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Child Labor: What Have We Learnt?

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Abstract

The purpose of this paper is to review what has been learnt from the growing volume of applied research on child labor and to indicate directions for future research. We start by looking at research by the World Bank, which has played a fairly pioneering role in this area in data collection and, increasingly, in data analysis, more recently in cooperation with other agencies, such as the ILO and UNICEF. With a view to guiding policy interventions in this area, we attempt to identify the patterns which arise from the study of a wide range of countries. We emphasize that the current state of empirical research makes this task difficult: A striking feature of available research is the sheer variety of results that it has produced. This review discusses the extent to which this diversity is a result of methodological problems, as opposed to genuine country variations. We argue that the neglect of statistical issues such as endogeneity, measurement error and aggregation error has biased the results of a number of studies. At least as important a shortcoming is that empirical research has been conducted without adequate reference to theory. As a result, the estimated equations are sometimes mis-specified and often difficult to interpret. This impedes the confidence with which policy prescriptions can be applied.

Child Labor: What Have We Learnt?

*Sonia Bhalotra and Zafiris Tzannatos**

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1. INTRODUCTION

This paper reviews research on child labor, concentrating on research conducted in or commissioned mainly by the World Bank¹. Child labor is not just a contemporary phenomenon and, for economic historians, sociologists and anthropologists, it is not a new subject. For economists, it is. A lively interest in the economics of child labor is only about five years old, although this literature has been growing exponentially. Much of the empirical work in this field has relied upon multi-topic or integrated household surveys such as the Living Standards Measurement Surveys conducted by the World Bank in association with the governments of about forty developing countries (see www.worldbank.org/lsms for a full list). As a result, a lot of the early work in this area has been conducted at or for the World Bank. A striking feature of this literature is the range of estimates obtained for the effects of common explanatory variables such as household income or household size. The motivation for writing this paper is to assess whether any clear patterns can be discerned from the corpus of results for different countries. The further step of marshaling the evidence to inform policies directed at reducing the incidence and severity of child labor requires an understanding of behavior, of markets and institutions and of the local political economy. Given the potential complexity of the problem, it is imperative to have a theoretical model from the structure of which testable predictions can be derived and taken to the data to be rejected or not. We argue in this paper that empirical studies of child labor have paid too little

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¹ The review is not comprehensive. There are certainly some studies that have not been incorporated in this review, especially more recent ones. There is also a rapidly growing literature outside the Bank, to which only passing reference is made.

attention to theoretical developments in the field. There is considerable scope for bridging this gap.

An early review paper by Grootaert and Kanbur (1995) set out the issues and surveyed very early work, the new generation of research on child labor having appeared after their paper.² Grootaert and Patrinos (1998) survey the findings of comparable research studies on Cote d'Ivoire, Colombia, Bolivia and the Philippines. Sasaki (1999) surveys a larger set of fifteen or so papers on child labor and education. A review of research on child labor in three African countries (Cote d'Ivoire, Ghana and Zambia) is presented in Canagarajah and Nielsen (2000). Andvig (1999) surveys the economic and anthropological literature concerned with family-controlled child labor in Africa. Further discussion of research questions and research findings relating to child labor in Africa is in Bhalotra (2002). Some empirical work is reviewed in Basu (1999), who is primarily concerned with concepts, theory and policy, and less with assessing the evidence. A broad non-technical overview of the economics of child labor and policy alternatives is presented in Grimsrud (1999), who also suggests a niche for World Bank activities in this area. A more recent survey was undertaken by Basu and Tzannatos (2003) which summarized definitional issues, theoretical considerations, empirical research and policy implications.

The layout of the paper is as follows. Section 2 sets the stage by raising the question of why we care about child labor and then describing briefly the survey data used in most of the studies discussed in this paper.

Section 3 describes patterns that emerge from a perusal of descriptive data. These patterns are not necessarily reflected in multivariate analyses of the data, conditional correlations often being different from unconditional correlations. Also, the nature of conditional correlations depends upon model structure.

Section 4 presents an analytical framework for thinking about child labor. This serves two purposes. First, it offers some principles around which the ensuing discussion of a list of explanatory variables can be organized. Second, it makes the point that policy choices can and should be linked to an analysis of the causes of child labor.

² This paper differs not only in its scope but also in its style. We not only review empirical findings but also assess these findings in terms of their statistical robustness and their coherence with theory.

Section 5 is dedicated to a detailed consideration of the relation between child labor and poverty - Since this relationship is central to much research and policy discussion..

An overview of statistical and other methodological issues that arise in analyzing child labor is presented in Section 6.

This is followed by a summary of the results of the surveyed studies in Section 7.

Finally, Section 8 comments on drawing policy implications from the available microeconomic research.

2. MOTIVATION AND DATABASE

2.1. Grounds for Concern

Although the average man or woman on the street would probably agree that child labor should be reduced/eliminated, not all social scientists would agree. A body of academic opinion associates policy interventions with a cramping of the freedom to choose and argues that child labor encourages socialization, independence and self-esteem in childhood. Most economists, on the other hand, would be likely to see sensibly designed interventions as expanding the choice set facing families. For example, building more schools, reducing fees or offering credit to families to help them smooth over income fluctuations are all potentially beneficial policies that do not involve constraining individual behavior.

Amongst reasons that we care about child labor is that it has potential ill-effects on the health, education, moral well-being and social development of the child, with implications that persist over the child's lifecycle (some evidence on these effects is considered later on in this paper).³ Many of these effects tend to perpetuate across generations, reducing economic and social mobility. For example, the evidence surveyed in this paper shows that parental education has a positive effect on child school attendance and

³ Child labor also generates experience-capital which, in certain circumstances, may be more valuable than the educational capital available from an alternative allocation of time. These are typically circumstances in which there is limited job mobility (so that a child is likely to work with a parent in a certain occupation, like farming, and then grow up to continue in this occupation) and the quality of available education is poor (as a result of which the value of educational capital is low). A long run policy that aims to improve the conditions under which the poor live will tend to address these problems so that, in the long run, one may assume that the returns to education exceed any positive returns to experience that child labor generates.

a negative effect on the probability and extent of child labor. So less educated parents tend to send their children to work and these children grow up to be less educated parents, who then send *their* children to work – thus perpetuating poverty (a phenomenon called **dynastic trap** by Basu and Tzannatos, 2003). Since cause and effect are reinforcing, resulting in persistence of poverty from one generation to another, this situation calls for government intervention to break this vicious circle. We argue that there is unambiguous merit in the objective of equalising opportunities for children, releasing the future prospects of children from the clutch of their family background.

On top of these individual level (microeconomic) effects there are also important macroeconomic effects of child labor. With theoretical developments in the area of endogenous growth, economists have produced considerable evidence, in recent years, of externalities associated with human capital accumulation that imply that the social return to human capital investment exceeds the private return (see, for example, Ray, 1998). So improving the human capital base of the economy is good not just for individual children but for the economy as a whole. Macroeconomic data show that countries that spend a greater fraction of GDP on education have higher growth rates, other things being equal (see Mankiw, Romer and Weil, 1992, for example). This offers an *a priori* justification for government intervention. Moreover, in developing countries, educational expansion can contribute to democratic change and to achieving lower fertility.

In addition to having instrumental value, education, health and freedom have intrinsic value. Some, though not all, forms of child labor are clearly an imposition on the child, whether by poverty or by the avariciousness of an adult or the neglect of society. To the extent that the child is inherently vulnerable and not in a position to exercise choice, child labor commands attention.

2.2. Multi-Topic Household Surveys

Up until a decade ago, most research on child labor referred to case studies in which small samples of working children were interviewed or observed (Bequele and Boyden (1988), Bhatta (1998) and Addison *et al* (1997)). While these studies offer important insights into the wages and working conditions of working children, they are often unable to illuminate the fundamental question of why children work because they contain no

information on the counterfactual. Historical studies of child labor (Cunningham (1996), Horrell and Humphries (1995), Moehling (1999), Humphries (2003)) make ingenious use of data but are typically restricted to data that are thin either in observations or in the range of control variables available.

New analytical insights were developed using the Living Standards Measurement Surveys (LSMS). These are integrated household surveys that began in the 1980s and, at the time of writing, about 40 surveys have been completed.⁴ The LSMS gather information for all individuals, whether working or not. The data include socio-economic and demographic characteristics at the individual, household and community levels. Information on educational enrollment and attainment is available for each person in the sampled household. Data on employment, hours and wages are typically available for all persons in the household over the age of 7 or 10, depending upon the country in question. The data on the employment and education status of children can easily be linked to information on the economic resources, educational levels and demographic composition of their households, as well as to a range of price and infrastructure variables pertaining to the communities in which they live. For these reasons, the LSMS are fairly well suited to analysis of child labor. However, a weakness of these data is that most are single cross-sections, though panel data are available for some countries, including Cote d'Ivoire, Peru and Ghana⁵. Panel data not only allow the researcher to model dynamics but they also produce more robust estimates of marginal effects by virtue of offering methods for controlling for individual (or household) level unobservables. There is fortunately, now a small literature that analyzes the dynamics of child labor.⁶

In line with the production of LSMS data, international organizations and country governments have also been conducting relevant household or labor force surveys. For example, the International Food Policy Research Institute (IFPRI) has produced excellent household survey data for a number of developing countries, including panel data for Ethiopia, the Philippines and Pakistan (see www.cgiar.org). Similarly, the RAND

⁴ Grosh and Glewwe (1995) present an excellent overview of the LSMS database.

⁵ A panel is a linked stack of cross-sectional data. In other words, panel data contain time-series information on individuals (or households or other cross-sectional units).

⁶ Basu (1999), Dessy (2000), Razzaz (2001), Hazan and Berdugo (2002), Emerson and Souza (2002), Bell and Gersbach (2001).

Corporation has a string of Family Life Surveys for Indonesia, Malaysia and other developing countries (see www.rand.org). The International Labour Office (ILO) has a number of surveys (SIMPOC) specifically designed to acquire information on child activities though these are not full-scale multi-topic surveys. Similarly, UNICEF has its own data (MICS).⁷ Information on these has been assimilated with related information on the Understanding Child Work (UCW) Program website at UNICEF (Florence) (see <http://www.ucw-project.org/>), marking a pioneering joint initiative on the part of the UNICEF, ILO and World Bank to bring together their resources on child labor.⁸

It is worth pointing out that the literature reviewed in this paper misses out on street children, refugee populations, orphans and institutionalized children. While they often constitute a small fraction of working children, these groups are likely to be engaged in the most detrimental forms of child labor.⁹

3. A PICTURE OF CHILD LABOR

Although the features of the data differ by continent, country, rural/urban sector, gender and type of child work, some interesting stylized facts emerge.¹⁰ These facts can guide research and policy-making in two ways. First, in selecting interesting and relevant research questions. Second, in identifying regions or populations to target. For example, the preponderance of self-employment in the rural regions of most developing countries immediately implies a limited relevance of legislation enforcing adult minimum wages¹¹. Similarly, the significance of the recent debate over trade sanctions (Golub (1997), Fields (1995), Basu (1999), (Bhalotra (1999))) is diminished once it is recognized that only a very

⁷ SIMPOC is the ILO's Statistical Information and Monitoring Programme on Child Labour. It carries out a wide range of child labor specific surveys around the world. Key to SIMPOC are national household-based surveys collecting detailed information on the extent, nature, causes and consequences of child labor. See: www.ilo.org/ipec/simpoc. UNICEF's Multiple Indicator Cluster Surveys (MICS) are based on household surveys and provide a list of global indicators which were developed jointly with other agencies (for example, WHO, UNESCO and the ILO) to assess progress in the area of children. For more info see <http://childinfo.org/MICS2>.

⁸ For a summary of the project, see Fyfe, Roselaers, Tzannatos and Rosati (2003).

⁹ The ILO has conducted rapid assessment surveys in a number of countries with a view to assessing the incidence and nature of child labor amongst children living outside households (see www.ilo.org/ipec).

¹⁰ See also ILO, 2002.

¹¹ For a theoretical analysis of the impact of adult minimum wages on child labor, see Basu (2000).

small fraction of working children is engaged in the export-producing sectors of developing countries¹².

1. While population-dense Asia has the largest number of working children, the incidence of child labor is higher in sub-Saharan Africa than anywhere else in the world.
2. Participation rates of children have been declining everywhere since the 1950s but, in the last two decades, parts of Africa have registered an increase (see Andvig, 1999). This is, likely, related to economic recession, conflict, wars and the AIDS epidemic all of which result in significant changes in (often, total destruction of) family structures.
3. The vast majority of working children in developing countries are engaged in agricultural work, typically on family-run farms. Indeed, often hardly any children work on the open labor market for a wage in Africa, where wage markets are incipient.
4. Consistent with this, the work participation rates of children tend to be higher in rural than in urban regions.
5. Child labor is not the inverse of school attendance.
 - Many children combine work and school and this is especially common when the work they do is on family-run farms or enterprises. This is facilitated by school schedules that accommodate agricultural seasons. It seems more common to combine work and school in Africa and Latin America than in Asia.
 - Household surveys for several developing countries find that a substantial fraction of children are neither in work nor in school. This fraction is typically larger for girls than for boys, an indication that “doing nothing” may correspond to doing housework¹³.
 - The effects on education of engaging in work should be considered separately for *attendance*, *grade progression* and *achievement* (learning outcomes) since, even

¹² It is recognized that minimum wage laws or trade sanctions may have indirect effects on children working on family farms or enterprises who do not fall directly in the scope of these interventions. For example, an adult minimum wage may raise the overall demand for child labor. The point here is to emphasize that even the most well considered policy intervention will miss the mark unless it starts out with a fair knowledge of the nature and incidence of child labor.

