and market work less prevalent in locations where handicraft industries are located but observes very little association between the activities of children and variation in other types of industries (over time or between locations) including manufacturing. For type of employer, Edmonds observes that the presence of state or large private employers reduces the incidence of market and wage work, while hours worked is slightly larger in communities with significant small employer presence. However, the endogenous placement of industries and employers is a serious concern and it is not addressed, and his findings cannot be taken as more than suggestive of future avenues for research.

Are there tasks that might be important in industrialization that require children for anything other than cheap labor? The literature on child development suggests possible ways in which children might have an advantage in several activities. Sloutsky et al (2004) showed color pictures of animals for memorization to a small number children around age 5 and young adults around 20. Children appear more effective at memorization of details because of differences in their approach to memorization. The young adults memorized by categorizing the animals whereas the children appeared to memorize by comparing each new animal to a reference animal. When the experimenters asked the young children to categorize animals for memorization, their performance deteriorated. Other work has found that children perform better than young adults in comparing visual objects and in drawing spatial analogies (Gentner et al 1977). Studies that compare young adults to older individuals suggest that the tendency towards categorization and thereby false analogy grows stronger with age (Koutstaal et al 1997). Research like this might imply that children would have an advantage at detailed work requiring pattern memorization such as carpet weaving or knitting.

The most detailed case-study we have on child productivity in manufacturing focuses explicitly on an industry where these developmental advantages should be most important: the hand-knitted carpet industry. Levison et al (1998) find little empirical support for the “nimble fingers” view. Adults and children tend to work on the same types of carpets and that children are 21 percent less productive in hand-knitting than adults (productivity is measured in square inches knit per hour). This case seems consistent with the overwhelming empirical fact about child labor in today's developing countries: formal sector wage employment of children is extremely rare. If children were critical for the early stage of industrialization, then its low prevalence would be a surprise. That said, our understanding of labor demand would clearly benefit from additional work like Levison et al (1998).

While it is unclear whether there are activities for which children have an absolute advantage in, there must be activities in which children have a comparative advantage. It is this comparative advantage that Goldin and Sokoloff appeal to in order to explain north-south differences in the employment of women. When the return to these activities in which children have comparative advantage is high relative to other uses of child time, we expect children to work everything else equal. Interestingly, Galbi (1997) argues that the nature of the child's comparative advantage in early English cotton mills was that adult laborers did not know how to be factory workers. In fact, he argues, that children were replaced in English cotton mills when the children became adults, trained and socialized for factory work.

Collection activities are often mentioned as activities where children will have comparative advantage. For example, Nankhuni and Findeis (2004) note that children in deforested areas of Malawi spend significantly more time collecting wood for fuel than do children in less deforested areas, and this collection time is associated with reduced schooling participation. Several studies document a connection between variation in access to water facilities and child schooling. For example, Psacharopoulos and Arriagada (1989) find that schooling is higher in Brazilian households with piped water; Cockburn (2002) notes that work time is lower and schooling higher in Ethiopian households with better access to water; and Guarcello and Lyon (2002) observe in Yemen that households connected to a water network are more likely to send their children to school and less likely to report their children as idle. While these studies do not address the non-random nature of water access, they are suggestive of how

important the return to child time in activities other than schooling can be for child time allocation.

Several recent studies note that children work more in households with more self-employment activities (Edmonds and Turk 2004 for Vietnam, Parikh and Sadoulet 2005 in Brazil), and Wydick (1999) notes a correlation between work and household involvement in a microcredit program. For example, using detailed time use data from Botswana, Mueller (1984) documents that the more productive capital the household has, the more productive work its children perform. Using Mueller's data from Botswana, Chernichovsky (1985) observes that this association between market work inside the household and the presence of productive capital varies depending on whether substitutes for child labor are present in the household. Cockburn (2002) goes into further detail in Ethiopian data. He notes that small livestock and land appear to be market work increasing whereas oxen, bulls, ploughs, land quality, and again, proximity to water are child labor decreasing. Shafiq (2006b) points out that, while greater assets may lead children to report working more because of the availability of employment opportunities, the human capital ramifications of this are unclear. In his data from Bangladesh, children work more in the presence of productive assets, but they are also more likely to attend school.

Some closely related evidence also illustrates how technology changes that replace the types of activities typically done by children can alter schooling and the activities of children. For example, Brown et al (1992) documents technological changes in the U.S. Fruit and Vegetable canning industry that lead to a shift to adult labor. Levy (1985) shows a relationship between the mechanization of Egyptian agriculture and the decline of child labor in cotton. Two important technologies he emphasizes are the spread of tractors and irrigation pumps. Dessy and Pallage (2005) emphasize the importance of technology in child labor formally in arguing that one way to view child labor is as the result of a coordination failure between parents and firms investing in skill intensive technologies. Technology changes can also affect child time outside of the formal wage labor market. Fafchamps and Shilpi (2004) observe that in Nepali data, there appears to be greater household specialization as proximity to urban areas increases, and Fafchamps and Wahba (2006) argue that children are more likely to attend school and not work as specialization increases with urban proximity. Interestingly, they note that while work in the household is reduced with urban proximity, there is a rise in child labor outside of the household although it is not enough to offset the total decline in hours worked.

### *Trade*

One frequently hears popular anecdotes about children working in export industries, and it is often asserted that the ability to trade with high income countries causes children in developing countries to work. Put another way, this argument implies that trade creates work opportunities for children that would otherwise not be present. Maskus (1997) is a formal presentation of this idea. In his model, the poor country produces an export good that is labor intensive and an import-competing, capital intensive good. The export sector subcontracts to the informal sector which employs children. The demand for child labor then depends on product demand for the export good. An expansion of the export sector then increases child labor and equilibrium child wages.

A number of studies have examined data on cross-country trade flows to consider whether there is any evidence of a link between trade and child labor in aggregate statistics. They typically document a negative correlation between child labor and openness which is defined as the sum of exports and imports as a share of GDP. Edmonds and Pavcnik (2006a) is one such study that explicitly attempts to account for the endogeneity of openness. They instrument for openness with trade based on geography. The main identification assumption in this approach is that trade which is driven by geography does not affect child labor except in its impact on total trade flows. They also observe that child labor is lower in countries that trade more. Moreover, addressing the endogeneity of trade nearly doubles the magnitude of the elasticity of child labor with respect to openness.

What explains why child labor is lower in countries that trade more? Edmonds and Pavcnik find that the negative association between openness and child labor mostly reflects the well documented positive link between trade and income: once they condition on a country's income, they find a very small and statistically insignificant relationship between trade and child labor. This result holds in the full sample, when they split the sample into different country groups, consider only trade between high and low income countries, or focus on exports of unskilled-labor intensive products from low income countries. Thus, the cross-country data provide no support for the claim that trade perpetuates high levels of child labor in poor countries via the labor demand channel.

Given that most child labor is in agriculture and family businesses, it is perhaps unsurprising that there is no evidence of a labor demand effect on child labor through trade in the cross-country data. More detailed industry or within country data on changes in industrial employment with growing trade is promising for shedding more light on how international markets might affect the activities of children.

Edmonds and Pavcnik (2005b) examine the relationship between market work, domestic work, and trade using panel data on rural Vietnamese households. Vietnam liberalized its rice export quota during the 1990s and lifted restrictions on trade in rice across Vietnamese regions. Subsequently, from 1993 to 1998 the price of rice increased on average by almost 30 percent relative to the consumer price index, and rice price changes varied widely across communities of Vietnam. Edmonds and Pavcnik relate child labor to regional and intertemporal variation in rice prices. Despite the growth in labor demand associated with a booming rice sector, they find that market work and domestic work decrease by more in communities that experience greater increases in rice prices. The declines in working children are greatest in households that were net rice producers prior to market reform. Part of this decline in work owes to an income effect, but part also owes to a rise in household specialization that Edmonds and Pavcnik (2006b) document in the context of these rice trade liberalizations.

Land and labor are the two primary inputs into rice production, and overall both are sufficiently equally distributed in Vietnam that most households are well positioned to enjoy the additional income stemming from this trade liberalization. Of course, it is possible that a growth in trade could have opposite effects when the income gains are not distributed to those whose employment opportunities are rising. For example, Kruger (2004) observes that during the coffee boom of the mid-1990s in Nicaragua, there is an overall increase in market work that is especially large in poor households in coffee producing areas. Her findings mirrors what Alessie

et al (1992) observed with cash crop price increases in Cote d'Ivoire: increases in cash crop prices are associated with more children working in the cultivation of those crops. One explanation for Kruger's findings is that because of the concentration of land in coffee (and the resulting market power in local labor markets), poor laborers have received increases in income that are minor compared to the growth in labor demand, and hence market has increased. Another interpretation of these findings is emphasized in Kruger's (2007) study of the coffee boom's effects on working children in Brazil. In that context, she emphasizes that when booms are expected to be transitory households should seize temporary employment opportunities, especially if it is easy to make up for lost schooling time in the future. Her findings are then consistent with evidence of delaying schooling or temporary withdrawals from school in response to macroeconomic crisis as discussed in section 4.4 below.

In the Vietnam rice price case, much of the affected population is exiting poverty while such improvements in living standards are not evident in Kruger's coffee data. Edmonds, Pavcnik, and Topalova (2007) look at the connection between trade policy, child labor, and poverty directly in their study of schooling and child labor responses to India's trade reform in 1991. They observe that children who were in areas with a concentration of heavily protected industries prior to liberalization and thereby are more impacted by tariff cuts, do not experience the same increases and schooling and declines in work without schooling evident elsewhere in India over the 1990s. This pattern of relatively rising work without schooling and declining schooling does not appear to be explainable with falling returns to schooling (they appear to be increasing) or rising unskilled wages (which appear to be falling). Rather, they reflect the relative rise in poverty in areas that experience a larger decline in protection. Further, they argue that the avoidance of schooling costs lies behind this trade policy – child labor- schooling connection. This combination of micro-studies emphasizes how multidimensional the interaction of trade and child labor can be and that the effects of international trade on the working status of children will be context specific.

## **4.2 Child Labor and the Family**

### *Who makes child labor decisions?*

Unitary models of the household are typically used in the child labor literature. The model of section 1 is one example with its single decision-maker. Implicit within these is an assumption of either unanimity of preferences within the family or a dictatorial household. Typically, parents are viewed as the primary decision-makers for child labor supply and schooling. This raises the classic parental agency problem. While parents may make child labor decisions, they do not fully internalize the costs of these decisions. Moreover, this assumption that parents make child labor decisions has led many to assert that child labor supply is evidence of parental callousness and indifference to their children. Specifically, if parents make decisions about child labor supply and do not consider either the current or future welfare in so-doing, then they will select higher levels of child labor than the child would choose or than governments would consider socially optimal. “Nimble Fingers” theories of child labor take this parental agency problem to an extreme. They posit that parents always take advantage of employment opportunities open to children and therefore that labor demand is the dominant determinant of whether and how children work.

In recent years, more attention has been paid to the fact that there is typically not one decision-maker in the household, and empirical studies uniformly reject the unitary household model. Decisions about child time allocation will be influenced by mothers, fathers, extended family, and perhaps even children themselves. Edmonds and Sharma (2006) consider an extreme example of how child time allocation can be affected by multiple decision-makers. In studying a population in Western Nepal with a high intrinsic risk of bondage, they argue that child labor is increased and schooling reduced in part, because neither parents, children, or bondholders have security over the returns to investments in children. They argue their case can be read as an extreme representation of the classic parental agency problem.

Several recent studies study deviations from the unitary household model in more conventional situations. A common question is how parental characteristics affect the activities of children. Emerson and Souza (2007) for example observe that the elasticity of child labor supply with respect to parental education is greater for fathers than mothers and that it is more important for the son's labor supply than the daughter's. Whether this reflects something intrinsic to education, relative earnings ability, actual incomes, type of occupation, or some omitted geographic characteristic correlated with child labor and schooling decisions is outside the scope of the study. A perennial difficulty in tests of the unitary household model is to find characteristics that are associated with variation in the influence of different family members but that do not simultaneously affect child labor and schooling decisions, but Emerson and Souza's findings are suggestive that researchers may observe patterns in child labor that is consistent with what other studies of intrahousehold allocation have found. Similar findings for education are surveyed in Strauss and Thomas (1995), and they argue that the evidence strongly supports effects of parental education that go beyond the effect of education on income.

Basu (2006) considers how the status of women in the household affects child labor supply. In his model, both mothers and fathers dislike sending their children to work, but they differ in their preferences over consumption goods. As female status improves, the family opts for less child labor, because it becomes increasingly difficult to agree on other decisions over which there is disagreement. However, as women's status improves and she becomes dominant in the household, child labor may rise as she can exert more influence over consumption choices in other goods. For example, suppose that utility depends on the child's labor status and consumption of two different goods. Additional consumption of good 1 does not improve the woman's utility, and additional consumption of good 2 does not benefit the man (but it does the woman). Thus, as female power increases in the household, first the family shifts to less child labor, then it shifts to more good 2 consumption and more child labor. Thus, the relationship child labor and female power in the household is predicted to be a U-shape. Basu and Ray (2002) examine this in household survey data from Nepal. The maximal female education in the household as a share of the sum of the maximal female and male education in the household proxies female power. In this data, they find suggestive evidence of this inverted U-shape hypothesis.

Comparatively little attention has been directed to the child's own role in child time allocation decisions. The focus on parents is driven by the observation that parents have comparatively more power within the household than do children. The fact that most working children are employed within the household in activities that are apt to confer little in the way of status or economic independence seems consistent with this view. Moreover, work is typically

considered in tandem with schooling, and schooling is expensive in ways that may require the parents to finance it. If children cannot pay for alternatives to work, then parents necessarily influence child labor supply. However, there is some evidence that suggests that when opportunities outside of the household are open to children, they may be able to influence household decision making.

Moehling (2005) is perhaps the most compelling direct evidence on the ability of working children to influence household decision-making. She examines data from the U.S. collected between 1917 and 1919. She observes that the share of total household expenditures on child goods is increasing in the children's contribution to household income. Unless the child's work demands this expenditure, it is hard to understand why more income to children increases spending on child goods more so than other types of income without some impact of child's income on family decision-making. Interestingly, Moehling (2006) notes that despite the fact that young children typically turned over their entire pay envelope to their parents, it still seems to be treated differently than other sources of income although her results for younger children may reflect something about the younger children's requirements for work. Basu (2006) also points out that there may be a cycle of power in the household. As children work, their ability to influence household activities increases, and thus they may choose to work more.

How important is the child's role in deciding her own labor supply? If she can influence household decision-making by working, it seems the potential is large. However, very little research has considered the child's own role in deciding her own labor supply or schooling. One suggestive piece of evidence is from Iverson (2002). He interviews child migrants in one location in a rural South Indian district about why they migrated and the extent to which they have contact with parents. He reports that the labor supply of young children and girl migrants seem to be largely determined by parents. However, boys who start working at ages 13 and above, report little contact with parents which may reflect that they are working by their own choice. Iverson speculates that autonomy is an important motivation for this group's migration decision; these early teen migrants may have migrated and work in order to have greater control over their lives.

The implications of some child influence over their time allocation can be very important for interpreting evidence that purports to show a link between the labor market opportunities of children and child labor supply. This evidence is often interpreted as parental callousness about the welfare of their children or indifference to education. However, it may reflect more about the child's own valuation of their time. In particular, if children are myopic relative to adults, they may respond more to changes in their employment opportunities than parents.

If this is the case, there may be relatively little scope for anti-poverty policies, etc., to affect the labor supply of this group. Future research understanding the child's own role in her time allocation is perhaps the most pressing need in the child labor literature.

### *Parental attitudes towards work and schooling*

One of the key reasons why child labor is viewed as a human rights issue is that parents likely have considerable influence over child time allocation. They may capture many of the benefits of child work while not personally bearing the costs (except in as much as they



internalize the child's welfare). As discussed above, it is unclear how important child and parental agency are in child time allocation, but to the extent that parents have influence (especially over young children), then parental attitudes towards work are of potentially great importance.

Accusations of parental callousness towards their children and disregard of the costs of work abound in the policy debate and in the academic literature. The focus of the anti-child labor campaigns in the Progressive Era of the United States was largely on changing parental attitudes towards work. Zelizer (1985) emphasizes the important role changing attitudes towards children played in the changes in schooling and work in the U.S. during the later half of the nineteenth, first part of the twentieth century. Analogous campaigns to stigmatize work for children are pervasive in many developing countries today.

There is ample basis for this focus on norms in the treatment of children in qualitative work on child labor and schooling decisions. For example, the Public Report on Basic Education in India (1999) found that 37 percent of parents listed a lack of parental interest in educating their children as an explanation for why boys had never enrolled in school. However, it is very difficult to disentangle cause and effect in studies of child labor and parental attitudes towards work and school, and statements about motives are often a challenge to interpret.

There are a few approaches taken in the econometrics literature to study the influence of parental attitudes on work decisions. One approach is to look at correlations between the parent's background and the child's activities. This evidence has already arisen in section 3.4 and obviously attitudes towards work are only one component of how parental background can influence child time allocation. A second approach is to look at some measure of parental attitudes or gender bias within the household and correlate these with child time allocation. These studies are surprisingly rare, perhaps because of the challenge of capturing variation in attitudes or gender bias that is not simultaneous with other factors influencing child work. A third approach is to correlate community average behaviors with an individual household's schooling or work decisions. The hope is that the community mean reflects local values and not anything else about the community. In reality, the econometric challenges presented by this approach are insurmountable.

