



International
Labour
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Defining child labour:

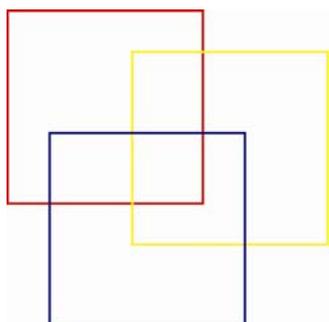
A review of the definitions of child labour in policy research

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the Elimination
of Child Labour
(IPEC)

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1. Introduction

There is no universally agreed upon definition of child labour. Developing an international, statistical definition of child labour is an agenda item on the Eighteenth International Conference of Labour Statisticians to be held in late 2008. The purpose of this report is to provide a concise review of the theoretical and empirical definitions of child labour and child work that have been used in academic studies, research sponsored by international organizations, and published reports by national statistical offices. This review is based on the analysis of 34 theoretical papers, 90 empirical research reports, and 27 national statistical office studies.

Public discourse on child labour uses the phrase to refer to child time in activities that are somehow harmful to the child. For example, the United Nations Convention on the Rights of the Child (UN-CRC) emphasizes the importance of protecting children from: "work that is likely to be hazardous or to interfere with the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral or social development" (1989, Article 32). The public's general understanding of the concept of child labour applies to activities that violate this standard. Whether the work is hazardous depends on the tasks performed in the work and working conditions, and one can debate what hazardous means. However, when does work interfere with education? When is it harmful to the child? The present discussion assumes that interference with education is harmful to the child's future welfare and therefore, the question of whether work is harmful encompasses the question of whether work interferes with education.

It is important to be precise about what harmful means. One possible interpretation of harmful is that the work entails an opportunity cost in terms of other activities that might be beneficial for the child or the child's development. To the extent that there's non-satiation in the returns to time in child development oriented activities like school, study, and play, there will always be an opportunity cost to time spent outside of these activities. All work is harmful under this interpretation. A second possibility is that harmful implies that total cost in terms of lost future child welfare is greater than the positive welfare gains from child participation in the activity. Put another way, harmful can be understood as implying the child would be made better off by not participating in the activity. This definition of child labour creates **the problem of the counterfactual** if child labour is understood to refer to activities in which child participation makes the child worse off; it is impossible to know in national statistics what children would be doing in the absence of work.

Economic theory largely focuses on child labour as labour supply rather than as a distinct type of work where there may be human rights issues. There is little distinction about types of activities, and therefore theory is not informative for solving the problem of the counterfactual. The focus of theory on child labour as simply labour supply makes sound economic sense. When there are multiple potential uses for child time, the family equalizes the marginal return to child time across activities. There will be activities in which children do not participate. Conditional upon observing children engaged in multiple activities, the family should perceive the same marginal return to the activities. Activities will have the same marginal cost in terms of foregone schooling. One type of activity cannot be worse than another when time is allocated optimally. Hence, there is little reason in theoretical studies of child labour supply to distinguish between types of work, and the empirical literature does not

clearly identify activities that are more apt to trade off with schooling or other aspects of child well-being.

The main exception to the idea that work is work is the most prominent theoretical paper on child labour – Basu and Van (1998). In Basu and Van, child labour is an activity, never precisely defined, that parents only allow the child to engage in when the family cannot otherwise meet its subsistence needs. There is nothing in the theory to suggest what type of activity meets these criteria. It is simply an assumption that there is some activity.

Empirical work might be useful to suggest whether there are activities that meet this Basu and Van assumption. There is considerable heterogeneity in the empirical literature about whether and what types of activities are most poverty elastic. The literature suffers from a number of data and methodological problems. However, it is often observed that the most prevalent types of work are the most elastic.

We review this theoretical and empirical work in detail in the following subsections. Nothing in the literature allows us to conclusively identify what activities are bad for children in the sense that children are better off if they did not participate in the activity, although in some ways, recognition of the problem of the counterfactual is intrinsic in ILO Convention No. 182 on the worst forms of child labour. Based on ILO Convention No. 182 hazardous work and worst forms of child labour other than hazardous work are often identified based on job characteristics. This solves the problem of the counterfactual. An activity is counted based on the activity's characteristics rather than some guess about the counterfactual of what children would be doing absent a particular type of work, although when the activity characteristics are more complicated than industry or occupation, there are measurement issues that arise. Simple, clear counts of child involvement in various activities offer the most promise of getting an accurate description of the working situation of children across countries.

The next section surveys theoretical definitions of child labour. Section 3 considers the empirical implementation of these definitions in applied research. There have been attempts by researchers to implement definitions that match international conventions rather than economic theory, and those efforts are surveyed in section 4. Section 5 concludes and summarizes many of the other statistical measurement issues relevant for an international standard definition of child labour that are outside the scope of the present study.

2. Theoretical work

Theoretical work on child labour is defined as research that does not include econometric work. There are two potential ways in which theoretical work on child labour might be useful in developing a statistical definition of child labour. First, the modelling assumptions made about the nature of child labour could guide the development of a statistical definition. This section reviews the modelling assumptions made in the literature. The modal modelling assumption is that child labour is the residual claimant on child time outside of schooling. Given the strong negative connotation that child labour carries, it is unlikely that a consensus can be built around the idea of defining child labour in this way. Second, the implications of the models about how child labour relates to other aspects of the economic environment could facilitate a "revealed definition" of child labour. That is child labour could be defined based on activities that seem to respond to the household's environment as theory suggests the concept of child labour should. The problem with this "revealed definition" approach is that it puts a lot of burden on the econometrician, and there is no reason why a revealed definition of child labour should be standard across countries.

There are a number of theoretical papers on child labour. Table 1 summarizes the definition of child labour in 34 prominent child labour related theory papers published in peer reviewed academic journals. The papers listed in Table 1 are chosen based on the results of an Econlit search of keyword "Child Lab*r" in August 2007 of peer reviewed journals. Papers with a mix of theory and empirics are discussed in the next section. Hence, all 34 papers in Table 1 are theory only. The first column of Table 1 takes a value of 1 if the paper distinguishes between "child labour" and other forms of work. "U" indicates that the paper is unclear on this question. Column 2 indicates whether the paper models child labour as a discrete choice without a time constraint. In these papers, there is no explicit cost inherent in having the child engaged in a particular activity other than the disutility associated with an activity. Column 3 indicates whether there is an explicit time constraint in the model. A time constraint makes any activity costly, because it implies a trade-off against other possible uses of child time. The remaining columns of Table 1 specify what child labour trades off against. In Column 4 the only alternative to child labour is schooling. In Column 5, the only alternative to child labour is leisure (not work). Column 6 indicates whether the paper considers both leisure and schooling as an alternative to child labour. Column 7 indicates whether multiple types of work are considered explicitly.

Table 1: Definitions of child labour in selected theory papers

Answers coded: 1 (Yes), 0 (No), U (Unclear)

Paper	Child labour is distinct from work	Child labour is a discrete choice	Child labour is limited by time constraint	Child labour is alternative to school	Child labour is alternative to leisure	Time is allocated between child labour, school, and leisure	Multiple types of work specified
Rogers and Swinnerton (2007)	1	1	0	0	0	0	0
Basu (1999)	U	1	0	0	0	0	0
Basu (2005)	U	1	0	0	0	0	0
Basu (2006)	U	1	0	0	0	0	0
Basu and Tzannatos (2003)	U	1	0	0	0	0	0
Basu and Van (1998)	U	1	0	0	0	0	0
Genicot (2005)	U	1	0	0	0	0	0
Baland and Robinson (2000)	0	0	1	0	1	0	0

Paper	Child labour is distinct from work	Child labour is a discrete choice	Child labour is limited by time constraint	Child labour is alternative to school	Child labour is alternative to leisure	Time is allocated between child labour, school, and leisure	Multiple types of work specified
Basu (2001)	0	0	1	0	1	0	0
Bommier and Dubious (2004)	0	0	1	1	0	0	0
Chakraborty and Das (2005)	0	0	1	1	0	0	0
Chaudhuri and Dwibedi (2006)	0	1	1	0	1	0	0
Das and Deb (2006)	0	0	1	1	0	0	0
Dessy & Pallage (2001)	0	0	1	1	0	0	0
Dessy (2000)	0	0	1	1	0	0	0
Dessy and Vencatachellum(2003)	0	0	1	1	0	0	0
Doepke and Zilibotti (2006)	0	0	1	1	0	0	0
Emerson and Knabb (2006)	0	0	1	1	0	0	0
Emerson and Knabb (2007)	0	0	1	1	0	0	0
Grossmann and Michaelis (2007)	0	0	1	1	0	0	0
Hazan and Berdugo (2002)	0	0	1	1	0	0	0
Horowitz and Wang (2004)	0	0	1	1	0	0	0
Hussain and Maskus (2003)	0	0	1	1	0	0	0
Jafarey and Lahiri (2002)	0	0	1	1	0	0	0
Jafarey and Lahiri (2005)	0	0	1	1	0	0	0
Katav-Herz (2004)	0	0	1	1	0	0	0
Krueger and Tjornhom Donohue (2005)	0	0	1	1	0	0	1
Lopez-Calva and Miyamoto (2005)	0	0	1	1	0	0	0
Pallage and Zimmerman (2007)	0	0	1	1	0	0	0
Ranjan (1999)	0	0	1	1	0	0	0
Ranjan (2001)	0	0	1	1	0	0	0
Rogers and Swinnerton (2004)	0	0	1	1	0	0	0
Stulik (2004)	0	0	1	0	1	0	0
Tanaka (2003)	0	0	1	1	0	0	0

Results of an Econlit search in August 2007 for the words "child lab*r" in title, abstract, or keywords. Papers without an empirical component published in peer reviewed journals are listed.

A Google Scholar search of "child labour " shows that the two most cited child labour papers are both theoretical: Kaushik Basu and Pham Van's "The Economics of Child Labour" in the *American Economic Review* (1998) and Jean-Marie Baland and Jim Robinson's "Is Child Labour Inefficient?" in the *Journal of Political Economy* (2000). These two studies exemplify the two main approaches to defining child labour in the theoretical work on child labour in economics.

In the Basu and Van model, child labour is effectively undefined. The child is either a child labourer or the child is not. The modelling assumption is that a child participates in child labour to help the family meet their subsistence needs and stops when the family's adult only earnings are sufficiently high so that subsistence is met without the child's contribution. This approach to child labour appears in other studies by Basu (including Basu 1999, Basu 2005, Basu 2006, Basu and Tzannatos 2003) as well as Genicot (2005) and Rogers and Swinnerton (2007) who employ a similar approach in considering child participation in exploitative work.

Most papers define child labour as a part of the child's time constraint. That is, they add child labour as one of the factors in child time allocation. In Baland and Robinson, the child's time

is allocated between working and not working. Basu (2001), Stulik (2004), and Chaudhri and Dwibedi (2006) employ a similar approach. An alternative formulation to Baland and Robinson is to define child labour as time not in formal schooling. This is equivalent to relabelling time outside of child labour in the Baland and Robinson setting as schooling. Theoretical studies that define child labour as time outside of schooling include Dessy (2000), Ranjan (1999 & 2001), Dessy and Pallage (2001), Jafarey and Lahiri (2002), Hazan and Berdugo (2002), Dessy and Vencatachellum (2003), Hussain and Maskus (2003), Tanaka (2003), Rogers and Swinnerton (2004), Bommier and Dubious (2004), Horowitz and Wang (2004), Katav-Herz (2004), Chakraborty and Das (2005), Jafarey and Lahiri (2005), Lopez-Calva and Miyamoto (2005), Das and Deb (2006), Emerson and Knabb (2006 & 2007), Doepke and Zilibotti (2006), Grossmann and Michaelis (2007), and Pallage and Zimmerman (2007). Sylvain Dessy and Stephane Pallage (2005) model child participation in worst forms of child labour as the residual claimant on child time outside of schooling.

Outside of Basu's papers, Rogers and Swinnerton (2007), and Dessy and Pallage (2005) child labour is not distinguished from child work (the Basu papers are vague on whether there is a difference between child labour and child work). This is because the distinction between labour and work that is frequent in policy discussions of child labour does not have precedent in labour economics. The study of labour is the study of work, and the only work that can even be interpreted as distinguishing between the two is when the exact nature of the time constraint is left unspecified.

Another issue in these studies, especially those that define child labour as time not in school, is that there are things other than work and school that might be valuable to the child. Few theoretical studies explicitly consider leisure or types of work. The omission of a discussion of leisure is substantive only if one thought the goal of these theoretical works was to motivate a statistical concept of child labour. Otherwise, from a modelling perspective, it is straightforward to think of education as essentially leisure plus time in school. While there may be subtleties missed by not distinguishing between leisure and schooling, it is unlikely that most of the fundamental lessons from the theoretical work on child labour would change if leisure were explicitly considered. However, the fact that children are often seen outside of both work and school is clearly problematic a statistical definition of child labour as time outside of education.

A few studies explicitly develop a more nuanced time constraint (as Becker 1965 originally did). A classical time allocation model might distinguish between work in the formal labour market, work in home enterprises, work in domestic production, leisure and schooling. This explicit specification of the time constraint is rare in the theoretical literature. Krueger and Tjornhom Donohue (2005) is an exception – in their model time as allocated between schooling, work in the labour market, and work for the family.

Because the theoretical literature views child labour as work and the question is whether or not the child is working, there is little, in general, to be gained by more fully specifying alternative uses of child time. This is because when children participate in multiple activities, an optimizing agent (typically modelled as the parent) will allocate child time across activities to equalize the value of the child's marginal product in each activity. The argument is simple. Suppose a child does two things – she works in the family farm and performs chores around the house. The cost of her time in chores is that the child has less time to work on the family farm. That is, the cost of time in chores is the return on time in the family farm. The cost of time on the family farm is the return the agent perceives to time in chores. If the agent would

be better off allocating time away from chores to the farm, then the agent should do so until there are no feasible beneficial reallocations of the child's time.

The argument is the same if additional activities are added. Suppose the child works on the family farm, performs chores, works in the local market, and goes to school. If time in school were more valuable than time in chores, then the agent would allocate child time towards school and away from chores. Thus, all activities in which the child participates will have the same marginal cost and marginal benefit. There is no sense in which one type of work implies more of a trade-off with schooling than another type of work. One cannot define child labour based on what activities imply greater marginal costs in terms of foregone schooling – they all have the same marginal cost.

It is possible that there could be variation across activities in the answer to the thought experiment of what happens to schooling if we somehow exogenously vary child time in the activity. This would occur if activities differed in the relationship between time in the activity and the family's return on time in the activity. Imagine that the value to the agent of child time in each activity exhibits a positive diminishing marginal product. The trade-off inherent in moving time from one activity to another depends on the rate at which the marginal product of child time in the activity diminishes. Theory cannot be informative about how the marginal product of child time will vary across activities. Consequently, theory cannot guide us in this alternative interpretation of what a costly or harmful activity might mean.