¹³ Rural India is a notable exception in this regard: see the data in Cigno and Rosati (2000).

when working children attend school, their educational attainment are likely to be lower than for full-time school-goers.¹⁴

6. The history and geography of child labor reveal an negative but not linear relation of economic development and the incidence of child labor (in the sense that child labor falls relatively fast as low income countries grow but more or less stabilizes among middle income countries until a critical level of higher income is attained).¹⁵ See also Section 5.1.
7. At the microlevel, the relation of household income and child labor is often found to be non-linear and, in many cases, is weak, while ownership of productive assets (like land) can increase child labor.
8. Most countries exhibit large gender differentials in total child labor force participation. Even more often, the distribution of girls and boys across different types of child work is different.

A rough generalization is that the proportions in work and out of school are larger for girls than for boys in Asia, the proportion in work but not necessarily the proportion out of school is larger for boys than for girls in Latin America, and the proportions of boys and girls in work and school are roughly similar in most parts of Africa, though there is significant gender segmentation in occupations.

4. AN ANALYTICAL FRAMEWORK

4.1. Incentives, Constraints and Agency

When discussing the determinants of child labor, the question that often arises is whether this is not a trivial pursuit: is it not evident that poverty is the cause of child labor? The answer is that it is not evident. The idea that poverty compels child labor reflects the importance of subsistence constraints. However, micro-data reveal that children work in households that cannot be classified as subsistence-poor. There must, therefore, be other reasons that children work.

¹⁴ This is confirmed in a recent analysis of this issue with reference to Latin American countries. For a summary see Orazem, Sedlacek and Tzannatos (2003).

¹⁵ Fallon and Tzannatos (1997).

A useful organization of causes is to categorize them as incentives, constraints or agency (see Bhalotra, 2000b). Consider each in turn. The incentive to work is determined by the return to work relative to alternative uses of time such as school attendance. Thus children may work because the net returns to education are low and the returns to work experience are relatively large. Policy can modify incentives, for example, by improving school quality or lowering school fees.

Even where incentives favor education over work, a household may be compelled by poverty constraints to send a child to work. When these are binding, the opportunity cost of schooling is too high. In this case, policy interventions are best targeted at alleviating poverty in households supplying child labor.

As indicated above, most child workers are employed on household-run farms or enterprises, by their own families. Even if they work outside the home, decisions over child time allocation are often taken by adults. While these adults are typically parents, a substantial and growing fraction of children in Africa are in the care of adults who are not their parents- this is because of both fostering and orphanhood. There are therefore agency issues relating to child labor that distinguish it from adult labor. However remote it may seem at first glance there is, in principle, the possibility that adults are not quite as altruistic as we tend to assume. In this case, child welfare may be raised by policies that make schooling compulsory or that ban child labor, thereby eliminating adult agency.

These three different factors may, of course, interact. For example, adult labor supply decisions will determine the tightness of the household budget constraint. So adults with limited altruism may choose to consume some leisure while sending children to work. If poverty is measured by adult income then what appears to be a poverty constraint might in fact be relaxed under greater parent altruism.

In any real context, the different causal factors will prevail to different extents and they may interact with one another. *However, since the policy implications are very different, depending upon whether it is incentives, constraints or agency factors that dominate, it is important to investigate their relative force.* As of now, there is a considerable distance between theory and applied research in this area. Section 5 describes some empirical work that attempts to discriminate between the alternative hypotheses.

4.2. Markets and Institutions

The strength of markets and institutions will mediate the force of incentives, constraints and agency. In this Section, we consider the role of imperfections in the markets for credit, land and labor, and the part played by tastes and norms. For example, *underdeveloped credit markets* will tend to increase the impact of constraints in determining child labor (see Ranjan (1999), Lahiri and Jaffrey (1999) and also Baland and Robinson (2000)). Limited access to capital markets not only perpetuates chronic poverty but also traps non-poor households in states of poverty following income shocks (Rosenzweig and Binswanger and (1993), Morduch (1994)). Poor households are likely to be particularly risk-averse and they may employ children *ex ante* to diversify their sources of income (Anker and Melkas, 1995) or *ex post* to make up income losses in bad times (also see Section 7.18 for evidence).

Similarly, *imperfect labor markets* may strengthen the incentive to put children to work. For example, it may be difficult to substitute hired labor for family labor, or difficult to rent out or sell land. This creates an incentive to employ family labor (Cockburn (2000), Bhalotra and Heady (2000)). The fact that the marginal product of family labor is increasing in the value of productive assets such as land or livestock means that we may expect to find that the children of the land-rich (for example) are more likely to be in work than are the children of small landowners or landless agricultural workers. Remarkably, this is the case in rural Ghana and Pakistan (Bhalotra and Heady, 2000) and, likely, in other countries too.

Anthropologists have suggested that children may work because they enjoy work or the independence that it brings more than they enjoy going to school (Delap, 1999). Thus incentives can be non-material and local policy interventions should be sensitive to encouraging *creativity and joy in education* as much as to improving infrastructure and increasing pecuniary returns. The question of parent's agency and altruism towards children is clearly likely to be influenced by *social norms*. In some societies and at certain stages of industrialization, child labor may be more acceptable than in other times and places (Adelman and Robinson, 1989).¹⁶

¹⁶ For a general discussion of norms that incorporates the anthropological literature, see Andvig (1999). For a model of social stigma that exhibits multiple equilibria, see Lopez-Calva (2003).

4.3. Supply and Demand

We have so far spoken largely of how incentives, constraints and agency, working through markets and institutions, influence the decision (of parents) to supply child labor. What about the demand side of the market? Together with total supply, demand determines relative wages and hence the incentive to supply labor. If child labor is in fact substitutable (be it imperfectly) for (unskilled) adult labor in production, then cost-minimizing employers will only prefer children if they are effectively cheaper. In principle, a well-functioning labor market should equalize effective wages, that is, wages adjusted for productivity. Under these conditions, employers are indifferent between adults and children and, with improvement in adult skills and, thereby, the relative productivity of adults, households will face a falling nominal return to child labor. In practice, however, just as women continue to be paid less than men for equal work, children may be paid disproportionately less than adults. There is some evidence that this is the case (Grimsrud, 1999). This sort of wage discrimination, by making child labor more cost-effective, raises the demand for it.

Historical analyses and case studies have, moreover, identified non-pecuniary reasons why employers prefer to hire children. A possible argument consistent with the casting of employers of child labor as exploitative is that children are relatively easy to control (this is a similar argument to the one for the “docility” of female workers).

Other arguments relate to the technology of particular sectors. For instance, children worked in coal mines in England because they were just small enough to go down the shafts. There was a visible decline in child labor with advances in the technology of mining (for example, Kirby, 2000). The concentration of children in the production of matchsticks, fireworks, footballs and carpet weaving in contemporary South Asia has similarly been thought to be related to their having small and nimble fingers (although see Levison *et al* (1996) and Anker and Barge (1998) discredit this view). Technical change may thus change the demand for child relative to adult labor by altering their relative marginal productivities. For example, Levy (1985) finds that mechanization in Egyptian agriculture reduced the incidence of child labor. Technical change will also tend to increase the return to schooling for given levels of school access and school quality (see Rosenzweig (1995), Foster and Rosenzweig (2000)). The *total* demand for labor (adult and child) is also a function of

technological change, though whether total demand increases or decreases depends upon the relative strength of efficiency and substitution effects.

The studies we survey have typically used household-level data and concentrated on the supply side, that is on the characteristics of households that send children into work or upon the characteristics of children themselves. Many do not control for demand effects - which may be done by including region fixed effects or a regional unemployment rate (see Sections 7.15, 7.16).

5. POVERTY AND CHILD LABOR

From a policy perspective, it is interesting to consider how child labor responds to trends in economic growth (and globalization). A fair consideration of these issues lies outside the scope of this paper, which is primarily concerned with what a selection of empirical research on microdata has found. However, as there is some evidence on the effects of growth and trade-expansion on poverty and poverty levels will reflect changes associated with growth and trade reform (for instance, in consumer and producer prices), a first step in linking the available microeconomic evidence with the larger questions of growth and globalization is to study the relation of poverty and child labor.

5.1. Aggregate vs. Microdata

The reason that poverty is perceived as the explanation for child labor is probably that both the geographic distribution of child workers today and the economic history of specific regions demonstrate a negative association of child work and aggregate income (for example, see the data in ILO, 1996a). These aggregate associations are often evoked as evidence of poverty effects, as for example, in Grimsrud (1999). These data show that the labor force participation rate of children aged 10-14 is decreasing in per capita GDP: it is 30-60% in countries with a per capita GDP of \$500 or less (at 1987 prices) and it falls to 10-30% in countries with incomes between \$500-\$1000. Balancing this picture, Andvig (1999, p.3) points out that the relation of national income and child labor participation (using ILO statistics) is weak in a sample of African countries. This is consistent with the fact that virtually all child labor in sub-Saharan Africa is family-controlled and that labor markets are relatively underdeveloped in this region.

The problem with aggregative evidence is that it is unclear whether it was the rise in household incomes that eliminated child labor by dispelling the need for it, or whether the instrumental factors were the introduction of relevant legislation or other structural changes such as in returns to education, school availability and technology. This is because aggregate income may register an increase without any increase in the incomes of households supplying child labor. At the same time, economic growth or increases in aggregate income tend to be associated with the development of legal and political infrastructure, as well as with shifting and evolving social norms. In the last decade, microdata for developing countries have become available, which make it possible to disentangle household living standards (a microeconomic variable, which differs across households) from factors like new laws or changed norms, which apply equally across households (Bhalotra, 2000a). The resulting microeconomic research is reviewed in Section 7 below.

What effect of household living standards does microeconomic theory lead us to expect? When the choice is between work and leisure, and leisure is a normal good, it predicts a negative effect of household income on child labor¹⁷. When school attendance is admitted as a further possible use of child time, a negative effect is predicted as long as the marginal utility from attending school exceeds the marginal utility from working (Bhalotra and Heady (2000)). The case for a negative effect is weakened if parents can make transfers to their children by means other than investing in their human capital, for example, through capital markets. Investments in educating children will then be made up to the point where the return to education equals the return to capital market investments (Rosati and Tzannatos (2000)). Overall, subject to these provisos, we expect child labor to be decreasing in household income.

5.2. Poverty Constraints

A negative effect of income on hours of work is, however, expected for adults and for children and in poor as well as non-poor households. In other words, it only indicates that child leisure (or child schooling) is a normal good. How might we investigate the sharper

¹⁷ “Household income” should be read as “the non-labor income of the child”. In an income-pooling or altruistic household, this is the labor income of adults in the household plus any asset income and, in an intertemporal setting, any borrowing.

question of whether poverty *compels* child labor? The basic theory of labor supply offers an answer. It tells us that if an individual is working under a binding income constraint or, equivalently, towards a target, then a drop in their wage rate will be matched by an increase in their labor supply, giving a wage elasticity of -1 . More generally, if the household is very poor, the income effect will tend to dominate the substitution effect¹⁸ and the wage elasticity will be negative (see Bhalotra, 2000a). Thus a testable prediction of the hypothesis of compelling poverty is that the wage elasticity is negative. A positive wage elasticity, on the other hand, is consistent with the view that children work on account of the relative returns to school being low. This test has the advantage that it does not require any arbitrary assumptions about poverty lines. Instead, it relies upon observable behavior (the reaction of work hours to wage changes) to indicate how compelling poverty is.

Can this method be applied to investigate the behavior of children for whom wage data are not available, for example because they work on a family farm? As discussed in Section 3, this is the case for the vast majority of children. One alternative is to estimate shadow wages by estimating a farm production function (Jacoby (1993) does this for Peru though only for adult workers). Another might be to exploit variation in farm prices as these will alter the real wage (for a related study using data from the Cote d'Ivoire, see Alessie *et al*, 1992).

The impact of credit constraints on school attendance and progression can be investigated by examining the significance of household income in a model of schooling. In the absence of credit constraints, schooling should be independent of income, and also of income shocks (see Jacoby and Skoufias, 1997). Recent research finds that credit constraints result in a larger reliance on child labor amongst families experiencing income shocks (Beegle, Dehejia and Gatti (2003); see also Section 7.18).

5.3. Parent Agency & Altruism

The preceding discussion assumes that parents are altruistic and that men, women and children pool their incomes. This is the common assumption in the economics literature and it is often a critical assumption - whether in models of child labor (for example, Basu and

¹⁸ The substitution effect is the effect of a wage change on the hours of work supplied, holding constant total income. It is always positive. Thus, if the wage goes up, hours supplied go up at constant income.

Van 1998) or macroeconomic policy (Barro, 1974). Basu and Van (1998) defend a strong assumption of parent altruism by arguing that the children of the non-poor do not work. However, microdata such as the LSMS show, for a number of developing countries, that the prevalence of child work in households with incomes above the subsistence level is not insubstantial. The empirical research reviewed in Section 7.2 confirms that income effects on child labor are surprisingly small even after controlling for correlated variables and endogeneity. Small effects of parental income on child labor are consistent with limited parental altruism. For this reason, investigation of altruism is relevant.

How might this be done? Parent altruism corresponds to parental concern for child welfare (consumption, leisure, schooling).¹⁹ A testable implication of the restriction that the relative weight on a child good in the parental utility function is non-zero is that marginal changes in adult consumption are positively associated with changes in child consumption, prices held constant. The greater the increase in child consumption for a given increase in adult consumption, the greater is the degree of altruism. Equivalently, the degree of altruism is increasing in the ratio of the income effects on child consumption and adult consumption (see Bhalotra, 2001).

Of course small income effects may be consistent with a high degree of parent altruism. For example, they may arise spuriously for reasons of statistical specification (see Section 6), or else they may be small because they are confounded with substitution effects associated with productive assets (Section 5.4).

5.4. Market Imperfections

Productive assets like land or enterprise-capital will have negative wealth effects on child labor and, in a perfect-markets economy, we would expect the children of large landowners to be less likely to be in work than the children of small landowners or landless agricultural workers. Remarkably, we observe the *reverse* tendency – for both boys and girls - and for countries as diverse as Ghana and Pakistan (see Table 1). These facts challenge the common presumption that child labor emerges from the poorest households (as stated, for example, in U.S. Department of Labor (2000)). This is very important since the vast majority

¹⁹ See, for example, Becker (1991).

of child workers in developing countries work on farms - typically family farms - in rural areas, and land is the most important store of wealth for rural households.

