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Child labour wages and productivity: Results from demand-side surveys

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Programme on
the Elimination
of Child Labour
(IPEC)

CHILD LABOUR WAGES AND PRODUCTIVITY:
RESULTS FROM DEMAND-SIDE SURVEYS

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OF CHILD LABOUR (IPEC)

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International Labour Office, Geneva
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TABLE OF CONTENTS

Chapter 1: Executive Summary	1
Chapter 2: The Problem and its Context	11
Chapter 3: Methodological Considerations	15
Chapter 4: Sectors and Samples	23
Chapter 5: Descriptions of Child Labour from the Study Samples	27
Chapter 6: Analysis	59
Chapter 7: Conclusion	87
References	95

EXECUTIVE SUMMARY

1

INTRODUCTION

Demand-side research on child labour is relatively underdeveloped compared to research on household factors. Much attention has been given to paid employment of children due to the concern that they are more vulnerable to exploitation than adults. If particular occupations could be identified in which child labour is especially profitable, demand-side interventions would be more effectively designed and targeted. This SIMPOC study gathered preliminary evidence on wages and productivity of children and adults in two occupations in each of four selected countries in different world regions. Survey work was carried out in Ghana, India, the Philippines and Uganda in 2004 and 2005.

It is paradoxical that, while much of the public concern over child labour centers on the potential for children to be exploited at work, both research and policy have been based largely on the presumption that only household decision-making is of consequence. According to this perspective, child labour is the result of the willingness of households to supply it and has little if anything to do with the extent of the employer's demand for it. It is common, for instance, for researchers to simply assume that any difference between child and adult wages simply mirrors the same difference between their productivities. This assumption is built into the economic models that underlie most quantitative work. On the policy side, hope is placed in programmes to reduce poverty, alter cultural values that influence households and make education a more attractive option for children and their families. It is widely believed that action targeting employers would fail to address the true causes of the problem and might even be harmful to those it is intended to help.

There is much sense in these views, but it would be a mistake to rule out the demand side of child labour markets altogether. Perhaps there are some work situations in which employers have a strong incentive to hire children rather than adults, exerting a pull that complements the push from the household. It may be possible to devise programmes that can reduce these incentives, thereby making

Child labour wages and productivity: Results from demand-side surveys

household-oriented efforts more effective. Moreover, if there are contexts in which children tend to be exploited, there is a moral imperative to uncover and address them. This defines the purpose of the present research.

We begin from what is essentially a blank slate. Previous studies have looked into aspects of children's employment, but not in a systematic effort to identify their contribution to profitability. There are many studies that have gathered data on child earnings, but primarily to assess their role in household finances, not in comparison to adult workers in the same enterprises. Productivity studies have occasionally been undertaken to assess the potential costs to enterprises of a withdrawal of child labour (particular in light of the disputed "nimble fingers" hypothesis) or to determine the extent to which child and adult work serve as substitutes. What has not been attempted previously is a direct test of the proposition that employing children in place of adults may reduce unit labour costs, enhancing profitability and competitiveness. For this reason, the current project is pioneering: it stakes out new terrain in the study of child labour rather than building on an established stream of research.

METHODOLOGY

Researching child labour requires thinking carefully about topics that are sometimes taken for granted in the study of adult labour markets. Concepts need to be clarified in light of work arrangements that often differ for children, and the criteria for choosing sectors to be sampled should be responsive to the factors that promote or inhibit child employment.

Since the focus of this study is on employer incentives, we will interpret any compensation paid for the work of children as their wage. This will be the case whether the payments are monetary or in-kind, and whether they are made directly to the child or to some other party. In practice, we found that direct monetary payments to children predominate in the sectors we studied. On the productivity side, we note the distinction between productivity in task, how well children perform the tasks to which they are assigned, and productivity of task, the contribution made by these tasks to the overall output of the enterprise. If task assignment is random with respect to age, only the first matters for this study. If children are systematically directed to particular tasks, then the relative productivity of those tasks has to be taken into consideration. Also, we recognize in principle the distinction between incremental productivity, the additional output due to the employment of an additional worker, and systemic productivity, the difference in output attributable to one work arrangement rather than another. In the sectors we studied, work organization did not appear to depend on the presence or absence of children, so systemic aspects did not arise, but they might prove relevant in future research.

While our main interest lay in the wage- and productivity-related incentives facing employers, we were also aware of other motives that might result in the employment of children. Thus questions were inserted into the surveys

asking employers whether they were swayed by such factors as children's greater obedience, their availability relative to adults or the financial needs of their families.

In practical terms, the questions we sought to answer were these:

1. What is the relationship between the ratios of child to adult wages and child to adult productivity?
2. What portion of the child–adult wage gap can be attributed to age per se rather than other factors?
3. What portion of the child –adult productivity gap can be attributed to age per se?
4. To what extent are children differentially assigned to less productive tasks, and what difference does this make to child/adult productivity comparisons?
5. To what extent do employers respond to indicators of potential profitability (wage and productivity differentials) in their decision to hire children rather than adults?

Where possible we sought direct evidence bearing on them, but in some cases the evidence had to be indirect.

A final methodological concern had to do with the possibility that employers might not respond willingly or truthfully to questions about their employment of children. In the past researchers encountering this problem had attempted to gather the needed information on their own, directly observing children in the workplace. This approach is expensive and may not be practicable in a wide range of cases, however. Instead, we propose asking employers a set of ecological questions, that is, questions about the practices or attitudes of other employers. There are a variety of ways ecological responses could be validated, demonstrating whether, taken together, they provide a measure of the true sample means for these variables, or even whether they reliably predict true observations at the individual level. As it turned out, we did not need to resort to this method in any of the sectors we sampled; this itself is a notable finding. Nevertheless, we used the study context to test the accuracy of ecological questions for future research.

SAMPLE SELECTION

We selected eight sectors, two each in four countries, that are known to be significant employers of children, exhibit a variety of social and economic characteristics and are accessible to research.

Ghana: 100 “chop bars”, small restaurants serving a mostly working class clientele, were sampled in the greater Accra region. Separate questionnaires were administered to employers and child workers; interviewers accomplished this in their dual role as customers, ordering food and discussing work-related matters. The other sector chosen was coastal fishing, again in the greater Accra

Child labour wages and productivity: Results from demand-side surveys

region. As before, 100 enterprises were sampled, and questionnaires were developed for both child workers and employers.

Philippines: 100 small producers of fireworks (pyrotechnics) were sampled in Bulacan province, to the north of Manila. These are simple outdoor workshops that fill orders for larger contractors and employ native and migrant workers primarily in November and December each year. The same number of subcontracting shops were sampled in the fashion accessories sector near the coastal city of Cebu. Information was gathered primarily on two activities with high degrees of child employment, stringing shell beads onto wire and then transferring them to nylon thread for necklaces, bracelets and other ornaments.

India: 300 workshops engaged in vehicle repair were sampled, half from Delhi and half from Patna, the capital of Bihar state. These proved to be different in a number of important respects, and so they were kept separate for purposes of analysis. Detailed information was taken on individual workers in both locations; this yielded two data sets each, one in which the unit of analysis is the worker, and another in which it is the employer. 160 workshops were also selected in the zardosi production sector of Lucknow. Zardosi refers to the artisanal creation of garments and other textile products embodying colored threads and sewn-in ornaments. The same strategy of gathering both worker- and enterprise-specific data was employed here.

Uganda: 125 small enterprises were sampled in the fishing industry along Lake Victoria. Some of the enterprises were engaged in actual fishing, others in support activities. Separate questionnaires were administered to workers and employers, and care was taken to gather gender-specific data. Unlike the other countries, which employed the usual age 15 cut-off to determine child status, the Uganda team extended the “child” designation through age 17. Since too few workers were under the age of 15, the descriptive and analytical chapters of this report use the higher cut-off to distinguish between children and adults. The same caveat applies to the other sector chosen, construction in Kampala and Mbarara. Most of the 125 enterprises are engaged either in stone quarrying or brick-making, and the age 18 cut-off was also employed.

Taken together, these sectors display a range of geographic locations (rural versus urban), form of activity (service versus manufacturing), and market context (local versus national or international). They include workforces that are mostly male, mostly female, and mixed. They are both sporadic or seasonal and year-round. They are not intended to represent the entire world of child labour, but they encompass much of its diversity.

DESCRIPTION

The surveys conducted in conjunction with this research cast new light on a variety of sectors employing child labour. The following summaries draw on these survey data as well as the background material collected by the country research teams.

Ghana: Although it is the custom in Ghana for women to prepare food, many young boys as well as girls can be found in the chop bars of Accra. While most children are engaged in cleaning and dishwashing, they are also employed as servers, cook's helpers and occasionally cooks themselves. They often start this work young: the average age of children surveyed was 12.6 years, and the majority of them had been working for more than a year. Children tend to work nearly as many hours as adults, but their monthly pay averages less than two-thirds the adult wage.

We asked employers how many additional customers would be required before they hired another child or another adult at each of a set of common tasks; this was intended to provide a measure of perceived productivity. According to this question, children are half to two-thirds as productive as adults in the tasks adults most often perform, but they are adjudged somewhat more productive in dishwashing and cleaning. Employers were also asked about their reasons for hiring children; responses pointed most often to the low cost and high productivity of children, but also to the need to help the child's family.

Fishing is strictly men's and boys' work, and child labour is commonplace. Children are mostly involved in paddling, throwing nets and scooping water out of the boat; they are less likely to haul in nets and almost never pilot a boat or take care of its machinery. Almost two-thirds or all children employed in fishing are related to the employer, reflecting the family organization of this sector. The average age of these working children was 12.8, and most had worked for more than a year. Only a quarter have completed elementary school, and few are likely to return. Children generally get high marks from their co-workers on productivity, but their wages average about two-thirds of the adult level. Employers are most likely to give productivity-related reasons for their decision to hire children.

Philippines: Pyrotechnic production is highly seasonal, with nearly all the orders occurring during November and December. Children are primarily engaged in folding five star, an inexpensive fireworks product. They average over 30 hours per week during peak season and earn a piece rate under half that received by adults doing the same work. When asked why they hire children, employers stress their productivity, obedience and availability above more altruistic motives. Indeed, on average they view children as more productive than adults at the task of folding.

In fashion accessories, most of the work is performed by women and girls. The two tasks analyzed most closely, stringing beads and transferring them to nylon thread, occupy a workforce that ranges from 25-50% under 15. The average child piece rate is only slightly lower than that of adults in this sector. Employers view children as more productive than adults at these tasks and give this productivity advantage as the main reason for hiring them.

India: Vehicle repair proved to have different characteristics in the two study locations, Delhi and Patna. In Delhi a high percentage of the repairs involve automobiles, whereas in Patna it is more common to repair two- and three-wheeled vehicles. Prices and earnings are higher in Delhi. Also, children

Child labour wages and productivity: Results from demand-side surveys

tend to be integrated differently into the work process in these two cities. In both, however, children made up about a third of the total workforce.

The majority of children in both regions are illiterate; the percentage is somewhat higher in Patna than Delhi. Children in Patna enter the vehicle repair sector hoping to apprentice themselves; in Delhi their main motivation is to relieve family poverty. Children make about half the adult wage in Delhi, but only about a third in Patna. (This does not hold for adult trainees, who earn little more than children.) On the other hand, children are somewhat more likely in Delhi to be doing work more closely related to the repair process, whereas children in Patna are more concentrated in such tasks as cleaning and sweeping. Employers in both regions view children as less productive than adults, but they still cite productivity as a principal reason for their employment.

The *zardosi* sample consisted of small enterprises (an average of just over five workers) in which child labour makes up about 19% of the workforce and accounts for about 15% of total work hours. Less than a tenth of the child workers say they have obtained at least a middle school education, whereas more than half the adults have achieved this level. Children are concentrated in the least skilled aspects of the production process, such as preparing the sewing borders and attaching ornaments, and on average they earn only about a sixth as much as adults.

Uganda: The lake fishing sector in Uganda differs in important ways from the coastal fishing sector in Ghana. About half the work in Uganda is not actual fishing, but support activities, such as processing and marketing fish and provisioning the fishers themselves. Thus girls/women are found working in this sector as well as boys/men. Rates of migration are high for all subgroups, and those under 18 have rates of orphanhood approaching 40%. Boys generally have had more schooling than girls, but only a minority of either group has gone beyond primary school. Boys are also more likely to be engaged in activities closely related to fishing; the most common activity (over 60%) for girls is selling food to other workers.

For purposes of analysis, the various activities in this sector were classified according to the average daily wage of workers performing them. There were five such classes, with the lowest earning under 300 shillings (\$1 PPP) and the highest over 900 shillings. Boys are rather evenly distributed over the bottom three classes; three-fourths of all girls (and adult women) were in the bottom.

Construction is predominantly (over three-fourths) male; indeed, most women working in this sector are either related to the employer or work in conjunction with other members of their household. About 40% of all workers in our sample are under 18; boys have high (40+%) rates of migration and orphanhood. (Girls are equally likely to be orphans.) As with fishing, boys tend to have more schooling, but neither boys nor girls show a majority advancing beyond their primary years.

The gender gap in earnings (40%) somewhat exceeds the age gap (33%). This is largely explained by the division of labour, in which males are distrib-

uted over a number of productive activities, whereas females are concentrated in stone quarrying (women) and stone crushing (girls). A similar breakdown of tasks was constructed for this industry as for fishing, and the great majority of all activities, for all age and gender groups, were in the lowest-paying class.

ANALYSIS

Given the large number of data sets to be analyzed, only the simplest methods (correlation and ordinary least squares regression) were employed. Nevertheless, the information was rich enough to yield valuable evidence on the profitability of child labour. After a brief country-by-country sketch, we will consider the overall patterns.

Ghana: Standard wage regression, where models are estimated to predict an individual worker's wage based on personal information, the job performed and other variables, do not produce an age differential; that is, controlling for non-age variables, whether the worker is a child or an adult does not seem to influence how much he or she makes. On the other hand, it is possible to compare wage and productivity differences between adults and children, and on that basis there are strong profitability motives for hiring children. Moreover, there seems to be an inverse relationship between the child wage and the extent of employer reliance on child labour, a result consistent with the view that profitability motives are operating. On balance, it is reasonable to suppose that demand-side pressures for child labour exist in this sector.

The situation is quite different in fishing. Here, taking into account differences in task assignments, wages are largely equal across age groups, and so is productivity. Children appear to be hired in more or less the same fashion as adults; they are selected for their ability to do the work and paid accordingly.

Philippines: Since children working in pyrotechnics receive a lower piece rate than adults, only significant offsetting differences in the speed or quality of their work could cause us to doubt the presence of demand-side incentives. Both objective and subjective measures of relative productivity, however, fail to show this; if anything, they point toward greater output from children. On the other hand, higher child piece rates appear to be associated with greater reliance on child labour. Thus the evidence for profitability motives is strong but not conclusive.

Fashion accessories were less clear. Child piece rates are again lower than adults', but there are less data on relative productivity. In addition, higher child piece rates are again associated with great use of child labour; so little can be said of demand-side incentives.