3. Empirical research on child labour

Empirical, statistical research on child labour tends to mimic theory in considering one aspect of child time allocation in isolation. This is somewhat harder to justify in empirical work than in theoretical work, because typically the goal of empirical research is to look at how the allocation of child time varies with some other aspect of the environment. In that way, the empirical research is aimed at tracing out the shape of marginal product curves, and there is nothing in theory to suggest why one activity should be more interesting than another. Before turning to the applied research, this study first describes terms that are used to describe the applied data.

3.1. General child time allocation terms

Theoretical economic research on child labour is generally not careful to precisely define the concept. In empirical application, it is important to be precise in the language used. This section defines the key terms concerning child time allocation used throughout this report. The goal of this section is to define these terms as they are typically used in applied research, but there is enormous heterogeneity in how researchers use these words. Unfortunately, researchers do not always clearly define their language precisely, but the definitions in this section reflect the most common use of the terms and will be used throughout. Academic researchers are not always in tune with international statistical standards. Hence, the use of these terms by researchers may not correspond precisely to an existing international statistical standard. Child labour related terms such as child labour, child work, and light work are discussed in the next section.

Table 2 lists commonly used phrases describing aspects of how children work. Guarcello et al (2005) is a more thorough discussion of these terms. Activities are organized by whether the activity involves the direct production of economic goods and services that fall under the United Nations System of National Accounts (SNA). According to the SNA, the production of economic goods and services includes all production and processing of primary products whether for the market, for barter, or for own consumption, the production of all other goods and services for the market and, in the case of households which produce such goods and services for the market, the corresponding production for own consumption. The production of economic goods and services will include wage employment, self-employment, participation in agriculture, milling, handicrafts, construction, as well as water and wood collection.

Table 2: Commonly used terms

Class	Term	Definition
<i>SNA Economic Activity:</i>		
	Economically active	Participates in the production of economic goods and services or is unemployed and seeking such employment
	Employed	Economically active, excluding the unemployed, but including those temporarily out of work with a formal connection to a job
	Economic Work	Economically active, excluding the unemployed and those temporarily out of work
	Market oriented economic work	Economically active in the production of goods or services for the market or barter
	Paid Work	Receives cash or in-kind payments for economic work
	Non-market economic work	Economically active in the production of goods or services for own consumption
	Non-market economic work	<i>Sub-categories:</i>
		Own account production of goods and services

Class	Term	Definition
		Own account construction and substantial repair services by owners of dwellings
		Own account collection and gathering activities
	Family Work	Economic work in own or family business or farm
	Market Work	Economic Work
	Market Work	<i>Sub-categories:</i>
		Inside household
		Outside household (sometimes separated into paid and unpaid)
Non-SNA Activities:		
	Non-economic work	Participates in productive activities that are outside of the SNA definition of economic activity
		<i>Alternatives:</i> Non-economic activity, non-market household activity, non-market household production
	Community service and volunteer work	Non-economic work provided outside of own household
	Domestic Chores	Provides services to own family members
		<i>Alternatives:</i> Household chores, housework (sometimes excludes shopping)
	Domestic Chores	<i>Sub-categories:</i>
		Child and Elder Care
		Cooking
		Cleaning
		Small repairs
		Shopping for household goods and services
	Domestic Work	Non-economic work excluding community service and volunteer work

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

Aggregate statistics of child employment typically cover the economically active population. **Economically active** is defined as being involved in economic activity and it includes wage workers, employers, own-account workers, members of producer cooperatives, unpaid family workers, apprentices, members of the armed forces, and the unemployed. **Economic work** or **market work** is used similarly to economically active individuals, except the unemployed are excluded. Participants in market work are sometimes separated by whether their work is for the consumption of others (**market oriented work**) or their own family (**non-market oriented work**). **Paid work** is a subcategory of market oriented work, and many authors focus on studying wage employment alone. One unique challenge in classifying children engaged in market work outside of their own household is that children are not always paid directly in wages. They either receive pay in-kind (goods and services) or their labour is contracted for a fixed fee. Typically, these children are grouped with those paid in cash under "paid work", but some studies separate them, labelling them **unpaid out of household market work** or **unpaid out of household economic work**.

Child involvement in non-SNA activities is studied infrequently in child labour studies. In the empirical child time allocation papers reviewed herein and summarized in Appendix Table 1, all but two papers consider paid work, but only 25 percent look at child involvement in non-SNA activities. The phrase **non-economic work** is sometimes used to denote participation in the provision of goods and services to family members or other members of the community that fall outside of the scope of the official definition of economic goods and services. This includes for example community service work that helps build or maintain local schools. It also includes **domestic chores** such as caring for family members, cooking, cleaning, or shopping. The phrase "housework" is sometimes in place of domestic chores or it is used to refer to domestic chores excluding shopping. Finally, "**domestic work**" is used in reference to non-economic work exclusive of community service and volunteer work.

The use of the word "economic" in the SNA is confusing. Since the early 1960s, economists have emphasized how important these "non-economic" activities are to the household's standard of living. Moreover, non-economic can be interpreted to imply that the associated activities are inelastic with respect to economic factors, an assumption that is not born out by the data. *Nearly all of the empirical papers surveyed in Appendix Table 1 avoid using the phrases "economic" and "non-economic" work.* Instead, they classify work into **market work** and **domestic work**. The remaining classification of work, community service and volunteer work is rarely studied and poorly understood. There are two obvious problem with using this market and domestic work lexicon. First, market work and market oriented economic work are apt to be confused. Second, domestic work performed for compensation outside of the child's own household is considered a type of market work and is often referred to as domestic service or domestic work. In the remainder of this study, child domestic servants working outside of their family will be grouped with market work and domestic work will be used to reference non-economic work exclusive of community service and volunteer work.

The unmodified term "*work*" is used herein to refer to child participation in either market or domestic work. The phrase "*household work*" is common in the literature but will be avoided throughout this review. Household work often refers to domestic work but can be used in reference to family work.

3.2 Definitions of child labour in applied research

Cross country studies of child labour universally define child labour as the economically active population. Ages 10-14 are studied, because economic activity rates for the 10-14 population were available from the ILO and UN statistical databases. Examples of papers defining child labour as economically active population include: Becchetti and Trovato (2005), Dehejia and Gatti (2005), Edmonds and Pavcnik (2005), Neumayer and De Soysa (2005), Cigno et al (2002), Shelburne (2001), Hussain and Maskus (2003).

Microeconomic studies of child time allocation using household survey data are substantially more heterogeneous in how they define child labour. Appendix Tables 1, 2, and 3 list the definition of child labour employed in 90 different empirical studies using household survey data. The physical layout of the appendix tables are described first. The conclusions that can be drawn from them follow later.

The first appendix table is compiled from an August 2007 Econlit keyword search of the phrase "child lab*r". Listed are all papers on child labour in modern low or middle income countries written in English and published in peer reviewed, widely available academic journals. A few studies have been omitted, because it was impossible to discern how child labour was defined from the study.

Many of the listed studies in Appendix Table 1 contain both a theoretical and empirical component. The column "theory framework" for Appendix Table 1 indicates how child labour is defined in the theoretical work in the paper. The coding "n/a" indicates that there is no mathematical model of child labour explicit in the paper. A coding of 1 implies that child labour is modelled without explicit reference to a trade-off between child time in child labour and other activities (similar to the Basu and Van framework). Code 2 indicates that the paper models the trade-off between working and not. "Not" may be leisure or schooling. Code 3 indicates that leisure and schooling are treated distinctly in the model. When work inside and

outside the household are modelled separate, Code 4 is listed in the "theory framework" column. The most commonly used theoretical setting is one where child labour is modelled as time outside of either school or leisure, as in Table 1.

The remaining columns of Appendix Table 1 indicate whether domestic work (column 3), market work outside the household (column 4), and market work inside the household (column 5) are explicitly considered in the empirical work. The final column of Appendix Table 1 describes the statistical definition of child labour used in the paper. Few papers explicitly call one variable child labour. The modal practice in empirical child labour research is to use the phrase in the title and in discussion but to never explicitly statistically define the concept. For the majority of papers in appendix Table 1, the listed definition of child labour is the definition of the variable used in a result discussed as child labour. That is, it is the implicit definition of child labour that follows from the discussion in the text.

The coding of market work outside the household is a challenge for most studies. It is common to use market work outside the household interchangeably with paid market work, and almost all of the empirical studies coded as looking at market work outside the household are actually looking at paid employment (which may occur within the household). The challenge is that many children working outside the household are not paid (more than 5 percent of children in UNICEF's End of Decade Assessment, Edmonds and Pavcnik (2005). Unpaid work outside the household may reflect measurement error in in-kind compensation as well as labour exchanges between families. Studies do not generally mention unpaid market work outside the household, but it is assumed that they are grouped with paid work when not otherwise mentioned.

Appendix Table 2 describes the definition of child labour used in research reports published by the World Bank or the Understanding Children's Work (UCW) project. World Bank or UCW papers that were eventually published in peer reviewed journals are listed in Appendix Table 1 and not listed in Appendix Table 2. As with Appendix Table 1, listed papers are restricted to those using household survey data in modern low and middle income countries where it was possible to identify how aspects of child time allocation are defined. These papers generally do not have a theoretical component, so information on theory in these papers is omitted from Appendix Table 2.

Appendix Table 3 lists empirical papers issued in three major international academic research working paper series that are not otherwise listed in this study's tables.¹ Appendix Table 3 lists only the definition of child labour used in each study. This set of studies are particularly informative for present purposes, because there is a long lag in publication within economics, and these working papers reflect the prevalent view of researchers at the time of this report.

3.2.1 Paid work or market work outside the household

All empirical studies of child labour listed in the appendix tables other than Dumas (2007) consider paid work outside of the child's family in their statistical definition of child labour. Dumas (2007) is an exception only because, her study is based on an area of Burkina Faso where it is not clear if there is market work outside the household in the data. Few studies are precise in how they treat unpaid market work outside of the child's household and family business, but it appears that many have grouped this with paid work.

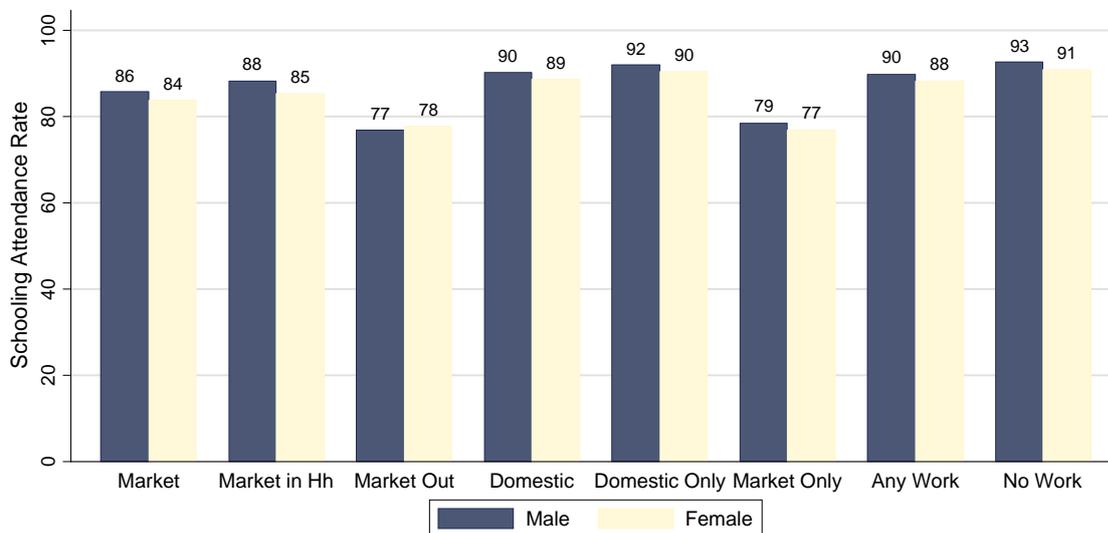
¹ All child labour related papers in the BREAD Working paper series have been elsewhere listed in the appendix tables.

For 11 studies, child labour is defined as market work outside the child's household and family enterprises. This was the most prevalent statistical definition of child labour prior to 2000. All studies published before 2000 except Patrinos and Psacharopoulos (1997) defined child labour as market work outside the child's family.

The reason for the first focus on market work outside of the child's household is that this work is the most visible, and most images of children in dire conditions are children captured outside of their household. In fact, there is an empirical basis for the focus on child labour as market work outside of the household, because children working outside the household have the lowest school attendance rate of any group.

This is evident in simple tabulations drawn from UNICEF's Multiple Indicator Cluster Surveys (MICS) from 2000 and 2001. Figure 1 shows schooling attendance rates for children 10-14 by activity status, tabulated from 34 publicly available MICS surveys.² The advantage of these surveys for the present purpose is that they collect essentially the same information in each surveyed country.³ For children 5-14, the MICS surveys collect whether children work outside of their household in the last week and the last year as well as how many hours they worked outside the household in the last week. The surveys also collect hours in the last week for work in domestic chores and in the household business (separately) and schooling attendance.

Figure 1: School attendance rates (in last year) by category of work and gender, children 10-14



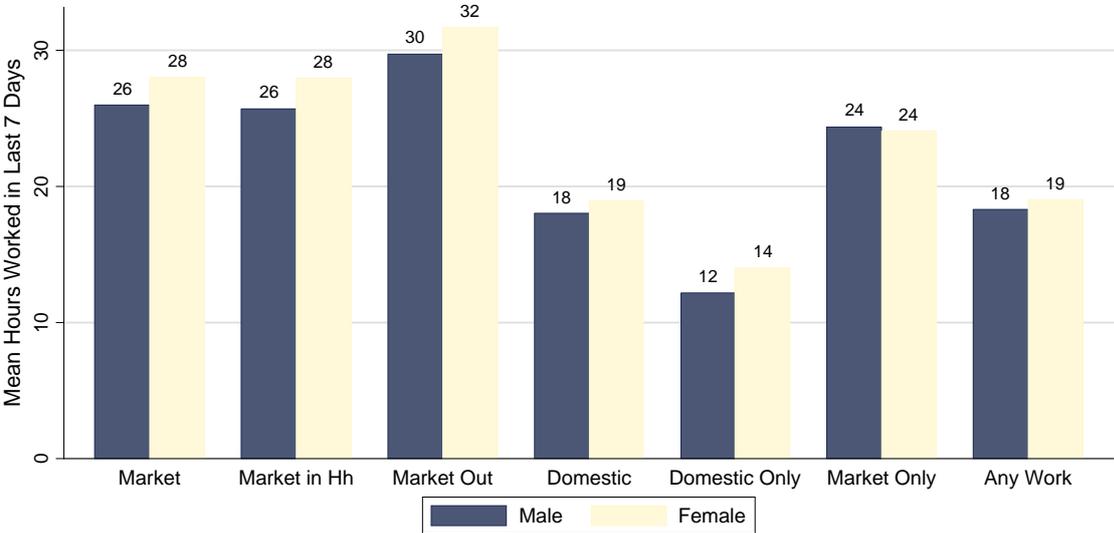
Source: Author's calculations from the pooled MICS data. Each child in the MICS countries is weighted to reflect the number of individuals they represent. Hence, the picture is representative for the pooled populations of the MICS countries.

² <http://www.childinfo.org/MICS2/MICSDataSet.htm>.