The seeming paradox may, however, be explained by imperfections in labor and land markets - though credit market failure will tend to weaken the force of this paradox (Bhalotra and Heady 2000, Cockburn 2000). Consider credit market imperfection first. Since land is an important form of collateral, the effective interest rate will be a negative function of land ownership. So large landowners will find it easier to borrow and this will tend to reinforce the wealth effect. Labor market imperfections may make it difficult for landowners to hire in workers, whether on account of peak season labor shortages or on account of moral hazard (family labor is easier to supervise). If, at the same time, it is difficult to lease out land on account of land market imperfections then landowners have an incentive to employ family members, including children, on the farm. Since the marginal product of (family) labor is increasing in land size, this incentive is stronger the larger is the farm. There is also a reinforcing dynamic effect on marginal productivity that depends on the relative effectiveness of work experience and education in raising the future earnings of the child (also see Rosenzweig and Wolpin 1985). This, in turn, depends upon the probability that the child will grow up to inherit the farm and upon any gender or birth-order biases in inheritance norms. If these effects overwhelm the wealth and collateral effects of land ownership then we may see the “wealth paradox”, that is, that child labor is increasing in household wealth, where wealth is measured in terms of productive assets.

Including both a measure of total consumption and land size (or value of productive assets) allows separation of the wealth effect from the other (substitution) effects. A zero coefficient on land in an equation for child labor suggests no market imperfections or else counter-balancing imperfections. A non-zero coefficient signals market imperfections. A positive coefficient suggests that both the land and labor markets are imperfect and more so than the capital market. A negative coefficient suggests that the capital market is imperfect and more so than the land and labor markets (Bhalotra and Heady, 2000). Data permitting, it is useful to try to disentangle the labor and land market effects from the credit market effect (see Section 6.11).

6. ISSUES OF MODEL SPECIFICATION

This Section discusses specification issues that arise in modeling child labor with a view to informing future research in this area. It also provides an analytical backdrop for the review of empirical research in Section 7. The review will reveal that estimates of effects of many determinants of child labor differ widely across studies. Does the diversity of results in the literature simply reflect the diversity of country experiences of child labor, or might it instead reflect a range of weaknesses in methodology? There is an interesting parallel here with research on female labor supply in OECD countries, which has produced a wide range of estimates of income and wage elasticities, often based upon the same data sources. The seeming inconsistency of these results has stimulated research into the microeconomics of labor supply, where developments have been largely concerned with issues of sample selection, simultaneity or measurement error biases, and functional form (Mroz (1987), Heckman (1994)). Here we consider each of these issues in the context of the literature on child labor. We will also introduce other issues relevant to specifying a model of child labor.

6.1. Censoring and Sample Selection

Since only a small fraction of children work, modeling their labor supply raises issues of sample selection. In particular, both hours of work and wages are only available for individuals in work. The literature on child labor has side-stepped this problem by concentrating on estimation of reduced form participation equations. This involves throwing away information on hours of work which is typically available in the surveys used – and which reveals considerable variation, exploiting which can offer important insights (see Bhalotra 2000a). It also means that we have limited knowledge of how an important economic variable- the opportunity cost of working (the wage) - influences the amount of child work (see Section 7.3). In order to use the available data on hours and wages of children, sample-selection correction methods need to be employed (Heckman, 1974).²⁰ While it has to be said that the Heckman estimator does not have a favorable record in terms of robustness, the literature on child labor can learn a lot by following developments in the

²⁰ Estimation of an hours model without the correction for endogenous selection into work participation will tend to create a positive bias on the wage coefficient.

literature on women's labor supply (see Killingsworth and Heckman 1986 for an early assessment).

Although the majority of studies estimate reduced form participation equations, there are some exceptions. For instance, Ray (2000) uses the available data on hours and wages to estimate a tobit model and – with no apparent justification- sets the wage for all non-working children equal to the smallest wage amongst working children. A tobit model is also estimated in Bhalotra and Heady (2000) but this is a reduced form: the wage data are not used. Hours of work conditional on participation are modeled in Bhalotra (2000a, 2000b) with sample selection correction. The only study we are aware of that has attempted to estimate the shadow wage from data on children in agricultural work is Cockburn (2002).

6.2. Separability of Parent and Child Labor

The labor supply of children is typically more variable than that of adults, and a significant degree of that variability can be explained in terms of their household circumstances - especially their non-labor income and household composition (especially fertility). It is therefore important to cast the labor supply decisions of children in a model of the household. In particular, child labor supply will tend to be jointly determined with the labor supply of parents and siblings. This has the implication that either the (actual or potential) wage rate or (in a conditional demand framework) the actual labor supply of other household members should appear as regressors in an equation describing child labor. If it is the participation and/or hours of parent work that appear in the model of child labor, they need to be instrumented. To neglect these variables amounts to assuming separability of parent and child labor supply. This is generally not acknowledged or investigated (an exception being Bhalotra (2000b)).

6.3. Endogenous Fertility and Altruism

An important difference between the labor supply of adults and children is that adults may be assumed to take their own decisions, while decisions relating to work and school for children are typically taken by parents. This has two interesting implications. First, (following Becker and Tomes (1976) and Becker (1991)) parent utility depends upon both the quantity and the quality of children. Thus fertility is jointly determined with investments

in child quality – including investments in education or work experience. With the exception of Cigno, Rosati and Tzannatos (2000), endogenous fertility has largely been ignored in the empirical literature on child labor. Indeed, most studies include household size and/or the number of children in the household as regressors in models of child labor.

Second, if parents place a greater relative weight on their own consumption or leisure than on that of their children, then increases in adult income will translate less rapidly into child leisure or child school-attendance than otherwise. Theoretical models of child labor often assume a strong form of parent altruism²¹ but it is important to recognize that agency issues arise when the decision-maker is not the child (see Section 5.3). This has potential implications for the empirical specification of an equation explaining child labor. For example, analysis of the LSMS data for rural Pakistan reveals that, even as parental selfishness is decisively rejected, households which consume tobacco spend significantly less on children, other things being equal (Bhalotra, 2001). The results are consistent with tobacco addiction, or with tobacco behaving like a subsistence good. They may also be interpreted to suggest that, given that men smoke four times as much as women in the sample for rural Pakistan, men are less concerned about child welfare than women, a view for which evidence has been noted in a related literature (1990, 1994).

6.4. Multiple Choices

Men's decision to work can be quite adequately modeled as a choice between market work, self-employment and leisure. In the case of women, a third choice is home production (productive work within the households for which there is no explicit wage). In the case of children, a third choice is school attendance. The child labor supply decision involves allocation of time between *labor, leisure and school*. The basic assumptions are that leisure is a good and labor is a bad (that is, it affords disutility or people do not like it), and it is probably reasonable to assume that the marginal utility of school attendance is positive. Labor brings the benefits of a wage income today (or of additional revenue if self-employed) as well as the benefit of experience accumulation and therefore higher wages tomorrow. Education also promises higher wages tomorrow, so time allocation has to weigh up these

²¹ For example, Basu and Van (1998). Many other theoretical models of child labor assume altruism, although it may not be critical to the model (Baland and Robinson, 2000).

dynamic benefits since more education usually means less work experience. A dynamic model of the simultaneous choice between work, school and leisure, that allows for returns to both experience and education is presented, for example, in Bhalotra and Heady (2000), building upon a similar literature developed to model the choice between work, leisure and training amongst young adults.

A further, more empirical dimension to the problem of modeling time allocation across the three activities arises in terms of whether they are mutually exclusive or not. By definition, there is a conflict in time spent. Sometimes there is also a conflict between work and school participation, as evident for wage work in South Asia. In some countries, especially in Africa, children combine work and school attendance on a fairly regular basis. In most countries, but to different extents, a substantial fraction of children are reported as being neither enrolled in school nor engaged in any regular income-generating activity. In view of these observations, some of the empirical research on child labor has defined four possible states: work only, school only, both, and neither.

If *types of work* are distinguished, further states can be defined. The most commonly used estimation structure for this is the multinomial logit, although it has its problems, most particularly, the assumption of the independence of irrelevant alternatives (see Maddala (1983)). Papers using the multinomial logit include Cigno, Rosati and Tzannatos (2000), Rosati and Tzannatos (2000), Cartwright (1996), Cartwright and Patrinos (1997), Sasaki and Temesgen (1999), and Liu (1998).

An alternative approach that has been used to deal with the fact that there are several possible outcomes to the time-allocation decision is the sequential probit (see Grootaert and Patrinos (1998), who present analyses of data for Cote d'Ivoire, Colombia, urban Bolivia and the Philippines). This approach has some attractive modeling features but it necessitates rather strong assumptions about the sequencing of decisions. In particular, these two authors assume that parents first decide whether the child attends school or not and then there is a further hierarchy of choices regarding the nature and extent of work participation and whether this is combined with other activities. In contexts where combining activities is uncommon, the simultaneity of the school and work decision can be modeled by estimating a bivariate probit which allows the unobservables in the work and school participation

equations to be correlated (see Canagarajah and Coulombe (1997), Coulombe (1998) and Nielsen (1998), Bhalotra and Angeriz (2002)).

6.5. Endogeneity

Some of the explanatory variables in commonly estimated models of child labor are endogenous, that is, correlated with the unobservables in the equation error. For example, household income is expected to have a negative effect on child labor but, at the same time, we may expect a positive effect flowing in the reverse direction as child labor contributes to household income. The simultaneity bias arising from neglecting to instrument household income will therefore be positive. This is important to recognize since many of the reviewed studies do not instrument income and many report an insignificant or even positive income effect (see Section 7.2).

In his analysis of data from Cote d'Ivoire, Grootaert (1998) does not include any measure of income status as an explanatory variable on the grounds that it is likely to be endogenous. Some studies tackle endogeneity by subtracting the child's contribution to income from reported household income – these include Ray (2000), Cartwright (1996) and Cartwright and Patrinos (1997). This approach has two problems. First, it is difficult to estimate the child's contribution when the child works without an explicit wage on the household farm or enterprise, and this is the predominant form of child labor in developing countries. The assumptions made in imputing a wage to the child are often untenable (as, for example, in Ray, 2000) Second, even where it is possible to estimate child income and deduct it, adult income is not exogenous to the extent that child and adult labor supply are jointly determined (for evidence that this is the case in rural Pakistan, see Bhalotra 2000b).

This said, finding an instrument for income in the data is inherently difficult. Potentially good predictors of adult income or household income include parent education, parent occupation, the number of adults in the household and the value of land, livestock and other assets owned by the household. However, it is unclear that any of these can justifiably be excluded from the child labor equation. Some authors have used community-level instruments such as the presence of a shop, a road, a post-office, electricity supply, an index of land inequality and so on. A possible objection to these instruments is that they capture village productivity effects. However, conditional on village-level wage rates, it may be

reasonable to exclude them from the child labor equation. They have good predictive power and are not rejected by a test of overidentifying restrictions, given an (arbitrary) initial restriction (Bhalotra (2000a), Bhalotra and Heady (2000))²². A persistent weakness of community-level instruments is that they reflect inter-village variation and involve some loss of information in regard to within-village differences in incomes.

Identification of income effects on child labor is best done in situations where the data offer a natural experiment, that is, where some households receive a genuinely exogenous income transfer. Even in these cases, some delicate specification issues arise and modeling requires a fine understanding of program design, selection rules and any self-selecting behavior. While such data are not easily available, they are becoming increasingly so. The response of child labor to exogenous income transfers has been analyzed by Ravallion and Wodon (2000) using data incorporating information on a school subsidy offered by an NGO in Bangladesh and by Martinelli and Parker (2000) and Bourguignon et al (2003), using data from the Progresa program in Mexico. Carvalho (2000) uses data on the introduction of an old-age pension to analyze the effects of an exogenous increase in income on child labor in three-generation households. Using two years of data from the Vietnam LSMS, Edmonds (2001) identifies large effects of income growth on child labor incidence.

There are potentially endogenous variables other than income in a structural model of child labor. For example, the child wage, household size or acres of land leased in (or out), or sharecropped. Household size is typically included as a regressor but not instrumented, though Cigno, Rosati and Tzannatos (2000) acknowledge endogenous fertility and exclude this variable. The child wage is typically not included as most of the surveyed studies estimate reduced form participation models. Exceptions include Ray (2000) who does not instrument it and Bhalotra (2000a) who instruments the individual child wage with the going agricultural wage for children in the community, investigating the overidentifying restriction associated with using the child's completed schooling as an additional instrument. The decision to rent or sharecrop land is endogenized in Bhalotra and Heady (2000) who instrument it with land owned and an index of land inequality in the village. In conditional

²² It is good practice to report tests of both the strength and validity of instruments and to show comparable OLS estimates along with the IV estimates because weak instruments not only produce inefficient estimates but can also produce biases (Bound, Jaeger and Baker, 1995).

demand models that incorporate schooling, sibling activity or parent labor supply as regressors, these variables are endogenous. The hours worked by the mother and father appear as regressors in Bhalotra (2000b), where they are instrumented by indicators of parent illness in the week preceding the survey. Oveidentifying restrictions associated with community variables and with the education and age of the parents (including interactions between education and age and between these variables for mother and father) are investigated (education and age are commonly used as instruments in labor economics even though they are, in principle, questionable). The completed school years of the child is included as a regressor in Bourguignon et al (2003) and Bhalotra (1999a). The papers we surveyed do not contain instances where sibling activity status appears as an explanatory variable, and, if it did, it would be endogenous.

6.6. Measurement Error

It is difficult to obtain accurate assessments of household income in general and this problem is particularly acute for rural households. A large fraction of their income may be derived from self-employment and a varying fraction may be directly consumed rather than sold. Also, agricultural incomes are volatile, making measured income sensitive to the reference period of the survey. For this reason, total expenditure is often used in place of income, there being evidence that even poor households perform some smoothing of consumption (Townsend 1994). However, measurement error will tend to creep into estimates of total expenditure on account of having to impute value to home-produced consumption or measure the value of services from durables or –typically not attempted– include the value of leisure consumed.