Several studies assert that regression residuals capture social norms or parental attitudes for child labor decisions. This is strange. By construction, in linear regressions, residuals are mean zero and orthogonal to included covariates. However, it seems unlikely that norms and attitudes towards work have no influence on work decisions on average or that these beliefs would be orthogonal to observable household characteristics. Moreover, regression residuals will be influenced by misspecification of the model, mismeasurement of any included covariates, and the researcher's subjective choice about what covariates to include in the estimated models.

Perhaps the most frequently cited evidence directly on parental attitudes towards child labor is Parsons and Goldin (1989). They consider the association between savings and child wage labor supply among industrial families in the U.S. in the late nineteenth century. They note that the marginal propensity to save out of child income is significantly less than 1 and that there is a positive correlation between asset levels and child labor income. In both cases, child income appears to be treated like adult income in the household. Moreover, Parsons and Goldin observe

that child income appears to have little effect on total family income. Each dollar of child income implies a 9/10 reduction in male household head income. They hypothesize that this reflects family migration toward areas with better child labor opportunities that comes at the expense of adult income. Indeed, Parson and Goldin paint a bleak picture of how parents allocate the time of their children. They write: "These working-class families apparently sold the schooling and potential future earnings of their offspring very cheaply" (p 655).

There are, however, several difficulties with this interpretation of the patterns observed by Parsons and Goldin. In particular, the source of variation in child income is unclear in their data. Suppose, for example, that parents are altruistic towards their children and only have children work when it is critical to meet basic needs (as assumed in Basu and Van 1998, section 3.4). In that case, we would expect to observe lower adult earnings as child labor earnings are higher, but the causality runs from adult earnings to child earnings. In this case, child income is compensating for the loss of adult income, so the marginal propensity to save or spend should be similar for each. With imperfect insurance markets, part of the family's basic needs must include a saving component to help cope with future shocks. Hence, the marginal propensity to save out of income is likely to be above 0. The positive correlation between child income and asset accumulation is more of a puzzle, albeit one that can be explained in several ways. It may reflect the same concerns as savings (and may be the instrument for savings); it may reflect the indivisibility of fixed schooling costs (school costs tend to need to be paid on irregular intervals like the start of the school year); or it may reflect a latent correlation between the degree of economic activity in an area and the activities of children. Recall, that even perfectly altruistic parents send their children to work when the relative returns are highest. Hence, it is very difficult to draw concrete conclusions about the callousness of parents in this data.

Future studies of norms or attitudes towards child labor and schooling would be better served in trying to codify or measure such attributes directly. In general, the role attitudes and norms play in child labor is poorly understood. It is clear that child time allocation is in general elastic with respect to the household's economic environment, but it is not clear whether this elasticity is bounded by social attitudes towards work, whether there are some children who are especially vulnerable in this regard, and whether this elasticity reflects changing norms or if norms are just one component of how child time allocation decisions are made. Ultimately, the interest in parental norms is most acute for its implications for the design of policy, and it is unfortunate that so little work has been done to study how policy efforts to change attitudes towards work have influenced child time allocation decisions.

#### *Child and Adult labor supply interactions*

Most working children work inside their home. There are several explanations for this. Parents may prefer to have children at home to better monitor their working conditions or simply, because they enjoy their proximity. There may be strong norms against child work outside of the household which lowers the perceived return from having a child work outside of their home. Children may also be more productive workers at home. Parents may be more effective at monitoring or disciplining children. Moral hazard problems may be especially acute with children who may not perceive or care about threats of social sanction outside of the household.

There is a literature on the activities of children in family run businesses in developed economies that emphasizes the productivity of children relative to hired in labor. Sanders and Nee (1996) for example consider the role of children within the self-employed immigrant families in the U.S. They emphasize the importance of child labor within these families because it is both very reliable and continuous over time in comparison to other sources of labor. In her study of Chinese take-out businesses, Song (1999) emphasizes the work of children as translators and mediators in these businesses. Parents rely on their English language skills for assistance and guidance, often freeing the parent for oversight duties of hired in help. Song also emphasizes that parents often prefer family labor, because typically there is not much privacy in the work environment that often starts in the family home (p71). For children to work within their own household, there must be a sufficient amount of economic activity and working capital within the household. Hence, many observers emphasize a positive correlation between family asset holdings and work inside the household. This is discussed in detail in section 4.4.

When children work outside of their household, there appears to be a strong association between the types of work they do and that of their parents. Parents may prefer their children to work with them, be more effective at affecting high levels of effort, have better information about job opportunities open to children, and there may be geographic clustering in the types of activities performed. Genicot (2005) also emphasizes nutritional spillovers to children from adult earnings as an explanation for the association between child and adult work. She considers (theoretically) a setting where an employer elects to pay a higher wage to enhance his employee's nutritional status. The worker spends a portion of this higher wage on his child, enhancing the child's productivity. The employer then prefers to hire the child in addition to the parent in order to capture all of this externality.

Some of the strongest evidence of complementarities between parent and child in the type of wage work performed comes from U.S. history. For example, Goldin and Parsons (1981) find that the median schooling of males whose fathers were employed in textiles (where child labor was also prevalent) was 3.3 years less than those whose fathers were not, even controlling for parental income differences. Goldin (1979) observes positive elasticities of male and female child labor supply with respect to the father's wage in nineteenth century Philadelphia, but she does not see this pattern in mother's labor supply. From this, she infers that children (rather than wives) were the most common source of labor income apart from the male head of household.

However, in a contemporary setting, there is much more evidence of same sex substitution patterns with respect to adult female labor supply. For example, Skoufias (1993) observes a negative correlation between adult female wages and wage child labor. He theorizes that this connection is driven by children filling in for absent mothers in the households and thereby reducing their work outside of the household (although an income effect is hard to rule out in his case). Wahba (2006) observes declines in wage work for boys in parts of Egypt where unskilled wages. She emphasizes an income effect explanation. Further, Katz (1995) and Hazarika and Sarangi (2005) observe increases in girl domestic work as mothers become more involved in home enterprises or microcredit programs. Katz (1995) speculates that the availability of an older girl to substitute for the mother in domestic work could act as a binding constraint on female labor supply in her data from Guatemala.

Adult – child substitution patterns can be affected by changes in the returns to activities in which adults or children have comparative advantage. For example, Field (2003) examines how patterns of child and adult time allocation change when Peruvian squatters receive secure titles to their land. She finds that children work less outside of their household when titled and that adults work more outside of the household. Her evidence does not seem to suggest that this is an income effect as their does not appear to be an identifiable income effect of titling. Instead, she argues that adults have comparative advantage in providing security for their property. Hence with insecure property rights, children work away from home, but adults are freed to work away with titling. Thus, there is support in the empirical literature for both complementarities in wage labor supply and substitution possibilities between child and adult labor depending on the economic environment.

*Does parental co-residence influence child labor?*

There are many ways that parents might influence child labor supply aside from either complementarities or substitution patterns in child labor. The absence of a parent might either attenuate the employment options open to children or accentuate the need for children to fill in for the parent's work. It is worth noting that these two issues work in opposite directions and are most likely to affect different types of work. Thus, the relationship between child and adult work can be very sensitive to the types of activities considered. Beyond substitution patterns, the absence of a parent is likely associated with variation in family income (although the direction of this variation is unclear), and there is a separate concern from biology that parents might have differential investment incentives in their genetic offspring, and this can be modeled by allowing child investment incentives to vary with the biological relationship.

Moehling (2004) considers the association between family structure and child labor and schooling in the American South at the start of the twentieth century. Living apart from one or both parents is associated with lower school attendance and greater market work participation, especially for black children. She is careful to note that the variation in child labor and schooling for American blacks that is attributable to variation in living arrangements is small compared to parental literacy, household resources, and school characteristics.

Interest in the relationship between parental co-residence and investments in children has risen significantly in recent years, because of the AIDS crisis in sub-Saharan Africa. Most existing studies find that orphanhood is associated with reduced schooling enrollment. Two approaches are common in the literature. First, many studies compare children living within the same household who differ in whether they have had a parent die. Case, Paxson, and Ableidinger (2004) exemplify this household fixed effects approach in their study of orphanhood and school enrollment in 10 Sub-Saharan Africa countries using data from demographic and health surveys. They find that orphans are less likely to attend school than the non-orphans with whom they live. These within household (household fixed effects) comparisons are complicated by the fact that the orphans and non-orphans likely come from different backgrounds and certainly differ in one important experience: the loss of a parent.

A second approach to study the relationship between schooling and parental death is to use individual level panel data that follow children over time. Evans and Miguel (2005) is one such study. In a panel of 20,000 rural Kenyan children, they find a substantial decrease in

participation in school following a parental death and some decline prior to the death. Beegle, De Weerd, and Dercon (2006) follow a smaller sample of children from the Kagera region of Tanzania for over 10 years, and find substantive, sustained declines in educational attainment and height associated with parental mortality.

The effects of parental death on child work are less clear. There does not appear to be any individual level panel studies on orphanhood with detail on child work. Guarcello and co-authors (2004) use some of the same demographic and health survey data as Case, Paxson, and Ableidinger (2004) from sub-Saharan Africa and cannot draw generalities about correlations between parental death and various forms of work. Throughout this literature, a chronic problem is how to separate different mechanisms for the impact of parental death from the non-random nature of deaths. Are children withdrawing from school to work to substitute for lost parental wages, to fill in for the parent's role in the household? Alternatively, is withdrawal a trauma effect of the loss of a parent? Studying child time allocation seems to be a promising way to better understand the schooling – orphanhood connection, and it is likely to be of interest in its own right.

#### *How does sibling composition affect child labor?*

A number of studies document a positive correlation between family size and child labor, and this is generally viewed as suggestive of resource and credit constraints on child time allocation (e.g. Knodel and Wongsith 1991, Patrinos and Psacharopoulos 1997), but it may also influence the shadow value of child time when there are tasks for which it is difficult to hire in help. Many researchers have attempted to better understand why children work by looking inside the household to see how sibling composition affects child labor and schooling. The reason for this attention is that by looking at differences in how parents treat children, many believe it might be possible to infer the influence of parental preferences in child labor and schooling decisions, although it is not obvious how we can learn about preferences from sibling differences in child labor.

Studies typically look at birth order, sibling sex composition, or birth spacing. There are a variety of mechanisms through which birth order may affect investments in children. They can be roughly categorized as mechanisms owing to parent's age, socialization, or resource constraints. Higher birth order children will have older parents who may be wealthier, more experienced at raising children, or feel more altruistic but they also face a higher risk of birth defects and twinning. Lower birth order children grow up in a more adult environment, have the experience of teaching their siblings, but have comparative advantage to younger siblings in the wage labor market and in household production. Higher birth order children grow up in households with more competition for scarce resources such as income and parental time, the present value of returns on investment may be lower because of longer time horizons until the market realization of these returns, or they may benefit from sibling transfers. Ejrnaes and Portner (2004) argue that birth order (conditional on household size) reveals something about the child's latent genetic talent, because they argue that the probability the family stops having children is increasing in the child's ability relative to the family's expectation.

While a number of studies document an association between birth order and child labor or schooling, few studies attempt to distinguish a mechanism. Emerson and Souza (2002)

observe in Brazil that older boys and girls are more likely to work and less likely to attend school than their younger siblings. They point out that this could be of credit constraints – older children might be working because poor families are unable to borrow to finance education. Edmonds (2006b) observes similar patterns in Nepal and argues that they may also owe to differences in comparative advantage in household production. He cannot exclude a preference or credit constraints based explanation, but he observes that sibling differences in total hours worked are largest in household production, and that the oldest girls especially spend more time working in domestic work when there are more younger siblings. Parish and Willis (1993) emphasize a similar supportive role of the oldest girl in Taiwanese households. She helps with the schooling outcomes of their younger children by caring for younger children and by bringing in income through wage employment that helps with school fees and allows later entry into the labor force for younger siblings. However, Parish and Willis argue that her most important contribution to the household comes through leaving early and marrying.

Two studies stand out in their ability to identify specific mechanisms through which birth order is correlated with child labor and schooling. First, Manacorda (2006) finds that children are less likely to work when they have older siblings and are in U.S. states where those older siblings can work (see section 3.4 for more detail on this paper). Second, Birdsall (1991) emphasizes the importance of constraints on time in generating birth order effects. In data from urban Columbia, she shows that education is lower for later born children. She argues that this is inconsistent with what would expect to see with credit constraints where older children should support younger children. Moreover, she observes that birth order effects are less likely among working mothers in urban Columbia. She argues that this reflects that time can be traded for money in the market so that working mothers can shift in and out of the labor force to keep the shadow value of time equal in all periods.

The sibling sex composition literature tends to emphasize sibling rivalry, peer effects, or sex-typing to explain sibling sex composition effects on child labor and schooling. The sibling rivalry idea is that everything else equal, the child is better off with more siblings who are comparatively less valued in terms of preferences, market opportunities, social status, etc. For this to hold there need to be some type of a constraint on credit, transfers, labor markets, or household production that cause household investment decisions to depend on the sex composition of children in the household or parental preferences have to vary across children. Peer effects work through the influence of the sex composition of siblings on the family environment. A more masculine environment, for example, may influence a girl's social interactions in the world. Sex-typing occurs when there are certain tasks that are stereotypically male or female but a child goes against type because of the absence of an appropriately gendered individual to carry out the task in the household. For example, a boy raised in a household without girls may engage in tasks that are more typically female in a household.

Peer effects and sex-typing of tasks have drawn the most attention in the developed economy context, but for developing economies, many writers have emphasized sibling rivalry. Parish and Willis (1993) for example emphasize in Taiwan that it is the support available from having an older sister that is critical for schooling. While Parish and Willis focus on the oldest sister, Edmonds (2006b) observes in Nepali data that the larger the number of older sisters, the less likely younger boys and girls work. Morduch (2000) finds that moving from all brothers to all sisters raises completed schooling by nearly half a year in Tanzania. Similar patterns are

documented in Garg and Morduch (1998) for Ghana, but the result is not as general as Morduch (2000) observes no such pattern in South Africa. Whether sibling rivalry is more intense between sexes or within sex groups may vary across cultures. In Malaysian data, for example, Lillard and Willis (1994) observe that siblings of the same sex appear to be rivals in attracting investment of resources from their parents in the sense that female education is reduced by more girls present, boys by more boys.

Much of the attention in the child labor literature has been on sibling sex composition or birth order. Comparatively little attention has been devoted to issues of birth-spacing. Implicitly, many of the mechanisms for birth order effects on child labor are actually working through spacing. For example, two children close in age are more apt to be seen as substitutes in household production, work, or schooling opportunities. Likewise, the probability of receiving substantive support from an older sibling is likely to increase with the age gap between siblings. While there is some suggestive evidence in Edmonds (2006b) that sibling sex differences in activities are more pronounced when age gaps are small, more research on the implication of birth spacing for child labor and schooling is needed.

Several empirical problems plague most of the research into how sibling structure effects investments in children. First, births are typically unobserved. Rather, only co-resident children are observed. This could easily be resolved by surveys that collect complete fertility histories or details about non-resident siblings, but in practice, this appears rare in surveys with detailed child labor data. Second, household composition is typically endogenous to the household's economic environment (and thereby labor supply) through fostering, mortality, marriage, migration, etc. Akresh (2004) for example emphasizes how important fostering can be to a family's risk management strategy. Third, when households include extended families or when polygamy is prevalent, it may be impossible to even establish resident sibling relationships. Fourth, fertility is endogenous to factors influencing child labor supply. Sex composition may reflect parental preferences about the type of children they would like to have. Birth order, for example, cannot be separated from factors influencing fertility or from household size as higher order birth orders can only be observed in larger households. Several authors address this later problem with specifications that compares birth order effects within household size groupings. However, the empirical challenges dealing with these issues are considerable.

An additional issue is whether to include household fixed effects in the analysis. On the positive side, this controls for common household factors such as current employment opportunities inside and outside the household, parental attitudes that may be correlated with sibling size, and other child invariant characteristics. However, this approach will limit the analysis to children with siblings, exaggerate sibling differences when they are relatively small, and may not address most omitted variable concerns as the effects of factors such as local labor market opportunities or household endowments may vary with age and thereby birth order, age spacing, or sibling sex composition. To the extent controlling for household fixed effects expands within sibling differences, they may make controlling for differences in factors associated with age more difficult. Similarly, within household differences in sibling composition owe to differences in the sex of the child or differences in parents. Both of which create estimation problems. Hence, while household fixed effects can be useful, they are often viewed incorrectly as a solution to most of the empirical problems that plague the empirical analysis of sibling differences in child labor.

### 4.3 Child Labor and the (Net) Return to Schooling

In the developed country context, a number of authors have emphasized that work is not the main opportunity cost of schooling; rather, foregone leisure is (e.g. Parsons 1975). In the developing country context, researchers tend to view work as the main opportunity cost of schooling. If so, there should be a close connection between work and the relative return to schooling. This section surveys the evidence on a link between the measured or proxied return to schooling and child labor. Note that in the model of section 1, it is the relative return to education that matters for child labor supply. For example, for a child that engages in wage work and schooling, the allocation between schooling and wage work requires:

$$\frac{\partial u}{\partial V_k} \frac{\partial R}{\partial E} - \frac{\partial u}{\partial S} \frac{\partial F}{\partial c} e = \frac{\partial u}{\partial S} \frac{\partial F}{\partial c} w \quad (\text{eq. 4.1})$$

Thus, time allocation between wage work and school depends on the local wage, the marginal utility of income (in the model of section 1 where credit constraints are implicit), and the net return to schooling. The net return to schooling is the difference between the marginal utility associated with any future returns to education and the foregone consumption schooling costs require. A major consideration in the literature on the returns to schooling and child labor is what factors could lead to a situation where the returns to schooling do not affect child labor. A lack of parental altruism or credit constraints are the two most frequently cited explanations. We have considered altruism in the previous section. Here, we discuss credit constraints.