³ Questions are likely to be interpreted in different ways based on local context. For example, 38 percent of children 5-14 in Niger answer that they work in unpaid work outside of their family. The average across all countries is 6 percent. It could be that this labour arrangement is much more frequent in Niger, or it may be that respondents are interpreting the question in a different way than are respondents in other countries.

In the pooled MICS survey data, 77 percent of boys and 78 percent of girls who participate in market work outside of their household in the last week also report attending school. In contrast 88 percent of boys and 85 percent of girls active in market work inside their home attend school. Of the available classifications of child time listed in Figure 1, children working outside the household in market work have the lowest school attendance rates. Is this reduced attendance rate something intrinsic to market work outside the household? Figure 2 tabulates hours worked in the last week by activity status. Children who work in market work outside of their household have the most hours worked of any activity class. Boys in market work inside the household spent a total of 26 hours working in the last week whereas boys in market work outside the household spent a total of 30 hours working in the last week. Children that participate in domestic work only have the highest schooling attendance rates in Figure 1 and the lowest hours worked in Figure 2.

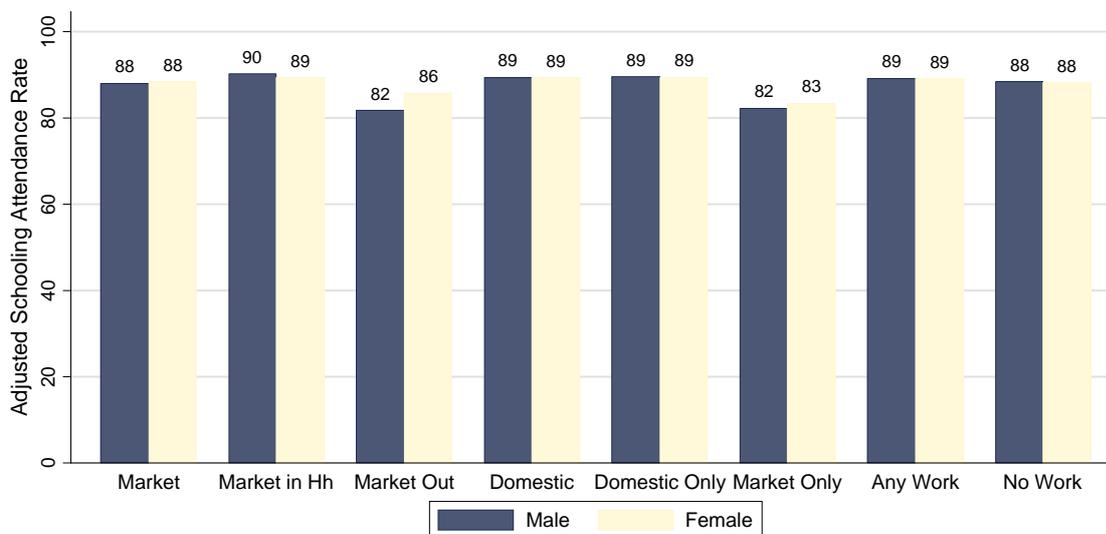
Figure 2: Hours worked in the last week by type of activity and gender, children 10-14



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

Most of the difference in schooling rates across in activity types in Figure 2 owe to differences in hours worked. Figure 3 adjusts the data for differences in hours worked and the child's age. After adjustment, working children are equally likely to attend school across activities except children who work outside the household in market work. These children still are less apt to attend school, although the difference between market work inside the household or domestic work is substantially attenuated after adjusting for hours worked.

Figure 3: School attendance rates (in last year) by category of work and gender, children 10-14, hours and age adjusted



On theoretical grounds or empirical grounds, it is extremely difficult to justify focusing on work outside of the household alone as child labour. On average, children work more intensively and are less likely to attend school, but there are many children working long hours inside their household. There is no economic theory to suggest that one type of activity should be more apt to affect schooling or other aspects of child welfare. In fact, theory predicts the opposite: conditional on working in activities, the marginal cost associated with time in the activity should be the same across activities. Consequently, most empirical studies of child labour after 2000 have included market work more generally in the definition of child labour.

3.2.2 Market work

A majority of studies in Appendix Tables 1, 2, and 3 define child labour as market work. That is, a child labourer is a child who works outside their household for wages or other compensation or a child who helps on the family farm or business. The modal implied definition of child labour in empirical research is market work participation. Half of all papers define child labour as market work only. World Bank Policy research papers (Appendix Table 2) put even more emphasis on market work. Only 1 study focuses on paid work rather than market work, and 3 studies consider anything other than market work in the child labour definition.

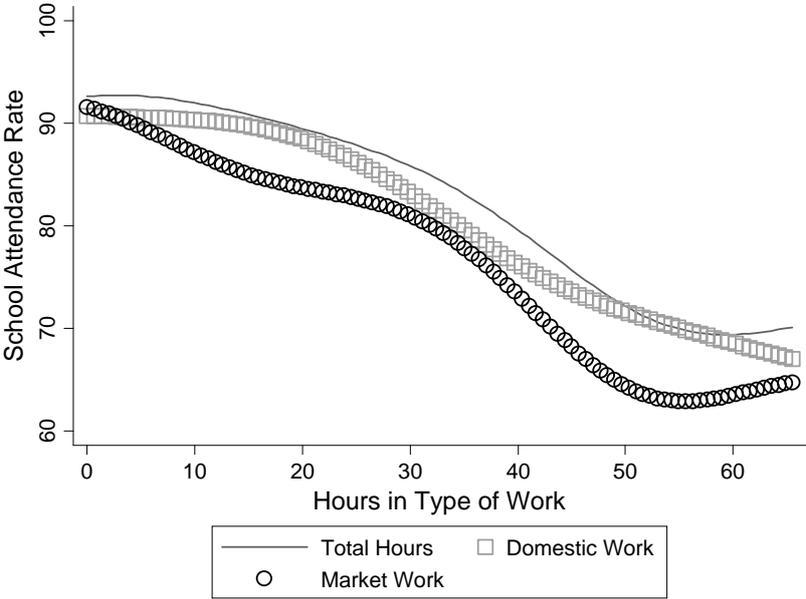
Some studies call a child's involvement in market work child labour only if it meets a stipulated hours worked and age criteria. Emerson and Souza (2007) is one study that does this among published, peer reviewed empirical papers. A child engaged in market work is a child labourer if they participate in market work for at least 20 hours during the reference week. Two of the Understanding Children's Work working papers define child labour as market work for a child under 12 years or market work more than 13 hours a week for children aged 12-14 inclusive. This type of definition of child labour based on hours worked is consistent with the idea above that observable job characteristics are more plausibly useful in defining child labour than speculation about what might happen to a child after removal from work. The working papers listed in Appendix Table 3 represent the most recent prominent empirical studies of child labour. Every one considers market work. Thus, the

argument that there is no conclusive justification for focusing on paid work alone seems to have won out in academic research. A majority of the research papers in appendix table 3 define child labour as market work alone without domestic work, and only the paper by Kruger et al (2007) define child labour based on the number of hours in market work (in her case, 15 per week).

3.2.3 Market and domestic Work

The same argument that leads one to focus on more than paid work also leads one to consider domestic work. When the child participates in multiple activities, the value of the child's time is equalized across activities. It does not matter whether the child's output falls inside the SNA definition of economic activity, and we have no strong priors to suspect that market work is more apt to trade off with child wellbeing than is domestic work. Figure 3 above illustrates this point. After adjusting for hours worked and child age, children in domestic work and market work have the same schooling attendance rates. Figure 4 shows this more explicitly by graphing the probability a child attends school against hours market work, hours domestic work, and hours total for the MICS sample. The circles at the bottom of the figure show the schooling attendance rate observed at each hour the child spends in market work. The squares show the school attendance rate as a function of hours in domestic work, and the solid line represents the school attendance rate as a function of total hours. Notice that the market work hours – schooling relationship is most everywhere below the other two curves. This is because market work is associated with additional domestic time. A similar argument explains why time in domestic is below total hours worked. On average, time in market work is associated with more additional time in the other type of work than is domestic work so the market work curve stays below the domestic curve.

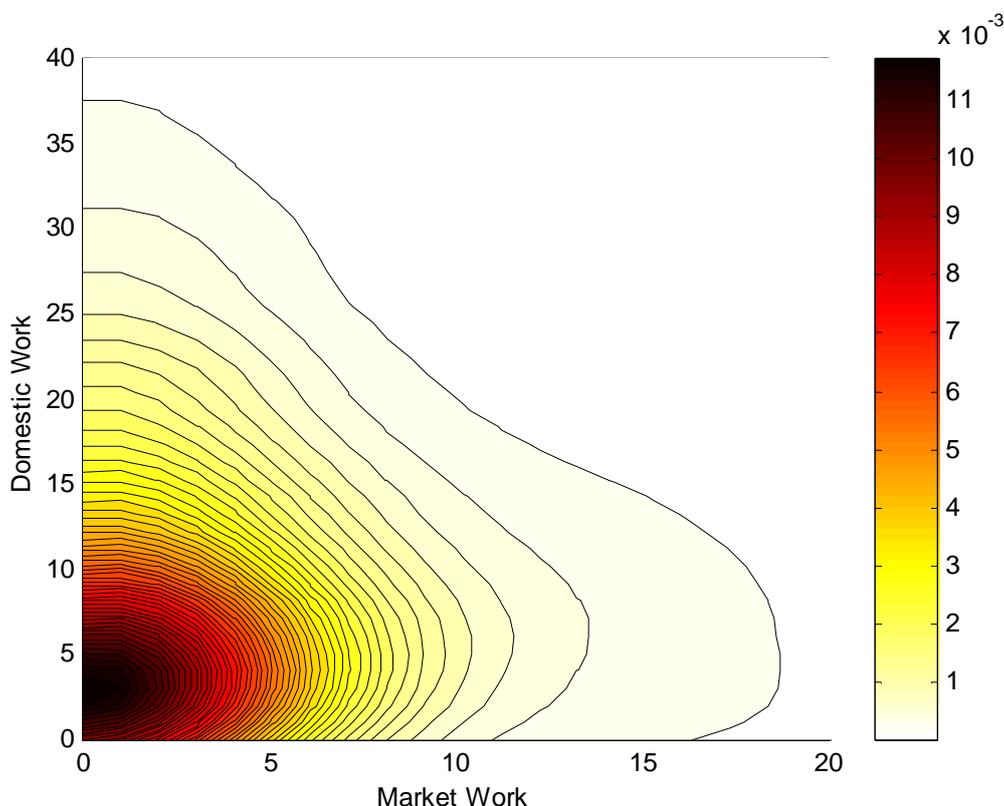
Figure 4: School attendance and total hours worked, children 10-14



Source: Author's calculations from the pooled MICS data. Each child in the MICS countries is weighted to reflect the number of individuals they represent. Hence, the picture is representative for the pooled populations of the MICS countries. Each pictured curve is from a separate nonparametric regression: an indicator for whether a child attends school is regressed on hours, hours squared, and a series of the form $\sin(j * \text{hours})$ and $\cos(j * \text{hours})$ $j=1,2,3$ where hours is transformed to range between 0 and $2 * \pi$. Total hours worked in the last week (connected without markers), total hours in the last week in market work (circles), and total hours worked in the last week in domestic work (squares) are the three different hours measures pictured. Fitted values (*100) are pictured. Only fitted values between 0 and 2.5 standard deviations above the mean are pictured.

This is especially true at relatively few hours in market work. The reason why schooling rates seem to decline more steeply in market work than in other types of work is that most children in market work also participate in domestic work. In general, participation in various activities is positively correlated when children work a small number of hours in each activity (as is typical) but not with extreme hours. This is evident in Figure 5 which presents the joint distribution of hours worked in market and domestic work for all children 10-14 in the MICS data. Figure 5 is a contour map of the joint density of hours in market work and hours in domestic work for children 10-14 in the pooled MICS data. Each contour on the map is a given density. Thus each point on a given contour is equally likely. Density is increasing in colour intensity.

Figure 5: Joint density of hours worked in domestic and market work for children 10-14



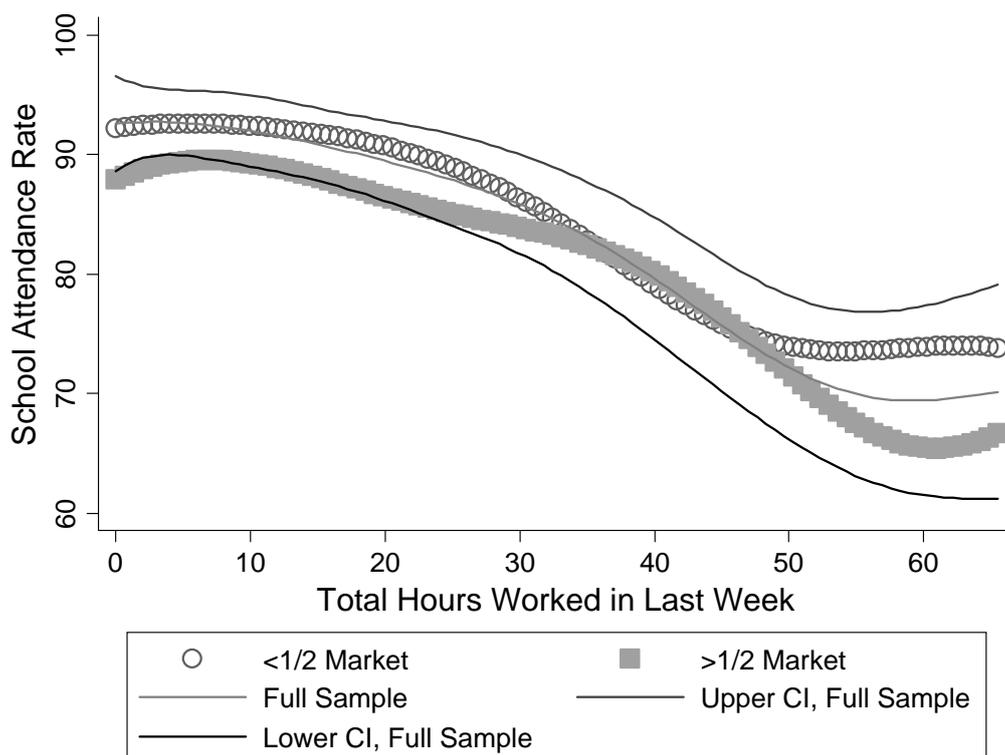
Source: Author's calculation from MICS data. Joint density estimates use a bivariate normal kernel with bandwidth chosen following Silverman (1986, page 20). Each child in the MICS countries is weighted to reflect the number of individuals they represent. Hence, the picture is representative for the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

Several key points are evident in Figure 5. First, at the peak of the density, children work more hours per week in domestic work than market work. Ignoring domestic work would frequently understate total hours worked by a child by a factor slightly greater than 2. Second, children working a large number of hours in market work are more likely than not to spend additional time in domestic work. This is evidence by the humps in the market work direction. No such humps are evident with hours in domestic work. Third, as hours per week in domestic work increase, it becomes less likely to observe the child doing significant time in market work. This is evident in the increasing slope of contours as one heads up the domestic hours worked distribution.