Classical measurement error biases coefficients towards zero. The common way of addressing this problem is to use instrumental variables, the alternatives for which were discussed in the preceding section. An alternative approach is to estimate M-demands rather than the standard Marshallian demands (see Bhalotra 2001, Browning 1998). This involves replacing total expenditure with expenditure on a reference good. It seems plausible that most data will offer a candidate reference good that is measured with less error than total

expenditure, since it is in arriving at the total that the problems of having to deal with durables, leisure or imputed values for non-purchased goods arise²³.

Additional measurement issues are associated with using data on hours of work.

6.7. Aggregation

Interpretation of results for policy or other purposes should be sensitive to the manner in which the sample is defined. The surveyed studies tend to pool data by age, gender, region (rural/urban), and type of child labor (wage work, work on household farms and enterprises). Separation of these samples suggests that the pooling restrictions do not hold. Imposing slope heterogeneity will tend to yield biased estimates.

6.8. Definitions

The researcher has a choice of definitions, both of child labor and of explanatory variables. Related to the preceding section, the researcher chooses what *categories of work* are included in the definition of child labor and, in particular, whether it refers to wage work; work on family farms and enterprises; domestic work, or a combination of all of these. The first typically involves being employed for long hours outside the home whereas the second and third involve working for the family and are more compatible with school attendance. Under labor and land market imperfections, the opportunity cost of sending a child to school is larger for landowners and, indeed, larger the larger is the size of land owned.

A second definitional issue is whether the dependent variable is *participation or hours* of work conditional on participation or, indeed, hours of work unconditional on participation. The evidence is that the elasticity of labor supply – with respect to income and wage rates- tends to be higher for participation than for hours (see Heckman 1994). A third choice relates to selecting the *age range* of children. This lies between about 7 and 18 in the studies surveyed. One might expect larger elasticities of, for example, income, for younger

²³ For example, in an empirical application that investigates parent altruism in the context of child labor, Bhalotra (2001) uses expenditures on adult goods as the reference good. In his empirical illustration for commodity demand in the UK, Browning defines food expenditure as the reference good. Now food expenditure or adult-goods expenditure are directly reported in most surveys. While they may be reported with some error, the measurement error in these variables will tend to be smaller than in total expenditure because there is now no need to construct a value for expenditure on leisure or expenditure on durable goods.

children. There is a similar issue of distinguishing enrolment in school from attendance and, further, progression and achievement at school.

As this is a variable of central interest, consider alternative definitions of household income or living standards. First, the available studies differ in whether they use food expenditure, total expenditure or current income. Some directly use indices of asset ownership and some use both a measure of current income and of assets. The possible conflation of wealth and incentive effects associated with productive assets is modeled in Cockburn (2000) and Bhalotra and Heady (2000) and discussed in Cigno, Rosati and Tzannatos (2000), Rosati and Tzannatos (2000) and Andvig (1999). As discussed in Section 5.4, including assets alone can result in ambiguous “income effects”. A second issue relates to adjusting the measure of resources for demographic differences between households. Either the income measure is defined in adult-equivalent terms or, alternatively, the equation includes controls for household size and composition. There is considerable heterogeneity in the reviewed studies in this regard: some control for household size but not composition, others control for both. Interpretation of the resulting elasticities should be sensitive to these differences in specification.

6.9. Functional Form

Most studies use linear or log-linear specifications although, for variables such as income or acres of land owned, one may expect non-linear effects. For instance, both Canagarajah and Coulombe (1998) and Bhalotra and Heady (2000) find a quadratic effect of income on child labor. The non-parametric relation of child labor with income and the child wage is described in Bhalotra (2000a, Figures 3 & 4), and that of child labor and income in Edmonds (2001). These studies suggest that a log-linear specification is restrictive.

The empirical literature on child labor involves a range of limited dependent variable models: univariate and bivariate probits, sequential probits, multinomial logits and tobits (Section 6.4). These differ in the assumed distribution of the error term and in their assumptions about the manner in which the choice set is sequenced and arrayed. Their results are therefore not directly comparable. Marginal effects are often reported at sample means but it may be interesting to see the distribution of marginal effects corresponding to the

distribution of the explanatory variables. This is seldom reported, Cockburn (2001) being a notable exception.

6.10. Conditioning Variables

Many of the regressors are correlated and any marginal effect or elasticity will depend upon what other variables it is conditioned upon. For instance, the income elasticity may depend upon whether the equation controls for *household size and composition* and the value of *productive assets*. It has also been shown to depend upon whether *parents' employment status* is held constant: for example, Bhalotra (2001b) shows that the income effect rises threefold when hours of work of both parents are held constant.

6.11. Data Needs

The forgoing discussion suggests ways in which the collection of data may be improved to assist research and policy formulation. First, it is extremely useful to have panel data that permit following a child for some years. This would allow us to study the dynamics of work and school participation, a good illustration of which is in Sawada and Lokshin (2001) who use a panel of data for twenty-five villages in Pakistan to examine the sequential nature of schooling decisions. It would also allow us to control for child-specific time-invariant unobservables such as inherent ability and health endowments (see Bhalotra and Angeriz 2002 and Cockburn 2002 for attempts to do this using alternative methods with cross-sectional data).

Second, data collection needs to be designed to permit program evaluation. This involves collecting data before and after the start of a program, allowing sufficiently long intervals at each end to avoid program announcement effects (before the start of the program) and to allow the program to take full effect (after it has started). Such data should be collected for both “treatment” and “control” groups. A fine illustration of an attempt to do this is in the case of Progresá, a major policy intervention in progress in Mexico (Skoufias and Parker 2001). Experimental data of this sort overcome the need for instrumental variables by providing information that can be used to estimate causal effects.

Third, it would be useful to supplement household survey data like the LSMS data with surveys of children who do not live in households. The ILO has, in the last decade,

conducted a number of rapid assessment surveys in developing countries with this objective. The surveys and reports can be found via www.ilo.org. Attempts to combine information from these surveys with the information in household survey data to build a consistent picture of child labor for an economy are still scarce.

Fourth, time allocation surveys experimenting with alternative recall periods are merited. These will provide useful information for some of the following reasons. Some children combine work and school and others do neither: it is especially useful then to understand exactly how their time is allocated. Since we are interested not only in participation in work but in how many hours it consumes and since we are interested not only in attendance at school but in how much time the child has to study or rest, it is again useful to know how residual time is spent.

Fifth, multi-topic surveys of the style that are available (see Section 2.2) may be expanded to include information on (retrospective) income shocks/variability (see Section 7.18), availability and use of credit (distinguishing credit available for consumption and business purposes), the question of what, if any, collateral rural households offer for credit (whether this is primarily land: see Section 5.4 above), property rights, inheritance laws (refer Section 5.4) and questions regarding the individual household's experience of trying to hire or supply labor (again see Section 5.4). Indicators of the activity levels of labor markets for adults and children and also of land and credit markets would be useful to have though some thought needs to be given to how best to define such indicators.

7. EMPIRICAL RESEARCH : A REVIEW

This section reviews the findings of the relatively recent crop of empirical papers on child labor that analyze micro-data from a number of developing countries. While these have contributed substantially to identifying the correlates of child labor, there remains considerable scope for further research into the causes of child labor. This requires rather sharper tests than we have seen, motivated by explicit theoretical models. The econometric specifications used also need to be tightened and more closely related to theory.

We have reviewed about thirty empirical studies. There is little to be gained in taking the median of elasticities or conducting a meta-analysis since the choice of sample and the equation specification are typically not comparable. Instead, we present an broader overview

of the results. The reader will notice the wide range of estimates which, as discussed in Section 6, may reflect specification errors rather than genuine geographic diversity. Following Section 7.1, results are organized by explanatory variable. In each sub-Section, we indicate expected effects and potential misspecifications before proceeding to describe the findings of the different studies.

7.1. Parent Altruism

Altruism is investigated by the method described in Section 5.3 using the 1991 LSMS for rural Pakistan, a region where both child labor and child malnutrition are prevalent in households that live above the poverty line. The data are consistent with altruism but, at the same time, they reveal that households that smoke (buy tobacco) spend significantly less on children, other things being equal. This is argued to be consistent with tobacco being addictive or, alternatively with men (the dominant smokers) being less altruistic than women (Bhalotra, 2001).

The latter implies heterogeneity in preferences between parents. This is investigated for Indonesia by Galasso (2000), who rejects preference homogeneity. Andvig (1999) raises the issue of child labor being dependent upon whether the family system is patrilineal or matrilineal. The possibility that biological children are favored over non-biological children in the allocation of work within the household is investigated in Bhalotra (2000a) and Bhalotra and Heady (2000). The hypothesis is rejected for family-farm work in Pakistan where children of heads of household are more likely to work, indicating that this kind of child work may be motivated to train children who are going to inherit the land. For Ghana, on the other hand, the evidence is consistent with the hypothesis that sons of the head of household work less. There is a similar negative sign for daughters but this coefficient is poorly determined. The question is more interesting when posed for an African country as child fostering happens there on a fairly large scale (see Ainsworth, 1996).

7.2. Household Poverty

7.2.1. Small income effects on child labor

One of the most striking findings that emerges in surveying the empirical literature on child labor is that both its unconditional and conditional correlation with household poverty

is small, and often insignificant. An insignificant income effect is reported, for example, in Coulombe (1998, Cote d'Ivoire), Sasaki and Temesgen (1999, Peru), Patrinos and Psacharapoulos (1997, Peru), Ilahi (1999, rural boys in Peru) and Ray (2000, Pakistan). A positive coefficient on income is obtained in Cartwright (1996, household farm/enterprise work in rural Colombia) and in Patrinos and Psacharapoulos (1994, Paraguay). Negative income effects are found in Cartwright (1996, wage work in rural Colombia), Cigno and Rosati (2000, rural India), Ilahi (1999, rural girls in Peru), Rosati and Tzannatos (2000, Vietnam), Liu (1998, wage work in Vietnam), Ray (2000, Peru), Bhalotra and Heady (2000, boys in Pakistan and girls in Ghana, both in rural farm work). In a review of empirical studies of Cote d'Ivoire, Ghana and Zambia, Canagarajah and Nielsen (1999) conclude that there is not much evidence in favor of the view that poverty is a very important cause of child labor. In her survey of field studies of child labor in India, Bhatta (1998) concludes that there is no clear association between poverty and child labor. The rest of this Section presents an illustrative selection of sizes, while Section 7.2.4. offers a more detailed consideration of the specifications used in some of these studies, which puts the numbers in context.

Using data for rural India, Cigno, Rosati and Tzannatos (2000) find a marginal effect of income on participation in “work-only” of -0.52 and a larger effect of -0.78 on participation in “work-and-study”. They show that raising a household from the poorest to the least-poor category would only reduce the probability of being in work by 4%. Other studies have found no effect of income. For example, Patrinos and Psacharapoulos (1997) report a marginal effect of *zero* of income on the probability that school-going children work in Peru. Some find a *positive* effect – for instance, Canagarajah and Coulombe (1997) report a positive effect of per capita wealth on child labor in Ghana.

Now consider two *comparable* studies, one of which refers to wage-working children and the other of which refers to children employed on family farms. Both studies separate the samples for boys and girls and are restricted to rural areas and both instrument income. Conditional on participation, the income elasticity of hours of work for children in wage work in rural Pakistan is *-0.17 for boys and -0.34 for girls* (Bhalotra, 2000a). This means that a 10% increase in income will result in a decrease in work of about one hour in the case of both boys and girls, the proportionate decline being larger for girls because their average

hours of work are smaller (31 hours a week as opposed to 45 hours a week for boys)²⁴. Alternatively, consider how much child hours of work would decline if we got the average household in the bottom quartile of the living standards distribution into the second quartile. Measuring living standards as per capita food expenditure, this involves a 60% increase in the case of rural Pakistan. A simple model of labor supply predicts a decline of 6 hours: down from 45 to 39 a week in the case of boys and down from 31 to 25 a week in the case of girls. So, even a 60% increase in income does not reduce child labor enough in this sample to make school attendance feasible. This underlines how small the effect of household income is. Is it any different for children that work for the family farm or enterprise? Estimates of income effects on hours obtained from a tobit run, for comparability, on rural Pakistan show that the gender differential is turned around and the elasticities are significantly different: the income elasticity is now *zero for girls and -0.66 for boys*. (see Bhalotra and Heady, 2000)²⁵. A 10% increase in income reduces boys' farm work by 1.2 hours, which is larger than the impact on wage work as average hours in farm work are, at 15 hours a week, smaller. The same study also reports estimates for children working on family farms in rural Ghana. Here, *the income elasticity is zero for boys and -0.20 for girls*. An increase in income of 10% reduces girls' work by only 0.3 hours, from an average of 15 hours a week.

In contrast, Edmonds (2001) finds that income growth in Vietnam can account for a large part of the reduction in child labor observed in this country during the 1990s. Carvalho (2000) finds that the introduction of an old-age pension in Brazil resulted in a reduction in child labor amongst children living with grandparents, the impact of a grandmother's pension on her granddaughters' labor being especially large. It is unclear whether these relatively large income effects reflect real differences associated with Vietnam and Brazil or whether they reflect the weight of different methodologies. Edmonds has access to two years of data on Vietnam and Carvalho has data from a natural experiment. More robust estimates can certainly be obtained with these better data sources. It is nevertheless puzzling that such a

²⁴ How large is this? Consider that the average household in this sample spends only 2% of its budget on education. So a policy that promises to relieve households of school costs would be more modest than a 10% increase in incomes.

²⁵ The different elasticities we obtain when the data are sub-sampled by gender and types of work show that aggregation can yield spurious results (see Section 6.7).

large body of previous research finds small income effects and further research on this subject is merited.