#### *Credit constraints and child labor*

Most recent studies of credit constraints and child labor are based on the theoretical work of Baland and Robinson (BR 2000). BR is a variant on the Ben-Porath model in that it emphasizes child labor explicitly. BR has a single household decision-maker (a parent) who decides child labor and schooling decisions after making other household income decisions. The parent lives two periods. In the first period, the parent chooses savings  $s$  and the fraction of child time spent working,  $h$ .  $m$  is the household's income each period. Wages from working are normalized to 1. Thus, consumption in the first period is:  $c_1 = m + h - s$ . In the second period, in addition to the parent's income  $m$ , the parent receives the savings income and gives a bequest  $b$  to the child:  $c_2 = m + s - b$ . Parental utility comes from consumption in period 1, period 2, and the well being of the child:  $U_p(c_1, c_2, U_c(w_c))$ . Child well-being depends on the return to the time spent not working,  $z(1-h)$ , and income from bequests:  $w_c = z(1-h) + b$ .

BR show that if savings and bequests are not zero, then the household chooses child labor so that cost in terms of foregone consumption today of decreasing child labor exactly equals the return to the child of foregoing child labor:  $z'(1-h) = 1$ . They argue then that child labor is privately efficient, although Bommier and Dubious (2004) show that this efficiency is not the case even with complete markets if children have a disutility of labor. However, if bequests are zero, then the return to not-working is greater than the household's cost of not having the child work, and child labor is inefficiently high. Without bequests, children cannot compensate parents for the foregone consumption that comes from decreasing child labor. Likewise, if



savings are zero, then, the household's marginal utility of consumption in the first period is greater than the marginal utility the household attains from increasing child well-being, and child labor is inefficiently high.<sup>7</sup>

Evidence directly on whether credit constraints influence child labor and schooling is relatively rare, because of the difficulty of disentangling credit constraints from other market imperfections. For example, a number of studies that will be discussed below consider the association between child labor and crop shocks, but they cannot in general separate insurance failures from changes in the relative returns to work or from credit constraints.

There is some suggestive evidence at the cross-country level. Jafarey and Lahiri (2001) emphasize that borrowing constraints in the aggregate should decline as access to international credit markets increase and that this in turn should mitigate the need for children to work. Dehejia and Gatti (2002) consider the link between formal financial development and child labor in aggregate cross-country data. They measure credit constraints by the ratio of private credit issued by deposit-money banks to GDP, and call this "financial development." They find that financial development is negatively correlated with child labor. In particular, a move from the 25th to 75th percentile of financial development among low income countries is associated with a 17 percent decline in the economic activity rates of children 10-14.

The BR model and other theoretical writings on child labor and credit constraints tend to emphasize the inability of families to borrow against the future returns to child education. Testing for constraints on intergenerational transfers or long-term borrowing is generally not feasible in existing datasets. However, if households are not able to move resources over relatively short (and potentially measurable) time horizons, then it seems unlikely that they should be able to move resources over the long-term. Micro-studies of household responses to crop-shocks have attempted to look at credit constraints to see whether there is a correlation between household assets and responses to shocks. Unfortunately, isolating the credit channel in this way seems infeasible given the correlation between household assets and the value of child time in a setting when most children work at home.

An alternative approach is to consider household responses to anticipated changes in their economic environment. For example, Edmonds (2006a) examines the response of schooling and child labor to the timing of anticipated income in the context of the social pension program in South Africa. The end of apartheid in South Africa brought the extension of the white social pension program to black South Africans. The pensions are large (125 percent of median black per capita income in 1999), highly anticipated, and primarily determined by age in the elder black population. Edmonds compares child labor and schooling in families about to receive a fully anticipatable social pension income to child labor and schooling in families already receiving the income. The average rural South African child living with an elder that is not yet pension eligible spends 3 hours per day working. In the data, pension income to an elder male is associated with over an hour less work per day. These declines in hours worked occur simultaneously with increases in school attendance (to nearly 100 percent for rural boys). These changes in hours worked and schooling with male pension eligibility lead to levels of work and

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<sup>7</sup> BR show that these results for savings and bequests also hold under reciprocal altruism when children value the well-being of their parents.

schooling that are similar to what the data report for nearly eligible elder women. Hence, his results suggest a role for credit constraints, but only for elder men. Moreover, unlike the data above that tend to emphasize the economic contribution of children, the South African data suggest that an inability to afford schooling is the primary reason why children are not in school prior to receipt of anticipated income.

One interesting appendix to the empirical work on credit constraints and child labor is the theoretical paper by Rogers and Swinnerton (2004) who point out that with credit constraints and an agency problem, rising incomes can increase child labor. In their model, each child is altruistic toward his parent and the savings strategy of a very poor parent includes investing in her child's education in part to induce a voluntary repayment when the child grows up. To induce repayment, the poor parent realizes that her consumption decisions must be consistent with the child's preferences, and as a result she provides more education for her child than she would if not for the "child preference" constraint. As parental income rises, there comes a point when the parent can optimally circumvent the "child preference constraint" by doing her all of her saving directly, rather than in part through the child's education, so that the education meant to induce voluntary repayment stops. At this point, child labor goes up. The interesting dynamics between incomes and intergenerational transfers is a fertile area for further study.

*Does child labor respond to the return to schooling?*

The presence of credit constraints within a population does not exclude the possibility of the relative returns to education influencing child labor. The major challenge in isolating the returns to education as a causal influence on child labor is that it is very difficult to measure perceptions about the returns to education.

Typically, researchers rely on the assumption that the expected returns to education at the time child labor decisions are made depends on the current return to education or literacy. While likely imprecise, even this approximation is difficult to estimate for two reasons. First, it is difficult to separate variation in the returns to education from confounding factors influencing income in the local community. Hence, an apparent response to the returns to education may just reflect parental income differences. Second, it is often very difficult to measure the returns to education, because child labor is most prevalent in locations where wage work is rare. Most production occurs in family enterprises, and there is little specialization. Hence, it is extremely difficult to assign income to individuals in places where child labor tends to be most prevalent, and analysis based only on wage workers may suffer from severe selection bias that is likely to be correlated with child work status.

How does one identify returns to education in populations where few individuals work for wages? One option is to measure the returns to education data at some aggregate level. Chamarbagwala (2006) is one example. She observes that Indian children in regions with higher returns to education are more likely to attend school and less likely to work. In addition to the problems of confounding factors and selection mentioned above, an additional difficulty inherent in this aggregate approach is that estimates of the returns to education are essentially a common effect to the level of aggregation with a functional form assumption and the more aggregate the study is, the less variation researchers have to work with. Hence, Chamarbagwala is one of the few published studies using this approach.

A second option is to examine whether there are changes in the returns to education and schooling for a common factor rather than directly measuring the link between the two. Foster and Rosenzweig (1996) approach this by estimating a conditional profit function from the adoption of HYV rice in India and capturing the additional profit associated with more schooling in areas where HYV has diffused. They report changes in schooling which are consistent with improvements in the return to schooling (and school construction) by finding the same variables linked to increased schooling.

A related approach is to infer movements in returns to education through observing other behaviors that depend on the returns to education. For example, Edmonds, Pavcnik, and Topalova (2007) infer movements in returns to education in two ways. First, they compare differences in per capita expenditure by head's literacy or schooling completion. Second, they examine changes in adult employment by education status. They assume that adult labor supply is upward sloping and that expectations about the returns to education are based on differences in the wages of literate and illiterate populations with a given geographic area (the district in India in their case). They infer what must be occurring then to returns to education in the labor market by comparing changes in employment of the literate and illiterate populations.

A novel set of studies considers how the schooling activities of rural children are influenced by urban labor markets to which they could migrate. In addition to being a realistic description of how expectations of returns to education are formed, this approach minimizes the problem of a confounding between returns to education and adult income effects and is more apt to be measurable. Kochar (2004) for example finds that urban rates of return influence rural schooling in India, especially among landless who are most apt to migrate to urban areas. De Brauw and Giles (2005) observe that the education of rural migrants does not appear to be rewarded in the city in China. They make use of geographic and time variation in the implementation of national identity cards which make legal migration possible, and find that schooling enrollment declines with the opportunity to migrate. Of course, unlike the above studies that seek to isolate a returns to education effect, these two studies consider more the relative returns to schooling in the rural sector. While limited, it may not be possible to isolate returns to education from changes in labor market opportunities.

An alternative approach to studying the link between returns to schooling and child labor and schooling is to look at whether improvements in school quality affect child labor. Causal evidence on a link between school quality and child labor that would meet modern standards of evidence does not appear in the literature. However, descriptive studies such as those by Lloyd and co-authors (2003) suggest a connection, and evidence on the link between some measures of school quality such as pupil-teacher ratios and schooling attainment is well documented. For example, Case and Yogo (1999) use variation in school quality for blacks in apartheid South Africa to study the link between pupil-teacher ratio, the returns to schooling, and school attendance. Their findings are dramatic. A decline in the pupil-teacher ratio by 10 students is associated with a 2 percent increase in the return to education and an additional 0.6 years of completed schooling. Hence, while the problems with looking at the return to education are considerable, there is some suggestive evidence of a connection between returns to education and schooling which might also be reflected in child labor data provided that the marginal utility of income today is not the dominant causal factor in the decision to have a child work.

### *School costs and child labor*

Further, the relevant return to schooling is the return net of direct costs, and like with school quality, direct evidence on a link between schooling costs and child labor is rare. Several studies document an association between the mitigation of school costs and schooling (for example, Duflo et al 2006), and Foster and Rosenzweig (2004) argue that school construction accompanying the green revolution in India facilitated increased schooling and decreased child labor in both landed and landless households although they do not directly observe a measure of child labor in their data.

Slightly more direct evidence of a link between child labor and schooling costs also exists. Several studies find a link between measured schooling costs and child labor. In rural Pakistan, Hazarika and Bedi (2003) observe that children are more apt to work outside the household in communities where schooling costs are higher. Shafiq (2006b) observes that boys are more likely to work and less likely to attend school in Bangladesh in communities where schooling costs are higher. Edmonds, Pavcnik, and Topalova (2007) argue that the avoidance of schooling costs explains the child labor-schooling-poverty association observed in their study of rural India, and they find that the relative declines in schooling and increases in work associated with India's tariff reforms are smaller in areas where schooling is less expensive. Edmonds (2006a) study of credit constraints in South Africa documents some qualitative evidence suggesting that schooling costs are an important part of why there is a link between credit constraints and child labor and schooling. Kondylis and Manacorda (2006) study one dimension of schooling costs, travel time, in detail in rural Tanzania. They observe that children longer travel times induce children to specialize in either schooling without work or work without schooling. The interpretation of all of these studies is complicated by the fact that the source of variation in schooling costs is not well understood, and it is difficult to separate whether this reflects support of other siblings or the child's own schooling, however, as higher costs for one child likely imply higher costs for siblings in the same. Nevertheless, these studies provide some support for the idea that the relationship between child labor and schooling costs and quality is a fertile area for future research.

One important interpretation point often emphasized in the literature (e.g Shafiq 2006a, Das and Deb 2006) is that the relevant return on education for family decision-making is the present discounted value of the future return to education. Thus, differences in discount rates across households can lead to differences in the family's valuation of education or the marginal utility of income and thereby differences in child labor and schooling. Why might discount rates vary across households? Das and Deb model this explicitly as a function of the family's current consumption, the subject to which we now turn.

#### **4.4 Child labor and Poverty**

##### *The link between child labor and living standards*

Theoretically, there are many reasons why there might be a negative connection between family incomes and child labor. First, child labor may be a bad in parental preferences so that as incomes improve, the family chooses to have children work less. In fact, in the seminal child labor paper by Basu and Van (1998), they posit the "luxury axiom": children only work when the

family is unable to meet its basic needs. Beyond subsistence, the luxury axiom posits, families always opt to keep children out of work. In the model of section 1, the idea that work might be a bad is captured by families receiving positive utility from child leisure. The luxury axiom is just a particular characterization of preferences. Second, with diminishing marginal utility of income, the value of the marginal contribution of the child's income decreases. Note that an important part of the child's economic contribution to the family might be through not attending school if direct and indirect schooling costs are high. That said, the economic contribution of working children can be substantial. Psacharopoulos (1997) observes that income earned by working Bolivian children of age 13 amounted to 13 percent of total household income on average. Menon et al (2005) attempt to compute the value of child's own farm labor to largely subsistence farm households in rural Nepal. They estimate that children contribute roughly 11 percent of the value of total agriculture production in Nepal or about 9 percent of GDP.

Third, higher family incomes may facilitate the purchase of substitutes for child labor that lower the return to child labor within the household. For example, a washboard, fertilizer spreader, or a combine harvester may replace child labor within the home. In the model of section 1, this would be a downward shift in productivity in household work,  $F(-)$ , and would only reduce work when work outside the household is at a corner solution. Fourth, the child's productivity in other activities such as schooling might improve because the family might be able to afford better inputs to schooling such as nutrition, textbooks, or uniforms. In addition, market imperfections and other aspects of the family's economic environment (including discount rates) might be correlated with family economic status and also affect child labor supply.

The important question for policy is to what extent a family's standard of living is the dominant determinant of whether children work. Are returns to education or leisure sufficiently high or employment opportunities sufficiently unproductive that children can be expected to transition away from work as incomes improve without additional policy changes? If child labor is an outgrowth of poverty and nothing else, then it is difficult to make an argument for attention to child labor without attention to the factors that create a need for the child to work. On the other hand, if child labor is independent of the family's economic status and if it has long term consequences for child welfare, then there exists a much stronger case for policy attention specific to child labor. The answer to the question of living standard's role in child labor is obviously context specific and can be expected to vary both between and within countries as well as over time. It is not surprising that there are a wide variety of findings evident within the empirical literature.

### *The empirical evidence*

The cross-country data on living standards and child labor suggests a strong connection between economic status and child labor. Figure 10 plots the ILO's LABORSTA estimates of economic activity rates for children 10-14 against estimates of real GDP per capita (using purchasing power parity exchange rates) from the Penn World Tables 6. 1. Each country observation is pictured as a circle where the size of the circle represents the size of the country's population between ages 10 and 14. While child labor is pervasive in poor economies such as Ethiopia and Nepal, child labor is unusual in a country wealthier than Gabon with a GDP per capita of \$8,400. The curve in Figure 10 is from the regression of a country's economic activity rate for children on a third order polynomial in GDP per capita (to allow a non-linear

relationship). The regression curve shown here is weighted by the population of children aged 10-14 in each country, but the unweighted regression curve is nearly identical. With this specification, variation in GDP per capita explains 73 percent of the variation in the economic activity rates of children.

Countries differ in many ways that may be associated with child labor and GDP per capita. Hence, the relationship in Figure 10 cannot be interpreted as causal. Attempts to address the endogeneity of income as in Edmonds and Pavcnik (2006a) do little to affect the strong correlation between national income and economic activity rates of children.

Most within country studies of the link between income and child labor are cross-sectional. They specify a linear relationship between child labor and family income, and test the hypothesis that the marginal effect of family income on child labor on average is different from zero. In general, researchers that compare poor households to rich households at a single point in time in a country find mixed evidence of a link between poverty and child labor. Comparative studies implement the same empirical approach in multiple countries, and the different results observed between countries in comparative studies such as Bhalotra and Heady (Pakistan and Ghana, 2003), Ersado (Nepal, Peru, and Zimbabwe, 2005), Maitra and Ray (Peru, Pakistan, and Ghana, 2002), Psacharopoulos (Bolivia and Venezuela, 1997), and Ray (Pakistan and Peru, 2000) illustrate how varied the cross-sectional relationship between economic status and child labor can be.

An intrinsic problem in studies of the link between economic status and child labor is that poor households differ from rich households in many ways that might be associated with child labor. Disentangling these omitted factors from the underlying causal relationship is difficult. Despite the great challenge, there are two basic approaches researchers use to address the endogeneity of living standards. First, many studies address part of the problem by relating child labor to variation in income that excludes the child's income (Dammert 2005, Duryea and Arends-Kuenning 2003, Ray 2000). While this addresses a mechanical source of endogeneity, it does not deal with the joint nature of child time allocation and family living standards. The second approach focuses on the broader endogeneity problem and argues that certain factors affect family income without also affecting the time allocation of children except through family income. Examples include Bhalotra (2000), Bhalotra and Heady (2003), and Ersado (2005). Note that the assumptions required for identification are often quite strong in these studies, as almost anything that affects the family's economic environment should also influence the value of child time in one activity (schooling, work outside the home, market work in the home, domestic chores). Glewwe and Jacoby (2004) focus on education rather than child labor, but they emphasize the types of structural assumptions necessary to accept many of the common IV strategies.

Another approach to address the intrinsic differences that exist between poor and rich families is to track children in the same household (or cohort) over time. Of course, using panel data only replaces the problem of cross-sectional heterogeneity with the problem of explaining differential changes over time. That said, studies tracking families over time almost universally find large increases in child labor with substantive declines in family incomes. For example, in tracking children over a three-year period in rural Tanzania, Beegle et al. (2006) find that children tend to work when households experience unexpectedly poor harvest, and that children

stop working when households recover from the bad harvest. Duryea, Lam, and Levison (2007) find that children transition in and out of employment with adult unemployment spells in urban Brazil. Dammert (2006) observes that market work increases in coca growing states of Peru after coca production (and its associated income) shifts out of Peru for Columbia.