Also, because the Philippine surveys asked questions about employment motives twice—once for the respondent's own view, and then a second time for his or her perception of the views of other employers—it is possible to test the extent to which ecological data correspond to those from self-reporting. In both sectors there is a high degree of correlation across most of the 25 questions.

Child labour wages and productivity: Results from demand-side surveys

India: Evidence is strong that employers in the Delhi vehicle repair sector earn extra profits through their employment of children. Helpers, whether child or adult, do little to contribute to output, but most children are not helpers. In these other tasks they appear to be as productive as adults, but they earn substantially less. In Patna, on the other hand, most children are consigned to non-productive tasks, where there is little gain from their employment.

Even stronger is the evidence in the zardosi sector. As we saw, there is an enormous pay gap between children and adults; productivity differences offset this, but only to a small degree.

Uganda: In fishing children are more likely to work in lower-paid activities than adults, and even within these activities (and controlling for different hours of work) they are paid less. There are no productivity data, however, against which to compare these results. Gender disparities are even greater, and they remain even when controls for other factors are incorporated into the analysis. In construction, on the other hand, there is great wage compression: all workers are paid very little, and it is difficult to discern significant differences by either age or gender.

CONCLUSION

We can divide these nine sectors into three groups. In one group, fishing in Ghana and construction in Uganda, there is little difference in pay between children and adults. This seems to result from different causes—highly selective employment in Ghana, extreme wage compression in Uganda—but the result is the same. Children enter employment on more or less similar terms compared with adults. It would not take extensive data-gathering to identify other cases; it should be apparent to most knowledgeable observers (or participants) when conditions like this exist.

The second group is on the opposite end of the spectrum. Here children are paid less than adults, and the difference is not sufficiently offset by greater adult productivity. In this study, chop bars in Ghana, pyrotechnics in the Philippines and vehicle repair (Delhi) and zardosi in India correspond to this profile to a greater or lesser extent. It is not so easy to demonstrate that employers actually respond to these profit incentives, but their presence is (mostly) established.

The third group consists of those remaining sectors in which a substantial child-adult pay gap exists, but in which an offsetting productivity gap cannot be ruled out. Some of these may eventually prove to belong in the second group as new information is gathered. Others may be found to adhere to the view of labour markets conventionally held by economists, as sketched in Chapter 2. For now, we can only be agnostic.

With such a small number of sectors to assess, any claim regarding an overall pattern must be highly qualified, yet some generalizations suggest themselves.

(1) **Light manufacturing.** Two of the three cases of light manufacturing surveyed, pyrotechnics in the Philippines and zardosi in India, belong to group of probable demand-side incentives. While not going so far as to assent to the “nimble fingers” argument, we can anticipate that children will not be much less adept at such tasks than adults. Moreover, the highly competitive nature of sub-contracting arrangements encourages employers to take advantage of any profit opportunities available to them.

(2) **Urban services.** The competitive character of markets for urban services creates incentives similar to those in light manufacturing. Although children may enter the workforce performing peripheral tasks, they may graduate to more productive work before long, earning a child’s wage but doing an adult’s job.

(3) **Distressed labour markets.** The counterexample of construction in Uganda demonstrates a different point, that age differentials may dissolve in extremely unfavourable labour market conditions. With a surplus of available labour of all ages, and with low-productivity work systems, such sectors impose hardship on all workers.

Thus the initial goals of this research have been met: we can say with some confidence that demand-side incentives do exist in particular child labour markets, and that research to uncover these effects is feasible and illuminating. Neither of these was more than a supposition prior to this project; now they are both established as bases for further initiatives.

On the policy side, there is a case for supplementing proven supply-side policies with those addressing the employer’s demand for child workers. These can be regulatory in form, but there are other, more collaborative options, such as technical assistance and informal sector support. Employers were ready allies in this research project, and we believe they can be allies in most well-formulated intervention programs.

From a research perspective, the results are entirely favourable. It has been proven that survey methods are possible even in one of the most sensitive of issues, child labour. Should this sensitivity be too great in some circumstances, it has been shown that ecological questions provide a satisfactory alternative. Future efforts can revisit the data collected in this study to employ more discriminating statistical tests, or they can extend this methodology to new regions or sectors based on the lessons learned from this pilot project.

INTRODUCTION

One of the greatest paradoxes surrounding child labour research and activism is that, while much of the public concern centers on the motives of employers, most analytical work foregrounds the choice of children and their families to supply this labour. In the popular press there is frequent mention of exploitation, under the presumption that children, being obedient and lower-paid, offer higher profits to their employers than adults. Remedy is sought in legislation and codes of conduct that would constrain employers from exploiting children for their own gain. Meanwhile, many child labour researchers view the main problem as the voluntary choice of children and households to substitute excessive or inappropriate work for education or other preferable activities. They regard poverty, lack of access to credit and ingrained social customs as the main determinants of this choice and therefore also the main targets of policy. In their view, to focus on employers and the demand side of the market is at best to shift child labour from one venue to another, not to attack its root causes.

Undoubtedly the researchers are substantially correct, but they are not completely correct. In a majority of instances, the most effective policies will be those that get at the determinants of child labour supply, but there will be others in which demand-side factors play a critical role. If there are instances in which child labour is, or is perceived to be, more profitable than adult labour, then interventions designed to counteract these incentives may be called for. The purpose of this research project is to make an initial inquiry into what those instances are. By measuring children's wages and productivity and comparing them to adults', we are not looking for a uniform pattern of either greater or lesser exploitation. Rather, if we can identify particular sectors, or characteristics of sectors, in which child labour is especially profitable, demand-side interventions can be more effectively designed and targeted. Moreover, to the extent that children are exploited in particular work situations, there is a moral imperative to mitigate or prevent this.

PRIOR RESEARCH

It is not an exaggeration to say that there has been no previous research whose purpose has been to test the hypothesis that, in some situations, children are more exploited than adults. This is surprising considering how central the notion of exploitation is to the broader public debate. On the contrary, there has been a tendency for many researchers to simply assume that differential exploitation does not exist. A characteristic example is Basu and Tzannatos (2003), who write:

By doing a full day’s work each adult can supply one unit of labour and each child 1. This assumption formalizes the substitution axiom for our use. Child labour is a substitute for adult labour, subject to an equivalent scale correction. Let the wage rate for a full day’s work by an adult be w and the wage rate for a full day’s work by a child be w_c . *Clearly* $w_c = w$. (pp. 3-4, emphasis added)

The assumption of equal unit labour costs is the norm rather than the exception among economists, since it is equivalent to the assumption of perfectly competitive labour markets. (This further requires that such markets are anonymous or non-repeating over time, but, although counterintuitive, these are also typical economic assumptions.) One reason, then, that there is no literature directly testing the differential exploitation hypothesis is that its exclusion is a basis for studies of other aspects of the problem.

Rao and Rao (1998) put the question of exploitation to a sample of employers, 25 each from five sectors known to employ children. Their survey yielded the responses summarized in Table 1.

Table 1: Employer Responses to the Question “To What Extent Are Child Workers Exploited at the Hands of Employers”?

	Construction	Domestic Services	Shops	Garages & workshops	Hotels & Restaurants	Total N=125
To a great extent	5	4	6	4	5	24
To some extent	14	7	4	9	10	44
Not at all	6	14	15	12	10	57

Source: Rao and Rao (1998), Table 6, p. 34

Interestingly, approximately one in five employers perceived substantial exploitation on the part of themselves or their competitors, although more than half rejected the notion that exploitation is entailed in the employment of children. There is no overall relationship between the distribution of these responses and the identification of particular sectors as potential worst forms of child labour, except perhaps for the limited rejection of exploitation in the construction sector.

Although the studies collected in Anker et al. (1998a) are concerned with a different problem—the impact on employers of the elimination of child labour in several Indian industries—two reported direct estimates of child versus adult productivity. Both were concerned with carpet manufacturing and utilized direct estimation by trained observers. The strategy was to enter the enterprise with the expressed intention of interviewing the owner, but also to take note of the apparent ages of the workers and the stage of their work. A repeat visit could then be used to estimate the amount of progress made toward completing a carpet, and these estimates could be compared for (apparent) children and adults. Both Anker et al. (1998b) and Levison et al. (1998) concluded that there were no measurable productivity differences, implying that lower wages for children translated to lower unit labour costs as well.

An indirect indicator of unit labour costs is profitability, although there have again been no direct tests of the relationship between the degree to which an enterprise utilizes child labour and its profitability. The Rao and Rao survey referenced above did, however, also ask employers about their reasons for employing children, and all but the last are presumably related to profits. These are presented in Table 2.

Table 2: Reasons Given by Employers for Hiring Children

Reasons	Construction	Domestic Services	Shops	Garages & workshops	Hotels & Restaurants	Total N=125
Children are more docile		7	14	14	1	36
Less labour costs/wages	20	16	23	6	9	74
Can extract more work	20	18	12	9	10	69
Suitability for some activities	4	21	11	23	22	81
Few industrial relations problems			9	2	5	16
Easy to remove		1	10	2	8	21
No payment of retirement benefits			11	1	1	13
Advantageous terms of employment			3	4		7
Out of sympathy for children's family	10	8	6	8	15	47

Source: Rao and Rao (1998), Table 1, p. 29

A narrower question is whether children perform the same tasks as adults, or whether child labour-using enterprises are differently organized than those using only adult labour. Here the answer appears to depend on the specific industry under investigation. The Anker et al. (1998b) study of the Indian carpet industry and the Barge et al. (1998) study of the Indian glass bangle industry

Child labour wages and productivity: Results from demand-side surveys

both find children and adults working side by side at similar tasks. This may be characteristic of a large part of light manufacturing, at which children's capacities are different in degree but not in kind from adults'. Heavier work, such as one finds in agriculture, may exhibit more task differentiation. This is exemplified by IPEC's Rapid Assessment reports on sugar cane harvesting in Bolivia, where children (and also adult women) are taken on as "cuartas" (lower-paid helpers), while adult men perform the actual cutting of cane. According to this study, children would typically peel and stack the cane after it is cut. Payment is made to the adult males with the expectation that they would see to the remuneration of the cuartas that assisted them. (Dávalos, 2002) On the other hand, four recent IPEC baseline studies of coffee harvesting in Latin America found that children are independently engaged along with adults. Surveys of these children generated estimates of the amount of coffee harvested and earnings received. (ILO, 2000)

Finally, Chandrasekhar (1997) provides an example of the Piore hypothesis in the match production industry of Tamil Nadu. In one region (Sivakasi–Sattur), 85% of the enterprises employ children and adult women, but not adult men, for a range of menial tasks. In the remaining 15% there is no child labour, and these tasks are mechanized. In this case, the productivity of child workers would have to be assessed against a counterfactual in which capital, and not adult labour, is substituted for child labour.

Unfortunately, there appears to be little additional research in this field to draw upon. The analytical models employed by economists make frequent reference to the substitutability of adult for child labour and to assumptions about the wage–productivity relationship, but these are grounded largely in supposition and not empirical evidence. Hence the need for the systematic approach to the problem embodied in the current study.

Prior to the selection of research sites and the construction of questionnaires, a general methodology was developed to guide the overall study. This chapter summarizes its main points. Not every element described below found its way into every survey, but all were taken into consideration.

CONCEPTUAL ISSUES

Because of the difficulties that tend to arise in measuring children's earnings and productivity, it is important to remove any possible ambiguities connected with the central concepts. This section will address four: wages, productivity, non-productivity-based employment incentives, and relative profitability.

A. Wages. Although the narrower term "wages" will be employed in this report, what is meant is the broader notion of compensation. Any form of payment from the employer to any other party intended as a counter flow to the worker's flow of productive effort can be regarded as a wage, or wage component. This payment can take the form of money, or it can be embodied in specific goods or services (in kind). Thus, if an employer provides the child worker with a meal, the value of this meal can be regarded as a component of the child's wage. The measurement issue, of course, is that of attaching a value to in-kind payment. Typically, the solution is to impute this value according to the prices commanded by equivalent goods or services sold in the market. Thus, if a comparable meal is offered at a food stand, its price can be attributed to meals provided as a benefit of employment. In practice, we found that in-kind benefits were not substantial or widespread enough to incorporate into the formal analysis, but data were collected on them whenever feasible.

The existence and size of the wage does not depend on the share, if any, received by the child herself. Sometimes the employer will pay other members of the child's family. Some portion of this will be passed along to the child

Child labour wages and productivity: Results from demand-side surveys

worker. It is the entire payment that constitutes the wage, however, and not the portion shared or even intended to be shared.

B. Productivity. Very broadly, worker productivity can be divided into two components, productivity in task and productivity of task. The first of these refers to the speed and effectiveness with which particular tasks are performed by a worker. An example would be the number of kilos of sugar cane harvested during a day. This is measured in physical units. The second refers to the contribution a given task makes to the profitability of the employer. Thus, harvesting cane is one component of a larger production process that results, in the end, in a market shipment with a monetary value. Hence, the role of harvesting (cutting and trimming) in the final product and the market value of that product together determine the productivity of the task of cane harvesting. In principle, we would need to know both of these in order to calculate the productivity of child workers in a specific enterprise. This may not be necessary, however, if adults and children perform the same tasks, since our interest is in the comparative productivity of the two. Being in the numerator and denominator of such a comparison, the value of the task would cancel out.

Productivity in task can be measured in more than one dimension. Simple physical output per unit of time is one aspect, but the qualitative effectiveness of the worker might be measured as well. This is an important issue in the (meagre) literature on children's productivity. It has been claimed, for example, that children's "nimble fingers" give them a qualitative edge in the production of certain goods, such as carpets. If true, this would suggest that the more extensive role of children in production would be associated with higher value-added products. Anker et al. (1998a) found, however, that greater employment of children in carpet production was not associated with either more complex design or tighter knotting. On the other hand, it has been generally assumed in other contexts that children are less capable of high-quality work than adults. A naturally starting point for the current project is the presumption that the relationship between child and adult work along relevant quality dimensions will vary, and that it is one of the tasks of field research to investigate how they compare in specific instances.

Both types of productivity are germane to this study. It matters whether children perform the same task as effectively as adults, and also whether they are assigned to tasks that are as productive as those adults are assigned to. When possible, each should be measured separately. The differential assignment of children to tasks raises the difficult empirical question of whether this difference is due to their age or some other factor. Ideally, if children are found primarily in the least productive tasks, it would be helpful to know if this is because employers do not find them capable of more productive ones. In such a case, both types of productivity differentials would apply.

Finally, there is a distinction to be made between incremental and systemic productivity. Economists normally speak in terms of the marginal productivity of labour, defined as the difference in output attributable to the contribution of one additional worker. More generally, we can regard the incremental produc-

tivity of a group of workers (of which one is a special case) as the difference in output due to the contribution of that group. Normally, this can be measured directly, by observing or otherwise obtaining information about the contribution itself. If the product in question is carpets, and a group of children are found to be knotting them, the number of carpets this group produces in a given period of time can be taken as its contribution to the overall production of carpets.