This characteristic of the data makes it extremely hard for researchers to justify neglecting domestic work in their analysis once they start defining child labour as a condition of hours worked. The joint distribution of hours worked in Figure 5 illustrates the problem with "child labour" definitions that focus on market work alone, especially definitions based on the intensity of hours worked. Suppose a researcher decided to be concerned about children that worked more than 20 or more hours per week. If only work outside the household was considered, this would be 8 percent of the MICS children aged 10-14 sample. If market work inside the household is also included, 23 percent of children work more than 20 or more hours per week. When domestic work is also considered, 38 percent work 20 or more hours per week and 17 percent work 40 or more hours per week. Hence, ignoring domestic work may seriously understate estimates of total hours worked and thereby the incidence of child labour if hours worked is used to define the concept.

Once we condition on the total hours worked in a week, the fraction of that work in market work has little bearing on school attendance rates. This is evident in Figure 6 which plots schooling attendance against total hours worked in the full sample, in the sample where at least 1/2 of total hours worked is in market work (squares) and at least 1/2 of total hours worked is in domestic work (circles). The pooled population is also plotted in Figure 6 with 95 percent confidence bounds. When the sample is bifurcates based on the fraction of total hours in market work, it is apparent in figure 6 that each of the separate curves is within the 95 percent confidence interval of the pooled line. This is consistent with the hypothesis that the schooling – hours worked association does not vary between market and domestic work once one considers the positive association in general between hours worked in each activity. Given that theory cannot predict that market work should be more likely to harmful to children than domestic work, it is extremely difficult to justify excluding domestic work from consideration.

Figure 6: School attendance and total hours worked by fraction in market work, children 10-14



Source: Author's calculations from the pooled MICS data. Each child in the MICS countries is weighted to reflect the number of individuals they represent. Hence, the picture is representative for the pooled populations of the MICS countries. Each pictured curve is from a separate nonparametric regression: an indicator for whether a child attends school is regressed on total hours, total hours squared, and a series of the form $\sin(j * \text{total hours})$ and $\cos(j * \text{total hours})$ $j=1,2,3$ where total hours is transformed to range between 0 and $2 * \pi$. Total hours worked in the last week (connected without markers), total hours in the last week for individuals where a majority of total hours are in domestic work (circles), and total hours worked in the last week for individuals where a majority of total hours are in market work (squares) are the three different hours measures pictured. 95 percent confidence bounds for the full sample curve (total hours of all children 10-14) are also pictured. Fitted values (*100) are pictured. Only fitted values between 0 and 2.5 standard deviations above the mean are pictured.

Many recent papers consider both market and domestic work. Of the published research papers in Appendix Table 1, only 5 consider domestic work in defining child labour. However, 3 of the World Bank papers do and most of the Understanding Children's Work research published within the last three years consider domestic work. The rising attention to domestic work in the child labour literature is also evident in the new research papers listed in Appendix Table 3. Just under half consider domestic work in their definition of child labour.

The challenge is that the public will not pay attention to child labour when the definition includes activities in which they and their children regularly participate. Thus, many recent studies apply an hours limit on the number of domestic hours a child works until their activity becomes child labour. Edmonds and Pavcnik (2005) and Edmonds (2005) consider 7 or more hours a week in domestic work as child labour. Many of the Understanding Children's Work research papers listed in Appendix Table 2 consider domestic work child labour when it is for more than 28 hours per week. A clear implication of the patterns observed in Figures 4-6 is that any cut on hours worked should be based on total hours worked rather than separate hours worked considerations across activities. Efforts to construct a definition of child labour that corresponds to public and political definitions of child labour are considered in greater detail in the next section.

4. Research and international criteria and definitions

4.1 ILO criteria

Child labour carries a negative connotation, and there is a clear indication within existing ILO Conventions for the idea that any statistical definition of child labour must refer to activities that are child welfare reducing. For example, ILO Convention No. 138 on the Minimum Age for Admission to Employment was passed in 1973 and ratifying countries agree to pursue a national policy to abolish "child labour" and to increase the minimum age of employment to "a level consistent with the fullest physical and mental development of young persons" (ILO Convention No.138, Article 1). Although the ILO Convention contains no express definitions of "child labour" nor "employment", the goal of abolishing "child labour" makes it clear that it must refer to activities in which child participation makes the child worse off in some sense. The reference by the ILO Convention to "employment or work" suggests that the Convention may encompass all forms of economic activity, including work outside of a conventional employment relationship, such as self employment.

The notion that there are activities in which children should not participate is also in the UN Convention on the Rights of the Child (UN-CRC):

States Parties recognize the right of the child to be protected from economic exploitation and from performing any work that is likely to be hazardous or to interfere with the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral or social development. (1989, Article 32).

Implicit in this quotation from the UN-CRC is that there are economic activities in which children may participate. This is also borne out by the framework of Convention No. 138 and Convention No. 182 on the Worst Forms of Child Labour, which provides that children under the age of 18 years can legitimately work, provided that they have attained the applicable minimum age, and the work concerned is not hazardous or another worst form of child labour.

Convention No. 138 explicitly introduces a distinction between child labour and light work:

National laws or regulations may permit the employment or work of persons 13 to 15 years of age on light work which is--

(a) unlikely to be harmful to their health or development; and

(b) not such as to prejudice their attendance at school, their participation in vocational orientation or training programmes approved by the competent authority or their capacity to benefit from the instruction received (Article 7, section 1)

How do we know when work is harmful to a child's health or development? How is it possible to know when an activity interferes with schooling? In order to know an activity's impact on the child, one must know what the child would be doing in the absence of that activity. This **problem of the counterfactual** makes it extremely difficult to statistically implement measures of child labour and light work that are consistent with the terms' usage in international conventions. We consider whether research is informative about the impact of common forms of work on child development later in this section.

The current criteria for identifying **child labour** used by the ILO's Statistical Information and Monitoring Program on Child Labour (SIMPOC) for its global child labour estimates is:

A child under 12 who is economically active for 1 or more hours per week,

A child 14 and under who is economically active for at least 14 hours per week,

A child 17 and under who is economically active for at least 43 hours per week

A child 17 and under who participates in activities that are "hazardous by nature or circumstance" for 1 or more hours per week

A child 17 and under who participates in an "unconditional worst form of child labour" such as trafficked children, children in bondage or forced labour, armed conflict, prostitution, pornography, illicit activities.

The ILO (2006b) estimates that there were 217.7 million child labourers in the world in 2004 under this definition. **Light work** is used to characterize the market work of children aged 12-14 that is non-hazardous and for less than 14 hours per week. **Child work** is an aggregate that pools child labourers with children engaged in light work.

This criteria for identifying child labour makes reference to hazardous work and the unconditional worst forms of child labour. Convention Nos. 138 and 182 both place special emphasis on activities – commonly referred to as hazardous work – that jeopardise "the health, safety, or morals of young persons" (Article 3(1) of Convention No.138 and Article 3(d) of Convention No.182) and define 18 as the minimum age of employment for activities that can be described as such. The Conventions require ratifying countries to determine what types of activities fall under this label and Convention No. 182 requires them additionally to develop specific plans for their eradication.

Article 3 of Convention No. 182 defines what types of activities are to be considered for persons under the age of 18. These include all forms of slavery and "practices similar to slavery." This later clause includes the sale and trafficking of children, debt bondage, serfdom, and forced or compulsory labour, and the forced or compulsory recruitment of children for use in armed conflict. It further includes the use, procuring or offering of a child for prostitution, for the production of pornography or for pornographic performances; and the use, procuring or offering of a child for illicit activities, such as for the production and trafficking of drugs as defined in the relevant international treaties.

Article 3(d) is the most undefined part of Convention No. 182. It defines hazardous work – discussed above – as a worst form of child labour. Article 4 of the Convention is explicit that it is up to individual countries to determine what types of work are considered "worst forms" of child labour under this clause. As previously noted, activities labelled "worst forms" under Article 3(d) of Convention No. 182 are often referred to as "hazardous forms of child labour." The accompanying Worst Forms of Child Labour Recommendation No. 190 suggests that these hazardous forms of child labour include:

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

It is worth noting that, unlike the more general child labour definitions discussed above, these hazardous forms of child labour are defined based on the characteristics of the work rather than relying on understanding what the child might do in the absence of work. Hence, the labelling of specific activity as a worst or hazardous form does not face the problem of the counterfactual intrinsic in child labour definitions.

4.2 Definitions of child labour, child work, and light work in national statistical reports

Many national statistical offices that have generated estimates of child labour rely heavily on ILO-SIMPOC for input. This often results in definitions of child labour that closely mirror the definition employed by SIMPOC at the time of drafting of the report. The definitions of terms used in national statistical reports do not necessarily reflect the concept of child labour used in a given country's related labour regulations and legislations.

Table 3 summarizes child labour definitions in 27 national reports on child labour. After country name, the first column describes the type of survey used in the analysis. A dedicated child labour survey is marked CLS. A multipurpose household survey is marked NHS. An integrated labour force survey with child labour related questions is marked "ILFS". The third column indicates whether the report distinguishes between child work and child labour. Most reports prepared in languages other than English do not distinguish between child labour and child work, because they lack the distinction between labour and work in their language (Portuguese, Spanish, and French all face this problem). The fourth column contains the relevant specific definition of child labour.

Table 3: National Statistical Office definitions of child labour

Country	Data source	Year	Distinguish between child labour and child work	Child labour / child work definitions if available	Source
Argentina	NHS	2000	no	Trabajo Infantil, Three definitions: 1- children that work outside or earn wages 2- children that work outside or earn wages or help at home 3- children that work outside or earn wages or help at home or take care of home / children	Ministerio de Trabajo, de Empleo y Seguridad Social (2002)
Bangladesh	CLS	2002/03	yes	child labour: economically active children under 12, economically active children 12-14 working 14 or more hrs per week, children under 18 in hazardous work or worst forms of child labour, children under 18 working 43 or more hours per week	Bangladesh Bureau of Statistics (2003)

Country	Data source	Year	Distinguish between child labour and child work	Child labour / child work definitions if available	Source
Belize	CLS	2001	yes	Child labour: child labour is defined as: in ages 5 to 11: all children at work in economic activity; in ages 12 to 14: all children at work in economic activity minus those in light work; and in ages 15 to 17: all children in hazardous work.	Central Statistical Office, Belize (2003)
Cambodia	CLS	1996	no	market work	National Institute of Statistics (1997)
Chile	CLS	2003	yes	trabajo inaceptable: All economically active children under 12 years; all children 12 - 14 who are economically active and do not study or who are economically active for 14 or more hours per week; all children 15-17 who are economically active for 21 or more hours per week and do not attend school; all children 15-17 who work more than 49 hours per week; all children working at night; all children working in the streets.	Instituto Nacional de Estadísticas, Chile (2003)
Ecuador	NHS	2001	yes	child labour is economically active child under 15 for at least 1 hour in reference week, child under 18 in mining, quarries, electricity, gas, water, construction, transport, storage, and communications, under 18 child working at night or pre-dawn hours; under 18 child working 6 or more hours per day on average; under 18 child working more than 30 hours per week; under 18 working usually more than 5 days per week.	Marschatz (2005)
El Salvador	CLS	2001	yes	child labour is 5-17 in mining, quarrying, construction, electricity, gas and water supply, transport, storage, communications; economically active working at night; economically active under 12; 12-13 economically active for more than 22 hours per week; economically active 14-15 for more than 34 hours per week; economically active under 18 operating tools, equipment, or machinery with risk of injury; economically active under 18 working with little ventilation, insufficient light, no bathroom, no telephone, no first aid kit, no protective clothing, bad odors	Marschatz (2004)
Ethiopia	CLS	2001	yes	"working children" includes market and domestic work.	Central Statistical Authority (2001)
Gambia	MICS	2000	No	Child work: children who have done any paid or unpaid work for someone who is not a member of the household or who did more than four hours of housekeeping chores in the household or who did other family work	Gambia Statistical Service (2000)
Ghana	CLS	2001	yes	child labour: an economically active child under 13 or a child 13-17 in mining, quarrying, hotels, restaurants, or fishing	Ghana Statistical Service (2003)
Guatemala	NHS	2000	yes	Child labour is an economically active child under 14; child 5-17 in mining, quarrying, construction, electricity, gas, water, transport, storage, communications; children 14-17 economically active for more than 42 hours per week or 7 hours per day; child 5-17 who starts or finishes work between 6pm and 6am.	Marschatz (2004)
Guyana	Small	2004	yes	"child labour in its worst forms": unconditional	Bureau of Statistics,

Country	Data source	Year	Distinguish between child labour and child work	Child labour / child work definitions if available	Source
				worst forms plus child under 18 that worked at least twice per month in economic activities under harmful physical and environmental conditions	Guyana (2004)
Honduras	NHS	2002	no	child labour: children under 17 that are economically active or do not attend school while engaging in domestic work	Cruz (2002)
Kenya	ILFS	1998/99	no	Child labour: Economically active children 5-17 that do not attend school or work in fishing, mining, quarrying, building, construction, or road transport work undertaken by children aged 5-17 years and which prevents them from attending school, is exploitative, hazardous or inappropriate for their age	Central Bureau of Statistics, Kenya (2003)
Kenya	CLS	1998/99	yes	child labour: economically active children 5-17 that did not attend school, worked for 25 or more hours per week, were self employed (not in family farm or business, or work for pay)	Central Bureau of Statistics (2001)
Malawi	CLS	2002	yes	Child labour: economically active children under 14 who work at least 7 hours in the previous week in total (including domestic work) and economically active children 14-17 that work more than 7 hours in agriculture in the previous week	National Statistical Office (2004)
Mongolia	ILFS	2002/03	yes	child labour: economically active children under 12, economically active children 12-14 working 14 or more hrs per week, children under 18 in hazardous work or worst forms of child labour, children under 18 working 43 or more hours per week	National Statistical Office of Mongolia (2004)
Namibia	CLS	1998	yes	"child labour force" - market work + unemployed seeking work	Ministry of Labour, Namibia (2000)
Nepal	NHS	1995	no	market work	National Planning Commission, Nepal (2003)
Nicaragua	NHS	2000	no	working children - economically active children 5-17	ILO-IPEC (2004)
Pakistan	CLS	1996	no	economically active children 5-14	Federal Bureau of Statistics (1996)
Panama	CLS	2000	no	never defined - child labour used to reference economically active children	Cornejo et al (2003)
Philippines	CLS	2001	no	economically active children 5-17	National Statistics Office (2003)
South Africa	CLS	1999	yes	2 defs of child labour: economically active for at least 1 hr per week or in domestic chores for at least 7 hrs per week or in school labour for 5 hrs per week / same as previous except economically active for at least 3 hrs per week	Statistics South Africa (2001)
Tanzania	ILFS	2000	yes	child labour: economically active children 5-17 that did not attend school, worked for 24 or more hours per week, were self employed (not in family farm or business, or work for pay)	National Bureau of Statistics (2001)
Turkey	ILFS	1999	no	Focs on economically active children and	State Institute of Statistics

Country	Data source	Year	Distinguish between child labour and child work	Child labour / child work definitions if available	Source
				children in domestic chores	(1999)
Uganda	ILFS	2002	no	Economically active children 5-17	Uganda Bureau of Statistics (2002)
Sources: Country reports related to child labour available on National Statistical Office Websites listed at http://unstats.un.org/unsd/methods/inter-natlinks/sd_natstat.asp . Countries without available reports in English or where definitions of child labour were not discernable have been eliminated.					
MICS - Multiple Indicator Cluster Survey (UNICEF); ILFS - Integrated Labour Force Survey; NHS - National Multipurpose Household Survey; CLS - Child labour (or youth activities) survey; Small - small scale surveillance or pilot study.					