Beyond endogeneity, another methodological issue is important in the child labor - living standards literature. There are strong theoretical reasons to expect the relationship between child labor and families to be non-linear. In the Basu and Van (1998) model, children no longer work when families can meet their subsistence needs with adult earnings. Hence, variation in income below subsistence should have no effect on child labor, nor should variation in income above subsistence. It is only over the range of incomes that corresponds to the existing heterogeneity in perceived subsistence needs in which Basu and Van would expect to see changes in child labor that are correlated with improvement in living standards. Edmonds (2005) finds support for this idea directly with panel data collected during Vietnam's economic boom in the 1990s.

Figure 11 plots market work participation rates for children 6-15 in Vietnam in 1993 and 1998 against household per capita expenditures in 1993. The data for this figure comes from the 1993 and 1998 Vietnam Living Standards Survey where information on the activities of children is collected in over 3,000 rural households that are interviewed first in 1993 and again in 1998. The top curve in Figure 11, which compares households at different levels of per capita expenditure in 1993, suggests a strong negative correlation between household living standards and child labor. For households below the 1993 poverty line, participation of children in market work exceeds 30 percent. From 1993 to 1998, real expenditure per capita increased by more than 50 percent for the poorest 10 percent of the population. For Vietnam overall, the incidence of poverty declined 36 percent. The bottom curve in Figure 11 pictures the relationship between participation in market work in 1998 and household's per capita expenditure in 1993. Thus, for each point on the per capita expenditure distribution in 1993 (the x-axis), market work participation rates are pictured for the same households in 1993 and 1998. Participation rates drop substantially over time, with the largest declines in child labor occurring in households in the neighborhood of the poverty line in 1993.

Edmonds (2005) uses the market work - per capita expenditure relationship in 1993 to recover the implied distribution of subsistence levels across households. He then projects the changes in child labor that would be expected in the Basu and Van framework based on the observed improvements in per capita expenditures between 1993 and 1998. He finds that improvements in per capita expenditure and the implied distribution of subsistence levels across households can explain 80 percent of the decline in child labor that occurs in households whose expenditures improve enough to move out of poverty. The strong structure of the Basu and Van model is not the only model that could generate these findings (a simple Engel curve in preferences would as would variable discount rates that depend on living standards). Moreover, factors other than preferences can generate important non-linearity in the child labor - economic status relationship. For example, one can imagine non-linearity in the household production function that would lead to discrete changes in the value of child time within the household. A family might opt to change its production technology to replace the labor of a child, and this type of shift could generate results as in Edmonds if changes in household production techniques are correlated with exiting poverty. Nonetheless, non-linearity in the child labor - economic status

relationship appears very important, as does the correlation between improvements in living standards and declines in child labor.

*Can the effect of rising incomes differ from that of declining poverty?*

The empirical literature on child labor and living standards largely attempts to estimate whether there is a link, but it might serve policy more by considering why there is a link. Indeed, one suspects that a more nuanced view of the determinants and definition of child labor might resolve some of the apparent inconsistencies observed across cross-sectional studies. For example, in the Basu and Van model and in Edmonds' data, child labor declines rapidly in the neighborhood of the poverty line, but appears relatively income inelastic elsewhere. Hence, depending on the distribution of variation in income in a population, standard approaches may miss the importance of poverty in child labor decisions.

Moreover, depending on the definition of child labor and local economic conditions, it may be that child labor appears to increase with family incomes. Rising incomes might be associated with changes in the types of activities in which children participate. Edmonds and Pavcnik (2006b) for example find that growing trade inside Vietnam is associated with a rise in household specialization which in turn may explain some of the decline in work in the family farm and business that they observe in Edmonds and Pavcnik (2005b). Fafchamps and Wahba (2006) observe a positive correlation between household specialization and wage work in Nepal as well. Consequently, if child labor is defined as wage work, then it might appear to grow with rising incomes even if the total time spent working when one includes work within the household declines. This might explain the rise in wage employment among children with economic growth that Swaminathan (1998) documents in Gujarat, India or that Kambahampati and Rajan (2005) have observed across Indian states.

Moreover, in a setting where the lack of employment opportunities is relevant, child labor may actually increase with rising incomes if they are associated with expanding economic activity or increased employment opportunities for children within their households. This is obvious in the model of equation 1.1 as it should be clear that the shadow value of child time depends on the wages in the local market and the household's production opportunities. Several studies discussed in section 4.1 note a connection between market work participation and household assets. Bhalotra and Heady (2003) label the positive correlation between market work participation and household assets or employment opportunities in the household a "wealth paradox." Ganglmair (2005) shows that this "paradox" occurs in Ugandan data when one fails to control for variation in the employment opportunities open to children and when one only considers types of work directly engaged with the asset. Shafiq (2006b) points out that, while greater assets may lead children to report working more because of the availability of employment opportunities, the human capital ramifications of this are unclear. In his data from Bangladesh, children work more in the presence of productive assets, but they are also more likely to attend school.

In fact, several studies find a negative correlation between child wages and child employment and a positive correlation between child wages and schooling. This may be, because children are often substitutes for adults. Rising child wages imply higher adult wages, and child work appears more elastic with respect to adult income than child wages. The finding



in Edmonds and Pavcnik's (2005b) study of rice price changes in Vietnam is suggestive of this. Children are actively involved in rice cultivation, the returns to that cultivation increase, but market work declines. Wahba (2006) is more direct evidence. She finds in Egyptian data from 1988 that a 10 percent increase in the illiterate male market wage *lowers* the probability that a child engages in wage work by 22 percent for boys and 13 percent for girls.

In fact, the academic literature on how households respond to macroeconomic shocks tends to emphasize declining child labor with declining income. Thomas et al (2004) examine education responses to the Indonesian financial crisis. They find that poor households coped with the shock in part by reducing educational expenditures and educational enrollment. These declines in education were particularly large for younger children as households appeared to triage to protect the schooling of older children. Interestingly, Cameron (2000) notes that in Indonesia, declines in schooling do not appear to be accompanied by a rise in formal employment amongst children. This is consistent with Thomas et al's observation that young children were withheld from school to cope with the crisis. In fact, Schady (2004) suggests that as a result of the decline in employment options for children during Peru's 1988-1992 macroeconomic crisis, schooling attainment for affected cohorts has increased substantially. This discussion highlights the potential importance of labor demand related factors in child labor as discussed above in section 4.1.

Thus, even if poverty is a key reason children work, it is possible to find child labor rising with incomes. More attention to the reasons why there might be a link between family incomes and child labor can then be important in understanding how child labor will evolve, as countries grow richer.

#### *Economic shocks, credit constraints, poverty, and child labor*

Poor households are more apt to be credit constrained, because their poverty typically means they lack collateral with which to access credit and they often live in locations with poor credit institutions. In section 4.3, we have discussed how an inability to access credit can lead to higher levels of child labor than is privately efficient from the parent's perspective (Baland and Robinson 2000). The poor also are less likely to have access to formal insurance and more likely to face uninsured credit risks. Pouliot (2006) adds uncertainty to the Baland and Robinson model, showing that incomplete insurance markets can lead to inefficiently high levels of child labor even with functioning credit markets. Several studies document a relationship between child labor and schooling and an inability of the household to cope with income shocks that extend beyond any effect the potential for uncertainty has on schooling and work decisions.

The adult labor supply literature in developing countries tends to emphasize how individual labor supply is used to buffer income shocks. Kochar (1999) for example observes that Indian men increase their market hours of work in response to unanticipated (weather related) variation in crop profits and that this rise in labor supply explains reduced farm results that fail to find a significant effect of crop shocks on consumption. Does child labor supply also act to help cope with shocks? Using the same ICRISAT data as Kochar, Jacoby and Skoufias (1997) find that child labor and variation in school attendance is an important part of family self-insurance. They observe declines in schooling and increases in market work in households that experience both idiosyncratic and aggregate shocks. Moreover, they decompose variation in

income using rainfall data to estimate predictable seasonal variation in income and unpredictable variation in income. They find that small farm households adjust schooling and child labor in response to both predictable and unpredictable variation in income. Hence, they argue that small farms are not well insured ex-ante, and they do not have access to seasonal borrowing and lending. A similar study in Tanzania is Beegle, Dehejia, and Gatti (2006). They correlate self-reported crop shocks with changes in child labor. They observe a significant increase in market work in households that report experiencing a crop shock, and that this shock is larger among households with few assets. One important point in Jacoby and Skoufias is that, despite variation in child labor and schooling with both predictable and unpredictable income variation, the overall effect of this on schooling attainment appears very modest. de Janvry et al (2006) note that the conditional cash transfers in Mexico's Progresa program were sufficient to protect school enrollment in the presence of agricultural shocks, but conditional transfers appeared to have little effect on the rise in market work associated with the shocks. As they point out, this is to be expected if child labor supply is part of the household's self insurance strategy.

Insurance failures and child labor are not just interconnected in rural agrarian societies. Using a longitudinal employment survey from urban Brazil, Duryea, Lam, and Levison (2007) compare households in which the male head becomes unemployed during a four month period to household where the head is continuously employed. They find that an unemployment shock significantly increases the probability that a child enters the labor force (by as much as 60 percent) and decreases the probability the child attends school. They do not observe changes in labor supply in anticipation of shocks. Hence, they conclude that the child's labor supply in part compensates for the lack of unemployment insurance. Moreover, unlike the evidence in Jacoby and Skoufias, Duryea et al observe substantial declines in schooling completion with these adult unemployment spells. For girls in particular, it seems that the loss of employment for the male household head often triggers a complete and permanent withdrawal from school.

The idea that child labor is part of the household's self-insurance strategy seems broadly supported in the literature. Yang's (2006) study of how Philippine households with overseas members were affected by the 1997 Asian financial crisis is especially useful for framing how to think about the insurance component of child labor. Migrants from the Philippines work in dozens of countries. Thus, the financial crisis was broadly felt in the Philippines, but there is a great deal of heterogeneity in how families were impacted by the crisis depending on what country their migrant members lived. Yang observes that a 10 percent appreciation in the Philippine / foreign exchange rate is associated with a 6 percent increase in remittance flows. Schooling increases, schooling expenditures increase, and work declines in households that benefited from the appreciation. This behavior is similar to classical permanent income behavior. Schooling is an investment, and families seem to be "saving" transitory income through increased schooling and less work. Likewise, the temporary (as in Jacoby and Skoufias) or permanent (as in Duryea, Lam, and Levison) declines in schooling and increases in work may reflect similar permanent income behavior. It is striking that decisions about schooling and work might reflect how households manage transitory income. These findings illustrate the complex set of interactions and response to market imperfections and market failures that are important in understanding the determinants of child time allocation.

## 5. Policy

Given the diverse array of social and economic factors that affect child time allocation decisions, most development related policies can influence child labor. In discussing the determinants of child time allocation, we have already reviewed research from microcredit programs, public infrastructure and school construction projects, school quality interventions, and programs to mitigate schooling costs. Risk reduction and management policies, health interventions, and production technology projects all could have large impacts on child time allocation. However, in this section, we consider policies that aim to directly affect how children spend their time.

Empirical research on child labor related policies that meets modern scientific standards is extremely limited. This does not owe to a lack of policy attention. Policies towards child labor can be grouped loosely into six categories: information campaigns, income replacement programs, flexible schooling programs, reintegration projects, restrictions on employment, and conditional cash transfers. Only legislative restrictions and conditional cash transfers have a sizeable academic literature. This research is described below. First, we describe the other four categories of child labor policies.

### 5.1 Child Labor Specific Programs

An incredible variety of policies and programs have been directed towards working children, and there are a considerable number of policy documents that describe these activities. ILO (2006b) for example reviews several ILO affiliated programs. This section briefly discusses these types of programs. However, causal evidence that has survived peer review within economics does not appear to exist for any of these programs at the time of writing.

Information or awareness campaigns attempt to educate parents, employers, and children that children should not work or should attend school. The mechanisms for delivery of information vary as does the precise content of information conveyed. Mass media campaigns are frequent, employing radio or TV programs, news reports, or billboards. Community mobilization is also common where activists or community leaders reach out personally to individuals involved with working or out of school children. Another frequent community mobilization approach is to organize community events that draw attention to whatever type of activity is being targeted. In practice, information and awareness campaigns seem to be the most common type of policy directed at working children, and they seem to be motivated in part by assumptions that parents do not know what is best for their children.

Income replacement programs attempt to compensate families for the loss of the child's income in the event that the child stops working. Some programs aim to provide alternative sources of income to the household, often to the mother, by providing working capital and training. Implicit in these programs is that parents make decisions about whether children work and that the direct economic contribution of the child's work is a main reason why children work. Other programs, attempt to redirect children towards work activities that are more compatible with schooling. For example, one program in Brazil gave working children goats, because it is easy to care for goats outside of school hours. These child income replacement programs address the child's agency in work decisions in addition to economic motives for work. Often,

income replacements programs contain some conditionality component. For example, conditional cash transfers typically require that children attend school in order to receive transfers. Conditional cash transfers are the one type of child labor related program that have received rigorous evaluation, and we discuss these in detail in section 5.4.

Flexible schooling programs attempt to make schooling and work more compatible. That is, they typically do nothing to influence whether the child works, but instead aim to make schooling compatible with work. In this way, flexible schooling programs mitigate the costs of working. Many different types of programs are prevalent. School hours can be modified to accommodate work schedules. Academic calendars can be adjusted to reflect local conditions. Additional school shifts could be added during off-work times. Independent study modules might allow students to progress through schooling at their own pace. The assumptions behind these programs is that it is the timing of school that causes the conflict between work and school and that the actual time spent working is not enough in itself to impair human capital accumulation. Some flexible schooling programs also modify the curriculum to increase child interest in the program. Others, attempt to extend school hours so that children have activities during times in which they would normally work. The assumption behind these daycare like programs is that an important portion of child time spent working is just a way to occupy the child's time.

It is straightforward to imagine how programs designed to prevent children from starting to work can influence child schooling, but children who are already working need help to reenter school. Reintegration projects aim to help students return to regular school when students have missed school or lag behind in school because of work. Working children may be unfamiliar with the school environment, be poorly socialized for schooling, and may be significantly older than nonworking children with the same educational background. This makes returning working children to school a challenge. Most reintegration projects include some counseling directed at formerly working children, some remedial education to catch working children up to age in skills, and some bridge program to gradually introduce working children back into the classroom. This emphasis on how to get working children back into school is often neglected in economics discussions, because most theoretical models such as that of section 1 treat child time allocation as seamless between different sectors of work, schooling, and leisure.

Unfortunately, while these policies are pervasive, scientific evaluation of them is not. This absence of policy research severely limits our ability to design or improve existing policy. To be effective, scientific evaluation needs to be designed into a project from its inception, with control populations selected to be comparable, ideally through randomization. This is rare. It is telling that of the 35 final program evaluations included in ILO (2006b), none of the publicly available research has been peer reviewed by independent researchers. The typical objection to formal evaluation is expense, but the growing body of randomized evaluation of education related initiatives shows that careful, informative, and scientific evaluations can be conducted on modest budgets. Moreover, considerable money is being spent on evaluation. That research is just not being held to the standards of peer review that are commonplace in other sciences. Hopefully, future scientific research on how these projects influence time allocation can both improve the design of policy and build our understanding of the determinants of work.

## 5.2 Restrictions and Prohibitions on Employment

Prohibitions on employment typically target children in specific activities. Often prohibitions are intended as symbolic gestures, but at times, they may be enforced by industry groups or the governments. Programs of identification and removal of working children from specific activities have occurred throughout the world, many the result of international pressures. Anecdotes abound about what happens to children upon removal from targeted activities, but rigorous statistical research does not appear available at the time of writing. The case for targeting one activity at a time is that it is more manageable to implement and enforce. However, it can lead to some inconsistencies that lead some to question the motives for targeting a particular activity.

General prohibitions on work or restrictions on working conditions are also common in low income countries. ILO Convention C138 on the minimum age of employment has been ratified by 141 countries, and nearly every developing country has some formal restriction on the age of employment for certain types of employment. Similarly, most countries have compulsory school ages as well. Beyond these aggregate laws which are similar on paper to those adopted historically in the U.S. and other high income countries, many countries have committed to pursue aggressive policies to eliminate child labor from certain sectors and 156 countries have committed to identify and eliminate worst forms of child labor under C182. Yet, despite all this policy discussion, there does not appear to be any study of the effectiveness of restrictions on work that would meet current standards of evidence. Part of the reason for this might be that bans are often not passed with the intention of enforcement. Instead, the motivation for such legislation can be that it helps outreach and education programs change social views about working children. However, there is a theoretical case that can be made for the enforcement of general bans on child labor.

The Basu and Van (BV, 1998, section 3.4) model is the most common framework used to illustrate the conditions under which enforced prohibitions on child labor may be welfare improving. BV gives multiple equilibriums as such, it allows a role for policy in the elimination of child labor. One frequently advocated policy is an enforced prohibition on child labor. Consider the labor market equilibriums that arise when demand function is given by a line marked GG in Figure 12. In this instance, there are two possible stable equilibriums marked E1 and E2.<sup>8</sup> In E2, children work. The presence of child labor depresses wages and hence creates a need for children to work. The equilibrium E1 creates an opportunity for policy to affect child labor supply. If policy can prevent children from working, the equilibrium in the economy can switch to E1. That is, by preventing children from working (i.e. eliminating CD and BC segment of labor supply), market wages increase, eliminating the household's need to send children to work.