Systemic productivity arises, however, when reorganization of production must be taken into account. In such a situation, the productivity of the entire enterprise is not simply the sum of the productivities of its individual participants. Adding or deleting a particular group may lead to a restructuring of the overall process, with effects on production that may be difficult to predict. Thus, if children are in a helping role at a construction site, the work may be organized to take advantage of their labours. If they are withdrawn, rather than putting adults to the same tasks, employers may choose to redesign the work process, perhaps mechanizing some aspects of it, in order to make do without the helpers. In this case, it would be a mistake to measure the productivity of the child helpers simply on the basis of the number of tasks they complete each day; rather, it is the difference between the output of the construction enterprise when using and not using their services that matters for productivity. It is even possible that this productivity could be negative, if the reorganization leads to more-than-offsetting increases in efficiency.

The issue of systemic productivity is particularly germane to child labour, since one of its main applications has been to the problem of substandard production in general: sweatshops. According to Piore (1990), a sweatshop is not just a regime of labour exploitation, but also an outgrowth of underdeveloped management. The organization of work on the basis of simple tasks, permitting little worker discretion and enforced by a strategy of coercion, is a sign that opportunities for more efficient organization have not been taken advantage of. Thus, part of the solution lies in technical assistance to those who manage production, enabling them to institute more effective human resource practices. To put it in our terminology, by focusing narrowly on incremental productivity, sweatshops may fail to achieve even greater systemic gains. In the context of child labour, this raises the question of what constitutes the appropriate counterfactual to child work—adult performance of the same tasks or reorganization of the work process. We will return to this later in this section when we consider the notion of profitability.

In practice it is difficult to address the problem of systemic productivity empirically. Comprehensively different production systems are usually not found within the same region and sector. In this study we will generally employ the incremental approach to productivity, but where the evidence is available systemic aspects will be addressed.

C. Non-productivity-based employment incentives. When considering how to organize work and which workers to hire, employers can be expected to reason largely in terms of productivity and cost. Nevertheless, there are other considerations that may come into play. Three of these are pertinent to this study.

Child labour wages and productivity: Results from demand-side surveys

(1) Children are often said to be more docile or obedient than adults. This may have effects that are difficult to translate into productivity terms. For instance, children may be less likely to join or cooperate with unions, providing employers with a buffer against the pressures unions may exert. Similarly, children may willingly perform tasks adults might shun as too unpleasant or dangerous. Employers may simply prefer to have a workforce more respectful of authority, quite apart from issues of productivity and profit.

(2) Children may make fewer demands on the employer to improve working conditions. They may be more willing to work seated on the floor or standing, with less ventilation, or more sporadically. The economic benefits to be had by not upgrading working conditions may be substantial, particularly in the informal sector.

(3) Children may simply be more available than adults. Particularly in rural areas, local adult labour pools may be insufficient to meet employers' needs, at least during peak periods. The alternative to hiring children may be importing adults from distant locations.

Questions concerning these non-productivity motives were incorporated into the employer questionnaires used in every country, and the results are reported in Chapter 5.

D. Relative profitability. The central comparison is between the ratios of child-to-adult wages and child-to-adult productivity. If the first is less than the second, a child worker contributes more to enterprise profitability than an adult, and the child can be regarded as relatively more exploited. Most of the analysis in Chapter 6 is designed to get at those measurements. Unfortunately, the data do not always permit such a direct comparison, particularly on the productivity side. Hence we may also search for indirect evidence, such as the apparent willingness of employers to hire more children at relatively lower wage rates.

The distinction between incremental and systemic productivity is also relevant to the analysis of profitability. Where systemic considerations come into play, changes in profit cannot be deduced solely from incremental changes in unit labour costs. In practice, this will come down to the question of substitution. If adult and child labour are essentially substitutes for one another—if both perform essentially the same tasks, so that more of some workers implies fewer of the other—then it can be assumed that incremental measurements capture profitability effects. If such substitution is not the rule—if the tasks performed are sufficiently different, such that the withdrawal of child labour would compel a redesign of some portion of the work process—then incremental measures will not suffice. In this case it would be desirable to compare enterprises organized to take advantage of child labour with those differently organized to do without it. Lacking that evidence (which is the case in every sector we studied), the second-best approach is to look for statistical evidence that the employment of children alters the productivity of adults. This too, however, proved to be difficult, and the knotty problems of systemic productivity effects remains to be addressed.

THE INFORMATION ELICITATION PROBLEM

In all likelihood, the scarcity of research in the productivity of child labour is due not so much to lack of interest in the topic, as to the perceived difficulty in pursuing it. At each step there are potentially severe difficulties associated with determining the universe to be sampled as well as actually measuring the essential variables. This is due to the illegality of most child labour under consideration, as well as the economic incentives faced by potential informants.

The first problem is establishing the size and scope of the sector in which children work. Most children do not work outside the household, but those who do are more likely to work in the informal sector. A principal reason is that employers who wish to hire children typically evade inspection and reporting requirements, but there are other considerations as well. As the Piore hypothesis suggests, employers who utilize child labour are likely to have other characteristics of informalization, such as low capitalization, a precarious market position, and minimal investment in human capital. On the other side of the market, children may be drawn by the ease of entry into informal work and less repelled by its sporadic or precarious nature. Whatever the cause, the result is that a researcher must go beyond the list of registered employers and use local informants to seek out unregistered enterprises.

Gathering data on children's earnings may present methodological problems but not those of incentive compatibility. Households do not have a significant incentive to misinform survey researchers about the income they receive from their children's work. SIMPOC and related household surveys have successfully gathered these data, and we can speak with some authority at this point on the earning capacity of children in a variety of locations and occupations. Employers may have more complicated motives, but their responses can, in principle, be checked against households.

The fundamental incentive problem concerns child labour productivity. We can assume that this information should come primarily from the employer; children and their adult family members are less likely to be able to give accurate responses to questions about their work outputs. (Children may be able to do this, but it would still be necessary to corroborate their reports with some other source of information.) The crux of the problem is therefore the incentive issue facing the enterprise. It may be difficult for an employer to admit that child labour is responsible for a significant share of his or her product. It is unlikely that records are kept that distinguish between child and adult workers and register the output of each. If children are paid less than adults, an employer may feel pressured to claim that this corresponds to the difference in their productivity. Thus, questions about the pay and productivity of child labour are sensitive for the employer, in the sense that they have the potential to provoke discomfort, and they encounter issues of incentive compatibility when employers do respond.

One of the most welcome findings of the present study, however, is that this does not appear to be a serious problem in most circumstances. We found that

Child labour wages and productivity: Results from demand-side surveys

employers were prepared to offer rough estimates of the productivity of the child employees, and that these responses yielded plausible results. Nevertheless, this may not always be the case in future studies, and so it is important to formulate backup strategies.

The most direct solution in that situation would be to have trained observers gather the needed information on-site. These individuals would have to be skilled in estimating the age of the workers they observe, particularly if adults and children work side-by-side at the same tasks. They would also need to be able to gage the productivity of the work on the basis of what can be recorded in a brief period of observation. This may be feasible in manufacturing or agriculture; it would be more difficult in services. Nevertheless, there are problems that cannot be resolved solely through technique. Employers may resist the entry of these observers; if some within a sector do and some don't, the possibility of sampling bias emerges. There is also a problem of absenteeism, as noted by several contributors to Anker et al. (1998a). On days when data are being gathered, many or the entire child labourers may fail to show up for work. Even if only a portion is absent, the same sample bias problem arises for them.

A second, more practicable approach is one we will refer to as ecological. The main idea underlying ecological data collection is that employers will be asked how other employers in their sector, those with whom they compete for sales and contracts, utilize child labour: how prevalent it is, how productive, and how it is remunerated. While any single response may be of uncertain reliability, the purpose is to generate a distribution of responses which constitute observations on the community of enterprises rather than each of them individually, and which can be assessed in light of its internal properties as well as its relationship to external parameters.

This approach rests on the assumption that there are enough enterprises in the sample to constitute a sufficient basis for analysis—no less than 100. Each enterprise will be asked two types of questions. The first relates specifically to the enterprise itself, generating direct observations on characteristics for which there is assumed to be no information elicitation problem; examples might include the total number of employees and whether or not the enterprise is registered. The second includes the first set, but adds questions concerning child labour specifically, including its productivity and profitability, and is asked with respect to the other enterprises. What emerges are two sets of data, a profile of each enterprise based on their direct responses and a group of collective observations drawn from ecological responses.

The first issue to be addressed is validation: how much credence should be placed in the ecological responses as a group? There are two general sorts of validation criteria. The appearance of the same questions (size, registration, etc.) in both data sets permits an initial analysis of the relationship between the two, both in central tendency and covariation. In addition, household surveys may be employed to generate data that can serve a validation purpose, particularly involving length of employment tenure and compensation.

The second issue is the analysis of the ecological data themselves. Here the purpose is to establish overall confidence intervals and to test for potential relationships between variation in ecological responses and enterprise characteristics as reported directly. A logical approach would be to compare the properties of the ecological distributions to those of conventionally gathered data. Another would be to examine the hypothesis that respondents are covertly describing their own activities in their accounts of others'. This could be explored by testing predictive models in which the conventional, self-reported data provide explanatory variables, while the ecological attributes are dependent variables. If the models generate plausible results, the hypothesis could be tentatively accepted.

Again, it was not necessary to employ ecological questions in this study. Nevertheless, they were used for testing purposes in the Philippines, and they were found to be satisfactory substitutes for direct self-reporting. Future research in child labour, and perhaps other fields of study, should take note of this.

CHAPTER 4: SECTORS AND SAMPLES

4

In order to incorporate as much variety in work situations as possible, two sectors were selected from each of four study countries, Ghana, the Philippines, India and Uganda. Consultation with the country study teams resulted in the identification of sectors that were significant employers of children, were known from previous research, had distinctive economic or social characteristics and were feasible subjects for investigation. In this chapter we describe the sample selection methods employed in each country.

GHANA

The two sectors selected were chop bars, inexpensive restaurants serving a wide cross-section of clientele, and coastal fishing, both centred in the greater Accra region. Child labour in the former is pervasive and highly visible, and in the latter it is understood to be on the increase.

Researchers determined the population of chop bars to choose from based on both the list of chop bars registered with the Chop Bar Owners' Association of Ghana and those that were not members. Once the population was determined, it was stratified into 3 main categories based on size, small (1-6 employees), medium (7-14 employees) and large (15 or more employees). Stratification controlled for the size and the stage of development of the establishments as it was believed that large bars would cater to more middle or upper class patrons and thus might employ children differently.

Given the busy schedules at chop bars, owners and workers were relatively unavailable to speak to interviewers, so in order to facilitate the interview process interviewers visited the chop bars as customers, ordering food and then asking the owners survey questions. In this way interviewers were able to interview both adult and child workers. Interviewers structured their surveys of child workers in the form of short conversations, so that they would not be distracted or made to feel uncomfortable. Overall, 100 enterprises in the restaurant indus-

Child labour wages and productivity: Results from demand-side surveys

try were included in the sample. Each visit resulted in two completed questionnaires, one for the employer and another for a child worker, if available. Adult workers also responded to a few items on the employee questionnaire.

In the fishing sector, researchers administrated a structured questionnaire to a sample of boat or canoe owners from the fishing community of the Greater Accra Region and Kpando and Djemeni in the northern part of the Volta Region. In the Greater Accra Region, interviews were conducted on Tuesdays which, according to local customs, are considered the day of rest for the gods and goddesses of the sea and are therefore the fishers' observed holidays. The Volta Region was included in the study in order to account for any differences in the child labour situation between coastal and inland fishing sectors. In both the Greater Accra and Volta regions, the Chief Fishermen were the key informants, helping interviewers determine which enterprises employed child labour and encouraging workers and owners to provide candid responses. Chief Fishermen were given customary gifts of money and gin or schnapps for providing these services.

Interviewers were permitted to interview all the child workers in the fishing industry, out of which they selected a sample. This sample was constructed to encompass exactly 100 enterprises. The interviewers determined the age of child workers being interviewed by asking the enterprise owner in the absence of the children, and then by asking the children in a group setting, so that they could verify each others' ages. Based on the first round of research, the inland fishing enterprises were dropped from the study, since children there (unlike in the coastal region) did not perform actual fishing.

PHILIPPINES

The two sectors chosen were the pyrotechnics industry, centred on Bulacan province in Central Luzon, and fashion accessories production in Cebu. Each is a prominent employer of children which has been the subject of prior research.

The pyrotechnics industry in the Philippines is informal, household-based and seasonal. While there are many large-scale producers, this study concentrated on the smaller subcontractors who fulfil orders during the brief seasonal rush preceding the December holidays. The sample was taken from producers in Baliwag, Bocaue, San Rafael and Sta. Maria, all communities within Bulacan province, the historic centre of pyrotechnic production. Children are involved in different stages of the production process, but primarily in the first stage, which involves folding paper into funnels to hold the chemicals, in their homes or at the employer's workshop. Researchers surveyed one hundred subcontractors in this industry. Focus group discussions with employers and workers (household, non-household and migrant) were conducted to assist in the survey design. Researchers conducted pilot tests and discussed the results with economists and survey specialists in order to ensure that the survey questionnaire was comprehensive and effective.

The sample for fashion accessories includes producers in Laray, situated in the outskirts of Cebu City. Laray attracts both adult and child workers from neighbouring areas during peak season (March to May). Children are primarily involved in stringing and threading shell ornaments. Interviewers surveyed a purposive sample of one hundred employers, i.e. subcontractors. The survey questionnaire was created using similar methods as those described above for the pyrotechnic sector.

For both sectors, questionnaires were distributed to employers requesting detailed wage and employment information specific to various categories of workers—three age brackets, male or female and migrant versus non-migrant. The result was a set of twelve data sets, one for each type of worker. These were consolidated into a single set in which the unit of analysis was the enterprise, incorporating data on each worker category.

INDIA

In India the two sectors selected were vehicle repair and zardosi. Vehicle repair, which encompasses the repair of two- and three-wheeled vehicles as well as automobiles, is a fast-growing, labour-intensive industry that is known to employ extensive child labour. Zardosi is a form of garment and other fabric production that uses colored threads and incorporates small ornaments. It is generally home-based and paid by the piece. Children are thought to be adept at its intricate demands.

The sample for the auto repair industry includes 150 workshops each from Delhi and Patna. Delhi, the capital city, has a rapidly expanding economy and the highest number of cars in any metropolitan area in India. This has led to a boom in Delhi's auto repair industry. Patna, the capital of Bihar state relies, primarily on two-wheeled vehicles, such as motorcycles, scooters and mopeds, rather than four-wheeled vehicles, such as cars and jeeps. Researchers chose the sample of auto repair workshops from geographic data collection areas specified by the National Sample Survey Organization. The random sample of urban and highway area workshops consisted of 165 workshops in Delhi and 150 workshops in Patna.