Nine countries use the phrase child labour to reference market work.

Three countries use definitions that closely match the ILO definition above (Bangladesh, Belize, and Mongolia). Two countries use a modified version of the ILO definitions. A child labourer in Kenya is defined as an economically active child of school going age that does not attend school or children who work in market work for at least 25 hours per week. Tanzania's is identical except that it focuses on a 24 hours per week cut off rather than Kenya's 25.

Six country reports (Costa Rica, Malawi, Ethiopia, Gambia, Honduras, and South Africa) include children working in domestic work in their own household in their definitions of child labour. Statistics South Africa (2001) includes domestic work in their definition of child labour if the child participates in domestic work for 7 or more hours per week. In Costa Rica, domestic work is legally defined as equivalent to economic activity when it conflicts with the child's involvement in school. In practice, the report appears to have included domestic work for at least 10 hours per week in the definition of child labour. Honduras defines child labour as children under 17 that are economically active or do not attend school while engaging in domestic work.

Some reports seem to explicitly avoid the use of the word child labour (Uganda, Turkey, Cambodia, Sri Lanka). Others have extremely elaborate definitions based on a series of hours and age restrictions. For example, in Chile, the following children are defined as child labourers: all economically active children under 12 years; all children 12 - 14 who are economically active and do not study or who are economically active for 14 or more hours per week; all children 15-17 who are economically active for 21 or more hours per week and do not attend school; all children 15-17 who work more than 49 hours per week; all children working at night; all children working in the streets (Instituto Nacional de Estadísticas, Chile 2003).

This approach of defining child labour based on particular working conditions has some precedent in other statistical reports. In El Salvador, child labour is 5-17 in mining, quarrying, construction, electricity, gas and water supply, transport, storage, communications; economically active working at night; economically active under 12; 12-13 economically active for more than 22 hours per week; economically active 14-15 for more than 34 hours per week; economically active under 18 operating tools, equipment, or machinery with risk of injury; economically active under 18 working with little ventilation, insufficient light, no bathroom, no telephone, no first aid kit, no protective clothing, bad odours. In Ecuador, child labour is economically active child under 15 for at least 1 hour in reference week, child under 18 in mining, quarries, electricity, gas, water, construction, transport, storage, and

communications, under 18 child working at night or pre-dawn hours; under 18 child working 6 or more hours per day on average; under 18 child working more than 30 hours per week; under 18 working usually more than 5 days per week. In Guatemala, child labour is an economically active child under 14; child 5-17 in mining, quarrying, construction, electricity, gas, water, transport, storage, communications; children 14-17 economically active for more than 42 hours per week or 7 hours per day; child 5-17 who starts or finishes work between 6pm and 6am.

Other offices rely on attributing causes of harms to particular jobs. For example, in the Namibian report, child labour is defined as children under 15 in mining or manufacturing, children under 14 in factory, mining, or industrial undertakings; children 6-18 who report schooling is affected by work; children absent from school due to work; children using tools or machines in market work; children who become ill or suffered injury at market work; children hospitalized due to work-related injuries; and children that work overtime without additional pay. This characteristics based approach is a promising step towards an accepted international definition of child labour, but given the problems with attribution, one would want to avoid relying on the child or parent's ability to infer causation in forming a national definition of child labour.

4.3 Attempts to implement international consistent definitions in applied research

Researchers have tried to apply definitions of child labour that are consistent with international definitions in two ways. One recent paper listed in Appendix Table 3 creates a hybrid variable that is the child does not attend school and works in market or domestic work. This hybrid variable approach is motivated by the observation that there is considerable heterogeneity across countries in the association between child involvement in a given activity and schooling participation rates. This is obvious in Table 4 which summaries school attendance rates by activity status for each of the countries in the MICS dataset.

Table 4: School attendance rates in various activities by country for children 10-14

	Market Work			Domestic Work	Domestic Work Only	Market Work Only	Any Work	Not Work
	Any	Inside H.Hold	Outside H.Hold					
Selected Countries	84.5	86.8	76.6	89.2	91.0	78.1	88.8	91.6
Albania	58.6	58.4	65.0	54.7	53.1	69.6	56.0	51.8
Angola	90.1	89.6	91.6	91.6	92.4	92.3	91.6	89.0
Azerbaijan	98.9	98.8	99.1	98.8	98.9	100.0	98.9	99.5
Burundi	80.0	80.0	79.9	86.6	91.7	69.2	86.1	81.0
Cameron	91.9	91.7	93.0	93.0	94.8	87.4	92.7	95.3
Central African Republic	79.5	79.5	80.3	82.3	88.7	74.3	82.0	90.3
Chad	92.4	92.5	91.8	93.3	96.7	92.9	93.3	96.7
Comores	81.4	81.7	80.3	77.1	72.4	82.8	77.7	79.2
Cote d'Ivoire	88.0	88.4	87.5	90.9	92.3	84.6	90.4	92.2
D.R. Congo	69.1	67.9	70.6	69.0	68.8	67.7	69.0	66.9
Equatorial Guinea	95.4	95.1	94.7	96.6	97.5	94.7	96.5	94.1
Gambia	86.5	86.2	88.0	89.7	91.7	88.5	89.6	92.9

	Market Work			Domestic Work	Domestic Work Only	Market Work Only	Any Work	Not Work
	Any	Inside H.Hold	Outside H.Hold					
Guinea-Bissau	90.6	90.1	93.6	93.2	95.7	83.2	92.3	94.9
Guyana	94.3	94.1	93.7	95.7	96.5	97.5	95.7	99.0
Kenya	77.5	96.9	65.5	95.9	96.3	56.4	95.4	95.5
Laos	85.9	86.4	78.8	89.5	92.7	79.8	89.3	93.6
Lesotho	93.2	93.5	90.6	96.1	96.9	88.2	95.8	96.3
Madagascar	72.8	76.8	61.9	78.7	79.8	72.9	77.0	89.3
Moldova	97.9	97.7	98.2	98.4	98.8	98.2	98.4	96.0
Mongolia	90.6	91.3	84.6	94.4	95.4	77.3	94.3	92.6
Niger	81.5	78.1	81.9	84.0	90.3	78.6	83.6	88.9
North Sudan	68.5	67.9	70.9	84.1	88.6	65.7	82.8	91.2
Philippines	86.2	88.7	77.6	93.4	95.0	59.3	93.0	98.9
Rwanda	81.2	81.4	76.8	86.5	90.4	80.4	86.3	85.0
Sao Tome	81.3	82.5	77.7	86.1	86.9	62.9	85.7	81.1
Senegal	81.6	83.3	78.6	85.3	87.2	79.2	85.0	89.9
Sierra Leone	91.9	91.1	92.1	92.3	94.6	93.8	92.4	92.4
South Sudan	91.1	92.6	82.4	93.3	94.8	96.0	93.5	97.3
Swaziland	91.6	93.6	82.6	93.2	93.4	87.4	93.2	92.8
Tajikistan	95.5	96.5	93.2	96.4	96.7	98.1	96.4	95.9
Trinidad	89.0	93.9	79.3	97.3	97.7	70.0	97.1	98.0
Uzbekistan	99.3	99.7	98.4	96.5	95.8	100.0	96.6	98.7
Venezuela	89.6	90.4	88.3	95.5	96.0	82.7	95.0	94.4
Vietnam	84.8	86.4	56.4	91.0	95.7	85.7	90.5	96.6

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

The hybrid definition of work without school for child labour is consistent with the Table 3 definitions that explicitly consider whether the working child attends school (Tanzania, Kenya, Honduras, Chile). However, this definition of child labour is most appropriate when schooling is the primary concern given that it completely neglects other aspects of child welfare. It also has the problem that it compares children who work without school to a pooled population of children who work and attend school, children that do not work and attend school, and children that do not work and do not attend school. Those might be very distinct populations.

The second approach to imposing a definition of child labour on the data that is consistent with international definitions is to define child labour as work with restrictions on hours. The most interesting implementation of this in the academic research listed in the appendix tables comes from the Understanding Children's Work project papers that defined child labour as market work for an hour or more in children under 12 years, market work for 14 or more hours in children aged 12-13, or domestic work for 28 or more hours per week (Guarcello et al 2006).

The obvious question is whether the data support the idea that there are discrete changes in child welfare with certain intensities of work. The theoretical justification for this approach is based on a model where children work or attend school. If children participate in two activities and there are binding constraints on the child's ability to spend time in schooling, the marginal cost of child time in schooling and work will not equalize. Time spent working for which it is no longer possible to consume all available schooling time is the natural cut in the definition of child labour. That is, child labour is defined as an intensity of work where it is impossible for children to fully consume schooling.

One way to implement this concept of child labour as work that necessitates a binding constraint on schooling is to compute the number of plausibly free hours in a child's day. Suppose healthy children under 15 years require sleep for 10 hours per day. That leaves 14 hours per day to be split between work, school, and play. It is not unusual in low income countries to observe school hours as little as 4 hours per day, but 7 hours is also common. Allowing an additional hour for study and travel, this would imply that a child has 6 or fewer hours a day available for work. Supposing that children need one day of work off a week for proper development, this would suggest that "child labour" would be work for 36 or more hours per week.

An alternative way to codify child labour as something distinct from work would be to infer whether there are certain work intensities where observable child welfare measures deteriorate discretely. From Figures 4 and 6, it is obvious that schooling declines with the intensity of work (regardless of whether the work is market or domestic work). Are there work intensities where schooling attendance declines more than would be predicted by the general trend observed in fewer hours worked? One way to examine whether there is any such possible point is to examine the data for evidence of discrete changes in the probability that a child attends school at certain hours worked.

Using the MICS data, we assume that the underlying association between hours worked and schooling is smooth, and we allow for the possibility that there is a discrete change in schooling at varied intensities of work. Figure 7 plots estimates of the change in schooling attendance rates when we allow for discrete changes in the probability a child attends school (left vertical axis) for each of the indicated total hours worked in market work. 95 percent confidence intervals are also pictured. The data are restricted to children aged 10-14.⁴ The interpretation of an estimated discrete change of -0.05 is that the probability a child aged 10-14 attends school is 5 percentage points lower for children working at least X hours per week relative to what would be expected based on the hours worked–schooling trend observed for hours worked less than X. Also pictured is the R² for the regression. The coefficients indicate the observed magnitudes of the change in schooling at the indicated hours worked, and a comparison of R²s across different hours worked reveals which discrete breaks in hours worked best fit the underlying data.

⁴ Specifically, figure 7 contains the regression coefficients from 43 different regressions. After adjusting the data for country specific age and gender differences (through regressing schooling on a full set of age indicators and age*gender indicators for each country), we compute schooling attendance rates for each observed total hours worked in market work. We then regress the schooling attendance rate on a third order polynomial in hours worked in market work and an indicator that hours worked is greater than or equal to the indicated age. Figure 7 contains the plot of the regression coefficient for this indicator and the associated 95 percent confidence interval.

Figure 7: Regression discontinuity estimates of changes in schooling attendance probabilities by total market hours worked in the last week, MICS



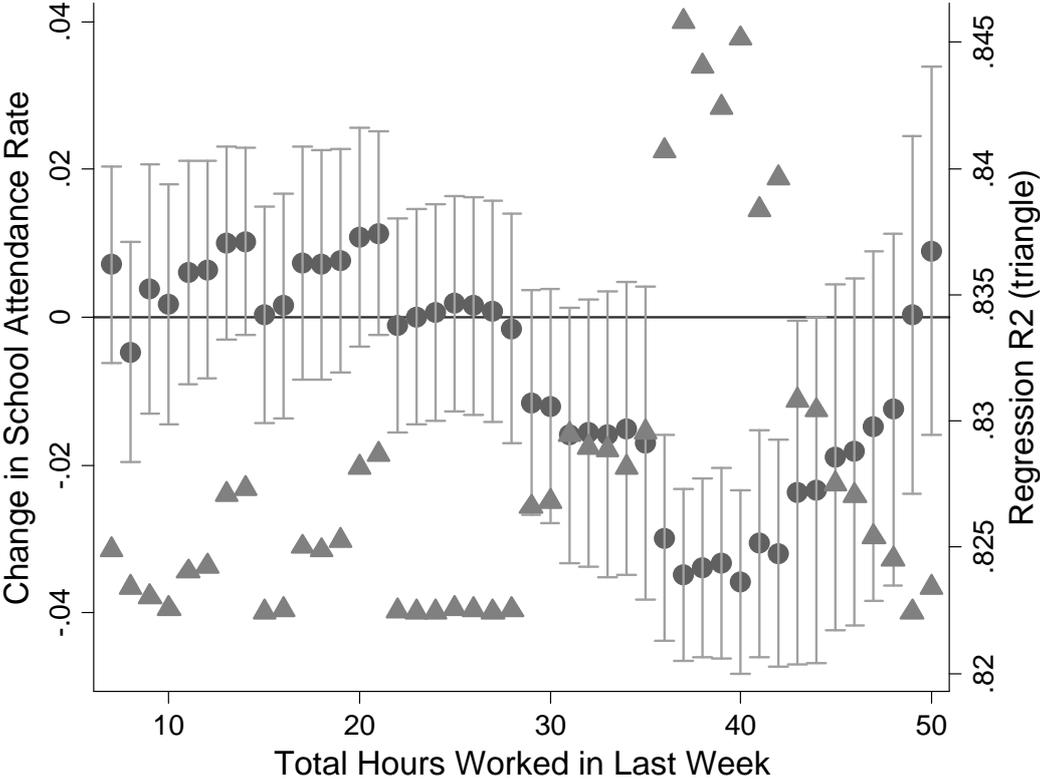
Source: Author's calculations from the pooled MICS data. Each child in the MICS countries is weighted to reflect the number of individuals they represent. Hence, the picture is representative for the pooled populations of the MICS countries. Regression coefficients are reported from 43 different regressions. First, the data for each country are age and gender adjusted by regressing a school attendance indicator on a full set of age*gender indicators separately by country. The data are then averaged to compute schooling attendance rates by total hours worked in market work. 43 separate regressions are then run fitting a 3rd order polynomial in total hours worked to the schooling attendance data but allowing a distinct break in the schooling attendance rate at each of the 43 different ages. The regression coefficients on these indicators are indicated by circles in figure 7 along with their 95 percent confidence intervals. Their scaling is on the left axis. A value of -0.05 indicates that schooling is on average 5 percentage points lower for children who work x or more hours than would be expected based on the underlying schooling – hours worked trend. The R2 for each regression is pictured with a triangle, and its scaling is the right axis.