Obviously, the potential existence of multiple equilibriums is not a sufficient condition for policy aimed at prohibiting child labor. For example, when labor demand is represented by FF, there is little that a ban can do to curtail child labor without improving labor demand (i.e. shifting FF up). Similarly, policy aimed at curtailing the demand for child labor could have the unintended consequence of moving households from the equilibrium defined by mG2 to the

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<sup>8</sup> The middle intersection of supply and demand is an unstable equilibrium and is neglected in the present discussion.

equilibrium indicated by  $mF$  if policy lowers labor demand for child labor without the commensurate increase in demand for adult labor (Dessy and Pallage 2005 is a different model with the same result). This might occur for example if a consumer boycott drove an industry out of business in a community.<sup>9</sup> Figure 12 clarifies that whether any case can be made for policy actions against child labor depends on the characteristics of the local labor market.

Empirical evidence from contemporary low income countries on either the effectiveness of general bans or restrictions on employment is not available. The case that a ban could be welfare improving even for those with working children relies on the existence of multiple equilibria in the labor market. As discussed in section 3.4, this seems hard to imagine as a general proposition given that children are such a small share of total employment in general. While there is no evidence of the existence of multiple equilibria owing to child labor supply, Doran (2006) finds evidence in Mexico of a depressive effect of child labor on adult wages. The problem with identifying an effect of child labor on adult wages is that one needs something to affect child labor without separately impacting the adult labor market. Doran argues that the conditional cash transfer program in rural Mexico discussed below (Progresa) withdraws children from work without otherwise effecting local labor market characteristics (see the chapter on Progresa in this volume for related work). Doran observes that in randomly selected Progresa treatment communities less children work during the corn harvest and there is an associated increase in adult wages and adult employment relative to control communities. This raises the possibility that some of the foregone child labor earnings can be replaced by increasing adult wages although Doran does not observe full replacement.

The most compelling evidence on the effects of general prohibitions on child labor come from the historical experiences of developed countries. Several careful empirical studies exploit variation in the implementation of the child labor and compulsory schooling laws across the U.S. states to examine whether these legislative measures were the *driving* force behind the drastic declines in child labor at the turn of the last century and increases in secondary school enrollment and educational attainment between 1910 and 1940. Moehling (1999), for example, finds little evidence that minimum age laws for manufacturing employment implemented between 1880 and 1910 contributed to the decline in child labor during this period. She compares differences in participation rates of 13 and 14 year olds across states with and without a minimum working age of 14 before and after the enactment of laws. This difference-in-differences-in-differences strategy can distinguish the effects of the law from differential pre-existing trends in child labor across states with and without minimum age limits that could have influenced the implementation of the law. While the participation rates of children covered by the law declined in states that enacted the laws, boys in control groups experienced similar declines. The results for girls suggest that declines in child labor might be driven by endogenous child labor law implementation: states were more likely to implement the minimum age legislation if other labor demand and supply factors reduced their reliance on child labor prior to the reforms. Doepke and Zilibotti (2005) formalize this idea in a model with endogenous adoption of child labor laws.

While the overall contribution of child labor laws to child labor declines may have been small in the U.S., there appears to have been some marginal contribution. A number of studies

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<sup>9</sup> See Davies (2004) for a theory on the consumer boycotts of products that are not child labor-free and why firms might select to produce their product child-free when their competitors do not do so.

have emphasized this. For example, Lleras-Muney (2002) documents an association between schooling completion rates and increases in the age at which children can apply for a work permit or reductions in the school entrance age in the U.S. in the early twentieth century. She finds some evidence of an effect of school continuation laws among white males but no other demographic group. Manacorda (2006) uses this variation in education owing to work permit ages to look at spillovers to siblings from child labor supply, and a number of studies have used this variation in educational attainment to evaluate the returns to education (Acemoglu and Angrist 1999, Oreopoulos, Page, and Stevens 2006). Overall, however, Goldin and Katz (2003) emphasize that all these legislative measures combined can explain at most 5 percent of the increase in high school enrollment and subsequent educational attainment between 1910 and 1939.

### 5.3 Trade Sanctions and Labor Standards

Popular discontent in developed economies about child labor in developing countries have lead to numerous calls for harmonized labor standards, trade sanctions against countries with high levels of child labor, and consumer boycotts of products made with child labor. While empirical evidence directly on any of these issues is non-existent, it is worth reviewing the issues raised in the theoretical literature. More rigorous surveys of the theoretical work in this area are in Maskus (1997), Basu (1999), and Brown (2001).

Calls for harmonized labor standards typically envision a regime where some international arbitrator would oversee adherence to certain core labor standards. One common argument is to incorporate labor standards into the WTO. Either the WTO or ILO would monitor compliance with these standards, and violators would be punished via trade sanctions.<sup>10</sup> In fact, the idea of core labor standards is already enshrined in the ILO, and the abolition of child labor is one of the ILO's core four labor standards that many argued should be followed independent of level of development. Moreover, harmonization is argued to be necessary to avoid a race to the bottom, where governments lower their standards to attract business and gain competitive advantage. In fact, one can theoretically show that coordinated bans on child labor *might* be more effective in reducing child labor than a national ban when capital can easily move across countries (Basu 1999), but one cannot show that this outcome is necessarily the case.

Others have suggested the use of unilateral trade sanctions by the rich countries as a stick to fight child labor. Such policies have often been debated in the U.S. For example, the Child Labor Deterrence Act (the Harkin Bill) aimed to prohibit imports of products into the U.S. that are manufactured by child labor. While this legislation has yet to pass, the Sander's Amendment to the 1930 Tariff Act passed in 1997. It prohibits imports of goods produced by forced or indentured child labor. The 2000 Trade and Development Act restricts eligibility for trade benefits to countries that the Secretary of Labor certifies as showing progress to eliminate the worst forms of child labor.

Consumer boycotts of products produced by child labor have become popular in rich countries. Consumers who do not wish to consume goods produced by child labor can do so by

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<sup>10</sup>Abolition of child labor is one of the ILO's four core labor standards that some view should be respected by all nations regardless of their level of economic development. Discussion of international labor standards is beyond the scope of this paper and is covered in Maskus (1997), Basu (1999), and Brown (2001).

purchasing products labeled as “child labor free” at a premium. Visible examples of such policies include RUGMARK-approved hand knotted rugs and “FIFA approved” soccer balls. Davies (2004) considers consumer boycotts in the context of a model of Bertrand competition with product differentiation. The threat of boycott allows for the creation of a profitable niche for adult-labor firms which in turn implies the creation of an analogous niche for child-labor firms. Moreover, he shows that even in the case of monopoly, a monopolist can segment the market by offering different product lines and then price-discriminate to increase profits. It is very difficult to show that this sort of product line specialization will be welfare improving for children. Basu and Zarghamee (2005) think about product boycotts with a focus on labor supply rather than demand. They emphasize that when wages are set locally, a product boycott can depress child wages. When children work only to help families meet subsistence needs, a decline in child wages can cause more children to need to work. Boycotts can increase child labor. Brown (2006) argues that donation labels where monitoring agencies denote some fraction of the purchase price to child welfare would be a more efficient way to reduce child labor. That said, empirical scientific evidence on the impact of boycotts on children is entirely absent.

The potential for unintended consequence is not limited to consumer boycotts. In general, it is not clear what types of policies these sanctions, threats, or boycotts are trying to affect, and it is hard to distinguish whether they reflect a genuine interest in the wellbeing of children in poor countries or are forms of hidden protectionism with all of these policies. When policies aim to restrict the employment options open to children, they can in turn have a depressive effect on child wages. If bans are not completely successful in eliminating or affecting enforced policies to prevent child labor, they may make child labor worse in two ways. More children may need to work to compensate for lost income, or children may be reallocated to sectors where monitoring is more difficult (see Basu 2005 for a formal discussion). It is not obvious that children are better off working in non-export sectors or underground. Scientific evidence on what happens to children displaced from export sectors is essentially nonexistent even in the most publicized prohibitions on the employment of children owing to the threat of sanctions involving Bangladeshi Garment industry and Pakistani soccer balls (See Elliott and Freeman 2003 for a description of both cases, pp. 112-115). In the case of Bangladesh, some suggest that most displaced child laborers went to work for lower wages in garment factories that did not produce for export while others describe children displaced into prostitution and stone crushing. However, it is unclear on what scale these diversions occur and whether they might be offset by improvements in other children's lives.

#### **5.4 Conditional Cash Transfers**

A number of countries have adopted policies designed to discourage child labor and increase schooling by lowering the cost of schooling via educational subsidies. Examples include PETI and Bolsa Escola in Brazil, the Mid-day meals program in India, and the Progreso program in Mexico. The idea of these programs is to condition transfers on household's taking certain desirable actions such as attending school. Consequently, they both lower the relative costs of schooling while raising family incomes. PETI appears to be the only conditional cash transfer program at present that explicitly targets working children, and it is novel in that it requires after school activities for children as a way of mitigating the number of children who



work and attend school. Most other conditional cash transfers only affect work as a by product of the cash transfers or as a result of the schooling requirement embedded in the program.

The Progresa program is particularly important, because it embedded scientific evaluation into the design of the program at the start. Consequently, it is the most researched of the conditional cash transfer program, and it is the most emulated. Schooling incentives in Progresa increase with the age of the child in order to compensate the household for the older child's greater opportunity cost of schooling. In addition, at secondary school ages, girls receive larger cash payments for attending school than do boys. Because of the conditionality of the program, it is not possible to separate the effects of changing household income from changes in schooling costs. Nevertheless, the evaluation data on Progresa is extremely encouraging. Schultz (2004) finds a significant reduction in wage and market work associated with eligibility for Progresa. Skoufias and Parker (2001) also document declines in domestic work for girls. Similar findings have been found in other countries as well. Schady and Araujo (2006) for example document declines in market work in Ecuador's program. Interestingly, grants in Ecuador's cash transfer program were not conditioned on schooling, but it appears that a significant number of recipients believed them to be.

The advantage of this type of positive program that indirectly discourages child labor through increasing schooling is that it also addresses the agency problems, credit market imperfections, and difficulty in monitoring most forms of child labor that may interfere with the efficacy of other child labor related interventions such as child labor bans, compulsory schooling laws, etc. Of course, the effect of these schooling incentives on child labor may be small relative to their effects on schooling, as Ravallion and Wodon (2000) found in their evaluation of Bangladesh's Food for Education program which pays students in rice for attending school.

It is also worth emphasizing that the idea that conditional cash transfer are in some (imprecise) way the optimal policy tool to combat child labor or encourage schooling is largely without formal justification. Moreover, it assumes that it is worthwhile to encourage schooling. That is, it presumes the availability of quality schools that are advantageous to the child relative to work. This point is emphasized in Jafarey and Lahiri (2005) who point out that improvement in education quality may be more effective relative to (unconditional) cash or in-kind transfers when credit markets operate. Conditional cash transfer programs are discussed at length in other chapters of this handbook.

## **6. Conclusion**

The recent boom in empirical work on child labor has substantially improved our understanding of why children work and what the consequences of that work might be. This survey aims to assess what we currently know about child labor and to highlight what important questions still require attention.

Child labor research needs to carefully define exactly what measures of time allocation are being considered. Studies that consider too narrow a scope of activities are apt to generate misleading conclusions. Children are active in a wide variety of tasks and appear to substitute between them easily. Thus, if a child is observed working less in one task (like wage work), one cannot assume that she is working less. Moreover, though wage work appears less likely to be

associated with simultaneous schooling, differences in schooling associated with variation in hours worked are much greater than those associated with location of work. Work is typically classified as market work or domestic work. Domestic work (often labeled "chores") is too often ignored in child time allocation studies. For a given number of hours worked, domestic work appears as likely as work in the farm or family business to trade off with school. Hence, studies of child labor need to consider as wide a range of activities as the data permit. There is considerable scope for learning about total labor supply or schooling changes by looking at changes in participation in various disaggregate activities.

Policy interest in child labor in today's rich countries arose during the late 19th century because of what Zelizer (1994) terms the "sacralization" of children's lives. She writes: "The term sacralization is used in the sense of objects being invested with sentimental or religious meaning" (p. 11). This view is behind much of policy's and the public's interest in child labor in developing countries today. This issue arises within economics because of concern about whether child labor is driven by agency problems – do parents fully consider the tradeoffs and costs of work when sending their children to work? However, despite some suggestive evidence, the primacy of agency problems in determining child labor supply has yet to be established.

Instead, most contemporary research in economics on child labor is interested because of the impact of work on human capital accumulation. There are a finite number of hours in a day, so at some margin, there must be a tradeoff between work and schooling. However, work and schooling are simultaneous outcomes of a single decision-making process. Identifying a causal relationship between the two seems likely to be an uninformative exercise. Moreover, work is not the residual claimant on child time outside of school, and the incidence of children who neither work nor attend school appears highest where schooling is the lowest. Consequently, it is somewhat problematic to motivate interest in child labor out of a concern for schooling. Studies of schooling should consider child labor supply in attempts to understand schooling variation, but the existing evidence is insufficient to motivate studying of child labor alone without considering schooling if human capital is the researcher's only concern. Researchers have considered several other consequences of child labor that might go beyond the child's time constraint and agency problems such as whether there are health consequences, externalities, effects on attitudes and values, occupation choice, fertility, or local labor markets. Much of this work is in its infancy.

The interconnection of child labor and poverty seems intuitive, but evidence has been more difficult to establish. This is because the assertion that child labor stems from poverty is often taken to imply that the only reason children work is because of high marginal utility of income. The data are inconsistent with this extreme view in general.

In fact, a more general description of the child labor problem is that the child works when the utility from working today is greater than the utility associated with not working. This raises several issues that the literature has considered about why children work. Perhaps the most important issue is the least researched: who makes child labor decisions – that is, whose marginal utility matters?

There is some evidence that child time allocation is influenced by the net return to schooling. While estimating the return to schooling is a challenge, there is suggestive evidence

that it influence child time allocation. Several studies document a correlation between the employment opportunities open to children inside and outside their household and child time allocation. Hence, there should be situations when work is the most efficient use of child time, and there is nothing in the literature which precludes this.

The fact that work can be optimal does not exclude the possibility that child labor's prevalence owes less to its efficiency but more to the family's need for the child's contribution to the household. There appears to be a fairly broad consensus that credit constraints force families to make child labor decisions without fully considering future returns to education, and several studies document that declining poverty is associated with rapid declines in the fraction of children who are working, especially in market work. For this to be true, there needs to be both credit constraints among the very poor and substantive changes in the marginal utility of the child's contribution as the family exits poverty. However, while transitioning out of poverty may be associated with declining economic activity levels, higher income households are apt to have more employment opportunities both outside and inside the household. This creates a difficult econometric problem for researchers if both labor supply and labor demand change in opposite ways with rising income. A failure to understand this has caused many to assert that there is little link between poverty and child labor. Fortunately, as research progresses, there has been increasing attention to all of the different factors that can influence child labor.

While the quantity and quality of research on child labor has been increasing dramatically in recent years, there are several omissions in the literature that need to be resolved (beyond the agency issues we have already mentioned). Policy appears to be largely operating in a vacuum from research. Namely, rhetoric is increasingly directed against "worst forms of child labor," but I am not aware of any current empirical work on why children select into worst forms that has survived peer review in a contemporary mainstream economics journal. Moreover, outside of conditional cash transfer programs, policies targeted at these worst forms and more common forms of child labor are not being evaluated in a scientific way as far as I can find. This is unfortunate. Not only could more effective policies be designed but fundamental questions about why children work could be answered in the process. Hopefully, future work on child labor will aim to combine rigorous research on these unanswered questions with formal evaluation of child labor policy.