The sample for the zardosi industry was determined through a preliminary survey that identified the areas with a high concentration of zardosi work. Researchers used purposive sampling to select 160 zardosi workshops in Lucknow. 38 out of the 160 zardosi workshops included in the sample do not employ child workers.

In both sectors interviewers administered two surveys, one for employers and the other for workers. They were cross-coded, so that data from either could be matched to the other. The result is two data sets, one in which the individual worker is the unit of analysis, but which also incorporates employer data, the other in which the enterprise is the unit of analysis, but which also includes data culled from the worker survey.

UGANDA

The Uganda team selected two sectors that have experienced rapid growth and are believed to be significant employers of children, fishing and construction. Unlike the other three countries that participated in this study, the Ugandans used the age of 18 as a cut-off for designating child labour. Their surveys recorded the actual age of each worker, making possible an analysis based on an age 15 cut-off, but there were too few of them to make it worthwhile.

For the fishing sector, the districts of Mukano and Wakiso, bordering on Lake Victoria, were chosen. Researchers gathered information from the Local Councils, Revenue Collection Points, Beach Management Units and Fish Landing Site Associations to determine which parishes to include in the study. Once the parishes were determined, researchers selected 125 enterprises based on the presence of different age groups engaged in the same tasks, the presence of both males and females and the coverage of a variety of activities.

Construction was surveyed in Kampala (the capital) and Mbarara. Five parishes were selected in a manner similar to fishing; with 25 enterprises in each sector sampled, the entire set consisted of 125.

For both sectors, interviewers used three structured questionnaires, one each for the employers, the employees (both children and adults) and focus groups. The questionnaires were developed in English and translated into Luganda and Runyakitara, two local languages. The employer questionnaire focused primarily on employee profiles, activities of the enterprise and seasonality. The employee questionnaire provided personal and work related information on individual employees, while the focus group questionnaire provided background that could be used to link the data from the other two. Pre-tests were conducted in a couple of parishes similar to the ones in the actual study in order to properly gauge the relevance and effectiveness of the survey instruments. In the end, for each sector, there were two data sets, one in which the unit of analysis is the enterprise and another in which it is the individual worker.

DESCRIPTIONS OF CHILD LABOR FROM THE STUDY SAMPLES

5

Before investigating the main questions behind this study, it will prove valuable and interesting to form pictures of the extent and character of child labour as revealed in the data we collected. The sections that follow are not intended to provide complete accounts. For more detail, the reader is advised to consult the country reports prepared by the four study teams. Not only do they present a wider selection of survey data; they also draw on a much broader background literature. This chapter summarizes the material in those reports, but some of the statistical data may differ, either because different techniques were used to parse the data, or because new variables were created that were calculated in somewhat different ways.

GHANA

Chop Bars

Our sample of chop bars reflected their status as relatively small, informal enterprises. They were placed in three categories: small (1-6 workers), medium (7-14 workers) and large (15 or more workers). 64 restaurants in the sample of 100 were small and 32 medium. Most adults employed are women, consistent with cultural norm in which food preparation is reserved for women, but a small number of men are also employed, especially in cleaning.

Child labour is commonplace. Table 1 records the number of enterprises that employ children for the various major tasks in the sector, while Table 2 records the number of children and adults engaged in these tasks, broken down by enterprise size.

Table 1: Number of Enterprises Employing Children by Task (Chop Bars)

Serving	24
Cooking	6
Help Cook	16
Dish Washing	76
Cleaning	65

Child labour wages and productivity: Results from demand-side surveys

Table 2: Number of Workers Employed by Task, Age and Establishment Size (Chop Bars)

Enterprise size	Small		Medium	
	Children	Adults	Children	Adults
Serving	26	56	5	31
Cooking	6	61	0	32
Help cook	16	53	2	32
Dishwashing	55	32	56	10
Cleaning	46	33	50	12

Children are concentrated in dishwashing and cleaning, but they can be found in other tasks as well. The adult pattern is the opposite, centering on serving, cooking, and assisting in cooking. Child labour is more common in the small enterprises than the medium ones, bearing in mind that size is measured by the total number of workers.

77% of the child workers in this sample are boys, reversing the predominance of women among adults. 59% moved to Accra from other regions, and 28% say they are related to their employer. Table 3 demonstrates that a substantial number of children do not live at home with their parents.

Table 3: Number of Children Reporting Where They Sleep after Work (Chop Bars)

location	percent
at home	52
at workplace	26
elsewhere	11
no response	11

The average age of the children is 12.6 years; Tables 4 and 5 report their education and experience in the industry.

Table 4: Child Worker Educational Attainment, Percent (Chop Bars)

no school	22
primary	50
junior secondary	15
drop out	13

Table 5: Child Worker Years of Experience in Chop Bars

less than a year	47
one year	2
between one and two years	31
more than two years	20

Descriptions of Child Labour from the Study Samples

As can be seen, most children in this industry have relatively little education, while more than half have worked for more than a year. Nearly half, 45 out of 99, say they do not intend to return to school.

Their employment in chop bars will not make it easy for them to combine work and school. Table 6, drawn from the employer questionnaire, demonstrates that the majority of children in this sector work substantial hours, approaching or equal to those of adults

Because the work varies so greatly by task, it is illuminating to view task-specific wage and productivity measures, as demonstrated in Tables 7 and 8. Thus the weighted averages for child and adult wages in Table 7 are equivalent to \$125 and \$211 PPP respectively. The value of the cedi was calculated as 8677 to one dollar or 1451 to on PPP dollar.

Table 6: Proportion of Child to Adult Working Hours (Chop Bars)

less than $\frac{1}{4}$	1
between $\frac{1}{4}$ and $\frac{1}{2}$	7
between $\frac{1}{2}$ and $\frac{3}{4}$	12
between $\frac{3}{4}$ and the same	13
the same	37
between the same and $1\frac{1}{2}$	0
more than $1\frac{1}{2}$	4
no response	26

Table 7: Average Monthly Wage in Cedis by Age and Task (Chop Bars)

Task	Child	Adult
Serving	185,118	308,644
Cooking	214,524	333,011
Help Cooking	175,630	312,364
Dish Washing	185,822	271,174
Cleaning	175,691	269,222
Weighted Ave.	181,984	306,469

Table 8: Additional Customers at which a New Worker is Hired by Age and Task (Chop Bars) (standard deviations in parentheses)

Task	Child	Adult
Serving	43.7 (22.4)	71.9 (50.3)
Cooking	35.8 (12.9)	69.1 (49.0)
Help Cooking	54.2 (17.3)	71.3 (49.6)
Dish Washing	79.3 (44.7)	60.2 (42.4)
Cleaning	75.4 (48.7)	69.5 (39.7)

Child labour wages and productivity: Results from demand-side surveys

Table 9: Number of Employers Citing Reasons for Preferring Children over Adults (Chop Bars)

A cheap source of labour	58
Children would perform these tasks anyway	45
Attentive and smart	30
They can do small/light work	29
Need when work arises	25
They are my children	24
Apprenticeship	22
Because I spend on her upkeep	19
The child has no choice but to work	19
Children can serve better and that speeds up business	18
Easy to control and instruct	18
Just helping them	17
They can be sent on errands	14
Child works because she stays with owner	10

Wages differ greatly by both age and task. The worst-paid adult task remains better-paid than the best-paid child task, however. It is interesting to note that the average child wage, as reported by employers (in Table 7), exceeds that reported by child workers themselves (143,550 cedis). It is not clear whether this discrepancy is due to misreporting on the part of employers or children.

Another wage issue of interest is whether adult wages are affected by the presence of children. Recall from Table 2 that the tasks performed by both adults and children are primarily dishwashing and cleaning. Adult wages in these two tasks are not significantly correlated with the presence of children working in the same enterprises.

To obtain an employer's estimate of productivity, we asked how many additional customers would be required to employ an additional worker, broken down by age and task. This was seen as the most direct method of inquiring about the marginal product of labour (the additional output attributable to an additional worker). The results in Table 8 contain several messages: (1) Average adult productivity exceeds that of children for the three tasks in which child work is least common, but child productivity exceeds adult in the other two. (2) Except for dish washing, average adult productivity is almost identical across tasks. (3) Variance is substantial, particularly for adults. Taking all of these into account, we provisionally accept the interpretation of this variable as a measure of productivity, but also recognize that it is inexact. The reportedly higher productivity of children in some tasks casts some doubt on this interpretation, but most of the numbers appear plausible.

Along similar lines, employers were asked whether they thought children worked equally as well as adults. 14 said they did, 69 said they didn't and 17 didn't know. Since this judgment was not applied to individual tasks, however, it cannot be used to corroborate the data in Table 8.

Descriptions of Child Labour from the Study Samples

Table 10: Number of Employers Agreeing with Reasons for Employing Children (Chop Bars)

Children are less likely to disobey instructions	62
Children are hired to assist their families	56
There is less need to pay benefits and taxes when children are employed	44
Employing children reduces industrial conflicts	37
Families, including children, need to be hired together	34
Children have an aptitude for work that adults lack	30
Children are more available than adults for short-term and part-time work	27
It is customary to hire children	26
There are not enough adults to hire	17

Finally, employers were asked twice to explain their employment of children. The first question was open-ended and coded by the interviewer, which resulted in the distribution presented in Table 9. The second was a series of agree-disagree questions that directed employers to predetermined arguments; their responses are summarized in Table 10.

These replies are broadly consistent. The combination of children's productivity and lower cost is attractive to many employers, but so is the desire to assist them in some fashion. About a quarter of employers take on children because of their relative availability.

FISHING

This sector is made up of small-scale enterprises with minimal capital investments and relatively few workers. Boats are simple in design; on average an enterprise owns two of them, along with two canoes and ten nets. Staffing them are, on average, just under 10 full-time and 2 part-time workers, indicating that there is little margin for poor performance on the part of the crews.

Child labour is ubiquitous; indeed, all 100 firms sampled reported at least one child worker, with most reporting two or three. Table 11 displays the number of enterprises reporting child and adult workers in each of the six major tasks.

Table 11: Number of Enterprises (Fishing) Reporting Workers by Age and Task

Task	Children	Adults
pilot/captain	1	98
machine man	0	93
paddling	69	86
net throwing	74	87
net pulling	38	80
scooping water	61	9

Child labour wages and productivity: Results from demand-side surveys

All of the children engaged in these tasks were boys; 20% had migrated to Accra, and 63% were related to the employer. Table 12 gives an idea of their work experience:

Table 12: Work Experience of Child Employees, Percentages (Fishing)

less than a year	8
one year	19
between one and two years	55
more than two years	18

Given that the average age of the children in the sample was 12.8, it is likely that most will be employed for at least two years before turning 15.

The education level reached by these children is given in Table 13. Approximately 80% of the respondents indicate they will not return to school, and this is reinforced by the length of their workday. Children report an average of nearly 11 hours of work per day; their employers are mostly likely (85%) to indicate that child and adult workdays are of equal length.

Table 13: Child Worker Educational Attainment, Percent (Fishing)

no school	27
primary	23
junior secondary	2
drop out	48

It is striking that child and adult wages are more equal in this sector than they are in chop bars. Overall, children in fishing are paid an average of 548,300 cedis per month compared to 834,500 for adults (approximately two-thirds). Adjusted for hours of work, this ratio would be slightly higher. In addition, children receive an average of 21,150 cedis per month in non-monetary benefits—small as a percentage of total compensation.

The surveys provide two readings of child productivity. Employers were asked to make general comparisons of the efficiency of child workers compared to adults; the results are summarized in Table 14.

Adult workers working alongside children were also surveyed for their impressions of the performance of children. Table 15 records their answers to three questions that get at different aspects of children's contribution to the team's output.

Table 14: Number of Employers Reporting Child Productivity

less than a fourth	0
between a fourth and a half	5
between a half and three fourths	12
between three fourths and the same	25
exactly equal	57
Between the same and one and one half	1
More than one and one half	0

Descriptions of Child Labour from the Study Samples

Table 15 : Adult Co-worker Responses to Three Questions on the Productivity of Child Labour, Percentages (Fishing)

Does working with a child hinder or improve your work ?	
Hinder	3
Improve	77
No effect	20
Do you have to work harder because you work alongside a child worker ?	
No	45
Yes	55
Do child workers accomplish as much as adult workers ?	
No	80
Yes	20

Co-workers are less likely to report equal child productivity than employers, in part because more than half feel they have to bear some of the burden of children's lower level of performance.

Nevertheless, children are attractive to employers to a considerable extent due to their perceived qualities as workers. Table 16 reports their responses to agree-disagree statements describing their motives for hiring children. There is considerable evidence for profitability-related motives and much less for altruistic ones.

Table 16 : Percentage of Employers Agreeing with Reasons for Employing Children, Fishing

Families, including children, need to be hired together	3
Children are hired to assist their families	20
It is customary to hire children for these tasks	73
Children are less likely to disobey instructions and more likely to do unpleasant work	62
Children have an aptitude for this work more than adults	78
Employing children reduces industrial conflicts, e.g. labour unions	67
Children are more available than adults for short-term and part-time work	80
There are not enough adults in the local area	51
There is less need to pay benefits and taxes when children are employed	51

PHILIPPINES

Pyrotechnics

The pyrotechnics industry in the Philippines is informal, household-based and seasonal. There are many large producers in the industry that employ 20 or more regular workers on a full-time basis. Increased demand for pyrotechnics during the peak season (October to December) leads these big producers to subcontract to smaller producers of final and intermediate goods. Subcontractors

Child labour wages and productivity: Results from demand-side surveys

hire children and migrant workers to accommodate these pulses in demand. Bigger producer-distributors may have their own stores while supplying wholesalers. Bigger producer-subcontractors might hire permanent workers in their workshops and contract out jobs to households according to production needs.

The most important product of this sector is the least expensive, “five star”, a simple paper tube filled with powder and bearing a small fuse. This is also where children will most often be found working. While they are involved in different stages of the production process, they are concentrated in the first stage, which involves folding brown paper into funnels to hold the chemicals, either in their homes or at the employer’s workshop. Indeed, 90 of the 100 enterprises in our sample used child labour in folding, but less than a third of this proportion in the other stages.

Approximately one-quarter of the enterprises are members of PATAMBA, a collective self-help group for the pyrotechnic sector. Nearly all work to fulfil specific orders, as Table 17 demonstrates. Of course, orders may originate from more than one source.