7.2.2. *Small income effects on schooling*

Although child labor is not the inverse of schooling because a non-trivial fraction of children are, at any time, engaged in neither or both (see Section 3), it is interesting to consider whether the association of poverty and schooling is any stronger than the association of poverty and child labor (on which see Section 5). Estimates of income elasticities for a range of indicators of educational enrollment and attainment are surveyed in Behrman and Knowles (1999) for the US and a number of developing countries. The median elasticity, at 0.07, is small, though somewhat larger estimates of about 0.20, are observed for lower income regions. In their own analysis of five indicators of schooling in Vietnam in 1996, Behrman and Knowles find rather higher income elasticities than the previous literature. This is at least partly on account of their more careful attention to the choice of indicators and the specification of the equation.

Their work on schooling therefore has two important lessons for us. *First*, a majority of studies find a weak relation of poverty and schooling just as a majority of studies seem to find a weak relation of poverty and child labor. *Second*, we cannot read too much into this since the results of a majority of studies of both schooling and child labor are probably not robust to specification errors. Although we indicate here that, even after a more careful analysis of the data, the impact of poverty on child labor is not as large and universal as we may have expected, we need to accumulate more such evidence before we can draw wide-ranging conclusions.

7.2.3. *Income effects by gender*

Income elasticities of participation and hours of child work are typically higher for girls than for boys,²⁶ a result that is paralleled in analyses of schooling (see Ilahi (1999), Ravallion and Wodon (2000), Behrman and Knowles (1999), Bhalotra (2000a)). This

²⁶ As discussed above, the gender differential is reversed in a sample restricted to farm workers in rural Pakistan. It is not reversed for a similar sample in rural Ghana. Various institutional and economic differences probably bear on this such as gender asymmetries in inheritance laws and the relative scarcity (and therefore the relative value) of land.

suggests that education is more a luxury good for girls than for boys, which is consistent with the fact that in many traditional societies, educated women do not seek employment or, when they do, they earn a lower wage than men with comparable education.

7.2.4. Context: Specifications underlying income effects

In their paper on rural India, Cigno, Rosati and Tzannatos (2000) directly use *household income*, measured to include earnings as well as own-production. It is not instrumented and no adjustment is made for the fact that it refers to the current period (period of the survey). The authors estimate a multinomial logit model for the alternative states of activity observed in the Indian data (work only, work and school, school only). Income has a negative effect on the probability that the child only works, though no effect on the probability of being in the other two states. This is not inconsistent with economic theory which predicts a negative effect only in the case where the choice is effectively between work and leisure (see Section 5.1).

Cartwright (1996) uses data from Colombia to estimate a sequential probit model in which the hierarchy of choices refers to the decision to work with or without a second activity, the decision to just work, the decision to work for wages, and the decision to work on a family enterprise. She measures income as *reported income minus the child's earnings*. For rural areas, she finds a significantly negative effect of this on the probabilities of the first three stages but a positive effect in the fourth stage. For urban areas, she finds a negative effect in stages one and three and insignificant effects in the other two stages. The result that it is worth hanging on to is that in both rural and urban areas, there is a negative income effect on wage work and not on work on the household enterprise. Using urban Bolivian data to estimate the same specification, Cartwright and Patrinos (1997) find significantly negative effects for the first stage only.

Using reported *household income* again, Patrinos and Psacharopoulos (1995) identify a negative and significant effect on the probability of combining school with child labor (as opposed to school alone) in Paraguay. Using the same binary logit specification on data from Peru in their 1997 paper, these authors find no significant effect of income. This result is confirmed by Sasaki and Temesgen (1999) who again use reported income per capita. They estimate a multinomial logit (allowing work only, school only, both and neither as

independent choices) for the same Peruvian data and find that income is insignificant in each of the three equations. A binary probit with random household (check that these effects are indeed for the household) effects estimated using two years of the Peru survey and separating equations by gender produces the same insignificant result for income measured as *log of household wealth per capita* (Ilahi, 1999). However, when Ilahi interacts the wealth variable with the rural residence dummy, he identifies a significant negative effect for rural areas, though only for girls. Comparison of the results of different studies for Peru indicate that the result can be more sensitive to the choice of sub sample than to econometric specification.

Using the full sample of Ghana data for 1991/2 and pooling data for boys and girls, Canagarajah and Coulombe (1997) find a positive but decreasing effect of the log of per capita total expenditure on the probability of child work. They allow for a correlation of unobservables determining work and school by estimating a bivariate probit, but they do not allow for endogeneity of income status. Bhalotra and Heady (2000) use a quadratic in the *logarithm of per capita food expenditure* which is a relatively smooth measure of household welfare status. They estimate tobit models for boys and girls in the sample of rural households that own or operate farm land in Ghana and Pakistan. They identify a significant negative effect of income status on child work hours in the case of girls in Ghana and boys in Pakistan. There is no significant effect of income on work for boys in Ghana or for girls in Pakistan. In all cases, food expenditure is instrumented using community level variables. Comparison of IV with OLS estimates shows that the OLS estimates carry the expected upward bias on the income coefficient.

7.3. Wage Elasticities

It is uncommon for studies of child labor to include the child wage as a regressor—most econometric analyses of child labor have estimated reduced form participation equations. In their studies of household production and time allocation, Levy (1985), Rosenzweig (1981) and Rosenzweig and Evenson (1977) find positive wage elasticities for child work force participation in the rural areas of Egypt and India respectively, but negative wage elasticities are ruled out by construction in their models.

Turning from research on child labor to the larger literature on labor supply, there is some evidence of negative wage elasticities for hours of work of adult men though these are

typically found at high wage levels (see Attanasio and MaCurdy (1997), Kniesner (1976) for the US, Kooreman and Kapteyn (1986) for the Netherlands). Negative wage elasticities *at low wages* have been found for Mexico (Hernandez-Licona, 1996) and rural India (Rosenzweig, 1980) using data on adults. Looking at children here sharpens the question: Since the earnings of adults provide non-labor income for children, we would expect forward falling labor supply curves to be *less* likely to be observed for children than for adults.²⁷

Bhalotra (2000a) presents a model of labor supply incorporating subsistence constraints and estimates it on data for children engaged in wage work in rural Pakistan, who comprise 10% of the 10-14 year-old population. As discussed in Section 5.2, own-wage elasticities for children carry more information than income elasticities because they indicate whether the substitution effect is dominated by the income effect or not. The paper identifies a significantly negative wage elasticity of hours of work for boys and an elasticity not significantly different from zero for girls. This is a striking result. It suggests that boys work when it is necessary, that is, when household poverty compels them to. This is much less clear in the case of girls. So, while raising the expected returns to school may draw girls out of work and into school, these results indicate that households in which boys are engaged in wage work cannot afford the opportunity cost of schooling. In this case, investments in school quality or other measures designed to raise the return to schooling will not draw them out of work. Instead, income transfers to households supplying child labor may be more effective, especially if conditional on the child attending school.

7.4. Parental Education

Policy interventions should consider not just the direct impact of mother's education on child labor and schooling but also the likely indirect effect working through reduced fertility. The absolute level of women's education is very low in most developing countries and the returns are often very high (Appleton 1999). Since uneducated daughters tend to grow up to produce uneducated daughters and since female education is known to generate

²⁷ For the village economies that we are concerned with, we can safely ignore "backward bending" labor supply behavior which occurs only at high wage levels. The negative wage elasticity associated with subsistence constraints occurs at low wage levels, yielding a "forward falling" labor supply curve.

strong social externalities (Sen 1999) there is a strong case for policy interventions that promote female education.

Most studies include parents' education, treating *mothers and fathers* separately but a number of those discussed below only consider the education of one parent, more often the father. About half the studies enter a set of dummy variables for level of education attained, that is, indicators for no-education, primary, middle or secondary level education. The others use years of education instead: in these studies this term almost always appears linearly even though the data appear to support non-linearities, reflecting either increasing or decreasing returns or else sheepskin effects. Of course, if the true effect is non-linear, a linear specification may misleadingly show insignificance.

In interpretation of coefficients on parents' education, it is important to know what variables are held constant in the estimation. In particular, if household income is not adequately controlled for then any effect of the education of parents will tend to include an income effect since more educated parents tend to earn more or to be richer. If income is held constant and we find that the children of educated parents are less likely to work, then a plausible interpretation of the education effect is in terms of attitudes to child work, aspirations for the child's future, and/or subjective degrees of time preference.

There is more or less consistent evidence that mothers' education has a negative effect on child labor, and the size of this effect often exceeds that flowing from fathers' education. However, there is considerable variation around this statement. Canagarajah and Coulombe (1997) find a negative effect on child work participation of fathers' secondary-level education and no effect of mother's education in Ghana, using data combined for boys and girls in rural and urban areas. Using the same LSMS data but isolating rural children and separating girls and boys produces a negative effect of mothers' middle or secondary level education for boys but no effect of fathers' education (Bhalotra and Heady, 2001).

On family farms in rural Pakistan, mothers' middle or secondary level education has a negative effect for boys and girls (larger in the case of girls) and fathers' secondary education has a negative effect that is restricted to girls (Bhalotra and Heady, 2001). In rural India, estimates indicate that the children of mothers with less than primary education are significantly more likely to be in full-time work as compared with full-time study, and that

having a mother who completed middle school reduces the probability of combining work and school as compared with full-time study. Fathers' education has no significant effect (Cigno and Rosati, 2000). An older study based on the 1961 Census of India indicates a negative effect of father's education on boy's work with no effect flowing from mother's education (Rosenzweig and Evenson, 1977).

Negative effects of mother's and father's education are identified for child labor in Bangladesh (Ravallion and Wodon, 1999). Father's education has a negative effect on child labor in urban areas of the Philippines whereas, in rural areas, there appears to be a positive effect (see Sakellariou and Lall, 1997); these authors do not investigate mother's education. In Vietnam, years of father's education has no effect on child labor but mother's education has a negative impact on the probability of work as well as on the probability of being neither in work nor in school (Rosati and Tzannatos, 2000). However, Liu (1998) finds insignificant effects of both mother's and father's years of schooling on child labor in Vietnam, whether market or home based.

The probability of combining work and school as compared with the probability of full-time study is found to be reduced by years of fathers' education in Peru (Patrinos and Psacharopoulos, 1997) and by years of mother's education in Paraguay (Patrinos and Psacharopoulos, 1995). However, using the same Peruvian data for 1994, Sasaki and Temesgen (1999) find that the probability of combining work and school as compared with full-time study is reduced by both father's college education and mother's secondary and college level education. While the first study uses a binomial logit, the second uses a multinomial logit, allowing for two further outcomes: work only and neither work nor school. Mother's education has no effect on these outcomes relative to study only. Father's secondary education has a negative effect on the probability of work only relative to study only. Controlling for household-specific effects using a random effects probit on the Peruvian data for two rounds (1994 and 1997), Ilahi (1999) finds a negative effect of the education of the oldest prime-age female on the probability of children working in an income-generating activity in Peru, and this effect appears to be similar for rural and urban areas.

While the results of the three studies for Peru do not contradict one another, here is one more instance of how statements like “mothers’ education is more important than fathers’ education in reducing child labor” need to be qualified with more specific information about what sub-sample is being discussed and in relation to what, and whether the education effects are allowed to be nonlinear.

In Colombia, multinomial logit estimates reported in Cartwright (1993)²⁸ indicate that, with full-time study as the reference category, there is a negative effect of fathers’ years of schooling on the probability of full-time child work whether this is for wages, on the family farm or enterprise, or it is full-time home care. Interestingly, mothers’ years of schooling has no effect on child labor that produces marketable goods but it has a positive effect on the probability that a child is at home in full-time care. The study does not distinguish boys and girls but this result is consistent with the view that educated women take work and, as a result, their children may have to substitute them at home at the expense of going to school. These effects are similar in rural and urban areas, the effects of mother’s education being stronger in urban areas.

In their analysis of child labor in urban Bolivia, Cartwright and Patrinos (1997) find a negative effect of mother’s years of education on the probability of children working in income-generating activities as opposed to being in school. Unlike in the case of Colombia, there is no effect of mother’s education on child time in home-care. They do not include father’s education in the model.

Data from Cote d'Ivoire, Colombia, Bolivia and the Philippines are analyzed within a sequential probit framework in Grootaert and Patrinos (1999) providing some comparable results and they indicate a negative effect of parent’s education on child labor.

In Cote d'Ivoire, the probability of full-time study as opposed to full-time work (in a sequential decision-making regime) is positively influenced by years of fathers’ education in urban areas and by years of mothers’ education in rural areas, in each case the education of the other parent having no effect. The other results are identical for rural and urban regions: Both fathers’ and mother’s education raise the probability of a child combining school with work as opposed to working full-time, and parents education has no effect on whether

children work or are neither in school nor in work (Grootaert, 1988). Analysis of the same Cote d'Ivoire data by Coulombe (1998) using a bivariate probit suggests no effect of father's schooling on either work or school participation. Mother's education has no effect on work although it does influence school participation. Nielsen (1998) also finds no effect of father's schooling on child work or school decisions in bivariate probit estimates of data for Zambia, but she does not investigate mother's schooling. No parental education effects are identified in the data analysis for Turkey by Tunalı (1997).

7.5. Farm Size and Mode of Operation

As indicated in Section 3, the vast majority of working children live in rural areas and work on farms, predominantly family-run farms. Since family-owned land denotes wealth at the same time as it denotes employment opportunities, the behavior of labor supply for children in farming households is likely to be different from that of other children and it raises new modeling questions (see discussion of the wealth paradox in Section 5.4). The wealth effect may be separated from the other (substitution) effects of farm size if both *farm size* and a measure of permanent income are included in the model. This distinction is ultimately relevant, for example, to policy consideration of income transfers versus land reform.