The pooled MICS data do not suggest discrete changes in the probability a child attends school until 29 hours per week. This is greater than any country or researcher has used in their market hours restriction for a definition of child labour. It is important to remember that schooling attendance is declining in hours worked in market work (Figure 4). However, the changes in school attendance are not statistically significant until the child is spending at least 29 hours per week in market work. The best fit of the data (allowing for only one break) appears at either 30 or 40 hours of market work per week. Figure 4 shows that 80 percent of children working 30 hours per week in market work attend school. 70 percent of children working 40 or more hours per week in market work report attending school, but at both 30 and 40 hours, there appear to discrete declines in the probability a child attend school relative to what would be expected given the general decline in school with hours worked at lower intensities of work.

Figure 5 illustrated that time in market work is often complemented by time in domestic work. Hence, if we replicate Figure 7 with total hours worked rather than total hours in market work, we expect to see breaks at greater hours. This is evident in Figure 8 which plots the break in schooling observed in the data for each hours from 8 to 50 hours. In the total

hours worked data, we observe a break in the schooling rates starting at 36 hours per week, and 37 total hours worked per week seems to best fit the data. It is striking that our simple calculation about available time above suggested that work intensities greater than 36 hours per week are likely to present binding constraints on the child's ability to get necessary rest and attend school. That prediction is broadly consistent with Figure 8.

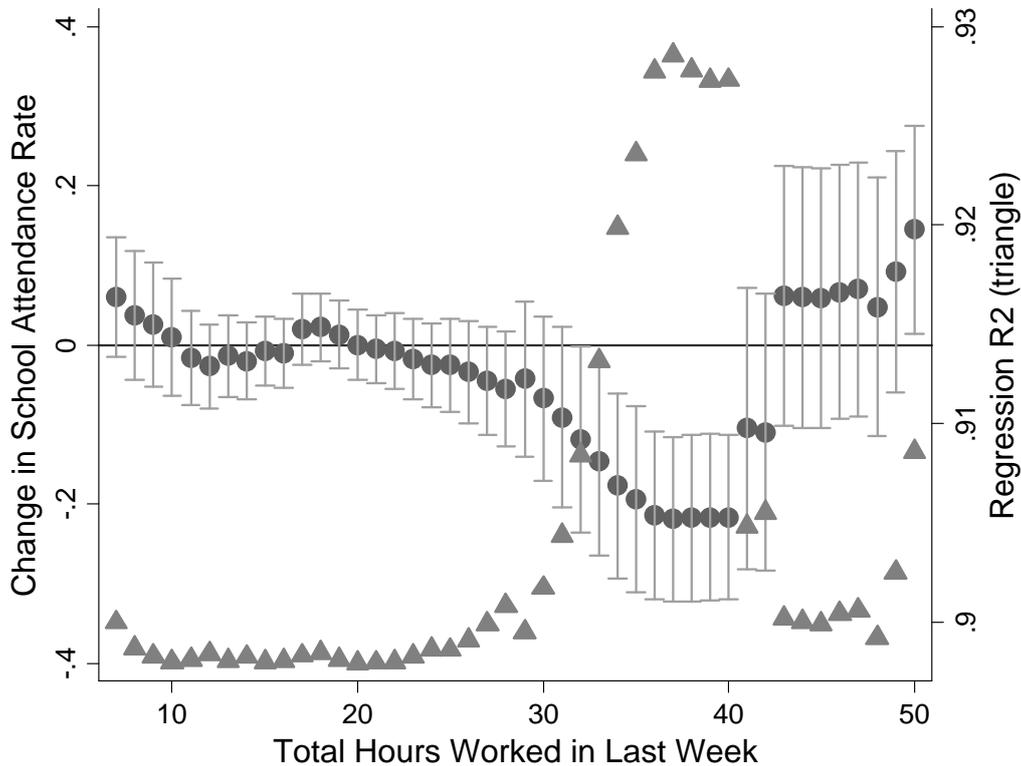
Figure 8: Regression discontinuity estimates of changes in schooling attendance probabilities by total hours worked in the last week (market + domestic hours), MICS



Source: Author's calculations from the pooled MICS data. Each child in the MICS countries is weighted to reflect the number of individuals they represent. Hence, the picture is representative for the pooled populations of the MICS countries. Regression coefficients are reported from 43 different regressions. First, the data for each country are age and gender adjusted by regressing a school attendance indicator on a full set of age*gender indicators separately by country. The data are then averaged to compute schooling attendance rates by total hours worked including market and domestic work. 43 separate regressions are then run fitting a 3rd order polynomial in total hours worked to the schooling attendance data but allowing a distinct break in the schooling attendance rate at each of the 43 different ages. The regression coefficients on these indicators are indicated by circles in figure 8 along with their 95 percent confidence intervals. Their scaling is on the left axis. A value of -0.05 indicates that schooling is on average 5 percentage points lower for children who work x or more hours than would be expected based on the underlying schooling–hours worked trend. The R2 for each regression is pictured with a triangle, and its scaling is the right axis.

Could this suggest defining child labour as working 36 or 37 hours per week or more? Figure 9 mimics Figure 8 using data from the 1999 Nepal Labour Force Survey (not included in Figure 8). For children 10-14, schooling attendance rates are regressed against a polynomial in total hours worked, allowing for a discrete change in schooling at each possible total hours worked between 8 and 50 hours per week. As before, R2 are also pictured. While the Nepal data first suggest a break in schooling probabilities at 32 hours per week, the best fit of the Nepal data is identical to that of the pooled MICS data, with a break at 37 total hours worked.

Figure 9: Regression discontinuity estimates of changes in schooling attendance probabilities by total hours worked in the last week (market + domestic), Nepal



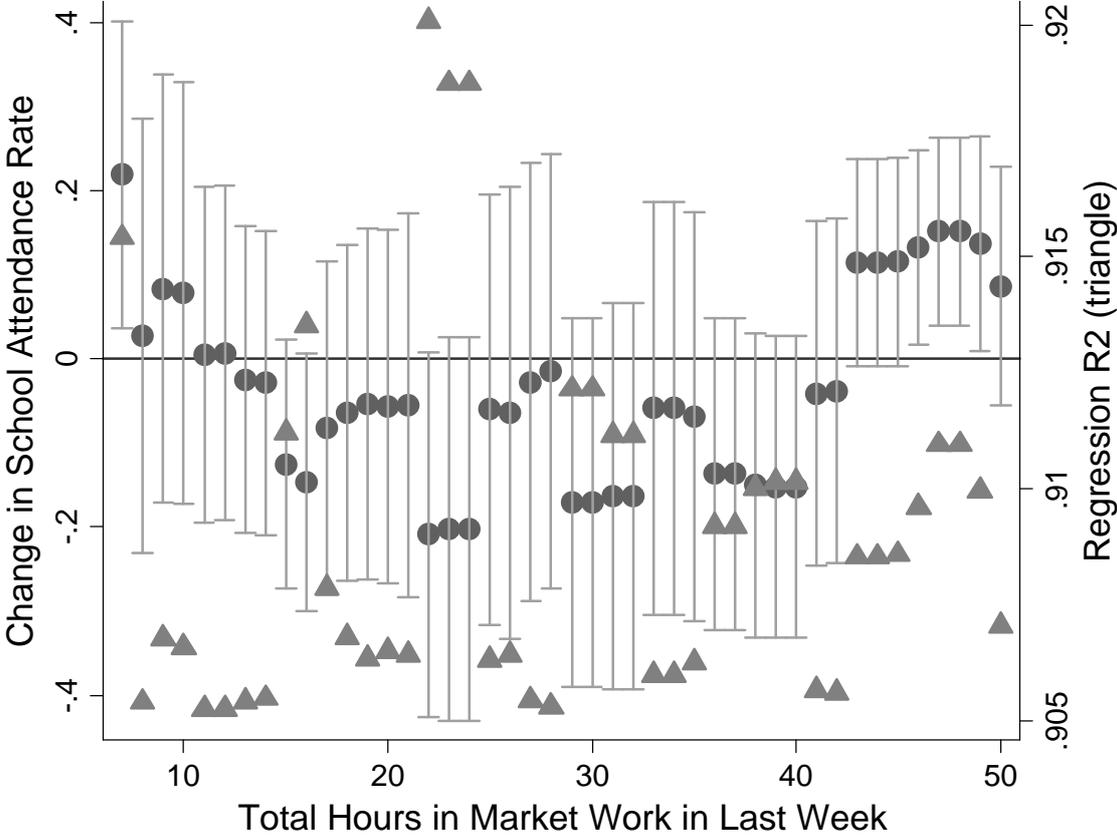
Source: Author's calculations from the 1999 Nepal Labour Force Survey. Regression coefficients are reported from 43 different regressions. First, the data are age and gender adjusted by regressing a school attendance indicator on a full set of age*gender indicators. The data are then averaged to compute schooling attendance rates by total hours worked including market and domestic work. 43 separate regressions are then run fitting a 3rd order polynomial in total hours worked to the schooling attendance data but allowing a distinct break in the schooling attendance rate at each of the 43 different ages. The regression coefficients on these indicators are indicated by circles in figure 9 along with their 95 percent confidence intervals. Their scaling is on the left axis. A value of -0.05 indicates that schooling is on average 5 percentage points lower for children who work x or more hours than would be expected based on the underlying schooling – hours worked trend. The R2 for each regression is pictured with a triangle, and its scaling is the right axis.

It is striking and, to this researcher, extremely surprising that the Nepal data, the MICS data, and a simple analytical calculation of the maximum possible intensity of work compatible with schooling all suggest that the ability to reconcile work with schooling should change discretely between 36 and 37 hours of work per week. Within the MICS countries, a discrete decline in schooling with between 35 and 38 hours of work per week best fits the data for Albania, Burundi, Cote d'Ivoire, DR Congo, Guyana, Madagascar, and Swaziland. However, there is considerable heterogeneity across countries in whether and at what intensity of work the data suggest discrete changes in schooling probabilities. They range from a low of 8 hours per week in Comoros to a high of 50 hours per week in Lao PDR.

While there is remarkable consistency in the total hours worked – schooling patterns observed across countries, there is less consistency in the market work – schooling relationship. Perhaps this owes to heterogeneity across countries in the extent to which market work is complemented by domestic work. For example, the market work results in the Nepal data look substantively different than the pooled MICS Figure 7. Figure 10 looks for breaks in hours worked in market work rather than total hours worked examined in Figure 9. The pattern of Figure 10 is dissimilar to that of Figure 7, and we observe no obvious breaks in the

data, although there appears to be a sharp decline in schooling probability starting at 16 hours per week.

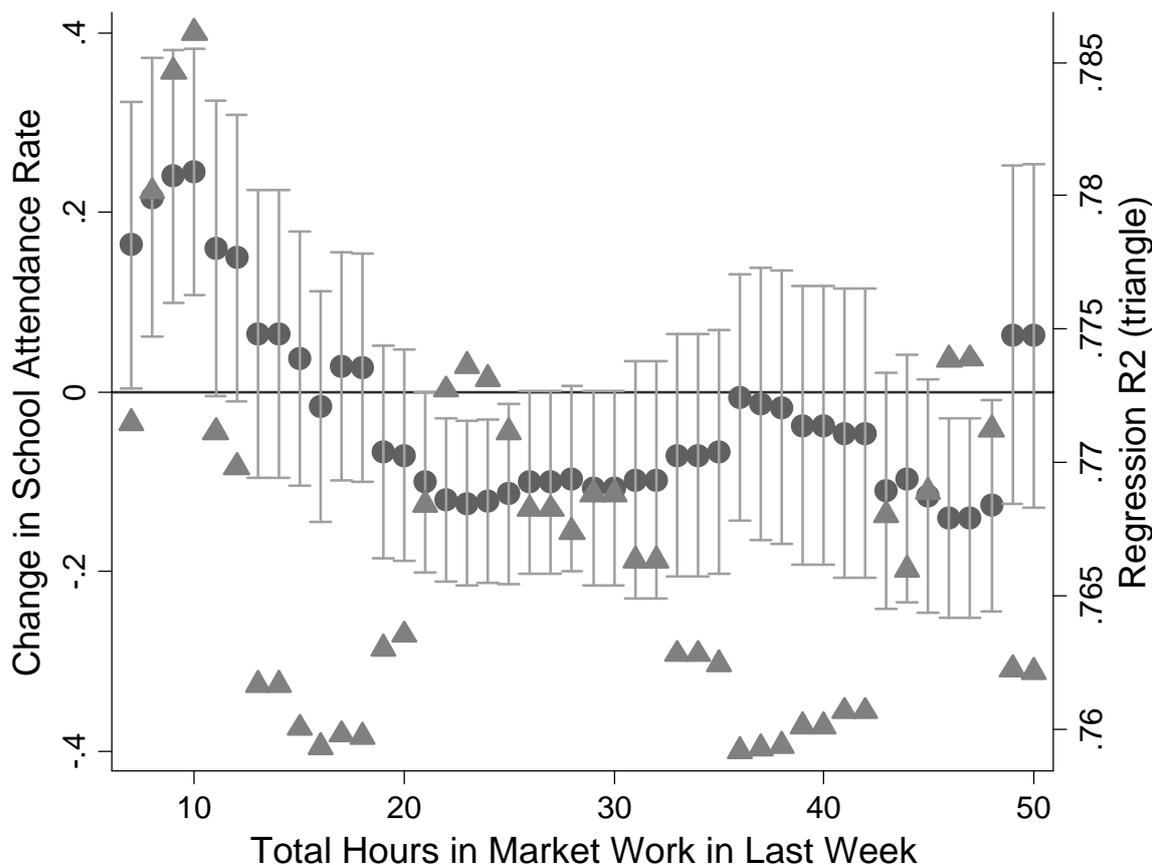
Figure 10: Regression discontinuity estimates of changes in schooling attendance probabilities by total market hours worked in the last week, Nepal



Source: Author's calculations from the 1999 Nepal Labour Force Survey. Regression coefficients are reported from 43 different regressions. First, the data are age and gender adjusted by regressing a school attendance indicator on a full set of age*gender indicators. The data are then averaged to compute schooling attendance rates by total hours worked in market work. 43 separate regressions are then run fitting a 3rd order polynomial in total hours worked to the schooling attendance data but allowing a distinct break in the schooling attendance rate at each of the 43 different ages. The regression coefficients on these indicators are indicated by circles in figure 10 along with their 95 percent confidence intervals. Their scaling is on the left axis. A value of -0.05 indicates that schooling is on average 5 percentage points lower for children who work x or more hours than would be expected based on the underlying schooling – hours worked trend. The R2 for each regression is pictured with a triangle, and its scaling is the right axis.

Figure 11 mimics the same approach for as Figures 7 and 10, instead using the 2000 Guatemala Living Standards Survey (ENCOVI). A total hours worked–schooling picture is omitted, (*Eric: Unclear, please explain*) because only market work data is available on a weekly basis in ENCOVI. While the ENCOVI pattern is similar to that of the MICS data, there seems to be a discrete decline in schooling at 19 hours per week that becomes statistically significant starting at 20 hours per week. This is substantially less than the 29 hours observed in the MICS data.