Table 17 : Basis for Orders in Pyrotechnic Sector

Do not fill orders	2
Orders supplied by final consumers	53
Orders supplied by retail or store distributors	67
Orders supplied by agents or middlemen	38
Orders supplied by wholesale distributors	39
Orders supplied by subcontractors	15
Orders supplied by suppliers	3

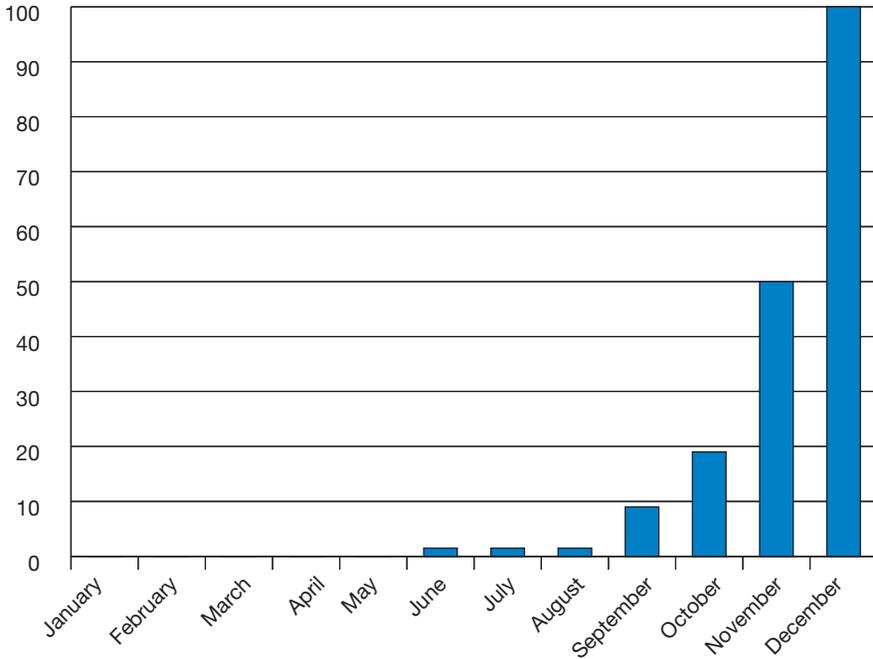
Production of fireworks is highly seasonal, as Figure 1 demonstrates. The bulk of the work takes place in November and December, and most other months are very slow. This sector cannot therefore provide enough income for workers to be attached year-round, and the ready availability of new hands, whether child or adult, is a principal concern of employers.

We do not have employment totals for these enterprises, but the information in Table 18 suggests that they are rather small, particularly when it is borne in mind that the same workers can be assigned multiple tasks. On average, they reported a net income (revenue minus cost) of about 28,000 pesos (roughly \$2,300 PPP) during the month of December. Table 18 also provides detailed information about employment and pay for children and adults in the three most important tasks.

To put these piece rates into context, it is useful to know that the unit in each stage is 1000 (five star). Thus a child who folds 1000 of these small fire-crackers receives about three pesos, or about twenty-five cents PPP. Wicking and filling are more exacting and dangerous activities, and they are paid more. Working conditions are often taxing, with exposure to caustic chemicals and the ever-

Descriptions of Child Labour from the Study Samples

Figure 1: Percentage of Employers Citing Month as “Peak”, Pyrotechnics (N=100)



present risk of explosion. The venue is typically an outdoor workshop to minimize the risk of fire to dwelling places.

Table 18 : Employment and Earnings in Pyrotechnics, Sample Means N=100

	Adults	Children
Folding		
Number	6.2	3.2
Piece rate	5.9	2.3
Hours per day	8.3	6.0
Days per week	6.2	5.4
Wicking		
Number	5.6	0.3
Piece rate	18.7	13.7
Hours per day	8.6	6.6
Days per week	5.7	5.0
Filling		
Number	8.4	0.5
Piece rate	17.0	15.4
Hours per day	9.4	7.3
Days per week	6.4	5.8

Child labour wages and productivity: Results from demand-side surveys

There are a variety of arrangements for financing production. In some cases the full cost is advanced along with the order; in others no payment is made until the order has been delivered and accepted. Our data are not sufficient to determine the relative frequency of these arrangements.

Employers were asked to rank 25 potential reasons for employing children; these were grouped into five categories for purposes of analysis. Table 19 reports the mean scores for these categories. The numbers are directly comparable since they represent the averages of their components.

Table 19 : Mean Rankings for Five Categories of Reasons
for Employing Children, Pyrotechnics

Children are available	2.4
Children are obedient	2.1
Children are productive	1.9
Children need work	1.9
Children are less expensive	0.0

It is interesting that employers unanimously reject the notion that they hire children because they are paid lower piece rates-although they are, particularly in the folding of five star.

Employers were asked to rate categories of employees for the speed and quality they display in three major tasks. Table 20 shows that, for the most part, children are actually preferred; they are seen as both faster and more accurate.

Table 20 : Mean Child-to-Adult Ratios, Pyrotechnics

	Ratio	N
Speed of folding	1.5	90
Quality of folding	1.5	85
Speed of wicking	0.8	91
Quality of wicking	1.4	85
Speed of filling	1.1	87
Quality of filling	1.4	85

These are remarkable results, particularly since children would seem to be preferred for filling the fireworks, but few are employed doing so. There is consistency, however, between the very high scores children receive in folding and their concentration in this stage of production.

As Table 18 indicates, children generally work in excess of 30 hours per week in this sector. Employers report that only 55% of their child employees are in school, although few are willing to admit that work interferes with schooling at times of high demand.

Fashion accessories

Unlike the fireworks industry, fashion accessories serves global as well as local markets. Production occurs in coastal towns, facilitating export to east Asia, Europe and Canada. Items produced include beads, earrings, buttons and other accessories made of wood or shell. Child labour is widespread, and it is believed by many in this industry that children possess an aptitude for some parts of the work that adults lack. The majority of child workers are girls.

The difference in market structure can be seen in Table 21. Like pyrotechnics, fashion accessories is organized through chains of subcontracting, but the chains are longer and more diverse. Orders may flow in either direction (from suppliers or consumers), and much of the impetus comes from exports. This greater reliance on the world market introduces more uncertainty and heightens competitive pressures.

Table 21: Basis for Orders in Fashion Sector, Percentages

Do not fill orders	9
Orders supplied by final consumers	17
Orders supplied by retail or store distributors	31
Orders supplied by agents or middlemen	29
Orders supplied by wholesale distributors	28
Orders supplied by subcontractors	30
Orders supplied by suppliers	49
Orders supplied by exporters	77
Orders supplied by foreign consumers	5

Orders peak during the winter months and enter a lull during the summer, as shown in Figure 2. Presumably the use of child labour follows a similar pattern.

Although children can be found in many aspects of fashion accessories production, the survey centred on two specific processes, the stringing of shell beads onto wires and the transferring of the strung beads onto nylon fabric. Both are exacting and require patience and attention detail sustained over long hours. Table 22 reports the averages for employment and earnings, comparing adults and children. Children work fewer hours than adults but still average more than 35 per week. While their piece rate is lower, the child/adult gap is smaller in this sector than it is in pyrotechnics. Note that in this industry “piece” refers to a single completed item, such as a string of beads. Thus, stringing a set of shell beads onto a wire to fashion a necklace would earn children an average of about 18 cents converted into international (PPP) dollars. (According to information provided by the Philippines research team, compensation of production workers in this sector accounts for approximately only 2-4% of the retail price in foreign markets.)

Child labour wages and productivity: Results from demand-side surveys

Figure 2: Percentage of Employers Recognizing Month as “Peak”, Fashion Accessories (N=100)

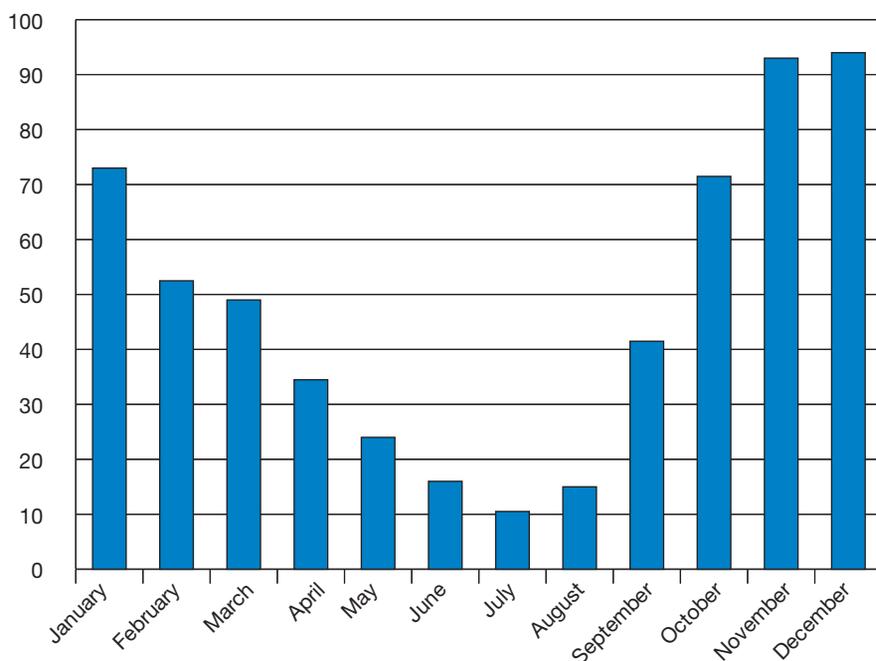


Table 22: Employment and Earnings in Fashion, Sample Means N=100

	Adults	Children
Stringing		
Number	15.0	4.4
Piece rate	2.5	2.2
Hours per day	8.8	6.3
Days per week	6.0	5.7
Transferring		
Number	14.7	5.9
Piece rate	1.4	1.3
Hours per day	8.3	6.4
Days per week	5.9	5.7

As in pyrotechnics, employers in the fashion accessory sector do not claim to hire children because they are less expensive, as Table 23 shows. Nevertheless, their reasons differ, with a strong emphasis placed on children’s productivity. This appears to reflect the common belief that children are adept at the fine hand-work required in threading and sewing. The stringing of beads, in particular, is seen as an area in which children are most apt, as Table 24 indicates.

Descriptions of Child Labour from the Study Samples

Table 23: Mean Rankings for Five Categories of Reasons for Employing Children, Fashion

Children are available	8.4
Children are obedient	7.6
Children are productive	11.4
Children need work	8.3
Children are less expensive	0.9

Table 24: Mean Child-to-Adult Ratios, Fashion (N=100)

	Ratio
Speed of stringing	1.7
Quality of stringing	1.6
Speed of transferring	1.1
Quality of transferring	1.1

Finally, employers report that two-thirds of their child employees attend school while working. This is somewhat surprising, given the seasonality shown in Figure 2 and the hours in Table 22. Only 12% of respondents believe that work, even in the peak season, interferes with schooling.

INDIA

Vehicle Repair

Two locations were chosen for the study of child labour in the vehicle repair sector, Delhi and Patna. As we will see, they exhibit striking differences that make it necessary to analyze them separately. In general terms, Delhi is a much wealthier region than Patna; car ownership is higher and a greater percentage of the repairs in Delhi's shops are to four-wheeled vehicles, rather than two-wheeled (motorcycles and scooters) or three-wheeled (auto-rickshaws). Delhi's shops take in far more revenue, but this is not reflected in other indicators of size and productivity. We will begin by comparing the characteristics of enterprises, then those of their workforce, and finally the differences in employment and earnings.

Enterprises

Table 25 summarizes descriptive statistics for the repair shops in the two locations. The registration rate among enterprises is almost twice as high in Delhi as compared to Patna — 12.1% as against 6.7% — although it is low in both regions. Shops in Delhi take in more than five times the weekly revenue, yet they are smaller on average, whether measured by the number of employees or the extent of capitalization. The shops in the Patna sample tend to have somewhat more experience and make greater use of child labour.

Child labour wages and productivity: Results from demand-side surveys

Table 25: Sample means for selected employer characteristics in vehicle repair

	Delhi	Patna
Registration	12.1	6.7
Revenue per week	23010	4352
Total value of assets	40703	99820
Number of employees	3.5	3.7
Percentage of child workers	27.1	33.1
Number of vehicles repaired	14.4	27.4
Years in existence	8.5	10.6

In both Delhi and Patna the predominant form of recruitment for child workers is for their parents to bring them to the shop. This and other recruitment methods are presented in Table 26.

Table 26: How children are recruited (percentages of enterprises identifying)

	Delhi	Patna
Parents	60.0	71.3
Distant relative of mine	1.2	4.0
Relative of someone at work	19.4	10.0
Local person brings to the employer	7.9	24.0
Child approaches	25.5	20.7

Workers

The average age of an adult worker in Delhi is 29.1 and he (they are all males) has been working in this sector an average of 7.8 years. The corresponding figures for Patna adults are 24.2 and 7.3, making it clear that the majority of these employees in both locations did not begin their careers as child workers. There are striking differences in education between these two regions, as shown in Table 27: over three-fourths of all adult vehicle repair workers in Delhi have graduated from primary school; nearly two-thirds of Patna workers have not.

Table 27: Educational attainment among adult workers (percentages)

	Delhi	Patna
None	18.6	40.9
Below primary	3.7	22.7
Primary	14.9	19.7
Middle	23.0	9.1
Secondary	39.8	5.3
Other	0	2.3

Descriptions of Child Labour from the Study Samples

Educational attainment for child workers was far lower, although still somewhat higher in Delhi:

Table 28: Educational attainment among child workers (percentages)

	Delhi	Patna
Illiterate	55.4	63.6
Below primary	12.9	28.8
Primary	28.1	4.5
Middle	3.6	3.0

(The source for Table 28 is the survey of child workers themselves.)

The great majority of child workers in both locations live at home with their parents; nearly a third of Delhi's child workers had moved there from some other region, while the corresponding figure for Patna was just under a fourth. The main reason for accepting work in vehicle repair among the Delhi children was helping out their family, which was cited by about 60% of them. Children in Patna, on the other hand, were nearly unanimous (almost 90%) in attributing their employment to their desire to get job training. It appears that entering this sector at a young age is a choice made under duress in Delhi, but is seen as more normal in Patna.

Employment and wages

There are many ways to approach wage and production questions in these data. Surveys were administered separately to employers, adult workers and child workers, and all three asked for information of this sort. Workers could also be classified according to their employment and payment status, as well as by their tasks within the enterprise, and these offer multiple windows on the data.

Our main interest is in employer-provided data, since these are likely to be more accurate, at least with respect to patterns across the workforce. Table 29 presents average daily wages by age and location according to employment status. 46 rupees equalled one dollar or 9 rupees to one PPP dollar. Clearly it is desirable for a worker to have a formal employment contract, while lowest pay

Table 29: Average daily wages by age and location according to employment status

Status	Delhi		Patna	
	Child	Adult	Child	Adult
contract		136.3 (12)	36.3 (4)	102.6 (64)
regular	43.5(106)	93.0 (379)	15.9 (77)	50.9 (269)
casual	46.0 (23)	87.7 (28)	17.7 (72)	47.9 (53)
trainee	29.2 (23)	30.8 (4)	16.3 (18)	28.8 (4)

Child labour wages and productivity: Results from demand-side surveys

tends to attach to workers characterized as trainees. Pay is much higher in Delhi than in Patna; the distribution of workers across these categories differs between the two regions, but not in a way that suggests fundamentally different systems of employment.

The worker's payment schedule has relatively little affect on his wages, with the exception of profit-sharing (which is uncommon) and monthly payment for adults, as Table 30 demonstrates.