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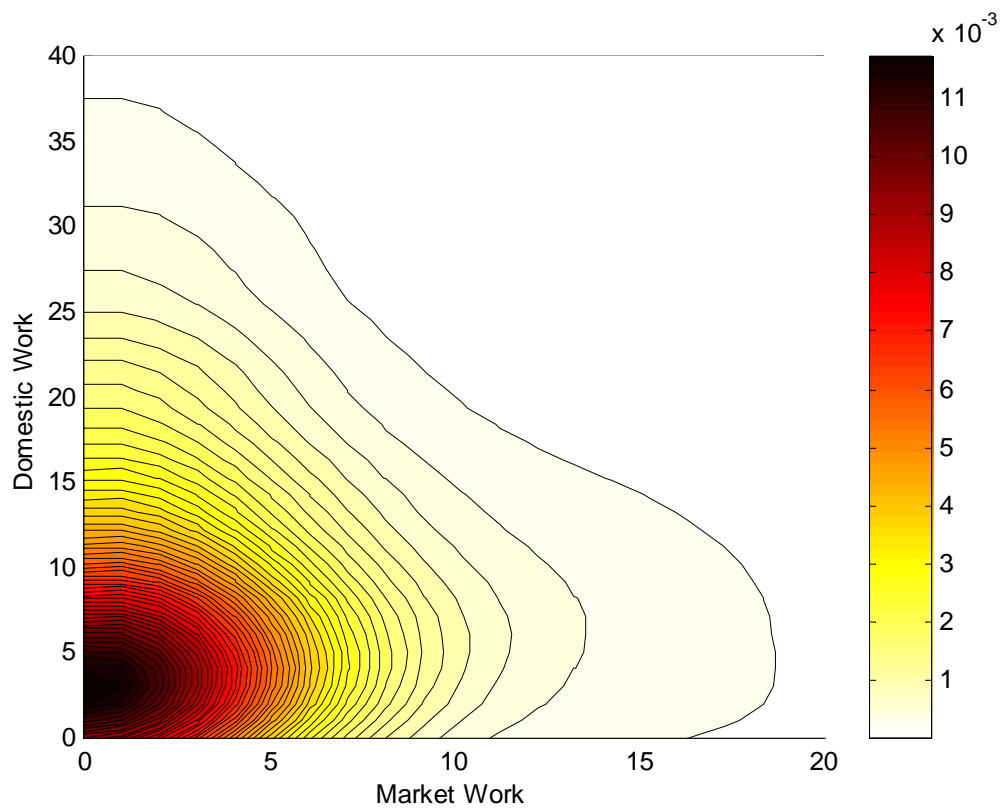
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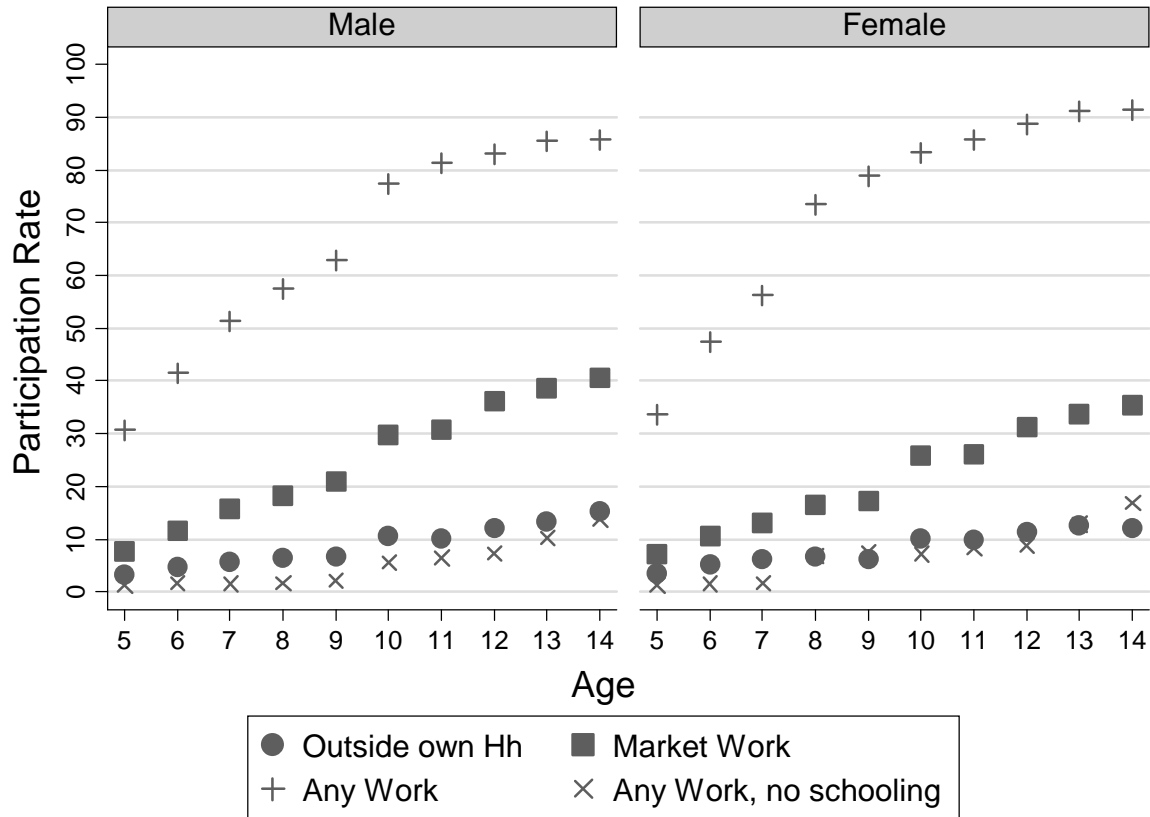
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**Figure 1: Joint Density of Hours Worked in Domestic and Market Work for Children 10-14**



Source: author's calculation from MICS data. Joint density estimates use a bivariate normal kernel with bandwidth chosen following Silverman (1986, page 20). Each child in the MICS countries is weighted to reflect the number of individuals they represent. Hence, the picture is representative for the pooled populations of the MICS countries.

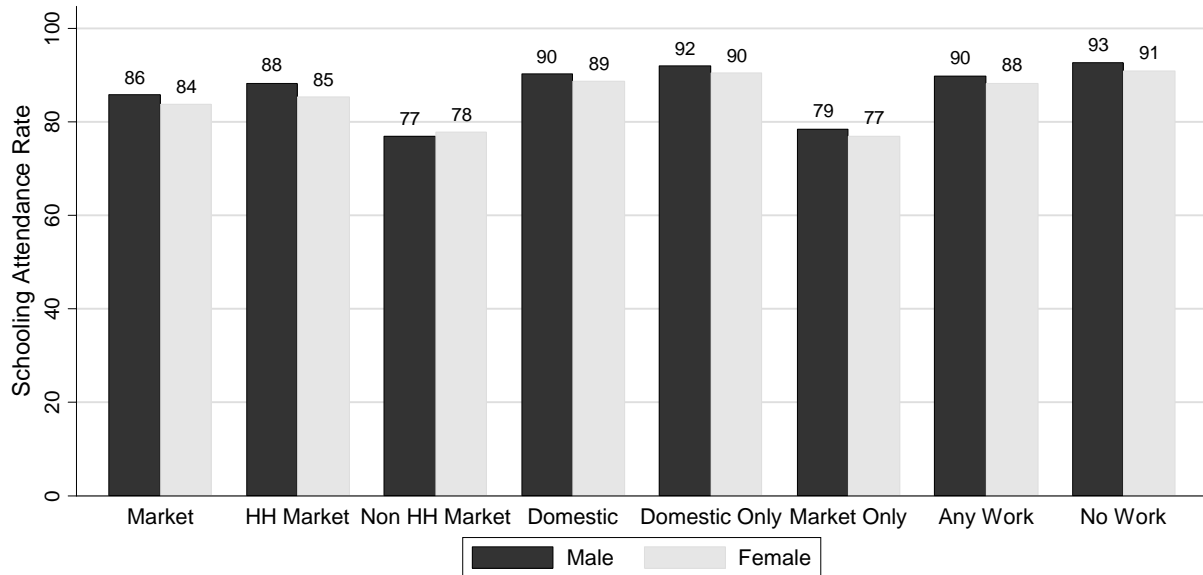
**Figure 2: Participation rates by Age, Gender, and Type of Work**



Source: author's calculations from the pooled MICS data. Each child in the MICS countries is weighted to reflect the number of individuals they represent. Hence, the picture is representative for the pooled populations of the MICS countries.

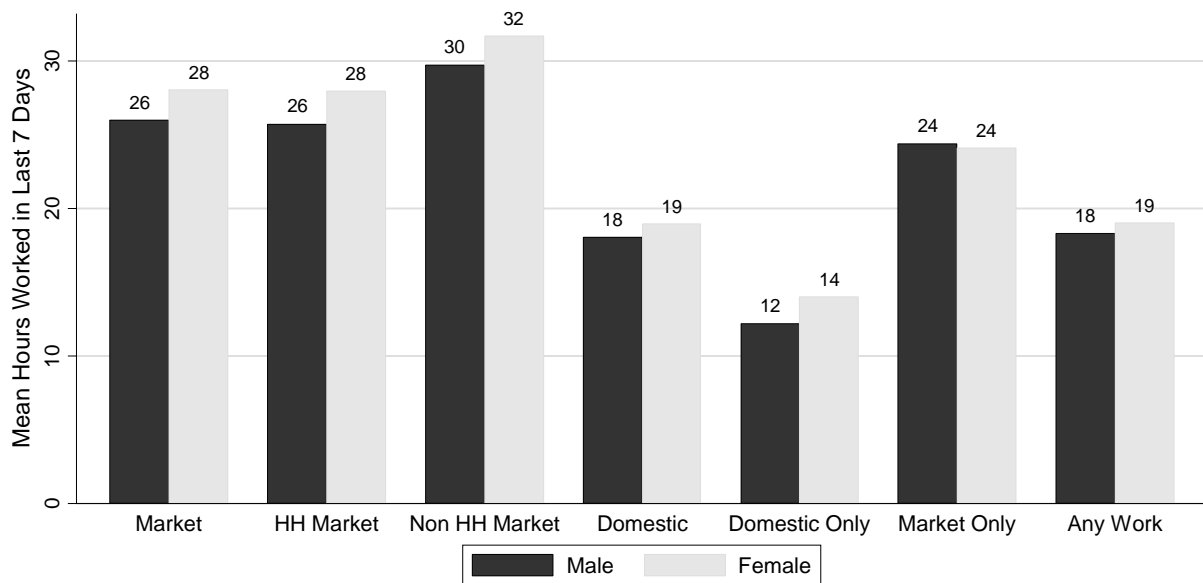


**Figure 3: School Attendance Rates (in last year) by Category of Work and Gender, Children 10-14**



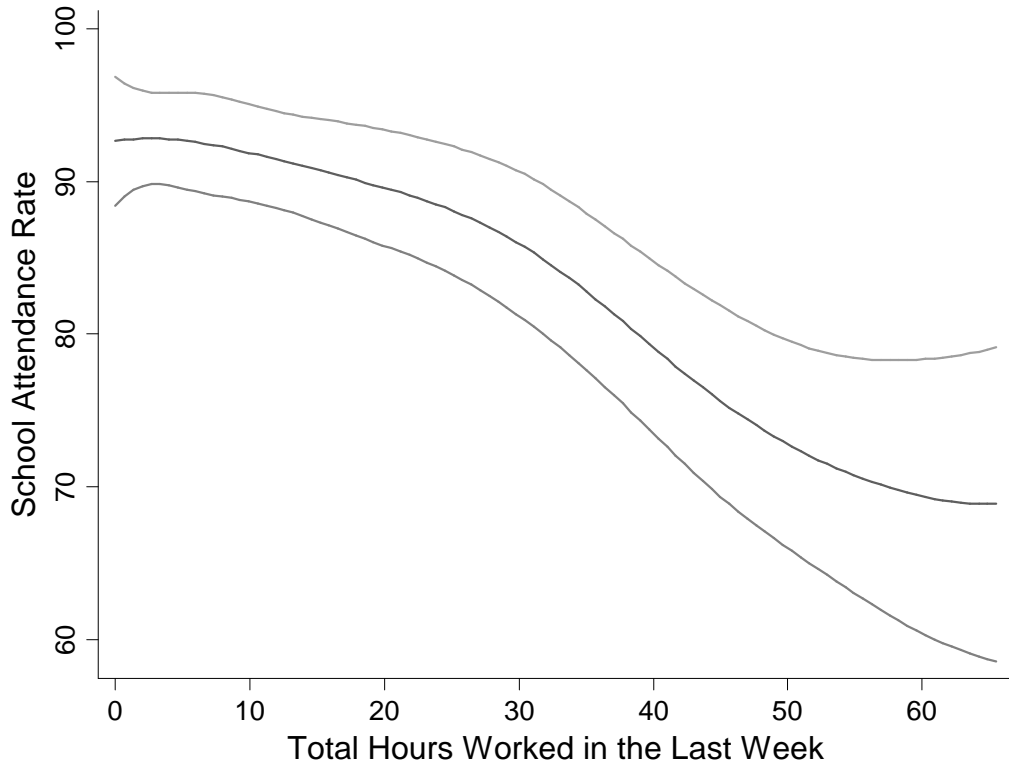
Source: author's calculations from the pooled MICS data. Each child in the MICS countries is weighted to reflect the number of individuals they represent. Hence, the picture is representative for the pooled populations of the MICS countries.

**Figure 4: Hours Worked in the Last Week by Type of Activity and Gender, Children 10-14**



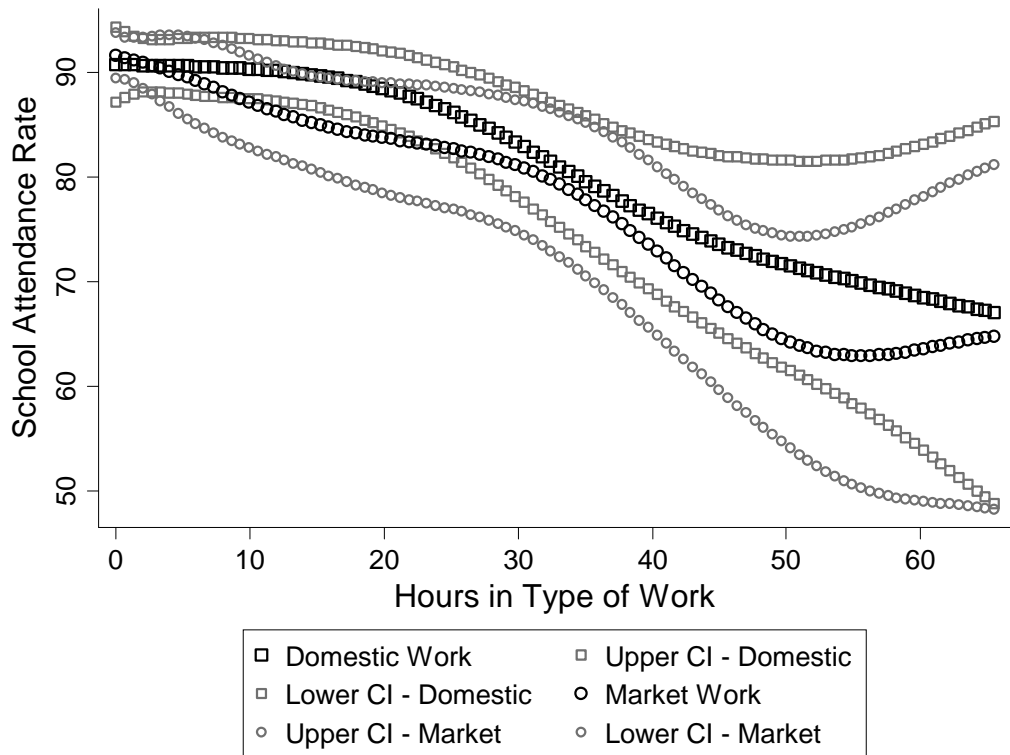
Source: author's calculations from the pooled MICS data. Each child in the MICS countries is weighted to reflect the number of individuals they represent. Hence, the picture is representative for the pooled populations of the MICS countries.

**Figure 5: School Attendance and Total Hours Worked, Children 10-14**



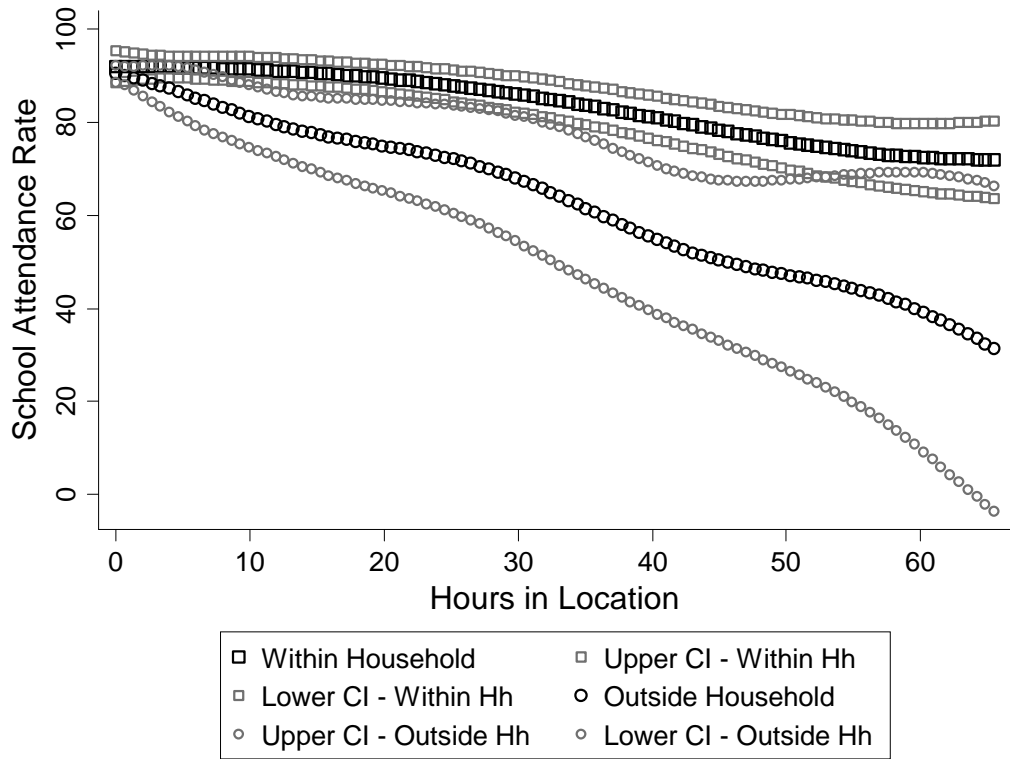
Source: author's calculations from the pooled MICS data. Each child in the MICS countries is weighted to reflect the number of individuals they represent. Hence, the picture is representative for the pooled populations of the MICS countries. The pictured curve is from a nonparametric regression: an indicator for whether a child attends school is regressed on total hours, total hours squared, and a series of the form  $\sin(j \cdot \text{total hours})$  and  $\cos(j \cdot \text{total hours})$   $j=1,2,3$  where total hours is transformed to range between 0 and  $2 \cdot \pi$ . Fitted values ( $\cdot 100$ ) and the 95 percent confidence interval are pictured. Only fitted values between 0 and 2.5 standard deviations above the mean are pictured.