Land tenancy forms are also likely to affect the probability of child work. For instance, one rationalization of the benefits to the landlord from pursuing sharecropping instead of renting the land out or hiring wage labor in, is that it improves the landlord's access to labor by making available the labor of the tenant's family in addition to the labor of the tenant (Basu, 1997). The *sub-division of land* across household members may also influence child labor, either for reasons of productivity (scale efficiency and also input-allocation (see Udry, 1996, for example) or for reasons of bargaining (Iversen 2000). In sub-Saharan Africa, in contrast to Asia, it is not uncommon for a household to own more than one plot of land and, indeed, for the plots to be controlled by different members of the household, men and women.

²⁸ Cartwright also presents estimates using sequential probit estimation but as they are not strictly comparable, to avoid confusion, only the multinomial logit results are presented here.

What is the evidence? Not many of the studies reviewed include a measure of land owned by the household. Consider those that do. Canagarajah and Coulombe (1997) find no effect of farm size on child work participation rates in Ghana. Distinguishing boys and girls and restricting the sample to rural farming households, Bhalotra and Heady (2000) find a positive effect of farm size on girls' work, though no effect for boys. Cigno and Rosati (2000) find a positive effect of land size on child labor in rural India, combining data on girls and boys. In Vietnam, the size of cultivable land owned by the household raises the probability that children will combine work with school as opposed to studying full time but it does not raise the probability of full-time work. Relative to study, not surprisingly, owning land reduces the probability that a child engages in neither work nor school (Rosati and Tzannatos, 2000).

The only study, it appears, that includes indicators of the form of land tenancy in the empirical model is Bhalotra and Heady (2000), which analyses data for rural regions of Ghana and Pakistan. The Pakistan data permit a distinction between owning, sharecropping and renting land. In Ghana, additional modes of operation are "free land" and village (community) land. Holding constant a quadratic in acres of land owned, they identify the following effects. All Ghanaian children and Pakistani girls are more likely to work in households that rent land, and Pakistani boys are more likely to work in households that sharecrop land. Free farms raise work participation in Ghana amongst boys and girls and village farms raise participation amongst girls alone. The estimates for Ghana show that, at a given land acreage, the number of plots of land owned by a household also raises child labor, a result that might be investigated further by modeling bargaining between the men and women that own the different plots, allowing for heterogeneity in parental preferences over their children (see Iversen 2000).

7.6. Household Size

It has been argued that children from larger households are more likely to work, as a consequence of resources per person being smaller in larger households (Patrinos and Psacharopoulos, 1997). However, we would not expect this association to persist after controlling for household income per equivalent adult. An alternative basis for positing a correlation of household size and child labor is that fertility may be encouraged by the

prospects for child work (Rosenzweig and Evenson (1977), Cain (1977), Singh and Schuh (1986), Eswaran (1998), Bardhan and Udry (1999)). In this case, it may be argued that desired household size is endogenous in the child hours model (see Section 6.5). Nevertheless it is not uncommon to treat current household size as if it were exogenous – both because it is very difficult to find a valid instrument and because it might be argued that relations identified in cross-sectional data represent long-run resolutions (Deaton 1997). The alternative is to suppress size from the model and replace it with exogenous determinants of fertility- an option that has largely been averted in this literature.

Since size and composition are clearly correlated, *the relation between household size and child work will depend upon whether household composition is held constant*. Jensen and Nielsen (1996) and Psacharopoulos (1997), for example, include assets and size but not composition of the household. Kassouf (1998), Jensen (1999), Canagarajah and Coulombe (1998), Grootaert (1998) and Patrinos and Psacharopoulos (1997) include income (assumed exogenous) and composition, but size does not appear independently. *The relation of household size and child labor will also depend, in rural areas, upon whether farm size is held constant*. Controlling for land size, we may expect child hours of work to be *decreasing* in household size because of diminishing returns. In general, if an empirical equation for child labor includes household size it should also include (instrumented) income, comprehensive indices of household composition and, in rural areas, land size and indicators for tenancy structure.

The empirical results support some variety (see Cochrane, Kozel and Alderman, 1990) but there is a tendency to find a positive association of household size and child work²⁹. However, this finding cannot be regarded as robust since the studies differ in whether or not land size and household composition are held constant. Estimates of an equation with this set of controls yields negative effects of household size on child hours of work for boys in rural Pakistan (no effect for girls) and for girls in rural Ghana (no effect for boys) (see Bhalotra and Heady, 2000). Cigno, Rosati and Tzannatos (2000) also find a negative effect for participation in work in rural India. Ilahi (1999) finds a negative effect for boys and no effect for girls in Peru. Also using data from Peru, Patrinos and Psacharopoulos (1997) find a

negative effect of the number of siblings (not household size) on the probability of combining work and school relative to the probability of simply attending school if the number of children not in school is held constant (insignificant if this control variable is not included).

For Vietnam, Rosati and Tzannatos (1999) find a significant negative effect of household size on the probability of being in work and on the probability of combining work and school, relative to the probability of simply being in school. There is no effect for the children who report being in neither work nor school.

Positive estimated effect of household size on child work are found in Patrinos and Psacharopoulos (1995), who, for Paraguay (in contrast to Peru), find a positive effect of the number of siblings (not household size) on the probability of combining work and school relative to the probability of simply attending school.

7.7. Household Composition

Standard compositional effects refer to the *age and gender structure* of the household. Additional compositional effects that may be taken into account are whether both *parents are alive* and whether they are *present* in the household (or have, for example, migrated away for work). The LSMS data usually include information on these variables.

There is some evidence that children - and especially girls - with *more siblings* work longer hours on average (see Lloyd (1993) and Jomo (1992)). This is likely to be a more pronounced effect when the siblings are younger than the index child, since higher *birth order* children are often more likely to be in work. Most studies include indicators of household composition (discussed above) but few directly include birth order effects: see Oto and Moffatt (2002) for an exception in a case study for India, and see Browning (1992) for a discussion of specifications for birth order effects.

Grootaert (1998) finds no clear evidence of sibling effects in Cote d'Ivoire although Coulombe (1998), using the same data, finds that the number of children under-6 raises work participation for older children. In Vietnam, both the number of siblings under 6 (pre-school) and the number of school-age siblings (6-15 years) raises the probability of school-age

²⁹ King (1987) reviews the literature on the association of large family size with adverse welfare outcomes for children including health and educational attainment.

children being at work (Rosati and Tzannatos, 2000). This is confirmed for per-school children by Liu (1998). Ilahi (1999) finds no household composition effects on child labor in Peru. Using the same data, Sasaki and Temesgen (1999) confirm that the number of children in the household does not affect full-time work participation of children in Peru but they find it does increase the probabilities of school and work and of being engaged in neither, relative to full-time study. On the other hand, estimates of binary probits in Ray (2000) suggest a positive effect of the number of siblings on work probabilities in Peru.

The presence of younger siblings discourages work participation amongst girls in rural Ghana, household composition having no effect on the work hours of Ghanaian boys (Bhalotra and Heady, 2000). The same study finds that the presence of younger boys (under 10) in the household reduces the work participation of both boys and girls aged 10-14 in rural Pakistan, whereas the presence of little girls in the household has no effect. Without controlling for the work status of the mother, it is difficult to interpret this in terms of relative neglect of little girls. Cigno, Rosati and Tzannatos (2000) find that having both younger siblings (0-6) and siblings in one's own age group (6-12) raises the probability of working of school-age children in rural India. Similarly, the number of 0-6 year old siblings raises the probability of work relative to school-only in Peru (Patrinos and Psacharapoulos, 1997).

Using data from Colombia and Bolivia respectively, Cartwright (1993) and Cartwright and Patrinos (1996) find that having older brothers and sisters reduces the probability that a younger child works. The *presence of men and (especially) women over 60* reduces the probability that a girl in Pakistan works, there being no effects on Pakistani boys or on Ghanaian children. Overall, the effects of household composition are gender-specific and they are stronger and exhibit a more complex pattern in Pakistan than in Ghana (Bhalotra and Heady, 2000). Canagarajah and Coulombe (1997) who use the same Ghana data find, curiously, that the *number of adult males* in the household has a significantly positive effect on the work participation of 11-14 year old children in rural and urban areas, though there is no effect for 7-10 year-olds. They find that numbers of siblings and other compositional variables have no effect. Ray (2000) uses the same Pakistan data as Bhalotra-Heady and, aggregating over the sibling terms, finds no effects of number of siblings on child labor.

7.8. Female Headship

The prevalence of female-headed households varies considerably across countries. It tends to be greater in sub-Saharan Africa than in Asia. For example, it is 30% in rural Ghana as compared with 3% in rural Pakistan (Bhalotra and Heady, 2001). Most of the studies that include female headship as a regressor in a model of child labor also include a measure of household income. If female headship significantly raises child labor participation at a *given* level of income, then it must indicate a degree of vulnerability of the household that is not picked up by household income. This could be its borrowing ability or, more generally, its ability to deal with a crisis, its perception of the range of job alternatives available to it, or its assessment of its human capital (i.e. a household with more adult men may be a more robust household, especially if they are maintained, through intra-household distributional preferences, in better health). The result is also consistent with women being less altruistic towards children than men. However the available evidence does not support this interpretation (see Thomas 1990, for example).

Approximately half of the surveyed studies included this variable. There is rather more coherence in the results for this variable than for some of the other correlates of child labor discussed in this paper. Support for the hypothesis that children of female-headed households are more likely to work and/or less likely to be in school is found for Paraguay in Patrinos and Psacharopoulos (1995) and for rural (but not urban) Cote d'Ivoire in Grootaert (1988). Although he does allow gender-specific effects, Ilahi (1999) finds no role for female headship in Peru.

Distinguishing boys and girls, Bhalotra and Heady (2000) find a positive effect of female headship on the hours of work of both boys and girls in rural Pakistan and, in the case of rural Ghana, for girls only. Canagarajah and Coulombe (1997) do not separate the data by gender and they find that the indicator for female headship is insignificant.

7.9. School Costs And Quality

The opportunity cost of school attendance may be captured by the *child wage rate*. This is likely to be less affordable by poorer households, and to be more restrictive in environments where the school calendar is inflexible to agricultural seasons. Direct costs

have also been investigated using measures of *distance* to school, often indicators for whether there is a primary, middle and secondary school in the cluster (or community). Some studies also include household *expenditures* on education as school-level data on fees are seldom available. These variables are sometimes insignificant but, when significant, they are often consistent with the hypothesis that improving access to school or lowering the direct costs of school attendance has the desirable effect of reducing child labor.³⁰ For example, Grootaert and Patrinos (1998, p.177) find a negative effect of school expenditure on the enrolment rate in urban Bolivia.

There is now considerable evidence in the education literature in both developing and developed countries that returns to education and hence participation in education depend upon school quality. A comprehensive account of its importance in Ghana is presented in Glewwe (1996). Policy makers would benefit from looking more closely at the *magnitude* of the effects of direct costs and different aspects of quality in order to be able to prioritize investments in this sector. Researchers should assist in this by delineating the sizes of these effects in comparable terms.

7.10. The Trade-off Between Work and School

Policy discussions of child labor are often motivated by its harmful effects on the education and health of the child. How large an effect does child labor have on education? Or, conversely, if increased enrolment in school is induced, what is the associated decrease in child labor? Most data sets describe an inverse correlation between child labor and education at the micro-level, which is unsurprising as these are competing uses of time. However, as seen in Section ?, one is not the exact inverse of the other. It is therefore possible that a policy intervention that results in an increase in school enrolment draws children out of “inactivity”, with no corresponding reduction in child labor.

In the time allocation problem, participation in work and school are jointly determined outcomes. Canagarajah and Coulombe (1997) and Bhalotra (2002) estimate a bivariate probit model for Ghana, which allows correlation of the unobservables in the

³⁰ Direct costs of education are found to have a more direct effect on school enrolment (with little effect on child labor) among younger children (below the age of 12 years) in Thailand (Tzannatos, 2003). Labor supply by older children (above the age of 12 years) seems to be more affected by child wages than costs of education.

equations for child labor and education. They find that it is negative and significant, though not very large. In order to identify causal effects, we need to find an exogenous source of variation that uniquely affects one of these two variables. For example, Ravallion and Wodon (2000) treat a subsidy offered to parents that send their children to school as a source of exogenous variation that encourages school attendance. Their data are a large household survey for Bangladesh which contain information on the school subsidy offered by a local NGO. The subsidy has a large impact on school attendance but a much smaller impact on child labor, since some of those joining school were formerly inactive. Using the LSMS data for Ghana (Wave 2), Boozer and Suri (2001) attempt to identify the causal impact running in the other direction, that is, the impact of child labor on schooling. They use a novel identification strategy, which involves creating exogenous variation in child labor by month and region as a function of month-by-region rainfall. The idea is that rainfall determines the productivity of child labor but has no corresponding effect on the attractiveness of school attendance. They find that an additional hour of child labor reduces school attendance by about 0.38 hours.

7.11. Child Gender

Some studies estimate separate models for boys and girls, allowing the intercept as well as the slopes (i.e. the effect of every covariate) to be gender-specific (Nielsen (1998), Ilahi (1999), Canagarajah and Coulombe (1998), Bhalotra (2000a, 20001b, 20001c), Bhalotra and Heady (2000)). Most others pool data on boys and girls and allow gender-specific intercepts. The evidence is fairly systematic with regard to this variable. For Asian countries, the gender dummy tends to be significant indicating a greater participation of girls on account of factors that are not captured by the covariates included in the model. It is tempting to ascribe this to culture but it could equally be a reflection of, for example, the technology of home production. This is not commonly done but an interaction between age and gender is likely to be revealing: the participation rates of girls and boys cross at around the age of 15 in many developing countries.

In the papers that estimate separate models for boys and girls, most variables show significant differences in their effects by gender. A lesson from this is that further analysis of child labor should be done by gender. Since many international and national organizations

influencing policy are already aware that educating girls is a specific priority expected to yield large social returns, it is useful for policy to have some guidance from research on what causes “excess labor” on the part of girls (ie that part of the higher participation or hours of work contributed by girls as compared with boys, that cannot be explained by the covariates in most standard models of child labor).