Table 30: Daily wages by payment schedule, age and location, in rupees (numbers in parentheses)

Payment	Delhi		Patna	
	Child	Adult	Child	Adult
Share		125.3 (15)	33.8 (4)	108.1 (109)
Monthly	43.1 (115)	107.0 (325)	16.4 (41)	51.1 (111)
Daily	43.3 (6)	91.4 (21)	17.4 (106)	47.2 (104)
Irregular	37.4 (30)	81.5 (11)	15.8 (18)	49.3 (11)

The most dramatic differentiation is by job classification, as can be seen in Table 31. Among both adults and children, in both Delhi and Patna, workers designated as "helpers" earn significantly less than the rest. Nearly all children, in fact, are helpers, but adults may also be employed in this capacity. The pay ratio within each age group between non-helper and helper is about 2-to-1 in Delhi, but 3 or 4-to-1 in Patna.

Table 31: Daily wages by job classification, age and location, in rupees (numbers in parentheses)

Position	Delhi		Patna	
	Child	Adult	Child	Adult
Denter	80 (1)	104.7 (81)	61.7 (3)	84.2 (56)
Painter	96.5 (2)	104.4 (80)		90.0 (31)
Helper	40.4 (147)	56.1 (32)	15.8 (163)	29.3 (100)
Mechanic	133 (1)	116.4 (179)	56.7 (3)	84.4 (147)

What exactly does the title of "helper" encompass for child workers in this sector? Table 32 provides a more detailed breakdown of tasks as identified by employers. It appears as though children are somewhat more integrated into the production process in Delhi, although less immediately critical tasks, such as cleaning and tea-making, predominate in both locations.

It is evident that children are paid far less than adults; this discrepancy remains even when only helpers are taken into consideration. The primary focus of this research is on the extent to which this is reflective of actual production

Descriptions of Child Labour from the Study Samples

Table 32: Detailed breakdown of tasks as identified by employers

Task	Delhi	Patna
Removal of panels	58.6	35.3
Dents panels	6.6	0.0
Cleaning and smoothing of panels	75.7	18.7
Applies primer	19.7	0.0
Mixes paint	16.4	0.0
Applies final colour	15.1	0.0
Cleaning of workshop	96.1	76.0
Cleaning of spare parts	96.7	74.7
Assisting with apparatus	95.4	82.0
Tea making	93.4	75.3
Sweeping	15.4	71.3

differences; while this will be explored in detail in the following section (analysis), the surveys permit an initial look at the perceptions of the parties directly involved.

Beginning with employers, Table 33 confirms that nearly all regard their child workers as useful, although few (far fewer in Delhi than Patna) believe they are as productive as adults.

Table 33: Percentage of employers agreeing with statements regarding the usefulness of child workers

	Delhi	Patna
Having a child worker in the workshop is useful.	79.4	80.0
Children save workers time in the workshop.	80.0	79.3
Children's and adults' work is of equal quality.	2.4	29.3

When asked why they take on child employees, their employers often stress their productive qualities and lower cost, as Table 34 demonstrates. Indeed, very few of them cite altruistic motives. Adult workers were asked whether the amount of time required to complete a task would increase in the absence of child helpers. Their choices were coded numerically in this way:

How much more time would it take to complete the following tasks without a child helper? 1 = more than twice the time 2 = twice as long 3 = about a quarter more time 4 = about the same time 5 = about a quarter less time 6 = half the time 7 = less than half the time

Table 35 provides the mean (ordinal) responses for four major repair functions. Clearly children are more integrated into the work process in Delhi, where each activity benefits from their contribution. In general, where children are seen as helpful, their perceived effect is to increase productivity by somewhat less than what an adult would accomplish.

Child labour wages and productivity: Results from demand-side surveys

Table 34: Percentage of employers and their major reason for hiring children

	Delhi	Patna
It is customary to hire children for these tasks	8.5	6.0
Children have an aptitude for this work that adults lack.	3.6	14.7
Children are less likely to disobey instructions.	29.7	5.3
They are more available than adults for short-term and part-time employment.	16.4	25.3
There are not enough adults in the local area to hire.	4.2	2.7
There is less need to pay benefits and taxes when employing children.	29.1	17.3
Out of sympathy for the child.	4.8	4.7

Table 35: Average perception of effect of child helpers on adult productivity by major task

	Delhi	Patna
Removal of panels	2.4	3.1
Panel denting	2.5	2.6
Panel painting	2.6	3.0
Mechanic work	2.5	2.5

Another question asked adult workers how production would change if there were no children employed. Percentage responses are given in Table 36. The most interesting point is that few respondents believe that this would increase employment opportunities for adults.

Finally, adult workers were asked to identify three reasons for the employment of children. In Table 37 their responses were consolidated; the numbers indicate the percentage of respondents who selected each reason as either the first, second or third most important factor. In both locations there is near unanimity in acknowledging their low cost as an attractive aspect of child workers. The only other reason with majority support in both Delhi and Patna is that children provide a flexible labour force to meet the fluctuating needs of enterprises. Service to children and their families ranks third in Patna and fourth in Delhi, behind children's perceived obedience.

Table 36: If children were not employed, how would the work change? (percentages)

	Delhi	Patna
No change	6.2	19.7
Adults would take more time	57.1	53.8
Repairs would become more expensive	4.3	13.6
Others will work in place of children	8.1	3.8
Only children can do some of the work	2.5	1.5

Descriptions of Child Labour from the Study Samples

Table 37: Reasons for hiring children (percentages identifying as one of the top three)

	Delhi	Patna
It is customary to hire children for these tasks	8.4	8.9
Children have an aptitude for this work that adults lack	9.6	18.7
Children are less likely to disobey instructions	48.3	22.4
Children are more available than adults for part-time and short-term work	70.3	68.7
There are not enough adults in the local area to hire	24.5	22.5
There is less need to pay benefits and taxes when employing children	85.9	85.0
Out of sympathy for the child	12.8	16.1
Children come for apprenticeship or are placed by parents or guardians	40.0	59.8

Zardosi

The zardosi industry refers to handicraft production of colourful garments and other textile products in a style that has evolved over many centuries. Traditionally, gold, silver and other threads were used for their elegance, and beads or other small ornaments were woven into the fabric. In modern times precious metals are seldom used, as the industry has shifted to a wider market for its output. Nevertheless, production is still organized on an artisan basis, and considerable skill is entailed in making attractive goods.

This sector is centred in the district of Lucknow. In the past the work was carried on entirely by the Muslim population, but over time Hindus have become involved in larger numbers. It was also a tradition that only men would do this work, but recently women have begun to make inroads. Nevertheless, their proportion is still so low that the surveys administered to workers and employers did not attempt to differentiate by sex. One pattern that has continued to hold is that workers tend to be young. The reason is that the long hours of detail work take a severe toll on the worker's eyesight, and after fifteen years or so the damage is too great for them to continue sewing.

Very generally, the zardosi process involves tracing pre-existing patterns onto fabric, turning these traces into outlines that can guide needle work, and the sewing itself. A division of labour emerges, with greater skill attached to sewing and, within sewing, to work requiring more accuracy.

Table 38: Glossary of terms used in this section

zardosi	sewing ornaments into the fabric
salma	twisted thread used for floral patterns
sitara	smaller spangles woven into the fabric
zari	gold thread
ari	creating an outline to guide cutting and sewing

Enterprises in this sector are small and work to fulfil orders from traders who in turn maintain contact with buyers. Little equipment is required to set up

Child labour wages and productivity: Results from demand-side surveys

a shop, and capacity depends primarily on the skills of the workforce. The volume of work ebbs and flows at individual shops, and employment is seldom secure. Unsurprisingly, none of the enterprises included in the sample were registered.

Table 39 summarizes a number of enterprise characteristics. The small size and capitalization are confirmed in this sample. Reported profit is nearly half reported revenue; if true, this indicates that workers do not capture much of the value added, despite the limited role played by machinery. Children make up somewhat less than a fifth the labour force, but their share of the work is even less, since they are employed for fewer hours.

Table 39: Average Enterprise Characteristics in the Zardosi Industry

Years of existence	10.5
Number of employees	5.2
Value of capital	5123.2
Monthly revenue	16890.3
Monthly profit	7154.9
Percentage of child workers	18.9
Percentage of child hours	14.9

Employers do not seek out child workers but are instead approached from the outside, according to the responses summarized in Table 40.

Table 40: How are children recruited? (percentages)

Parents send them	48.8
Through a relative of mine	23.8
Through a relative of a worker	0.6
Brought in by a local person	41.3
Child approached me	0.6

The survey asked employers to indicate their top three reasons for taking on child workers. In Table 41, these responses are consolidated and expressed as a percentage of all those giving at least one reason. Unlike those in vehicle repair, Zardosi employers point primarily to “altruistic” or “cultural” motives; profit calculation appears to take a back seat. To the extent that the decision to hire is motivated by economic considerations, it responds to labour supply—the availability of children relative to adults.

Once employed, children undergo training that mostly takes the form of watching how adults do the work. Only 14% of employers report that children work alongside their parents, so their status is that of trainees or, after enough experience on the job, workers in their own right. Only half of the employers say that it is useful to have children in the workshop, although almost two-thirds indicate their presence saves time. They were also asked whether children’s work was of equal quality to adults in specific task areas; their answers are summa-

Descriptions of Child Labour from the Study Samples

Table 41: Percentage of Employers Giving this as One of Three Reasons for Hiring Children

It is customary to hire children for these tasks	55.7
Children have an aptitude for this work that adults lack	8.9
Children are less likely to disobey instructions and more likely to do unpleasant work	9.8
They are more available than adults for short-term and part-time work	36.1
There are not enough adults in the local area to hire so they are needed	40.2
There is less need to pay benefits and taxes when employing them	11.5
Out of sympathy for child's family	50.8
Children come for apprenticeship here or are put here by parents/guardians	63.1
Other	8.2

rized in Table 42. The results demonstrate the concentration of children in a few tasks, such as creating pattern borders or attaching ornaments.

Table 42: Percentage of Employers Saying That Children's Work Is of Equal Quality in Task

Sewing the material to the stretcher bed	4.4
Tracing the pattern of the work	0.6
Threading the needles	31.9
Salma sitara and other ornaments	65.0
Zari	4.4
Zardosi	9.4
Ari	53.8

Despite the apparent usefulness of children in specific parts of the production process, only one employer in eight says he would hire more adults if child labour were curtailed.

As mentioned previously, the Zardosi workforce is young. The average age of adult workers is only 24.4; combined with an average of almost 11 years of experience, it is clear that it is common for employment to begin during childhood. As for the children, most live with their parents and are native to the region they work in.

Table 43 reports education and literacy data for children and adults in this sector. It is interesting that, while children have had far fewer years of school-

Table 43: Literacy and Educational Attainment (percentages)

	Adults	Children
Literacy	69.5	68.9
Below primary	16.5	50.0
Primary	25.3	40.5
Middle	49.5	9.5
Secondary	8.8	

Child labour wages and productivity: Results from demand-side surveys

ing, self-reported literacy rates are nearly identical. It is unlikely that children currently working will close the education gap through continued school attendance, and that the higher average attainment of adults is largely attributable to the portion of this workforce that postponed work in order to complete more schooling.

Once employed, children and adults find themselves in different places within the division of labour, as Table 44 demonstrates. Adults perform across the full range of tasks, whereas children are concentrated in just some of them, largely corresponding to those in which, according to employers, they are most likely to work at a level of quality equal to adults.

Table 44: Tasks Performed (percentages)

	Adults	Children
Sewing fabric to stretcher bed	93.1	4.9
Tracing the pattern	81.7	4.9
Threading the needles	80.9	61.5
Sewing Salma and Sitara	94.7	97.5
Zari work	95.4	9.8
Zardosi work	93.1	36.1
Ari work	88.5	93.4

The pay difference is dramatic: 452.5 rupees per week (adults) versus 76.8 rupees (children). The extent to which this is attributable to age differences alone will be explored in the following chapter. For now, it is useful to note that few adult workers believe children's work is of equal quality, and nearly all of them attribute pay differentials to children's relative lack of training.

UGANDA

Fishing

Fishing is a significant activity in Uganda, employing approximately 250,000 people, over half of them on Lake Victoria. The sample was taken in the district of Mukono, which borders this lake. The enterprises surveyed were generally quite small, with most having between three and six employees. 36% are registered. Almost half identify fishing proper as their main activity; the rest are engaged in supportive activities such as selling food to the fishers, making boats, marketing fish, etc.

The employment of male and female workers below the age of 18 is commonplace in this sector. Table 45, drawn from the employer survey, reports wage and employment data by age and sex. As we will see, even though the age 18 cut-off does not precisely correspond to the definition of "child labour" found in ILO Convention No. 138, there are systematic differences in employment

Descriptions of Child Labour from the Study Samples

characteristics that correspond to this classification, so we will adopt the definition employed in the Uganda survey and refer to all workers under 18 as child labourers. As this table demonstrates, children differ in all essential respects from adults: they are paid about one-third less, they are from 40-60% more likely to be working part-time, and they average 7-8% fewer hours per day. Alternatively, comparisons can be made between males and females in both age classifications. Males earn between $1\frac{2}{3}$ and twice what women earn; they are far less likely to work part time, and they tend to work somewhat longer hours. Finally, to put the earnings numbers in perspective, it should be noted that they are denominated in Ugandan shillings. These roughly exchange with US dollars at 1700:1 and with PPP dollars at 300:1.

Table 45: Employment and Earnings by Age and Sex, Fishing

	Children		Adults	
	Male	Female	Male	Female
N	103	58	210	64
Monthly pay	53,915	20,247	85,311	29,313
Part time %	38.4	24.1	21.6	9.4
Hours per day	7.4	8.2	8.1	8.8

These data can be supplemented by information from the employee survey reported in Table 46. The general pattern of hours per day is maintained, although employees report themselves working more hours than their employers do. This questionnaire also includes questions on supplemental benefits. Clearly such benefits can be substantial when they occur, but they are uncommon. The most widely distributed benefit is food, and 40% of the girls sampled said they had been fed.

Table 46: Mean Employment and Benefits, Fishing (numbers in parentheses)

	Children		Adults	
	Male	Female	Male	Female
Days per week	5.4 (77)	6.0 (45)	5.7 (93)	5.9 (22)
Hours per day	7.9 (76)	8.7 (45)	8.0 (94)	9.6 (22)
Value of meals	13,080 (5)	6,756 (18)	11,140 (10)	7,371 (7)
Value of transport	1,750 (2)	(0)	10,000 (4)	(0)
Value of education	6,500 (1)	10,000 (2)	3,000 (1)	(0)
Value of clothing	(0)	(0)	9,750 (2)	(0)
Value of housing	(0)	5,000 (1)	(0)	(0)
Value of medical	(0)	6,000 (3)	11,700 (2)	(0)
Value of training	2,000 (2)	(0)	45,000 (1)	(0)

Child labour wages and productivity: Results from demand-side surveys

As for the workers themselves, the employee survey contains a wealth of information. Table 47 tells us more about them. Migration is common, reflecting a society undergoing multiple transitions. The percentage of children who are orphans is shocking, and is due primarily to the HIV/AIDS epidemic. This cannot help but have an effect on their working life. Children are far more likely to work with others from their household, although this remains the minority situation overall. Finally, the percentage working part time is not too far out of line with the results of the employer survey; sampling differences and the intrinsic ambiguity of the concept may explain the discrepancies.