**Figure 6: School Attendance and Hours Worked in Market and Domestic Work, Children 10-14**



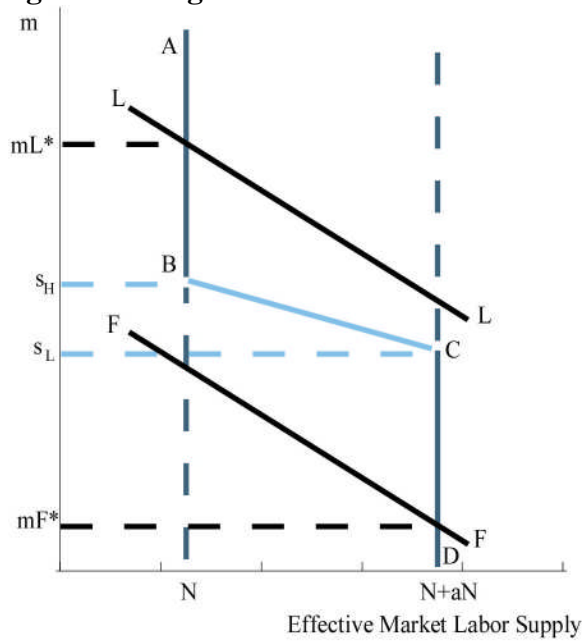
Source: author's calculations from the pooled MICS data. Each child in the MICS countries is weighted to reflect the number of individuals they represent. Hence, the curves are representative for the pooled populations of the MICS countries. The pictured curves are from nonparametric regressions: an indicator for whether a child attends school is regressed on total hours worked in domestic work (squares) or market work (circles), total hours squared, and a series of the form  $\sin(j \cdot \text{total hours})$  and  $\cos(j \cdot \text{total hours})$   $j=1,2,3$  where total hours worked in the location is transformed to range between 0 and  $2 \cdot \pi$ . Fitted values ( $\cdot 100$ ) and the 95 percent confidence interval are pictured..

**Figure 7: School Attendance and Hours Worked Inside and Outside of the Household, Children 10-14**

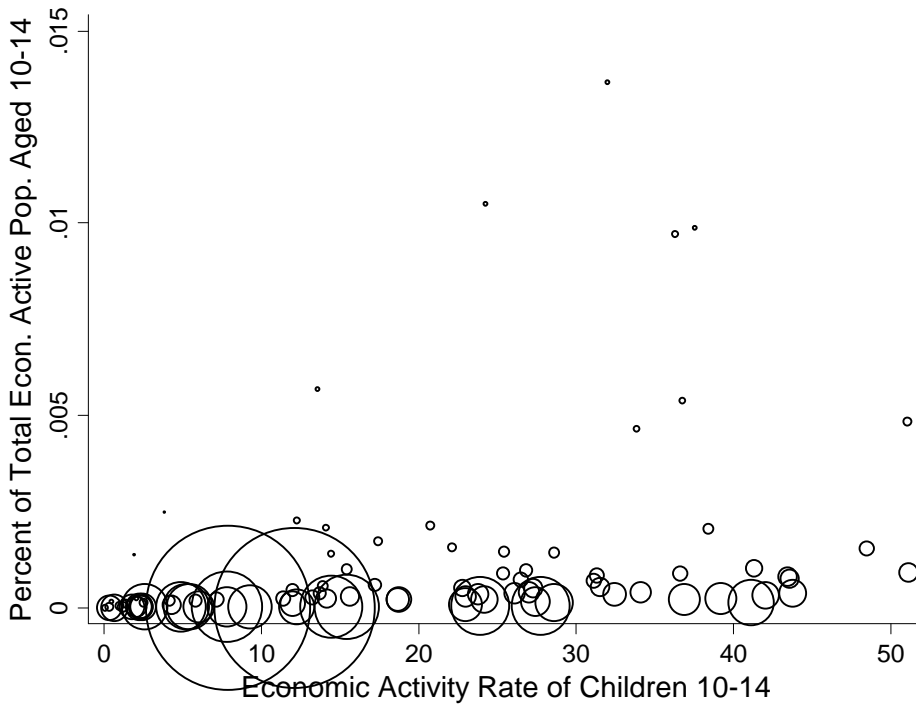


Source: author's calculations from the pooled MICS data. Each child in the MICS countries is weighted to reflect the number of individuals they represent. Hence, the curves are representative for the pooled populations of the MICS countries. The pictured curves are from nonparametric regressions: an indicator for whether a child attends school is regressed on total hours worked within the household (squares) or outside the household (circles), total hours squared, and a series of the form  $\sin(j \cdot \text{total hours})$  and  $\cos(j \cdot \text{total hours})$   $j=1,2,3$  where total hours worked in the location is transformed to range between 0 and  $2 \cdot \pi$ . Fitted values ( $\cdot 100$ ) and the 95 percent confidence interval are pictured.

**Figure 8: Wage Determination and Market Equilibrium for Child Labor**



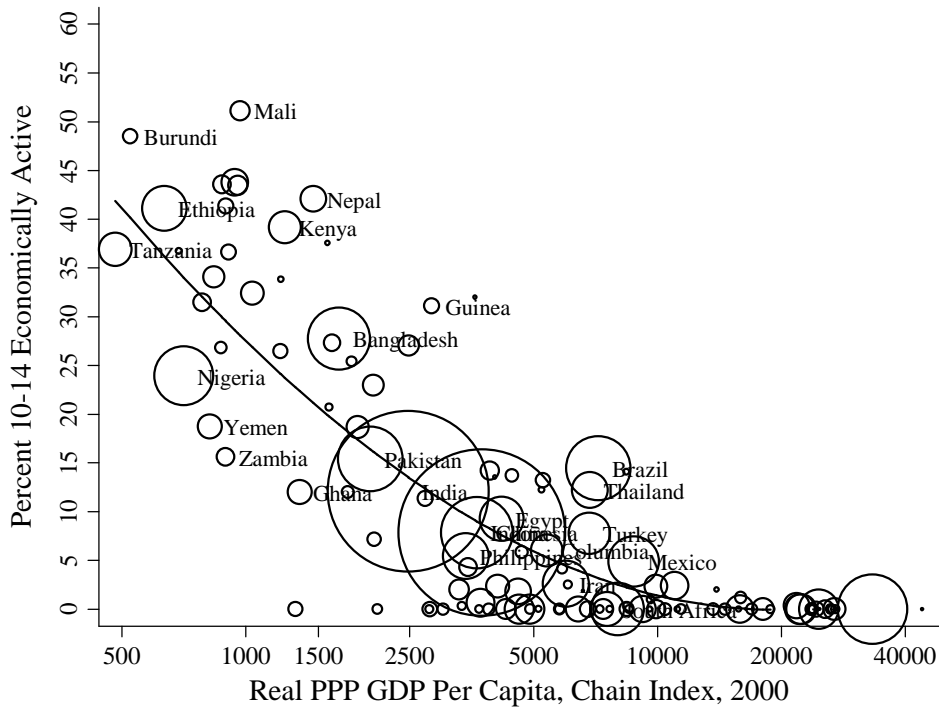
**Figure 9: Children's Share of Employment and the Economic Activity of Children**



Note: 1 = 1 percent.

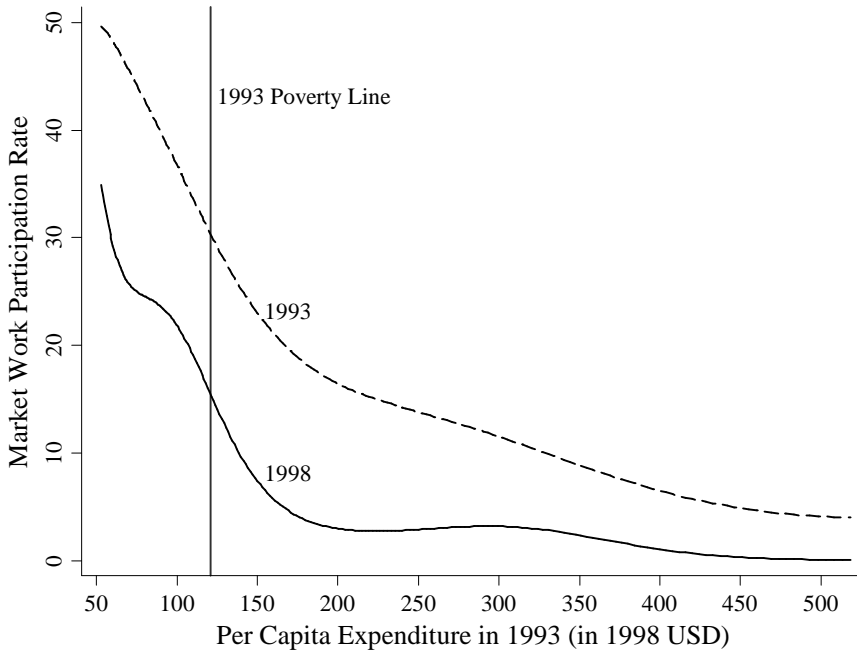
Source: Economic Activity for 2000 from LABORSTA (<http://laborsta.ilo.org>) and Population aged 10-14 weights (circle size) from UNStat.

**Figure 10: The Relationship between Economic Status and Economic Activity, 2000**



Source: Economic Activity for 2000 from LABORSTA (<http://laborsta.ilo.org>), GDP per capita from Penn World Tables 6.1, and Population aged 10-14 weights from UNStat.

**Figure 11: Living Standard Improvements and Market Work among Children 6-15 in Vietnam in the 1990s**



Source: General Statistical Office (1994, 1999): Vietnam Living Standards Survey, Rural Panel, 1993 & 1998



**Table 1: Commonly used terms**

<b>Class</b>	<b>Term</b>	<b>Definition</b>
<i>SNA Economic Activity</i>		
	Economically active	Participates in the production of economic goods and services or is unemployed and seeking such employment
	Employed	Economically active, excluding the unemployed, but including those temporarily out of work with a formal connection to a job.
	Economic Work	Economically active, excluding the unemployed and those temporarily out of work
	Market oriented economic work	Economically active in in the production of goods or services for the market or barter
	Wage Work	Receives cash or in-kind payments for economic work
	Non-market economic work	Economically active in the production of goods or services for own consumption Subcategories: Own account production of goods and services Own account construction and substantial repair services by owners of dwellings Own account collection and gathering activities
	Family Work	Economic work in own or family business or farm
	Market Work	Economic Work Subcategories: Inside household Outside household (sometimes separated into paid and unpaid)
<i>Non-SNA Activities</i>		
	Non-economic work	Participates in productive activities that are outside of the SNA definition of economic activity Alternatives: Non-economic activity, non-market household activity, non-market household production
	Community service and volunteer work	Non-economic work provided outside of own household
	Domestic Chores	Provides services provided to own family members Alternatives: Household chores, housework (sometimes excludes shopping) Subcategories: Child and Elder Care Cooking Cleaning Small repairs Shopping for household goods and services
	Domestic Work	Non-economic work excluding community service and volunteer work

The designation of an activity as SNA is based on its classification in the 1993 U.N. System of National Accounts. See Guarcello et al (2005) for additional discussion. See text for definition of economic goods and services.



**Table 2: Number of Children by women who gave birth in the last 15 years**

Country	Total births	# Dead	# Absent
Albania	2.06	0.06	0.01
Angola	3.26	0.77	0.29
Azerbaijan	2.44	0.25	0.01
Burundi	3.16	0.54	0.09
Cameron	2.82	0.39	0.36
CAR	3.38	0.61	0.39
Chad	3.46	0.65	0.27
Comores	3.35	0.22	0.23
DR Congo	3.12	0.56	0.22
Gambia	3.24	0.48	0.48
Guinea Bissau	3.06	0.64	0.46
Guyana	2.62	0.20	0.14
Kenya	2.83	0.25	0.21
Lesotho	2.26	0.23	0.25
Madagascar	2.76	0.36	0.26
Niger	3.35	0.79	0.33
Saotome	2.57	0.30	0.25
Sierraleone	3.33	0.93	0.65
Swaziland	2.46	0.21	0.47
Tajikistan	3.01	0.36	0.02
Uzbekistan	2.52	0.17	0.02
Vietnam	2.24	0.10	0.02

source: Author's calculation from the 2000 MICS microdata:

<http://www.childinfo.org/MICS2/MICSDataSet.htm>.

**Table 3: Missing Children 6-14 in Selected Panel Data**

Country	Nepal		Vietnam	
Round 1	1996		1993	
Round 2	2001		1998	
Gender	Boys	Girls	Boys	Girls
# Children in household in R1 that should be 6-14 in R2	704	675	2,515	2,410
# Present	546	503	2,354	2,241
Why Missing? Counts				
Dead	5	19	19	13
Married or Household Split	83	131	130	142
Work	38	5	1	4
Schooling	24	12	5	6

Source: Author's calculations from the Nepal Living Standards Surveys (Central Bureau of Statistics 1998 & 2005) and the Vietnam Living Standards Surveys (General Statistical Office 1994 & 1999).

**Table 4: Participation Rates in Various Activities by Country for children 5-14**

	Market Work				Domestic Work	Any Work, No Work,		
	Schooling	Any	Inside Hh	Outside Hh		Any Work	No School	No School
Sampled Countries	89.2	22.7	18.2	8.4	64.6	68.0	6.4	4.4
Albania	54.7	31.3	29.5	3.5	56.1	62.7	32.6	12.7
Angola	93.2	25.7	20.4	8.8	77.0	78.2	5.9	1.0
Azerbaijan	99.1	8.6	4.0	5.3	61.4	63.3	0.7	0.2
Burundi	88.1	31.2	27.6	6.9	84.3	87.3	11.2	0.7
Cameron	94.5	55.0	42.7	30.8	81.1	85.2	5.0	0.4
Central African Republic	85.5	62.2	50.3	37.3	85.0	88.9	13.6	0.8
Chad	95.0	62.6	55.2	26.7	82.5	88.3	4.6	0.3
Comores	77.1	38.1	32.2	16.3	61.1	66.8	15.9	6.3
Cote d'Ivoire	93.2	37.7	35.3	6.2	68.6	76.7	5.5	1.2
Democratic Republic of the Congo	53.5	19.2	12.9	10.4	50.3	52.3	17.4	29.1
Equatorial Guinea	94.9	33.7	31.0	5.4	84.9	85.8	3.1	0.6
Gambia	93.1	25.1	20.6	6.1	49.4	57.6	4.6	2.3
Guinea-Bissau	93.0	65.5	62.4	15.3	77.3	87.2	6.3	0.6
Guyana	97.4	26.3	15.9	14.7	72.8	75.2	2.3	0.3
Kenya	95.9	2.8	1.0	2.2	66.3	66.8	2.8	1.0
Laos	93.1	31.1	29.3	3.9	69.7	71.3	6.3	0.5
Lesotho	96.6	20.4	17.1	6.1	70.2	72.7	2.6	0.8
Madagascar	88.9	12.0	8.8	3.8	20.5	29.2	5.8	5.3
Moldova	97.3	30.5	23.2	11.8	86.3	88.0	2.1	0.6
Mongolia	95.2	21.4	20.6	1.4	91.2	91.7	4.6	0.2
Niger	88.1	67.1	44.4	42.9	88.7	93.7	11.4	0.4
North Sudan	86.0	16.4	14.2	4.1	52.8	56.7	10.1	4.0
Philippines	95.4	15.5	12.1	4.7	80.9	81.8	4.3	0.2
Rwanda	86.5	27.4	22.7	7.9	82.1	84.3	12.3	1.2
Sao Tome	88.7	15.5	10.0	7.8	80.0	81.3	9.5	1.7
Senegal	89.6	33.7	20.6	17.9	86.9	91.1	9.7	0.4
Sierra Leone	93.5	72.1	59.0	51.4	86.3	89.8	5.9	0.4
South Sudan	95.9	13.1	11.2	3.8	35.2	39.8	2.3	3.2
Swaziland	93.7	10.2	7.9	2.7	83.3	81.7	4.9	1.1
Tajikistan	97.2	12.4	10.0	3.4	72.5	74.6	2.6	0.3
Trinidad	98.0	3.2	2.3	1.1	56.3	56.6	1.1	0.8
Uzbekistan	96.4	15.2	10.6	5.8	78.1	79.8	3.4	0.3
Venezuela	92.0	8.1	3.9	4.5	62.4	64.6	3.8	4.2
Vietnam	95.1	24.4	23.4	1.9	51.7	57.8	4.3	0.6

source: Author's calculation from the 2000 MICS microdata: <http://www.childinfo.org/MICS2/MICSDataSet.htm>.