A startling finding in this direction is that the data for rural Pakistan suggest that boys take wage work when their income contribution is necessary to household subsistence, whereas girls engage in wage work even when the household could survive without this (Bhalotra, 2000a). The raw data are consistent with this result: households supplying boy labor are on average poorer than households supplying girl labor. Another pertinent finding is that, in settings as diverse as those of rural Ghana and Pakistan, the probability (and intensity) of girls’ work on household-run farms is increasing in land size, income constant. In contrast, land size has no significant effect on boys’ work. These results are consistent with the (discounted) returns to school for boys being perceived to be larger than for girls, although there may be alternative explanations (see Bhalotra and Heady 2000).

7.12. Other Child Characteristics

Child Age: The definition of children varies across studies but they are most often defined as over 6 and under 15, sometimes under 18. The lower threshold is usually determined by data constraints: available household surveys often ask no questions of children under 7 in some countries (for example, Ghana) or children under 10 in others (for example, Pakistan). This is probably because child labor under the age of 7 is not very prevalent. The choice of the upper threshold is guided by UN conventions and may be adjusted according to culture-specific knowledge of when children start to make their own decisions and/or to live independently of the parental home. For some countries age 14 is the exit age for primary school. In many developing countries, children start school late or, having started, drop out or repeat grades. As a result, the age of exit can be higher and is quite variable.

Most empirical studies include a linear term in age, which is either positive or insignificant. Where non-linearity is permitted in the specification, a quadratic effect is often

identified, especially for girls in Asia as they tend to withdraw from the open labor market as they grow into their teens.

Relation to Household Head: Households in developing countries are large and complex and often contain not just vertical but also horizontal extensions. As a result, nephews, nieces and sisters-in-law may be counted amongst children along with sons and daughters of the head of household. In sub-Saharan Africa, there is, further, a high prevalence of child fostering and orphans. Assuming that the head plays an important role in decisions regarding child labor, an interesting hypothesis is that the (biological) children of the household head are preferred and hence less likely to work (see Section 7.1).

Most studies do not investigate this. Cockburn (2001) investigates this variable in probits for work and school in Ethiopia and finds that children of the household head are more likely to attend school. In contrast, Bhalotra and Heady (2000) find that children of the head are more likely to be in work in rural Pakistan and that, in Ghana, sons are less likely to be in work but there is no effect in the case of girls. These results may signal an Africa-Asia difference but further research into this question is merited before any conclusions can be drawn. Ainsworth (1996) presents an empirical analysis of child fostering in the Cote d'Ivoire, where more than 20% of children live away from home. Given the increasing proportion of orphaned children in Africa (see Subbarao et al, 2000), it is important to investigate whether outcomes are different for children living with adult carers other than their parents. In a recent publication, the World Bank (2002) describes the relation between orphanhood and school enrolment as ambiguous. Based on data from Uganda, Bishai *et al.* (2001) show that biological relatedness is a strong predictor of the quality of care offered to children. Case and Paxson (2001) show that mothers are the “gate-keepers” for their children’s health investments. Analysis of schooling data also suggest the importance of targeting orphans rather than just poor households. Evidence from the Demographic and Health Surveys for 10 countries in sub-Saharan Africa in which households were interviewed between 1992 and 2000 shows that orphaned children in Africa live, on average, in poorer households and are significantly less likely than other children to be enrolled in school. The lower school enrolment of orphans as compared with other children is not explained by their greater average poverty: orphans are less likely to be in school than non-orphans with whom

they co-reside. This suggests that distant relatives and (to a greater degree) unrelated caregivers invest less in orphaned children than in their own children or closer child relatives (Case, Paxson and Ableidinger, 2002).³¹

Completed School Years of the Child: In commonly estimated models of adult labor supply, the main explanatory variables are non-labor income and the wage rate on offer. The educational level of the adult male is typically excluded from the labor supply equation and used to instrument the wage. This is a debatable practice if education affects tastes for work (see Pencavel, 1986, for example). In the case of children, in addition to picking up tastes, the completed level of schooling may determine the probability of work today if parents have a notion of a target level of schooling (for example, that needed to attain functional literacy). None of the surveyed studies has included this variable although it is considered in Bourguignon et al (2003) and Bhalotra (1999); see Section 6.5. These studies do not instrument child labor, it being very difficult to find a valid instrument. This variable is clearly endogenous since completed school years will reflect past child labor decisions which are omitted and correlated with current child labor decisions.

Innate Ability Of The Child: Using test score data that were collected in a special re-survey of the Ghana LSMS, Bhalotra and Angeriz (2002) investigate the effects of ability on the work-school choice. Bivariate probit estimates indicate that ability increases the probability of school attendance and reduces the probability of child labor amongst boys but has no effect amongst girls. The effects of these test scores on school attendance and wages are explored in Glewwe (1996). There is not much other work on innate ability, no doubt because it is difficult to measure. Even test score data are somewhat dubious since they may depend upon past work-school choices. Ideally, one would like data that span a considerable period of time, including information on cognitive skills at a young age and labor supply patterns at older ages. Panel data will allow a persuasive control for individual heterogeneity in ability but of course, as this is a fixed effect, estimates of its effect on child labor or schooling will not be obtainable.

³¹ Further discussion of orphanhood and fostering is in Bhalotra (2002).

7.13. Age and Occupation of Household Head

Age of the Household Head: This is an indicator of the stage of the lifecycle that the household is at. If the oldest male reports as head, then this variable may also indicate whether the child lives in a vertically extended household, with grandparents. If the equation also includes a full set of age-gender variables that reflect household composition (for example, the proportion of males and females in across a set of age groups), then the age of the household head has a less clear meaning and a weaker role to play. This may explain why not many studies include this variable.

Occupation of The Household Head: A few of the studies surveyed condition on this variable. It is likely to be especially important to distinguish between households engaged primarily in agricultural activity, and others. This is because children are more likely to work in agricultural households than in other households with the same living standards for the following reasons. First, the nature of farm work allows it to be combined with schooling, which it is in many countries, notably in sub-Saharan Africa. Second, agriculture makes seasonal labor demands and, in peak seasons, there may be labor shortages that result in families falling back on the reserve labor of children. Even when hired labor is available, family labor may be preferred, for example, because it is easier to supervise. Third, parents may see some value in training children in farm work if they expect their children to inherit the farm (see Section 5.4). The omission of family occupational indicators from child labor equations may be justified by including a measure of land ownership for rural households as this variable will tend to closely approximate the agricultural status of the household (although no authors of the surveyed studies present this argument).

7.14. Employment and Wages of Parents

Employment Status of Parents: We discussed in Section 6.2, the idea that parent and child labor supply are jointly determined. We argued that parent labor supply or else wages should be included as regressors in a model of child labor in addition to household income, unless separability has been established. If participation or hours variables pertaining to parents are included as regressors, they should be instrumented.

Some studies include a binary variable indicating whether parents are employed, although they typically neglect to instrument it. This has produced some evidence relating to the commonly held view that (older) girls substitute mothers in their (domestic) work activities when mothers take work outside and there are younger children in the home (Levison (1991), Patrinos and Psacharopoulos (1995)). So, for instance, using data from the Philippines, Sakellariou and Lall (1997) find that the children of working mothers are more likely to be engaged in work, irrespective of whether it is market work or housework, and the mean elasticity is 0.086. This effect is especially marked for female children. A similar result suggesting complementarity of adult female and child labor is reported for Columbia by Cartwright (1996). In their study of Bolivia, Cartwright and Patrinos (1996) find that children shift from full-time to part-time work when mother's enter the labor market. This is an interesting illustration of the fact that results from a univariate model with choices in-work vs. not-in-work may appear to *contradict* results from a multinomial model in which the choices are defined to distinguish part-time and full-time work. In their analysis of Ghanaian data, Canagarajah and Coulombe (1998) find that child labor is encouraged by parents being in self-employment. This is consistent with our earlier discussion of the incentive effects of ownership of productive assets (Section 5.4). Separability of parent and child labor supply is investigated in Bhalotra (2000b) using the LSMS for rural Pakistan. Separability cannot be rejected in the case of boys but, in the case of girls, it is rejected for both fathers and mothers. Contrary to the commonly held view, mother's work appears to be complementary to girls' work. Father's work, on the other hand, is a substitute for girls' work.

Adult Wage Rates: Optimization of a standard model with a unitary utility function defined over all household members will yield a labor supply equation for children that shows that child labor depends upon the child wage as well as the wage rates of other household members (such a model is set out in Bhalotra (2000a), for example). This can be translated into a conditional model by replacing the wage rate of a family member (for example, parent) with the hours of work of that person- as discussed in the preceding sub-Section. The cross wage elasticities indicate substitution or complementarity between child labor and the labor of other household members such as parents. This, clearly, is interesting information both from the point of view of policy and because it offers insights into intra-

household allocation. In a seminal theoretical paper on the economics of child labor by Basu and Van (1998), the level of the adult wage is a critical variable, used to define a subsistence threshold in an economy where non-labor incomes are small or can be assumed constant. Important information that should be carried along with these estimated cross-wage effects is whether they are obtained conditional on parents' education (which is expected to be correlated with their wage) and whether the wages refer to market wages or to individual-specific wages imputed based on data on earnings and hours. In the latter case, the issue of predicting a wage for adults (especially women) that are not in work arises and needs to be addressed (see Jacoby 1993).

Ray (1998) finds that a 1% increase in the wage rate of an adult male leads to a 1% decrease in the probability of child work participation in Peru but that an increase in the wage rate of adult females in Pakistan increases child labor there. Broadly similar results were found in earlier studies. Levy (1985) found that, in Egypt, a 1% increase in adult female wages reduced child hours of work by 2.7% for children aged 6-11 years and by 1.5% for children aged 12-14 years. However, adult male wages appeared to have a positive effect on child employment (in direct contradiction of the Basu-Van hypothesis, for example). Using Indian data, Rosenzweig and Evenson (1977) find that adult wages reduce child labor amongst girls but not boys: a 1% increase in the adult male wage reduces girls' hours of work by 1.2% and a rise in the adult female wage to 10% above the mean reduces the employment rate of girls by 14% (cited in Sasaki (1999)).

7.15. Community Variables:

Several of the surveyed studies include indicators of community infrastructure. These include indicators for whether there is a primary, middle and secondary school, whether there is a road, a bus, shop, a post-office, a bank, a regular market, and the fraction of households that have access to safe water and electricity. Indicators of the activity levels of labor markets for adults and children and also of land and credit markets would be very useful though these are not easily found or defined (see Section 6.11). There are no very consistent results across studies but there are some occasional interesting results. For example, the presence of a road and a bus may be expected to improve access to a school, though we cannot rule out the possibility that it improves access to outside work for a child. Irrigation and electrification

may be expected to reduce local labor demand and thereby reduce child labor (we indicated earlier that Levy (1985) supports a beneficial effect of mechanization in Egypt), but it is difficult to generalize.

7.16. Regional Unemployment

In order to allow for the possibility that children want to supply more labor than they are able to given prevailing labor demand, a sensible empirical specification should condition on the regional unemployment rate (Ham (1986), Card (1988)). The only study that does this is Bhalotra (2000a), who finds a negative effect of community-level unemployment on the labor supply of boys (the unemployment measure being constructed from individual responses). Note that this is distinct from the effects of household-level unemployment, for example, of a father.

7.17. Region Effects

It is strikingly evident that there are differences across developing countries in the nature and extent of child work and some of the broad parameters of the differences by continent were profiled in Section 3. Within countries, rural areas support a higher incidence of child labor than do urban areas. Why is this? Does it simply reflect a higher incidence of poverty in rural regions? The fact that a rural-urban dummy tends to be significant in child work participation equations even when household income has been held constant suggests that household-level poverty is not a sufficient reason. Additional reasons for a higher rural incidence include the following. Relatively weak school infrastructure and lower rates of technical change in rural areas may discourage school attendance. At the same time, children may be more easily absorbed into the informal economies of rural areas. This is on account of the prevalence of self-employment, relatively low skill requirements in agricultural work, and the greater degree of market imperfection in rural regions. In view of the higher incidence of child labor in rural areas, it is relevant to note the considerable interest that has been shown in geographic targeting (Baker and Grosh (1994), Ravallion and Sen (1994)): it makes sense for countries to initiate child labor programs in poor rural regions.

7.18. Shocks

The hypothesis that child labor may be a form of household insurance has been recognized for a long time but it is only recently, with the availability of appropriate data, that it has been investigated. The effects of price changes on youth employment have been considered in Alessie et al (1992) and in Grootaert (1998) and the effects of income shocks on school attendance by Jacoby and Skoufias (1997). Recent studies that evaluate the role of credit constraints include Beegle, Dehejia and Gatti (2003), Edmonds (2002), Guarcello, Mealli and Rosati (2002) and Dehejia and Gatti (2002).³²

8. POLICY IMPLICATIONS

We remarked earlier that there was an unfriendly distance between theory and applied work on child labor. A similar distance seems to prevail between most applied work and policy-design. There are exceptions and there is bound to be some filtering through of ideas and findings from theoretical and applied research, but the introduction of policies and their design seem to have relied largely upon common-sense, awareness and media campaign, accumulated operational expertise, local knowledge, international concerns or direct pressure and political will. It is expected that, as empirical research grows and becomes both more pointed in its objectives and more robust in its findings, it will offer insights that policy-makers find easier to draw upon. An important aspect of applied research is to identify interesting questions and then to find ways in which they can be addressed with the data or resources available.

Deriving direct insights for the appropriate design of policy ideally involves three linked steps.

- First, we need theoretical models of child labor that capture relevant aspects of the decision-making process that results in children supplying labor and that are able to accommodate the “institutional” facts relating to child labor.

³² These are not reviewed in any detail as they appeared after this paper was practically written. As indicated earlier, this survey is only a partial review, including mostly research done by or for the World Bank.