Table 47: Percent Reporting Selected Characteristics, Fishing

	Children		Adults	
	Male	Female	Male	Female
Migrated	38.5	39.1	36.2	56.5
Orphan	50.0	30.4	5.3	0.0
Related to employer	22.1	26.7	25.5	21.7
Part time	34.6	15.2	17.9	17.4
Work with others from household	21.8	21.7	13.7	8.7

Tables 48 and 49 tell us more about the educational situation of these workers. It appears that a gap has opened up among the under-18 workers, with girls twice as likely as boys to report they never attended school. Table 48 gives year-by-year attainment levels for both children and adults, where “p” indicates the primary, and “s” the secondary, level. Given their ages, it is unlikely that many workers whose highest attainment is in the first few years of primary school will increase their education in the future.

Table 48: Current Schooling Status, Percentages (Fishing)

	Children		Adults	
	Male	Female	Male	Female
Never attended	15.6	30.2	29.3	23.8
Left school	68.8	51.2	64.1	76.2
Currently attending	13.0	16.3	4.3	
On vacation	2.6	2.3	2.2	

Returning to their work situations, we find two snapshots in Tables 50 and 51, the first based on the employers’ survey and the second the employees’. In the first of these, employers were asked to identify a set of main activities conducted by their enterprise. For each of these they were asked to provide detailed employment information. Few of them listed more than one activity, however, and Table 49 is based only on the first. The main difference between the two

Descriptions of Child Labour from the Study Samples

Table 49: Highest Schooling Level Attained by Those Who Have Attended, Percentages (Fishing)

	Children		Adults	
	Male	Female	Male	Female
p1		3.0		
p2			3.0	
p3	7.7	3.0		
p4	9.2	6.1	6.0	6.3
p5	9.2	3.0	6.0	25.0
p6	16.9	15.2	6.0	12.5
p7	6.2	27.3	25.4	25.0
s1	12.3	21.2	4.5	12.5
s2	18.5	6.1	9.0	12.5
s3	4.6	6.1	10.4	
s4	4.6	3.0	7.5	
s5	1.5			
s6	9.2	6.1	14.9	
post primary training			6.0	6.3
post secondary training			1.5	

tables appears to be that many workers who are viewed by their employers as being paid by the piece view themselves as being paid either weekly or monthly. Perhaps both are correct: the amount of their pay is established by a productivity calculation, and their pay period is weekly or monthly.

Table 50: Mode of Payment in First Main Activity, Percentages (Fishing)

	Children		Adults	
	Male	Female	Male	Female
Piece rate	56.3	17.5	58.3	14.1
Daily	38.5	70.2	34.5	60.9
Weekly			1.0	
Monthly	5.2	12.3	6.3	25.0

Table 51: Mode of Payment, Percentages (Fishing)

	Children		Adults	
	Male	Female	Male	Female
Piece rate	43.6	6.5	38.9	8.7
Daily	28.2	34.8	36.8	60.9
Weekly	7.7	8.7	5.3	8.7
Monthly	20.5	50.0	18.9	21.7

Child labour wages and productivity: Results from demand-side surveys

The division of labour by age and gender becomes evident in Table 52, which is based on the first main activity of each worker as identified by the employer. Actual fishing is the principal activity for adult men, food vending for adult women. Among children, girls are still concentrated in food vending, while boys' activities are more diverse. Some tasks are almost entirely gendered, while others show roughly similar numbers of males and females engaged. Note that, while the fishing sector encompasses many hazardous activities, a clear majority of girls and a probable majority of boys are engaged in tasks that would not be regarded as violating the stipulations of Convention 138, provided they are at least 15 years old.

Table 52: Main Activity by Age and Sex, Percentages (Fishing)

	Children		Adults	
	Male	Female	Male	Female
Canoe construction	8.6		4.1	
Carrying outboard motors	1.1		1.5	
Collecting floaters	1.1			
Sorting nets	10.8	3.8	2.6	
Actual fishing	19.4		46.9	1.7
Food vending	5.4	61.5	1.0	69.5
Repairs	5.4	1.9	4.6	3.4
Offloading, carrying	20.4	1.9	9.2	3.4
Selling fish	1.1		1.0	
Smoking, drying, salting fish	2.2	11.5	2.0	16.9
Surveillance	1.1	1.9	1.5	1.7
Cleaning fish	2.2	3.8	0.5	1.7
Buying fish			0.5	1.7
Weighing fish	1.1	1.9	1.0	
Ice packing	3.2		1.0	
Recording fish		3.8	0.5	
Cleaning slabs	1.1			
Quality selection	1.1		1.5	
Loading fish	1.1		2.0	
Selling soft drinks	1.1	1.9	1.5	
Packing fish	5.4		8.2	
Boat pilot	1.1		3.1	
Cleaning boats	1.1	1.9	1.0	
Fetching water	1.1	1.9	0.5	
Making boats	1.1		1.0	
Beer brewing	2.2		2.0	
Selling fuel	1.1		1.0	

Descriptions of Child Labour from the Study Samples

To understand this task distribution, it is helpful to see it in economic terms. Based on employer reports concerning earnings and hours in each activity, they have been classified into five groups according to their imputed hourly wages. The formula used was

$$\text{Hourly wage} = \text{Monthly earning} \div (\text{Daily hours} \times 25)$$

(It was assumed that each worker worked 25 days per year, even though many were identified as part time. This is because part time status was not defined, and no reasonable estimate could be made of differences in days worked.) Activities that paid less than 300 shillings were placed in the lowest group, those between 300 and 500 in the next, and so on. Table 53 summarizes the results, based on workers' first listed activity. Women of all ages find themselves highly concentrated in the lowest class and excluded from the top classes. (The 700-899 wage class is drawn from activities listed second or lower by employers.) Little difference can be found between younger and older females; younger males are more likely to be placed in the lowest class.

Table 53: Percent in Activity Wage

Wage class	Children		Adults	
	Male (N=93)	Female (N=52)	Male (N=196)	Female (N=59)
0-299	31.2	75.0	17.9	76.3
300-499	36.6	5.8	56.1	1.7
500-699	24.7	17.3	15.3	22.0
700-899				
900+	7.5	1.9	10.7	

In light of these results, it is interesting to look at employers' own assessments. Table 54 summarizes their views on actual employment outcomes, while Table 55 reports their responses to questions about their motives for hiring children. Majorities view child and adult workers as essentially equal in their productive capacities, and overwhelming majorities deny a gender difference between boys and girls. Similar percentages apply to their perceptions of their own pay practices, despite the enormous disparities documented above. It is difficult to avoid the impression that employers are saying what they think they are expected to say. Similarly, few employers will admit that the lower cost of hiring children is attractive to them, although they point to the productivity and, in about a third of the cases, obedience of children as positive attributes. It is striking that more than a third report adult workers as being in short supply, even though the labour market in this locality is widely viewed as having a surplus of willing workers.

Child labour wages and productivity: Results from demand-side surveys

Table 54: Perceptions of Child Work, Percent Agreeing (Fishing)

Children produce the same quantity as adults	58.9
Children produce the same quality as adults	59.5
Girls produce at a higher quality than boys	9.1
Boys produce at a higher quality than girls	2.0
I pay boys and girls the same	93.4
I pay children and adults the same	59.2

Table 55: Percent Agreeing with Reason for Hiring Children (Fishing)

Families including children need to be hired together	2.3
Children are hired to assist their families	54.9
It is customary to hire children for these tasks	19.5
Children have an aptitude for this work that adults lack	68.8
Employing children reduces industrial conflict	37.0
Children are more available than adults for short term or part time work	5.3
There are not enough adults in the local area to hire	36.7
There is less need to pay benefits and taxes when employing children	8.6
Employing children reduces the wage bill	14.7

Construction

The construction industry in Uganda incorporates a wide range of projects, from individual buildings to large public works, but the sample utilized in this study concentrates on two general activities, stone quarrying (50%) and brick making (25%). A quarter of the enterprises are registered, and most have between 3-6 workers.

As Table 56 indicates, this is a male-dominated, but not exclusively male, sector. There is no systematic pattern regarding part time work, although monthly pay displays the age and sex differentials familiar to us from other industries and countries. Adults work longer hours than children, and males longer than females.

Table 56: Employment and Earnings, Percentages (Construction)

	Children		Adults	
	Male	Female	Male	Female
Part time	55.1	38.2	35.3	51.0
N	125	36	196	51
Monthly pay	50,980	29,875	64,642	51,098
Hours per day	8.7	7.1	9.1	8.1

The employee survey expands on these results, as shown in Table 57. Male workers report almost the same number of hours per day as are attributed to

Descriptions of Child Labour from the Study Samples

Table 57: Mean Employment and Benefits, Construction (numbers in parentheses)

	Children		Adults	
	Male	Female	Male	Female
Days per week	5.4 (95)	5.7 (31)	5.9 (87)	5.2 (22)
Hours per day	8.8 (94)	8.2 (32)	9.2 (87)	8.8 (21)
Value of meals	12,610 (11)	21,000 (3)	17,675 (4)	3,667 (3)
Value of transport	(0)	9,000 (1)	2,000 (1)	(0)
Value of education	29,000 (2)	26,333 (3)	(0)	(0)
Value of clothing	2,000 (1)	8,200 (1)	(0)	10,000 (1)
Value of housing	5,000 (3)	(0)	(0)	20,000 (1)
Value of medical	10,400 (3)	4,000 (1)	20,000 (1)	(0)
Value of training	12,833 (3)	(0)	(0)	(0)

them by their employers, but female workers say they work much longer than their employers do. Few workers of any age or sex receive supplementary benefits.

Rates of migration remain substantial, and the devastating effect of HIV/AIDS is apparent in the number of children who have lost their parents. Unlike fishing, it is clear that women's entry into the construction labour force is significantly conditioned on their relationship to employers. Approximately half of all female employees work in the company of other members of their household. Thus relatively few make their way to this industry on their own.

Table 58: Percent Reporting Selected Characteristics, Construction

	Children		Adults	
	Male	Female	Male	Female
Piece rate	43.6	6.5	38.9	8.7
Migrated	43.7	19.4	35.6	31.8
Orphan	41.7	40.6	1.1	9.1
Related to employer	26.3	43.8	21.1	45.4
Part time	45.8	37.5	34.1	50.0
Work with others from household	26.9	51.6	11.6	50.0

Turning to education, the most disturbing pattern that emerges from Table 59 is the large gap that has opened up between boys and girls in school

Table 59: Current Schooling Status, Percentages (Construction)

	Children		Adults	
	Male	Female	Male	Female
Never attended	13.7	29.0	26.1	27.3
Left school	61.1	29.0	65.9	59.1
Currently attending	23.2	41.9	8.0	13.6
On vacation	2.1			

Child labour wages and productivity: Results from demand-side surveys

attendance. This is only partially offset by the greater percentage of girls still in attendance. Part of this difference is explained by the difference in their mean ages, 15.4 for boys and 14.4 for girls. Indeed, girls are somewhat more likely to have achieved education stopping at the sixth year of primary school or before; after that the likelihood shifts to boys. (Table 60)

Table 60: Highest Schooling Level Attained by Those Who Have Attended, Percentages (Construction)

	Children		Adults	
	Male	Female	Male	Female
p1	1.3			
p2			1.5	
p3	5.2	5.0	3.1	
p4	7.8	10.0	6.2	
p5	16.9	20.0	10.8	7.1
p6	9.1	18.8	9.2	14.3
p7	22.1	5.0	30.8	35.7
s1	6.5	9.4	6.2	
s2	14.3		13.8	21.4
s3	5.2	5.0	6.2	14.3
s4	3.9	10.0	6.2	7.1
s5	1.3		1.5	
s6	3.9		3.1	
post primary training	1.3			
post secondary training	1.3		1.5	

Tables 61 and 62 compare employers' and workers' perceptions of how payment is structured. As with fishing, the employers' data are taken from the descriptions they provide of work arrangements according to the worker's first main activity. The employee survey implicitly assumes that one payment system prevails, whatever the range of an individual's tasks. Here again there is a general tendency for employers to ascribe piece rates in greater numbers than workers, although it is not so great as in fishing, and adult females are actually more likely to recognize piece rates than their employers.

Table 61: Mode of Payment in First Main Activity, Percentages (Construction)

	Children		Adults	
	Male	Female	Male	Female
Piece rate	70.7	64.7	77.2	56.9
Daily	9.8	14.7	7.8	19.6
Weekly	4.9		6.2	5.9
Monthly	14.6	20.6	8.8	17.6

Descriptions of Child Labour from the Study Samples

Table 62: Mode of Payment, Percentages (Construction)

	Children		Adults	
	Male	Female	Male	Female
Piece rate	60.4	40.6	72.7	63.6
Daily	12.5	34.4	10.2	13.6
Weekly	9.4	3.1	6.8	
Monthly	17.7	21.9	10.2	22.7

In Table 63 we find the division of labour by age and gender, and it is the latter which stands out. Adult women serve in only two tasks directly productive of construction outputs (in this case stone quarrying), otherwise being engaged in providing food. Nearly all girls are employed in stone crushing. Males of both ages, on the other hand, are distributed across many activities that contribute to stone and brick production.

Table 63: Main Activity by Age and Sex, Percentages (Construction)

	Children		Adults	
	Male	Female	Male	Female
Sand quarrying	11.5		6.6	
Food vending				16.7
Business			1.6	
Stone quarrying	15.4		34.4	50.0
Blocks			1.6	
Brick making	15.4	16.7	11.5	
Hard core			1.6	
Preparing aggregate	3.8		1.6	
Burning bricks			3.3	
Soil cutting			8.2	
Land scraping	3.8		3.3	
Molding	15.4		8.2	
Mixing soil	3.8		4.9	
Carpentry			1.6	
Carrying, offloading			3.3	
Stone crushing	23.1	83.3	4.9	33.3

The most striking result of Table 64, which divides main activities by their calculated hourly wage, is the poor earnings profile of the entire sector. The great majority of employees apparently receive less than 300 shillings per hour. (This estimate should be qualified by the assumption that all work 25 days per week. But even a somewhat smaller number of working days, and a correspondingly higher hourly wage, would not alter the profile fundamentally.) There is no

Child labour wages and productivity: Results from demand-side surveys

apparent division by age, and only a modest division by gender, to the advantage of males.

Employers are more likely to judge that children's work is of equal quality to adults' than they are to see their speed of work as equal. As we saw in the fishing sector, they claim not to see a difference in the quality of boys' work compared to girls', nor are they likely to admit to discriminating in their pay policies. The details can be found in Table 65.