Figure 11: Regression discontinuity estimates of changes in schooling attendance probabilities by total market hours worked in the last week, Guatemala



Source: Author's calculations from the 2000 ENCOVI Survey (Guatemala). Regression coefficients are reported from 43 different regressions. First, the data are age and gender adjusted by regressing a school attendance indicator on a full set of age*gender indicators. The data are then averaged to compute schooling attendance rates by total hours worked in market work. 43 separate regressions are then run fitting a 3rd order polynomial in total hours worked to the schooling attendance data but allowing a distinct break in the schooling attendance rate at each of the 43 different ages. The regression coefficients on these indicators are indicated by circles in figure 11 along with their 95 percent confidence intervals. Their scaling is on the left axis. A value of -0.05 indicates that schooling is on average 5 percentage points lower for children who work x or more hours than would be expected based on the underlying schooling – hours worked trend. The R2 for each regression is pictured with a triangle, and its scaling is the right axis.

Interestingly, the best fit of the both the Nepal and Guatemala schooling-market work models is with a discrete change in schooling probabilities at 22 and 23 hours per week in market work (respectively). However, none of the MICS countries suggest that the best fit of the market work- schooling association is discrete change in schooling between 22 and 23 hours. In fact in the MICS data, the R2s in the schooling–market work hours relationships are categorically below that observed in the schooling–total hours worked relationship. This consistent with theory which offers no justification for focusing on market work alone in a definition of child labour based on work intensity.

4.4 Evidence from applied research on the consequences of working⁵

4.4.1 Health

The existing evidence on the health consequences of common forms of work are not compelling and offer little instruction for defining a general definition of child labour.

Many studies attempt to assess the injury and morbidity risks associated with the child's work environment. Graitcer and Lerer (1998) list morbidity, injury, and hazard risks faced by children in different occupations and industries. Manufacturing draws a lot of popular attention, but family work, including work on the farm, also poses risks. Parker (1997) emphasizes that children who start work at a young age will be exposed to environmental hazards in the work place for longer, perhaps at a time when the effects of these hazards on development are more substantive. Beyond the direct risks of work, the increased nutritional needs associated with arduous work may exacerbate malnutrition, leaving the child stunted and impairing the child's productivity into adulthood (Forastieri 2002).

Working need not impair a child's health. Additional income may improve health and nutrition, especially in the destitute populations where children are most likely to work. The fact that the child earns the income may particularly benefit the child if the child retains control over a portion of her earnings. Moreover, her position within the household may improve with her economic contribution to the household, allowing her to capture other family resources or influence how they are spent in ways that benefit the child. It is not clear what the net effect of working should be on child health. These gains to the child must be weighted against any lost education (and its returns to health) as well as the consequences for malnutrition, morbidity, and injury.

There is little evidence that working children have worse health at the time of their work. Using data from 18 developing countries, O'Donnell et al (2002) observe that self-reported health status is not strongly correlated with the child's work and schooling status. Francavilla et al (2003) examine data from 6 developing countries. They do not observe a connection between domestic work and self-reported morbidity or body mass index (BMI) either. It is impossible to identify whether the absence of evidence reflects a lack of any relationship, the countervailing factors discussed above, measurement problems, or heterogeneity in the effect of working on health. This later problem may be especially important given the real variety of activities in which children participate. For example, children working outside, in the family farm in the summer might be no worse off because of their work while children working 6 hours a day in a tannery might be substantially worse off. However, the former is much more common than the later. On average then, there is no apparent relationship working and health that can be detected in the data.

Working while young may also affect adult health. Physical injury at work may lead to health problems that survive into adulthood. Alternatively, psychological stress or trauma at work in childhood may lead to health problems in adulthood. Speculation about this second mechanism owes to the psychology literature which shows a strong correlation between stress in childhood and the persistence of mental disorders such as depression, anxiety and panic disorders, and schizophrenia or even health problems such as diabetes, heart disease, and

⁵ This section is adapted from Edmonds (2008).

immune disorders (see Heim and Nemeroff 2001 for a review). There is a debate over the interpretation of this evidence, because there is a strong correlation between severe stress in childhood and stressful life events in adulthood (Horowitz et al 2001). Some argue this association reflects that childhood trauma induces a vulnerability to the effects of stress later in life. Most of this research focuses on stresses like the loss of a parent and severe physical abuse at very young ages, so whether this evidence is relevant for typical working child is an open question. Blattman (2006), for example, considers the psychological impacts of forced abduction into the military among children from northern Uganda, and he finds little evidence of sustained psychological distress after the end of conflict in child combatants relative to non-combatants.

Do common types of market work impair future adult health? In a recent study from Brazil, Kassouf et al (2001) observes that the younger a person starts working, the greater the probability that the individual reports being ill as an adult. This finding may reflect something about the impact of market work on child health and how that persists into adulthood, the impact of education on adult health, the impact of income on adult health, or something about the child or adult's environment associated with both youthful work and adult health. Lee and Orazem (2007) push this same data further and find that the negative association between adult health and working at an earlier age disappears completely when one controls for education. This might reflect that the lack of education is the underlying causal mechanisms or that early entry into the workforce and a lack of schooling are correlated jointly with entry into more hazardous occupations.

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

4.4.2 Schooling

Much of the concern today about common forms of work owes to the impact of that work on schooling. This differs from the debate over child labour during the Progressive era. Concerns about play were at the forefront of concerns about child labour in early 20th century U.S. (Fuller 1922, Pangburn 1929), but emphasis on the value of play in the contemporary discussion is rare. The existing evidence on the short and long-run costs of common forms of work for schooling is inconclusive and does not ultimately provide guidance in how to define child labour.

Schooling and child labour decisions are joint outcomes out of a single time allocation problem. Hence, the interpretation of any found correlation between labour status and schooling is controversial. Do children work because they are not attending school? Do children not attend school because they are working? Do other economic or cultural factors simultaneously influence both schooling and work decisions? Correlations between work and schooling cannot be taken as causal. Of course, causality is only important if one is trying to define child labour as work that harms a child's development or education. If child labour is defined based on job characteristics, causation is not relevant for the identification of job characteristics that are deemed "child labour".

Children that work more intensively are less likely to attend school. This is true for both market work and domestic work. In fact, a number of studies document that a failure to consider work within the household or work in domestic work can create a misleading picture of the trade off between schooling and work, especially for girls. In Egyptian data described by Assaad et al (2003), the low attendance of Egyptian girls relative to boys appears to be associated with a substantial domestic work burden of girls. In fact, because boys do not face the same work burden within the home, the Egyptian data do not suggest a trade-off between working and schooling attendance for boys. The sensitivity of attainment to work also depends on the definition of work. Levison and Moe (1998) using Peruvian data and Levison, Moe, and Knaul (2001) with Mexico data document that whether there is a trade-off between schooling attainment and work, depends on whether work includes domestic work, especially for girls.

Are work associated reductions in schooling attendance meaningful for educational attainment and school achievement? If lower attendance is meaningful for human capital accumulation, it should translate into lower schooling attainment. Moreover, beyond attendance, work may undermine human capital accumulation by interfering with learning as evident in test scores or schooling completion rates. Panel data on child work histories is rarely available, so studies typically compare current work to current attainment. However, current work status depends on past education and work histories as these affect the value of child time and whether it's optimal for the child to work. This makes interpretation difficult, but studies typically find that attainment is lower for working children. With Ghana data, Ray (2003) observes that an additional hour of wage work is associated with more than a year's less completed educational attainment. Psacharopoulos (1997) notes that children in wage work in Bolivia have nearly a year less completed schooling than non working children. He finds that working children in Venezuela have almost 2 years less attainment. Achievement also appears lower in working children. Akabayashi and Psacharopoulos (1999) note that working children spend less time studying which is reflected in both math and reading test scores in their Tanzanian data. Heady (2003), using the same Ghana data as Ray, notes that reading and mathematics test scores are substantially lower among wage working children than non working children.

Causal studies of the impact of common forms of work on schooling face the challenge of isolating some factor that affects child time allocation among work activities without simultaneously affecting child time allocation to schooling. This is a difficult econometric problem, but causal estimates of the effect of working as a child on schooling tend to produce a stronger association between work and schooling than in the raw data (for examples: Boozer and Suri 2001, Rosati and Rossi 2003, Ray and Lancaster 2003, Gunnarsson et al 2006). That said, none of these studies do not establish whether the trade-off between work and schooling varies by type of work.

Another set of studies attempts to get at the causal effect of work on schooling by examining schooling and market work responses to changes in schooling costs. For example, Ravallion and Wodon (2000) consider market work participation and schooling attendance responses to the Food for Education Program (FFE) in Bangladesh in which families receive food rations as long as they send their children to primary school. Children in households participating in this program have higher school attendance. Market work participation declines with this school attendance although the decline in market work is about a third of the increase in schooling. A similar finding is in Cardoso and Souza (2004) who compare market work and schooling attendance in families that receive cash transfers as a part of Brazil's Bosca Escola program to similar families that do not receive the payment. Bosca Escola conditions cash transfers on school attendance, and Cardoso and Souza find larger increases in schooling than declines in market work.

There is a debate about the implications of the finding that changes in the price of schooling lead to larger changes in school participation than in market work participation. This finding might reflect that there is more of an intensive margin with work than school. When a child attends school, attendance usually implies a full day of classes. However, market and domestic work are more flexible. In response to attending school for 4 hours a day, a child could have a precisely corresponding change in total hours worked (indicating a 1 for 1 trade off) but yet still work. In fact, in a much smaller sample with detailed time use data, Arends-Kuenning and Amin (2004) document that the decline in hours worked among FFE participants is similar in magnitude to the increase in time in school.

Evidence on the future consequences of working while young is also limited. Much of the work on the effects of market work in childhood on adult labour market outcomes comes from Brazil, where the 1996, large-scale PNAD household survey asks individuals at what age they entered the workforce (which is likely interpreted as beginning fulltime market work). Ilahi et al (2000) observe that adults age 18 and older who started fulltime work before age 13 have adult wages that are 13-17 percent lower than adults who entered the workforce later. Emerson and Souza (2004) extend the analysis of Ilahi et al by addressing the endogeneity of the age at which an adult started working as a child with state-time variation in the number of schools. Does the finding of lower adult wages for children who started work earlier reflect anything more than reduced educational attainment? Early entry into the labour force lowers the return to a year of education by roughly 20 percent in Ilahi et al's data. Interestingly, in individuals with no education, they observe slightly higher wages for children that start working earlier, conditional on the adult's age. This might reflect an experience premium as without any education and conditional on age, earlier entry means more time to accumulate experience. Alternatively, starting work at an early age requires having employment opportunities, typically with the child's own family. Hence, the relationship between early work and wages could reflect something about family background. Emerson and Souza (2004) speculate that the trade-off between returns to experience and education depends on what sector the individual works in as an adult and child.

The trade-off between additional experience and education is considered explicitly in Beegle, Dehejia, and Gatti (2005). Using panel data from Vietnam, they evaluate how the labour status of children influences their education, wages, and health five years after they are observed working. In their analysis, they focus on children who are enrolled in school and compare enrolled in school and participating in market work children to children enrolled in school without market work. They impose this sample selection rule in order to isolate the effects of market work itself without confounding the effects of working with the effects of

not being in school. Thus, their attention is only on the effects of working per se; they do not capture how the future of children who work exclusively is affected by their work. When they correct for the endogeneity of market work participation as a child with economic conditions in the base year of their data, they find that each additional hour of work as a child while attending school is associated with a nearly 3 percentage point decline in the probability the child is in school 5 years out and a 0.06 year decline in grade attainment. The mean hours worked for a working child in the base year of their data is 24 hours per week in market work. Hence, going from 0 hours to the average is associated with a more than 90 percent decline in the probability the child attends school and a nearly 20 percent decline in completed schooling five years after the child is observed working while in school. They also observe that the probability the child engages in wage work and the child's wage earnings conditional on participating in wage work are increasing in the child's hours worked. Beegle et al calculate that over a relatively short horizon (as might be appropriate in poor, credit constrained families), the value of increased earnings and the return to experience will outweigh the opportunity cost of foregone education.

Overall, academic research on the consequences of working focus principally on market work. There is little to suggest a work – health connection in the short term, but there is some suggestive evidence from Brazil of a long run health impact of working while young. Many more studies find a schooling – market or domestic work trade-off. Although there are difficulties in establishing causation, in general it appears that both market and domestic work can have human capital consequences. Of course, at some margin this must be true given the time constraint. Little in the current literature suggests what types of work or what intensities of work are especially likely to impact education or other aspects of child welfare.

4.5 Evidence from applied research on a revealed definition of child labour

One possible approach to defining child labour is to look for whether there are activities that appear to especially fit the theory. For example, the Basu and Van model defines child labour as work that children only engage in when the family is below subsistence levels. Is there evidence about what types of work declining rapidly with living standards?

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

An intrinsic problem in studies of the link between economic status and child labour is that poor households differ from rich households in many ways that might be associated with child labour. Disentangling these omitted factors from the underlying causal relationship is difficult. Despite the great challenge, there are two basic approaches researchers use to address the endogeneity of living standards. First, many studies address part of the problem by relating child labour to variation in income that excludes the child's income (Dammert 2005, Duryea and Arends-Kuenning 2003, Ray 2000). Second, other studies argue that

certain factors affect family income without also affecting the time allocation of children except through family income. Examples include Bhalotra (2000), Bhalotra and Heady (2003), and Ersado (2005). Note that the assumptions required for identification are often quite strong in these studies, as almost anything that affects the family's economic environment should also influence the value of child time in one activity (schooling, work outside the home, market work in the home, domestic chores).

Another approach to address the intrinsic differences that exist between poor and rich families is to track children in the same household (or cohort) over time. Of course, using panel data only replaces the problem of explaining cross-sectional heterogeneity in living standards with the problem of explaining differential changes over time. That said, studies tracking families over time almost universally find large increases in market work with substantive declines in family incomes. For example, in tracking children over a three-year period in rural Tanzania, Beegle et al. (2006) find that children tend to work when households experience unexpectedly poor harvest, and that children stop working when households recover from the bad harvest. Duryea, Lam, and Levison (2007) find that children transition in and out of employment with adult unemployment spells in urban Brazil. Dammert (2006) observes that market work increases in coca growing states of Peru after coca production (and its associated income) shifts out of Peru for Columbia. Edmonds (2005) observes that improvements in per capita expenditures in Vietnam can explain 80 percent of the decline in market work among household exiting poverty in the 1990s.

These studies document strong income (or equivalent) elasticity of market work. Edmonds, Pavcnik and Topalova (2007) is one of the few studies that attempts to estimate poverty elasticity of child time in a variety of activities. Using data from India in the 1990s and using variation in poverty rates driven by India's trade reforms, they find that domestic work and idle status (not working, not attending school) are the most poverty elastic types of child activities. Thus, if anything, the evidence in the income-child labour literature suggest the most common forms of work, especially domestic work, most closely match the Basu and Van conceptualization of child labour. This idea of using a revealed definition of child labour would suggest defining the concept as broadly as possible.

5. Conclusions

What is the goal in defining child labour? This study has presumed that the idea is to match the popular conception of child labour as work that is somehow harmful to the welfare of the child. All work is harmful in the sense that it has an opportunity cost. Indeed, the existing research on child labour suggests strong theoretical and empirical reasons to consider a vast scope of activities including market and domestic work as all forms of work imply tradeoffs that have welfare consequences.