**Table 5: Industrial Composition of Economically Active Children**

Country	Age Group	Industry:										
		Agr. & Forestry	Fishing	Mining & Quarry.	Manufact.	Construct.	Hotel & Rest.	Trade	Transport, Storage, Comm.	Social & Community Service	Private House.	Other
Bangladesh	5-17	53.6	2.8	0.2	14.4	3.1	2.5	13.9	4.5	4.4		0.4
Cambodia	5-17	72.7		0.5	6.3	1.0		16.0	0.7	2.3		0.4
Costa Rica	5-17	43.4			9.0	7.0	4.8	21.7			5.9	8.0
Costa Rica	5-14	56.6			7.3	4.8	4.9	19.5			2.8	4.1
El Salvador	5-17	48.3	0.8	0.3	16.0	2.4		23.0	2.1	2.1	4.8	2.2
Ethiopia	5-9	97.7			0.4	0.1	0.6	0.4	0.0	0.3	0.3	0.2
Ethiopia	10-14	90.6			2.0	0.3	1.7	3.0	0.1	1.0	1.0	0.3
Ethiopia	15-17	80.7			4.3	0.7	3.2	6.4	0.2	2.0	2.0	0.5
Ghana	5-9	70.4	2.7	0.4	4.3		2.5	18.4	0.3	0.5	0.3	0.3
Ghana	10-14	62.3	2.1	0.5	5.9		5.2	23.1	0.2	0.3	0.3	0.2
Ghana	15-17	57.1	2.9	0.5	8.7		3.7	22.4	0.9	1.5	1.0	1.2
Honduras	5-9	54.3		0.0	8.5	1.5		35.5	0.2	0.0		0.0
Honduras	10-14	59.8		0.0	6.9	1.4		27.3	0.6	3.9		0.1
Honduras	15-17	53.6		0.3	9.3	4.5		21.0	1.4	9.5		0.4
Kenya	5-9	88.9	0.0	0.5	1.1	0.0	0.0	0.8	0.3	5.9	2.4	0.0
Kenya	10-14	78.9	0.1	0.5	1.8	0.4	0.7	1.9	0.1	6.1	8.8	0.7
Kenya	15-17	70.4	0.3	0.5	1.4	0.5	1.4	2.1	1.3	4.7	16.7	0.6
Namibia	6-10	80.6	0.0	0.0	0.1	0.0		0.1	0.9	5.2		13.0
Namibia	11-15	79.2	0.0	0.1	0.7	0.0		0.4	0.8	4.8		14.0
Namibia	16-18	71.8	0.1	0.1	1.3	0.7		4.9	1.5	7.5		12.1
Nicaragua	5-9	60.4			8.4			24.8		4.3		2.1
Nicaragua	10-14	58.2			9.7			23.0		7.0		2.0
Nicaragua	15-17	51.4			13.1			16.5		11.4		7.5
Pakistan	5-14	67.0			10.8	1.8		8.7	3.7	8.0		0.0
Panama	5-17	47.0	2.3	0.2	3.5	3.1	2.3	16.6	3.7	11.1	7.8	2.4
Phillippines	5-9	58.1	2.8	0.0	3.6	0.0	2.0	22.2	2.0	2.0	3.6	3.6
Phillippines	10-14	59.5	4.7	0.5	4.2	0.5	1.7	20.4	1.3	1.4	3.3	2.6
Phillippines	15-17	46.1	5.9	0.5	5.3	2.7	3.2	16.2	3.9	2.2	8.6	5.1
Phillippines	5-17	53.3	5.2	0.4	4.6	1.4	2.4	18.6	2.5	1.8	5.7	3.7
Sri Lanka	5-17	63.6		1.3	14.8	2.0		10.8	0.9	5.4		1.1
Tanzania	5-17	79.9		0.1	0.3	0.0		2.2	0.0		17.4	0.0
Tanzania	5-9	71.3		0.0	0.1	0.0		0.8			27.8	0.0
Tanzania	10-14	81.0		0.0	0.2	0.0		1.9	0.0		16.8	0.0
Tanzania	15-17	86.9		0.2	0.7	0.1		4.2	0.1		7.8	0.0
Turkey	6-17	57.6			21.8			10.2		10.4		0.0
Ukraine	5-17	43.0		8.0		9.0		21.0		19.0		0.0
Zambia	5-9	91.3	0.9	0.0	0.2	0.2	0.0	2.2	0.0		3.8	1.5
Zambia	10-14	92.9	0.5	0.0	0.4	0.1	0.1	3.3	0.0		2.1	0.7
Zambia	15-17	73.3	1.8	0.1	2.0	0.4	0.5	10.7	1.0		8.7	1.4
Zimbabwe	5-17	82.4		0.3	1.9	1.7		2.1	0.2		10.8	0.6

Age categories determined by availability in report. Industry groupings determined by availability in report. A missing reflects that industry was not available in report. Sources: Bangladesh - Bangladesh Bureau of Statistics (2003); Cambodia - National Institute of Statistics (2002); Costa Rica - Trejos and Pisoni (2003); El Salvador - ILO-IPEC (2004); Ethiopia - Central Statistical Authority (2003); Ghana - Ghana Statistical Service (2003); Honduras - Cruz (2002); Kenya - Central Bureau of Statistics (2001); Namibia - Ministry of Labour (2000); Nicaragua - Silva (2003); Pakistan - Federal Bureau of Statistics (1996); Panama - Cornejo, Rodriguez, Adames, and Castillo (2003); Phillippines - National Statistics Office (2003); Sri Lanka - Department of Census and Statistics (1999); Tanzania - National Bureau of Statistics (2001); Turkey - State Institute of Statistics (1999); Ukraine - State Statistics Committee (1999); Zambia - Central Statistical Office (1999); Zimbabwe - Ministry of Public Service, Labour and Social Welfare (1999).

**Table 6: 4 Digit Industrial Composition of Working Children 5-17 in Bangladesh, 2002-2003**

Industry Description	Bangladesh(%)			Urban(%)		Rural(%)	
	Total	Boys	Girls	Boys	Girls	Boys	Girls
Growing of cereal crops (Paddy, Barley, Jowar etc.)	38.9	44.4	23.6	15.0	7.6	51.3	27.4
Growing of vegetable (Potato, Patal, Tomato etc.)	5.4	1.7	15.7	0.4	3.0	2.0	18.6
Growing of tea, coffee and other beverage crops	0.7	0.5	1.1	0.0	0.0	0.6	1.4
Farming of cattle, sheep, goats, horses areas etc.	1.1	0.9	1.7	0.5	1.6	1.0	1.7
Poultry farming	4.3	1.0	13.6	0.4	11.0	1.2	14.2
Felling of frees and rough shaping of timber	0.6	0.6	0.8	0.4	0.3	0.6	0.9
Inland fishing (excluding shrimp farming)	2.7	3.2	1.2	2.0	0.6	3.5	1.3
Processing and preserving of fish and fish products	0.5	0.0	1.7	0.0	1.3	0.0	1.8
Rice milling	0.7	0.7	0.7	1.0	1.1	0.6	0.6
Manufacture of bidies	0.8	0.4	1.9	1.2	5.0	0.3	1.2
Cotton textiles except handlooms	0.5	0.5	0.4	1.1	1.6	0.4	0.2
Handloom textiles	1.5	1.2	2.1	1.3	2.4	1.2	2.0
Wearing apparel except fur apparel	1.3	0.9	2.3	2.0	8.4	0.7	0.9
Manufacture of corrugated paper and paper board containers	0.1	0.1	0.2	0.1	1.1	0.1	0.0
Manufacture of structural metal products	0.9	1.1	0.1	2.0	0.3	0.9	0.1
Manufacture of wooden furniture and fixtures	2.2	2.8	0.3	4.9	0.5	2.3	0.3
Manufacture of cane and bamboo furniture	0.4	0.2	0.9	0.2	1.5	0.1	0.8
Wood, cane and bamboo decorative handicrafts	0.8	0.4	2.0	0.3	1.6	0.4	2.1
Textile and sewing decorative handicrafts	1.2	0.0	4.2	0.2	12.6	0.0	2.3
Manufacture of jewellery and related articles	0.4	0.5	0.0	1.6	0.3	0.2	0.0
Site preparation	2.0	2.6	0.2	3.9	0.6	2.2	0.2
Building of complete construction or parts there of civil engineering	1.0	0.6	1.9	1.4	4.9	0.5	1.2
Maintenance and repair of motor vehicles	0.5	0.7	0.1	1.3	0.1	0.5	0.1
Retail trade of pan, cigarettes, biddies, betelnuts and tobacco	0.8	0.9	0.3	1.6	0.6	0.8	0.2
Retail trade of rice, pulse, wheat and flour	0.6	0.7	0.3	0.8	0.3	0.6	0.3
Retail trade of fish and sea food	0.5	0.6	0.2	1.3	0.1	0.4	0.2
Retail trade of grocery and general store	4.1	5.1	1.5	9.3	1.4	4.1	1.5
Retail sale of vegetables	1.1	1.0	1.2	1.8	1.5	0.8	1.2
Retail sale of textiles clothing, hosiery, foot ware and leather goods	0.7	0.8	0.7	2.0	1.1	0.5	0.6
Retail sale in specialized stores N.E.C	0.9	1.0	0.6	1.8	1.0	0.8	0.6
Other non-store retail sale	1.0	1.2	0.4	2.1	1.3	1.0	0.3
Restaurants and non-residential hotels	0.8	0.9	0.4	1.7	0.5	0.7	0.4
Tea stalls	1.7	1.9	1.0	2.8	1.3	1.7	0.9
Land transport of scheduled passenger (Bus, Railway, etc.)	0.6	0.8	0.1	1.7	0.4	0.6	0.0
Land transport of non-scheduled passengers	1.8	2.4	0.1	4.5	0.4	1.9	0.1
All trade transport operation by road, whether scheduled or not	1.7	2.2	0.3	2.0	0.8	2.2	0.2
Activities of pre-primary school (Kindergarten, Coaching centre etc.	0.3	0.2	0.6	0.4	1.3	0.1	0.5
Hairdressing and other beauty treatment	0.6	0.8	0.2	1.1	0.6	0.7	0.1
Tailoring services	1.7	1.4	2.5	2.2	3.3	1.2	2.3
Private household with employed persons (maids, cooks, etc.)	1.3	0.3	4.0	0.4	6.4	0.3	3.5
Other Industries N.E.C.	11.7	12.8	8.5	21.1	10.3	10.9	8.1

N.E.C. - Not elsewhere classified. Only industries with at least 0.5 percent of economically active children in urban or rural Bangladesh are listed. Source: Table C52 of the Report on National Child Labor Survey (Bangladesh Bureau of Statistics 2003)

**Table 7: 3 Digit Occupational Composition of Economically Active Children 5-17 in Bangladesh, 2002-2003**

Occupation Description	Bangladesh(%)			Urban(%)		Rural(%)	
	Total	Boys	Girls	Boys	Girls	Boys	Girls
Teachers N.E.C (Religious/ Physical Education)	0.3	0.2	0.6	0.4	1.3	0.1	0.5
Transport conductors (Bus or train conductor, Helper)	0.6	0.8	0.1	2.0	0.4	0.5	0.1
Working proprietors (Wholesale and retail trade)	1.0	1.3	0.2	1.9	0.1	1.2	0.3
Sales supervisors (wholesale & retail trade)	4.1	4.1	4.0	7.4	6.4	3.3	3.5
Salesmen, shop assistants and related workers	7.4	9.1	2.7	17.2	3.4	7.2	2.5
Street vendors & door-to-door salesman	1.4	1.5	1.2	2.4	2.0	1.3	1.0
Waiters, Bartenders and related workers	1.4	1.6	0.6	2.8	0.8	1.4	0.6
Maids and related housekeeping service workers N.E.C.	1.4	0.4	4.2	0.6	6.3	0.3	3.7
Hairdressers, Barbers, Beauticians and related workers	0.6	0.8	0.2	1.0	0.6	0.7	0.1
Agricultural crop farmers	0.6	0.6	0.7	0.1	0.0	0.7	0.8
Farm crop workers	45.6	47.3	40.9	16.0	11.0	54.6	47.9
Livestock workers	0.5	0.6	0.3	0.3	0.0	0.7	0.3
Dairy farm workers	0.7	0.4	1.3	0.4	1.6	0.4	1.2
Poultry farm workers	4.5	1.2	13.7	0.6	11.1	1.3	14.4
Loggers	0.5	0.5	0.7	0.2	0.1	0.5	0.9
Fisherman	3.2	3.7	1.6	2.6	0.8	4.0	1.9
Spinners and winders (Textile)	0.8	0.7	1.1	1.3	2.5	0.5	0.8
Weavers and related workers	1.2	1.2	1.4	1.6	2.1	1.1	1.2
Knitters	0.8	0.5	1.5	0.8	4.4	0.5	0.8
Spinners, Weavers, knitters, dyers and related N.E.C.	1.1	0.2	3.6	0.2	12.6	0.1	1.5
Grain millers and related workers	0.7	0.7	0.8	1.0	1.3	0.6	0.7
Food preservers	0.4	0.0	1.7	0.0	1.1	0.0	1.8
Cigar makers	0.2	0.1	0.4	0.5	2.1	0.0	0.0
Tobacco prepares and tobacco product makers N.E.C.	0.7	0.4	1.5	0.8	2.9	0.3	1.2
Tailors and dressmakers	1.7	1.4	2.4	2.1	3.1	1.2	2.3
Sewers and embroideries	0.9	0.4	2.3	0.8	4.2	0.3	1.9
Cabinetmakers	1.1	1.3	0.3	1.9	0.3	1.2	0.3
Cabinetmakers and related wood workers N.E.C.	1.0	1.3	0.1	2.7	0.5	1.0	0.0
Motor vehicle mechanics	0.6	0.8	0.1	1.6	0.1	0.6	0.1
Structural metal workers	0.3	0.4	0.0	1.1	0.1	0.2	0.0
Jewellery and precious metal workers	0.5	0.7	0.1	1.8	0.4	0.5	0.0
Basketry weaver and brush maker	1.4	0.6	3.4	0.5	3.7	0.6	3.4
Reiniorced concreters and related workers	0.8	1.1	0.0	2.2	0.1	0.8	0.0
Construction carpenters	0.5	0.6	0.2	1.1	0.0	0.5	0.2
Other construction workers N.E.C.	0.9	0.6	1.8	1.2	4.4	0.5	1.2
Road non-motorised vehicles drivers	3.3	4.3	0.4	5.6	1.0	4.0	0.3
Labourers N.E.C.	7.5	8.9	3.8	15.3	7.2	7.3	3.1

N.E.C. - Not elsewhere classified. Only occupations with at least 0.5 percent of economically active children in urban or rural Bangladesh are listed. Source: Table C50 of the Report on National Child Labor Survey (Bangladesh Bureau of Statistics 2003)

**Table 8: Prevalence Rates of Worst Forms of Child Labor in Nepal**

	<b>Number</b>	<b>(%)</b>
Children in bonded labour	17,152	13.5
Child ragpickers	3,965	3.1
Child porters	46,029	36.2
Child domestic workers (a)	55,655	43.8
Children in mines	115	0.1
Children in the carpet sector	4,227	3.3
Child trafficking		(b)
<b>TOTAL</b>	<b>127,143</b>	<b>100</b>

(a) for urban areas only

source: ILO (2001).

**Table 9: School Attendance Rates in Various Activities by Country for Children 10-14**

	Market Work			Domestic Work	Domestic Work Only	Market Work Only	Any Work	Not Work
	Any	Inside Hh	Outside Hh					
Selected Countries	84.5	86.8	76.6	89.2	91.0	78.1	88.8	91.6
Albania	58.6	58.4	65.0	54.7	53.1	69.6	56.0	51.8
Angola	90.1	89.6	91.6	91.6	92.4	92.3	91.6	89.0
Azerbaijan	98.9	98.8	99.1	98.8	98.9	100.0	98.9	99.5
Burundi	80.0	80.0	79.9	86.6	91.7	69.2	86.1	81.0
Cameron	91.9	91.7	93.0	93.0	94.8	87.4	92.7	95.3
Central African Republic	79.5	79.5	80.3	82.3	88.7	74.3	82.0	90.3
Chad	92.4	92.5	91.8	93.3	96.7	92.9	93.3	96.7
Comores	81.4	81.7	80.3	77.1	72.4	82.8	77.7	79.2
Cote d'Ivoire	88.0	88.4	87.5	90.9	92.3	84.6	90.4	92.2
D.R. Congo	69.1	67.9	70.6	69.0	68.8	67.7	69.0	66.9
Equatorial Guinea	95.4	95.1	94.7	96.6	97.5	94.7	96.5	94.1
Gambia	86.5	86.2	88.0	89.7	91.7	88.5	89.6	92.9
Guinea-Bissau	90.6	90.1	93.6	93.2	95.7	83.2	92.3	94.9
Guyana	94.3	94.1	93.7	95.7	96.5	97.5	95.7	99.0
Kenya	77.5	96.9	65.5	95.9	96.3	56.4	95.4	95.5
Laos	85.9	86.4	78.8	89.5	92.7	79.8	89.3	93.6
Lesotho	93.2	93.5	90.6	96.1	96.9	88.2	95.8	96.3
Madagascar	72.8	76.8	61.9	78.7	79.8	72.9	77.0	89.3
Moldova	97.9	97.7	98.2	98.4	98.8	98.2	98.4	96.0
Mongolia	90.6	91.3	84.6	94.4	95.4	77.3	94.3	92.6
Niger	81.5	78.1	81.9	84.0	90.3	78.6	83.6	88.9
North Sudan	68.5	67.9	70.9	84.1	88.6	65.7	82.8	91.2
Philippines	86.2	88.7	77.6	93.4	95.0	59.3	93.0	98.9
Rwanda	81.2	81.4	76.8	86.5	90.4	80.4	86.3	85.0
Sao Tome	81.3	82.5	77.7	86.1	86.9	62.9	85.7	81.1
Senegal	81.6	83.3	78.6	85.3	87.2	79.2	85.0	89.9
Sierra Leone	91.9	91.1	92.1	92.3	94.6	93.8	92.4	92.4
South Sudan	91.1	92.6	82.4	93.3	94.8	96.0	93.5	97.3
Swaziland	91.6	93.6	82.6	93.2	93.4	87.4	93.2	92.8
Tajikistan	95.5	96.5	93.2	96.4	96.7	98.1	96.4	95.9
Trinidad	89.0	93.9	79.3	97.3	97.7	70.0	97.1	98.0
Uzbekistan	99.3	99.7	98.4	96.5	95.8	100.0	96.6	98.7
Venezuela	89.6	90.4	88.3	95.5	96.0	82.7	95.0	94.4
Vietnam	84.8	86.4	56.4	91.0	95.7	85.7	90.5	96.6

source: Author's calculation from the 2000 MICS microdata: <http://www.childinfo.org/MICS2/MICSDataSet.htm>.