- Second, we need to develop empirical procedures that are able to investigate the predictions of alternative theoretical hypotheses and, thereby, reject one model in favour of another (allowing context or region specificity).
- Third, we need to have in place mechanisms for the implementation, monitoring and evaluation of the program that are sensitive to the political economy of the region.

Evaluated in these terms, the design of policy in this area is currently quite rudimentary.

A weakness of recent discussion of policy interventions targeted at child labor is that they have neglected to recognize the predominance of household employment amongst child workers (evidence of which was cited above). This has been influenced by media coverage of child labor in export sectors such as the carpets, garments and sports equipment industries, resulting in debate on the role of trade sanctions, international labor standards and minimum wages (see Basu (1999), Basu and Tzannatos (2003)). To the extent that the parents of child laborers are self-employed, an adult minimum wage will have, at best, indirect effects on child labor. Trade sanctions that involve banning the import of products made with child labor will typically have no direct effect on children who work on subsistence farms. Legislation that bans child labor is especially difficult to monitor when children are employed in household-run or home-based activities. The preoccupation with these sorts of legislative interventions, therefore, may be misplaced after a point. The design of policy to address child labor depends upon recognizing that most children work with or for their parents in economies where markets are underdeveloped and the legal and political infrastructure is thin.

Another fact that policy has, in its detachment from large-scale representative data, neglected is that a fairly substantial fraction of children report being neither in work nor in school (“idle”)- this too was discussed above. While these children may be engaged in domestic chores that are not counted as work, it is by no means evident that this is the case. First, by common accounts, boys in Asia do not do much domestic work and, nevertheless, a non-negligible fraction are reported to be idle. Second, even if these children do engage in some domestic work it seems unlikely that this is a full-time occupation. A plausible explanation of the extent of “idleness” is that it is seen where opportunities for both work and

school-attendance are limited. In this case, general “economic development” may, by stimulating both opportunities, result in some tendency for *both* work and school attendance to rise. While this tendency is unlikely to dominate in data that include non-idle children, it may contribute to explaining why the relation of economic growth and child labor incidence is, in some cases, non-linear (see Bhalotra 2002b).

Alternative policy instruments to address child labor include elements of a general pro-poor growth policy; (conditional) cash transfers that cover the opportunity cost of school attendance; credit provision; policies that encourage the development of land and labor markets; investments in the quality and availability of schooling; measures that reduce employment and labor market discrimination against women and girls; the introduction of more flexible school schedules and more relevant curricula; and investments in the health of both children and adults. More controversial alternatives include bans on child labor, compulsory schooling, trade sanctions and adult minimum wages. Further discussion of the range of policy options is in Bhalotra (2002a, 2002b); for further discussion of labor standards see Basu (1999).

Considerable progress has been made in the last couple of years in designing and implementing policy programs that are directed at reducing the incidence of child labor. Possibly the most highly regarded and researched are the income transfers programs that are part of Progresá in Mexico, Bolsa Escola in Brazil and PACE in the Honduras (see Becker (1999), World Bank (2000): p. 158, and Orazem, Sedlacek and Tzannatos (2003)). They offer income subsidies to poor households conditional on their sending their children to school. Similar but distinct are Food for Education programs such as implemented by an NGO in Bangladesh and analyzed in Ravallion and Wodon (1999). An approach that is more directed at reducing drop-out rates and raising the net return to schooling than to compensating households for the opportunity cost of school is that taken by Indonesia in its Back to School Program (see Filmer and Sayed, 1999). An account of a fuller range of measures of social protection relevant in the context of child labor is in Bhalotra (2001). Grimsrud (1999) discusses child labor policies and attempts to identify a role for international organizations operating in this field. Basu (1999) contains an interesting discussion of the role of labor standards. On a different note, Miljeteig (2000) discusses

actions that international organizations might take in creating partnerships with children and youth. He sets out the principles underlying creation of partnerships and the characteristics of existing organizations.

Programs may need to be specifically tailored to particular needs. For example, the question of child vulnerability in Southern Africa is dominated today not so much by child labor but by high and growing rates of orphanhood (see Andvig (1999) and Bhalotra (2002) for more on child labor in Africa). The magnitude of the problem and good practice social protection measures to address orphanhood are discussed in Subbarao, Mattimore and Plangemann (2001). In addition to education and health or nutrition subsidies, that apply to all forms of child labor, finding ways of linking children to their relatives, arranging fostering and offering cash assistance to fostering families, or investing in orphanages, are complementary policy options specific to regions in which AIDS and war have killed substantial numbers of adults. Some specific tailoring of policy is also needed for the worst forms of child labor.³³ These include prostitution, soldiering, trafficking and employment in hazardous sectors. The international convention (ILO 182) on the worse forms of child labor is keeping alive the faith in addressing the worst forms of child labor through legislative action backed by international support garnered through local mobilization (media and community-based initiatives).

³³ See <http://www.ilo.org/public/english/standards/ipec/index.htm> for a number of relevant reports and analyses.

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ANNEX

SUMMARY OF FINDINGS OF EMPIRICAL RESEARCH ON CHILD LABOR		
Variables	Findings	Comments
Household Characteristics		
Parent altruism	<p>Findings typically confirm parent altruism towards children.</p> <p>However, households that consume tobacco spend less on children.</p>	Evidence usually based on incomplete household data on expenditures by adults and children.
Parent income	<p>Remarkably small (negative) or even insignificant income effects on child labor (and, to a lesser degree, on schooling). Income effect not very sensitive to controlling for parents education; more sensitive to whether land ownership is held constant.</p> <p>Experimental data produce larger income effects. Income effects on child labor and schooling are usually larger (in absolute terms) for girls.</p>	<p>Weak income effect can be explained by inappropriately controlled endogeneity, measurement error in income, or else by income reflecting land ownership in the absence of explicit controls for land.</p> <p>The resulting bias is in the direction of making the income effect on child labor less negative.</p> <p>Need more evidence associated with policy experiments or exogenous income shocks.</p> <p>Results suggest education of girls more of a luxury than that of boys.</p>
Income shocks	Negative shocks appear to increase child labor.	<p>Policy changes such as pension reform or changes in trade regime create exogenous changes in income that can be used to study the effect of income on child labor.</p> <p>Research needs to pay more attention to distinguishing ex ante and ex post responses to shocks. For example, child labor may be used to diversify income sources (ex ante) or to compensate for unanticipated income shocks like a bad harvest or an adult illness (ex post)</p>

ANNEX (Cont'd)

SUMMARY OF FINDINGS OF EMPIRICAL RESEARCH ON CHILD LABOR (Cont'd)		
Variables	Findings	Comments
Household Characteristics		
Child wage (or poverty compulsions)	<p>Some evidence that the child wage has a negative effect on child hours of work for boys, though no effect for girls.</p> <p>A negative effect on child <i>hours</i> of work is consistent with the child working towards a subsistence target.</p> <p>As predicted by economic theory, <i>participation</i> in work tends to be a positive function of the wage.</p>	<p>Results lend support to concerns that trade sanctions or bans may increase child labor by decreasing the child wage, leaving households that rely upon child labor worse off.</p>
Parent education	<p>Fairly consistent finding of negative impact of educational level of both mother and father upon child labor.</p> <p>Different effects of mothers' and fathers' education on daughters' and sons' labor.</p>	<p>Effects of parent education at constant income or wealth levels may be taken to reflect better household information or a preference of educated parents for educated children.</p> <p>Most studies use a linear specification but the education effect may in fact exhibit non-linearity.</p>
Parent employment	<p>Variety of results. A seeming pattern is that father's employment status is negatively associated with child labor while mother's employment exhibits a positive association.</p>	<p>The employment status of parents is potentially endogenous. Its significance in a model in which parent income is constant indicates non-separability of parent and child work.</p> <p>Most studies fail to address these two facts and this can bias the income coefficient.</p>
Parent wage rate	<p>Limited and mixed evidence. No general pattern emerges.</p>	<p>Evidence is limited because wage data are often unavailable on account of the prevalence of self-employment in the rural areas where most working children and their parents live.</p> <p>Some studies present results for parent wages that are consistent with results for parent employment: Father's labor appears to be a substitute and mother's a complement of child labor. However, the reverse pattern is seen in some other studies.</p>

ANNEX (Cont'd)

SUMMARY OF FINDINGS OF EMPIRICAL RESEARCH ON CHILD LABOR (Cont'd)		
Variables	Findings	Comments
Household Characteristics		
Age of head of household	Often insignificant. When significant, sign and size vary with specification/region.	Unsurprising if insignificant when household composition is held constant in the model. Otherwise this variable may indicate stage of lifecycle that household is at.
Occupation of household head	A fairly consensus result is that the children of parents in agricultural occupations are more likely to work.	Interpretation sensitive to whether, for example, land owned is held constant. Few studies include occupation variables.
Farm size	Often increases child labor, especially if parent income or education are held constant.	The positive effect identified is consistent with imperfect markets for labor and land. Implication that land re-distribution can increase child labor, other things equal. Overwhelming majority of working children employed on household farms. Yet many studies neglect to include this variable.
Mode of operation of land	Indicators for whether the land farmed by the household is owned, rented, sharecropped (etc.) are typically significant. At given acreage, renting or sharecropping increases child labor (compared to land ownership)	Few studies include these variables. Analysis of effects should recognise that renting or sharecropping are likely to be choice variables endogenous to the child labor decision.
Household composition (age and gender structure)	Differing specifications, complex and varied results but a simple pattern appears to emerge: Number of adults in household reduces child labor (depends on biological relation), number of children increases it (depends on birth order).	Households in developing countries are large and complex. Often more than 2 adults (see below).
Household size	Often a negative effect though considerable variation in sign and size of effect, depending (<i>inter alia</i>) on whether household composition is held constant (see row above).	Household size (which depends upon fertility or the quantity of children that parents choose to have) is jointly determined with child labor (a measure of child quality or parental investment in child human capital). Nevertheless household size is included in most studies to capture long-run reduced form effects.

ANNEX (Cont'd)

SUMMARY OF FINDINGS OF EMPIRICAL RESEARCH ON CHILD LABOR (Cont'd)		
Variables	Findings	Comments
Household Characteristics		
Female headship	Tends to increase child labor though estimated effects vary and are at times insignificant.	Female headship most prevalent in Africa; rare in Asia. Its effect on child labor may reflect economic vulnerability that is not captured by income (e.g. women may be less able to borrow money or to find work), or else that women have different preferences over child welfare than men.
Gender	Intercept (shift) effects suggest that there is a “pure” gender effect or that girls work more even after various socio-economic and regional characteristics are held constant. There are also significant slope effects.	On average, girls work more than boys, at least up to age 15. Gap most marked in Asia. Most studies include gender intercept but do not allow gender-specific slopes although these clearly matter for covariates such as age, parent education or land ownership.
Age	Child labor intensifies with age and the effect is often quadratic	Included in almost every study; Fairly consistent results across regions.
Birth order	Tendency to find that first-born children are more likely to work.	Not many studies include this variable. Sometimes it is insignificant. This may be because birth order effects are very likely interactive with gender and may compete with age.
Relation of child to household head	Varied results. Evidence suggests child in Africa less likely to work if closely related to head but no such effect in Asia. No evidence of effect in interaction with parent characteristics.	Recent interest in biologically-motivated altruism makes this interesting. Africa-Asia difference may arise because Asia has fewer children in the household who are unrelated to head. Alternatively, child farm labor is encouraged by the incentive to gain work experience and this effect may be more powerful in Asia than in Africa as a result of their different land arrangements and inheritance rules.
Highest level of education attained by child	Mixed and scant results.	If there were a target level of schooling, we would expect that children who have achieved a higher level of education would be more likely to move into work. If, however, there is no target then we would expect that the (possibly unobserved) factors (like ability or parent’s tastes for education) that have led a child to achieve a higher level of education today would keep him or her out of work tomorrow. Increasing returns to educational level would also tend to discourage children with some schooling experience to leave school for work.

ANNEX (Cont'd)

SUMMARY OF FINDINGS OF EMPIRICAL RESEARCH ON CHILD LABOR (Cont'd)		
Variables	Findings	Comments
Household Characteristics		
Ability of child	Evidence that this increases school attendance and reduces child labor amongst boys while having no effect on the work-school choice for girls.	Difficult to find measure of ability that is not itself a function of the work-school choices. Very few studies explore test scores.
Health of child	The limited evidence available indicates a positive effect on child labor relative to inactivity but negative effect relative to school attendance.	This results refers to the effect of the child's innate health endowment on the chances(s) he will work. This may be difficult to disentangle from the reverse effect, that is, the impact that working has on child health.
School costs and quality	Distance to school typically increases child labor. Limited and diverse evidence on effects of school costs and quality. Many surveys ask respondent why child was not sent to school. A common response is that the opportunity cost is too high. It is less common to find people say that quality is too low.	Effects of direct interest to policy. Distance effects are conditional on transport infrastructure. Expenditure on school is a difficult variable in participation models, being zero by definition if child is not in school. Quality is multi-dimensional. Not many studies use it.
Other community infrastructure	Mixed effects, depending on infrastructure type (e.g. electricity, transportation, credit availability, etc).	Not many studies use these data Mechanisms underlying effects indirect, often unclear.
Unemployment in community	Limited evidence. Some studies find the expected negative effect on child labor especially for boys..	Not many studies include this variable. Inclusion consistent with modeling labor supply when disequilibrium in market.
Region of residence	Child labor higher in rural areas. Regional and location dummies indicate significant province/district effects even within the same broader.	Important for geographic targeting. Region effects conditional on household characteristics may indicate economic effects (e.g.) labor demand conditions or non-economic ones (such as social norms).
Notes:		
(i)	A “negative” (“positive”) effect of a variable (say, X) on child labor implies that increasing X reduces (increases) child labor.	
(ii)	In empirical studies, “adults in the household” typically replace “parents” as households in developing countries often contain more than two adults, usually relatives who, at least to some degree, pool resources with the nuclear family.	
(iii)	An “endogenous variable” is one that is jointly determined with the dependent variable, child labor.	

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