While well grounded theoretically, it is likely impossible politically define child labour to encompass all child activities including household chores that occur throughout the world. The idea of harm implicit within the policy discussion of child labour is that a child labourer is a working child who would be better off not working. This requires knowledge of the counterfactual of what the child would be doing absent work. We have no evidence that allows us to draw strong generalizations about this. Hence, it seems implausible to adopt a statistical definition based on an unknowable counterfactual (at least, it is unknowable in national statistics).

This conclusion suggests that an international definition of child labour would need to be based on the key ILO Conventions and define child labour based on job attributes and work characteristics. Among these characteristics might be total hours worked, but the data herein clearly illustrate that any consideration of hours worked must consider both market and domestic work. There is some suggestive evidence documented herein that schooling declines with total hours worked (regardless of whether the work is in market work or domestic work, inside or outside the child's household) and that there is a discrete change in the relationship between work and schooling once children begin working between 35 and 38 hours per week.

In summary, the goal of defining an international definition of child labour might best be achieved by establishing a list of job characteristics to be tracked. The national statistical office reports reviewed above suggest several possible job characteristics:

Children working in certain industries (manufacturing, mining & quarrying, hotels and restaurants, private residences other than child's family, etc)

Children working some total number of hours, regardless of type of work

Children working in certain working conditions (streets, at night or predawn, low lighting, lack of ventilation, operating machinery or powered tools, etc.)

Assessing some types of working conditions might be extremely difficult as a worker's ability to self-assess working conditions will be sensitive to the worker's reference point. El Salvador is one example where the definition of child labour relied on self-reported working conditions. There is nothing theoretical and little empirical to suggest that there is a reason to collect whether any of this work is inside or outside the child's house. Hence, child involvement in any category of job is sufficiently informative. If one wanted to collect data on intensity by industry, this could be accomplished by collecting hours worked information,

but there little meaning to reporting this separately by job in national statistics given that most children will combine market and domestic work.⁶

Among the many important issues in defining and measuring child labour that are neglected herein, two bear particular mention:

What is a child? There is enormous heterogeneity in what ages are considered children in empirical studies, and measures of child labour to be comparable must solve the problem of different national understandings of what is a child.

What recall period shall be used for definitions of child labour? Most research studies have some bonded recall of activities in last 7 days. Others use information on in the last year, and longer recall increases child labour estimates as the activities of working children seem highly variable. For example, estimates of "child labour" in Kenya triple when refers to the child's activities over the last year rather than the last week (Central Bureau of Statistics, Ministry of Finance and Planning (1998). Using Brazilian data, Levison et al (2003) observe that the percent of children employed in any given month is roughly half the number of children employed in at least one of the four months. Moreover, depending on the city, between 20 and 40 percent of children 10-14 experienced 2 or more employment transitions in a four month period.

The research described herein is entirely ad-hoc in how it chooses ages and what recall periods it uses. Regarding age, there is some attention in the national statistical definitions to pay attention to local child labour laws. As these vary across countries, this will create some difficulty going forward in defining an international standard definition of child labour. Regarding recall times, at the moment researchers have been working with whatever is available in the data. There is a presumption that shorter recalls are more reliable, but ultimately this question of how to collect this time allocation information should be answered elsewhere.

⁶ An important caution in any effort to add together children across job characteristics is that data should be organized so as to easily identify overlap in the data. For example, child labour might be defined as the sum of children working in certain industries (manufacturing, mining & quarrying, hotels and restaurants, private residences other than child's family, etc), children working some total number of hours not elsewhere classified, and children working in certain working conditions not elsewhere classified.

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Appendices

Appendix Table 1: Definitions of child labour in empirical work

Answers coded: 1=Yes, 0=No

Paper	Countries	Year of Data	Theory Framework	Domestic Work	Market work outside HH	Market work in HH	Statistical Definition of Child Labour
Akabayashi & Psacharopoulos (1999)	Tanzania	1993	n/a	1	1	1	market or domestic work
Amin et al (2006)	Bangladesh	1995-96	n/a	0	1	1	market work
Amin, Quayes, & Rives (2004)	Bangladesh	1995-1996	n/a	0	1	1	market work
Beegle, Dehejia, & Gatti (2006)	Tanzania	1991-1994	2	1	1	1	market or domestic work
Bhalotra (2007)	Pakistan	1991	2	0	1	1	market work
Bhalotra & Heady (2003)	Pakistan, Ghana	1991 for both	1	0	1	1	market work
Blunch et al (2005)	Zambia	1998-1999	n/a	1	1	1	ambiguous
Burke & Beegle (2004)	Tanzania	1991-1994	n/a	1	1	1	not used
Cameron (2001)	Indonesia	1997-1999	n/a	0	1	1	market work
Chaudhri (2003)	India	1961- 1991	n/a	0	1	1	market work
Cigno & Rosati (2002)	India	1994	2	0	1	1	market work
Dayioglu (2005)	Turkey	1994 & 1999	1	0	1	1	market work
Dayioglu (2006)	Turkey	1994	n/a	0	1	1	market work
Delap (2001)	Bangladesh	1996	n/a	1	1	0	market work
Diamond & Fayed (1998)	Egypt	1990-91	n/a	0	1	0	paid work
Dumas (2007)	Burkina Faso	1981-1985	2	0	?	1	time in agricultural plots
Duryea & Arrends-Kuenning (2003)	Brazil	1977-1998	n/a	0	1	0	paid work
Edmonds (2005)	Vietnam	1993 & 1998	1	0	1	1	market work
Edmonds (2006, jde)	South Africa	1999	n/a	0	1	1	market work
Edmonds (2006, Jpope)	Nepal	1999	2	1	1	1	market or domestic work
Edmonds & Pavcnik (2005)	Vietnam	1993 & 1998	n/a	1	1	1	market work or ≥ 7 hrs/wk domestic
Emerson & Souza (2003)	Brazil	1996	2	0	1	1	paid work
Emerson & Souza (2007)	Brazil	1998	n/a	0	1	1	market work for at least 20 hours / week
Ersado (2005)	Nepal, Peru, Zimbabwe	1990-1991, 1994, 1995	n/a	0	1	1	market work
Fafchamps & Wahba (2006)	Nepal	1998/99	n/a	1	1	1	ambiguous
Foster & Rosenzweig (2004)	India	1968-1982	2	0	1	0	not measured
French (2002)	Brazil	1998	n/a	0	1	0	Shoemakers
Gunnarsson et al (2006)	Various Latin America	1997	2	0	1	0	work outside the home while attending school
Hazarika & Bedi (2003)	Pakistan	1991	4	1	1	1	not used
Heady (2003)	Ghana	1988-1989	n/a	0	1	1	market work
Iverson (2002)	India	1991	n/a	0	1	0	paid work
Jensen & Nielsen (1997)	Zambia	1993	n/a	0	0	0	not in school

Paper	Countries	Year of Data	Theory Framework	Domestic Work	Market work outside HH	Market work in HH	Statistical Definition of Child Labour
Koolwal (2007)	Nepal	1995/96	1	0	1	1	market work
Kruger (2007)	Brazil	1992-1999	2	0	1	1	market work
Kurosaki et al (2006)	India	2005	n/a	1	1	1	2 definitions: market work / market or domestic work
Levy (1985)	Egypt		2	0	1	?	"child labour force participation" unclear
Maitra & Ray (2002)	Peru, Pakistan, Ghana	Peru: 1994, Pak: 1991, Ghana: 1989	n/a	0	1	0	paid work
Nankhuni & Findeis (2004)	Malawi	1997-1998	n/a	1	1	1	not used
Nkamleu & Kiell& (2006)	Cote d'Ivoire	2002	1	0	1	0	Participation in cocoa sector
Patrinos & Psacharopoulos (1997)	Peru	1991	n/a	0	1	1	paid work
Psacharopoulos (1997)	Bolivia, Venezuela	Bl- 990, Vn- 1992		0	1	0	paid work
Ray (2002)	Ghana	1988-1989	n/a	0	1	0	paid work
Ravallion & Wodon (2000)	Bangladesh	1995-6	3	?	1	1	market work (domestic work unclear)
Ray (2000, JPopE)	Pakistan Peru	Pak-1991 Peru-1994	n/a	0	1	0	participate in the labour market (unclear-paid work?)
Ray (2000, WBER)	Pakistan Peru	Pak-1991 Peru-1995	n/a	0	1	0	paid work
Ray & Lancaster (2005)	Seven countries	1998	n/a	1	1	1	ambiguous
Rosati & Rosi (2003)	Pakistan; Nicaragua	N:1998, Pak: 1996	3	0	1	1	market work
Rosati & Tzannatos (2006)	Vietnam	1993 & 1998	2	0	1	1	market work
Sakellariou & Lall (2000)	Phillipines	1991-92	n/a	0	1	1	market work
Sawada et al (2006)	India	2005	n/a	1	1	1	not used
Suryahadi & others (2005)	Indonesia	1998-1999	n/a	0	1	1	market work
Swaminathan (1998)	India	1995	n/a	0	1	0	paid work
Tzannatos (2003)	Thailand	1995	n/a	0	1	0	paid work

Note 1: Results of an Econlit search in August 2007 for the words "child lab*r" in title, abstract, or keywords. Search results limited to empirical, English language articles published in peer reviewed journals. Journals with a specific country or region focus were eliminated. Historical studies of high income countries were eliminated. Articles without clear definitions of variables were eliminated - many studies simply referred to "work" without defining what work is.

Note 2: **Theory framework** indicates whether the paper includes a theory section (n/a=no) and if so, how child time allocation is modelled. The coding for this question is: 1=the child chooses whether to work and this choice does not imply any trade-off with other activities; 2= if the child works, the child consumes less leisure or schooling; 3= the choice between schooling, leisure, and work is explicitly modelled; 4= the choice between schooling, leisure, work inside the house, and work outside the house is explicitly modelled; 5= in addition to the choices in #4, within the household, a distinction is made between domestic work and work in the family farm or business. **Domestic work** indicates whether the paper explicitly considers time in chores, shopping, etc. done for the child's own household. **Market work outside the household** indicates whether the study considers paid work and other economic activity done outside of the child's household. **Market work inside the household** indicates whether the study considers time in the family farm or enterprise. If the phrase "child labour" is used with reference to data, its implied definition is listed in the last column.

Appendix Table 2: Definitions of child labour in international institutions' research papers

Answers coded: 1=Yes, 0=No

Paper	Countries	Year of data	Theory framework	Domestic work	Market work outside H.hold	Market work in H.hold	Statistical definition of child labour
World Bank Policy Research Working Papers:							
Canagarajah and Coulombe (1997)	Ghana	1987-1992	n/a	0	1	1	market work
Grootaert (1998)	Cote d'Ivoire		n/a	0	1	1	market work
Ilahi (2001)	Peru	1994-1997	n/a	1	1	1	market or domestic work
Edmonds and Turk (2002)	Vietnam	1993 & 1998	n/a	1	1	1	market or domestic work
Gustafsson-Wright & Pyne (2002)	Brazil		n/a	0	1	1	market work
Lopez-Acevedo (2002)	Ecuador	1998&1999	n/a	0	1	1	market work (unclear)
Edmonds (2004)	Vietnam	1993 & 1998	2	1	1	1	market work or >=7hrs/wk domestic work
Bando et al (2005)	Mexico	1997-1999	2	0	1	0	paid work (unclear)
Beegle et al (2005)	Vietnam	1993 & 1998	n/a	0	1	1	market work
Mansuri (2006)	Pakistan	2001-2002	n/a	0	1	1	2 defs: paid work and market work
Schady and Araujo (2006)	Ecuador	2003-2005	n/a	0	1	1	market work
Understanding Children's Work Working Papers:							
Guarcello et al (2002)	Guatemala		3	0	1	1	market work*
Deb and Rosati (2002)	Ghana, India	1997 & 1994	n/a	0	1	1	market work*
Guarcello et al (2004)	Zambia		n/a	1	1	1	** see below
Guarcello et al (2004)	Senegal		n/a	1	1	1	** see below
Guarcello et al (2004)	Malawi		n/a	1	1	1	** see below
Guarcello et al (2004)	Cote d'Ivoire		n/a	1	1	1	** see below
Guarcello et al (2004)	Burundi		n/a	1	1	1	** see below
Mealli (2004)	Guatemala		n/a	0	1	1	market work*
Guarcello & Lyon (2004)	Bolivia		n/a	0	1	1	market work for children under 12, market work for >=14 hrs for children 12 - 13
Menon et al (2005)	Nepal	1995-96	4	0	1	1	market work*
Rosati & Straub (2006)	Gautemala		n/a	0	1	1	market work*
Blanco & Valdivia (2006)	Venezuela		n/a	0	1	1	market work for children under 12, market work for >=14 hrs for children 12 - 13
Guarcello et al (2006)	Various Latin America	200-2003	n/a	1	1	1	2 defs: #1 - market work for children under 12, market work for >=14 hrs for children 12 - 13; #2 - Same as #1 plus children working >=28 hrs/wk domestic work
Manacorda and Rosati (2007)	Brazil	1981-2002	3	0	1	1	market work*
Rosati & Rossi (2007)	Mexico	1997-2000	n/a	0	1	1	market work*

Only includes papers not otherwise published in peer reviewed journals. Historical studies of high income countries are excluded. Articles without clear definitions of variables are excluded. Only empirical microeconomic studies are listed.

Theory framework is not included in table as very few of the listed studies had a theory component. Domestic work indicates whether the paper explicitly considers time in chores, shopping, etc. done for the child's own household. Market work outside the household indicates whether the study considers paid work and other economic activity done outside of the child's household. Market work inside the household indicates whether the study considers time in the family farm or enterprise. If the phrase "child labour" is used with reference to data, its implied definition is listed in the last column. *No variable in the empirical work is explicitly called child labour. For a definition of child labour, we use the variables that they refer to when using the words "child labour".

**3 definitions used in study: market work, market or domestic work, market work or at least 28 hours per week in domestic work.

Appendix Table 3: Definitions of recent prominent academic working paper series

Paper	Countries	Year of data	Statistical definition of child labour
<i>National Bureau of Economic Research (Cambridge, MA USA)</i>			
Thirumurthy et al (2005)	Kenya		market work
Yang (2006)	Philippines	1997-1998	market work
<i>Centre for Economic Policy Research (London, UK)</i>			
Attanasio et al (2006)	Columbia		market or domestic work
<i>Institute for the Study of Labour (Bonn, Germany)</i>			
Basu et al (2007)	India		market or domestic work
Dammert (2007)	Peru		market work
Edmonds et al (2007)	India		Market or domestic work without school
Emerson & Souza (2007)	Brazil		market work
Harazarika & Sarangi (2005)	Malawi		market or domestic work
Hazarika & Bedi (2006)	India		market work
Kruger et al (2007)	Brazil		2 defs: market work / market work for at least 15 hrs/wk at some point in last year
Wahba (2005)	Egypt		market work

Keyword searches of child labour in working paper series of NBER, CEPR, and IZA. Published papers and papers elsewhere referenced are excluded from this list. Historical studies of high income countries were eliminated. Only empirical studies are listed. Articles without clear definitions of variables were eliminated.