Table 64: Percent in Activity Wage Classes by Age and Sex, Construction

Wage class	Children		Adults	
	Male (N=26)	Female (N=6)	Male (N=61)	Female (N=6)
0-299	65.4	83.3	75.4	100.0
300-499	19.2		8.2	
500-699	15.4	16.7	13.1	
700-899			3.3	
900+				

Table 65: Perceptions of Child Work, Percent Agreeing (Construction)

Children produce the same quantity as adults	41.5
Children produce the same quality as adults	62.3
Girls produce at a higher quality than boys	9.9
Boys produce at a higher quality than girls	6.6
I pay boys and girls the same	92.7
I pay children and adults the same	68.5

As Table 66 demonstrates, employers in this sector often cite economic motives for hiring children: they praise children's aptitude and claim that not enough adults are available for hire. At the same time, altruistic motives, such as helping the families of child workers, are also claimed.

Table 66: Percent Agreeing with Reason for Hiring Children (Construction)

Families including children need to be hired together	22.7
Children are hired to assist their families	65.1
It is customary to hire children for these tasks	18.7
Children have an aptitude for this work that adults lack	60.7
Employing children reduces industrial conflict	38.2
Children are more available than adults for short term or part time work	18.8
There are not enough adults in the local area to hire	56.5
There is less need to pay benefits and taxes when employing children	27.8
Employing children reduces the wage bill	19.6

The purpose of this study is to explore in a preliminary way the extent to which, in a variety of circumstance, demand-side factors play a role in the employment of child labour. To investigate this we will now try to isolate some of the determinants of enterprise profitability, particularly wages and productivity, and in some cases we will test directly whether the lower wages paid to children provide an inducement to employers. This chapter is rather technical in nature, since it presents detailed results from a series of data exercises. Readers who are not interested in this level of precision can skip ahead to the next chapter, where the results are summarized in non-technical language.

Before presenting the data analyses themselves, a few words are in order concerning the techniques employed. Nearly all of the models that follow are simple ordinary least squares regression. To the extent that the properties of the data sets are considered in greater depth, this takes the form of alternative estimation models, the construction of new variables, partitioning samples, etc. The decision to restrict the methodology to OLS was above all practical: the study encompasses eight sectors (or nine, if the two vehicle repair sectors in India are considered separately, which may well be justified), and there wasn't time to test a variety of procedures on each of them. Indeed, any could be the basis for extensive investigation using econometric techniques to compensate for problems concerning the properties of their distributions, relationships between variables, etc. In particular, it will be observed that most samples exhibit potentially important endogeneity issues (independent variables are not truly independent), and there would be much to be gained by exploring identification strategies. All of these possibilities are open to future researchers. The analyses presented here are exploratory and suggestive only. Having said that, the data are rich enough that even these simple methods are powerful enough to generate significant findings, as Chapter 7 will demonstrate.

GHANA

Chop Bars

The survey of child workers in this sector provides an opportunity to investigate some of the determinants of their wages. This is summarized in Table 1, which demonstrates that, net of the constant, little of the variance in wages can be explained. The dependent variable was calculated by adjusting reported monthly income by the number of hours worked; its natural log was taken according to the usual presumption that percentage rather than absolute changes in income are more relevant to labour market dynamics. All the independent variables with the exception of age are binary.

Sex discrimination is suggested by these results, but the coefficient falls well short of significance. Similarly, there is little return to greater age among the child workers. One variable of some note is whether the worker is related to the employer: such a connection is associated with greater earnings. Children could identify working in any or all of three tasks; while they are non-nested in principle, it was decided to allow one task, cleaning, to serve as a default. (All children identify at least one such task, so any who does not select dishwashing or serving does select cleaning.) Task assignment seems to play a noticeable role in wage-setting. Of course, it is possible that unmeasured characteristics of workers account for both task and wage. (Age is not significantly correlated with task, although sex is. Boys are more likely to be either or both dishwashers and servers.)

Table 1: Wage Regression, Chop Bars

Dependent variable: In hourly wage (t-statistics in parentheses)

N=98

Variable		
sex	-.114	(-.82)
age	.028	(1.10)
migrated to Accra	.025	(.20)
related to employer	.300**	(2.54)
task: dishwashing	.411***	(3.35)
task: serving	-.380**	(-2.54)
constant	5.669***	(17.08)
Adj. R2	.204	

Turning to the employer data set, we have detailed information on wages and (with error) productivity according to five major tasks. The first question we might want to ask is whether children's earnings are related to their perceived productivity. Table 2 indicates that in most instances they are, particularly in the tasks, dishwashing and cleaning, in which children are most likely to be engaged.

Table 2: Correlations Between Child Wages and Productivity by Task, Chop Bars

	Serving	Cooking	Helping Cook	Dishwashing	Cleaning
Correlation coefficient	.334	-.101	.546	.547	.551
Significance (two-tailed)	.053	.664	.003	.000	.000
N	34	21	27	73	68

Second, is the productivity of children relative to adults related to their relative earnings? As we can see from Table 3, answer is an unambiguous yes. This signifies that there is little tendency for children who contribute more to their employers' revenues to be denied a corresponding share (and vice versa of course). The number of observations varies from one correlation to the next because enterprises can be included only if they have provided wage and productivity information for both children and adults in the respective task.

Table 3: Correlations between Child-to-Adult Wage and Productivity Ratios by Task, Chop Bars

	Serving	Cooking	Helping Cook	Dishwashing	Cleaning
Correlation coefficient	.548	.401	.515	.357	.431
Significance (two-tailed)	.000	.000	.000	.035	.000
N	69	77	74	35	37

Even though differences across children and adults in productivity are reflected in wages, there still remains the question of whether children as a whole are remunerated in each task in proportion to their contributions. To assess this, we can subtract the productivity ratio from the wage ratio in each task and for each enterprise. Table 4 offers the means and standard deviations of this difference for each task.

Table 4: Child-to-Adult Wage Ratio Minus Child-to-Adult Productivity Ratio by Task, Chop Bars

	Serving	Cooking	Helping Cook	Dishwashing	Cleaning
Mean	-.029	-.001	-.173	-.245	-.228
Standard deviation	.387	.333	1.142	.980	.796
N	69	77	74	35	37

It is interesting that in each task the average productivity ratio exceeds the wage ratio, in three of them by a substantial amount-although there is great variation across enterprises. This provides prima facie evidence for a demand-side incentive to employ children. Regression models were tested on these differences-in-ratio within tasks, but none of them performed well enough to be

Child labour wages and productivity: Results from demand-side surveys

Table 5: Productivity Regression for Chop Bars
 Dependent variable: average number of meals served per day (t-statistics in parentheses)

Variable	(1)	(2)	(3)	(4)
Number of children	13.23*** (3.25)		50.04*** (5.42)	
Number of adults	4.00*** (8.73)		8.37* (1.79)	
Percent working full-time	145.9** (2.17)	50.70 (1.89)	190.2** (2.11)	92.55 (.87)
Effective child input	.106* (1.60***)		.181** (1.80)	
Effective adult input	.160*** (1.33)	(8.44)	.082* (1.80)	
Number of gas cookers	38.80 (1.05)	13.40 (.48)	-13.06 (-.35)	24.29 (.62)
Number of refrigerators	27.37 (2.87)	11.16 (.45)	-6.231 (-.19)	-7.577 (-.22)
Number of ovens	94.68*** (2.87)	119.9*** (3.76)	21.65 (.47)	76.32 (1.47)
Number of blenders	-21.03 (-.947)	-59.39*** (-2.73)	-8.096 (-.30)	-37.97 (-1.28)
Number of coal pots	-19.58 (-.821)	-41.34* (-1.76)	-89.76*** (-2.83)	-79.18** (-2.35)
Constant	-93.83 (-1.46)	27.16 (.47)	-101.6 (-1.07)	42.21 (.43)
Adj. R2	.595	.442		
N	100	57	57	

Table 6: Regression on Child Employment in Chop Bars

Dependent Variable: Number of Children Employed (t-statistics in parentheses)

Variable	(1)		(2)	
Clients per day	.004***	(3.05)	.007***	(5.28)
Percent working full-time	-4.180***	(-4.11)	-1.112	(-1.15)
Relative child wage	-.435	(-.86)	-1.422**	(-2.47)
Relative child productivity	-.103	(-.67)	-.027	(-.18)
Children hired to help their families	-.869*	(-1.95)	-1.316***	(-3.22)
Advantageous to hire children	1.216**	(2.05)	.303	(.43)
Constant	5.226***	(5.98)	3.923***	(3.31)
Adj. R2	.337	.510		
N	72	57		

reported here. In other words, the data are not sufficient to single out characteristics of firms most likely to benefit from low relative child earnings and high relative productivity.

To better understand child versus adult productivity, regressions were performed on the variable that best captures output, the number of clients served per day. (These restaurants have very limited menus, and most of the dishes are meat or fish stews.) Table 5 reports four of them, consisting of two models employed on two data sets. (1) and (3) use the number of children and adults as measures of labour input; (2) and (4) use the number of each age group times the average reported productivity. (These are weighted averages, where the weights are determined by the percentages of each enterprise's child and adult workforce classified as performing particular tasks.) (1) and (2) are implemented on the full set of enterprises, (3) and (4) on those for which all labour input variables are positive.

As can be seen in Table 5, children appear to be far more productive than adults, especially in restaurants that employ them. This effect is muted when the input is adjusted for productivity, as we would expect. Still, the results have to be viewed as anomalous. At the least, we can say that the evidence points away from the supposition that adults are substantially more productive than children.

Finally, in order to assess the factors the lead employers to take on children, a regression model was applied to the number of child workers in each enterprise. These are summarized in Table 6, where (1) uses the larger sample from the productivity regressions and (2) uses the smaller sample. Thus (2) can be viewed as uncovering factors that are associated with the employment of multiple children. Obviously, firms that serve more meals employ more children. It is interesting that greater prevalence of part-time work appears to be related to more employment of children. This might simply reflect a higher percentage of children who work part-time, although we do not have the data to test this. It may also signal a type of enterprise which relies on more flexible labour input and which is therefore more disposed to hiring children. Higher child wages do little

Child labour wages and productivity: Results from demand-side surveys

to discourage the first child from being employed but seem to discourage the second or third. It is interesting that perceived productivity of children is unrelated to their employment, but there is support for the view that employer motives are relevant: employers who think that the main reason to employ children is to help their families are least likely to do so, while those who see personal advantage in it are more likely to take on at least one child.

Taken together, all of this evidence points toward significant demand-side pressure in chop bar child labour. The gap between child and adult wages appears to exceed the gap between their productivities, and more self-interested employers are most likely to employ children.

Fishing

Neither the wage nor productivity data are as rich in this sector as they are in chop bars. In particular, it is not possible to conduct a wage regression, since we do not know the wages of children performing various tasks. Nevertheless, it is possible to examine some of the same issues we did in chop bars. Table 7 reports two productivity regressions, the first using revenue and second value added as the dependent variable. As before, children appear to be vastly more productive than adults, a dubious outcome. Perhaps, as we speculated for chop bars, it is the productive enterprises that take on children, thus reversing the normally assumed causation in such studies.

Table 7: Productivity Regression, Fishing Sector

		T-statistics in parentheses	
		N=100	
Variable	(1)	(2)	
Dependent variable	Revenue per week	Value added per week	
Number of children	2.4x107** (2.60)	2.4x107*** (2.62)	
Number of adults	3.1x106 (.47)	2.6x106 (.39)	
Percentage working full-time	-2.5x108* (1.97)	-2.6x108** (2.02)	
Number of canoes	9.6x106 (1.12)	9.2x106 (1.07)	
Number of nets	3.0x106 (.93)	2.3x106 (.72)	
Number of stoves	3.0x107* (1.72)	2.9x107 (1.62)	
Number of outboard motors	-8.2x105 (.05)	-3.9x106 (-.22)	
Number of lights	-8.6x106 (-.96)	-7.7x106 (-.86)	
Constant	1.1x108 (1.02)	1.1x108 (1.00)	
Adj. R2	.345	.308	

Table 8 provides the results of a regression on the number of child workers employed. It is interesting to compare the coefficients on the number of adults and revenue per week. Both are measures of enterprise size, but only the second of these is significantly positive. A plausible interpretation is that the

coefficient on adult workers is picking up two offsetting effects, a positive effect from size and negative one due to the possibility of substitution between children and adults. If so, this would reinforce the impression that children are active contributors to output in fishing and are not simply “along for the ride”. Finally, note that the wage gap between children and adults does not appear to play a role in employers’ hiring decisions; indeed, as we saw in the descriptive section, the gap is not particularly large overall. As for equipment, the decisive role is played by the number of canoes and motors.

Table 8: Regression on the Number of Children Employed, Fishing Sector

Dependent variable: Number of children employed (t-statistics in parentheses)
N=100

Variable		
Number of adults	.044	(.59)
Percentage working full-time	-3.387**	(-2.30)
Child to adult wage ratio	.362	(.40)
Revenue per week	2.8x10 ⁻⁹ **	(2.47)
Number of canoes	.297***	(3.25)
Number of nets	.048	(1.32)
Number of stoves	.171	(.83)
Number of outboard motors	.464**	(2.47)
Number of lights	-.161	(-1.62)
Constant	4.921**	(2.15)
Adj. R2	.548	

The general impression emerging from these analyses is that children are productive contributors on fishing boats, and their relative pay is not sufficiently below their relative productivity to provide an extra spur to employers. Thus, children play an important role in largely the same way adults do, as individuals prepared to take on the rigors of this challenging industry. There is indirect evidence that children take roles that would otherwise be assumed by adults.

PHILIPPINES

Pyrotechnics

The Philippine data are rich in detail, but they are unusual in coverage. There is only partial information on production, for instance; as will become apparent, subjective measures are more comprehensive than objective ones when it comes to worker output. Some candidate analyses did not prove feasible. Numerous models were tested to determine if child-intensive production contributes to the likelihood of rejected orders, but none displayed sufficient explanatory power. Conventional wage regressions were ruled out by the use of piece rates. Never-

Child labour wages and productivity: Results from demand-side surveys

theless, two approaches yielded interesting results, and they will be reported here.

First, regressions were performed in which the dependent variable was the ratio of hours devoted to folding fivestar to total paid hours. The hypothesis is that this can be an indirect way to get at relative child productivity. If, controlling for other relevant factors, we find that having more children engaged in folding results in a higher share of folding hours overall, this could indicate that children were slower at this task. That might not translate directly into lower profitability, since under a piece rate system it is output rather than time that employers pay for, but it could have indirect effects through the ability to fulfil orders promptly. Folding was selected over other tasks because it commands the largest share of child labour.

The results of three such models are reported in Table 9. Controls were employed to account for the share of fivestar in the enterprise's product line (Sawa is a competing product), the scale of output, and the economic vitality of the enterprise. In each case it is clear that greater employment of children in folding is associated with less relative time spent folding, and the impact is substantial. If the controls capture all other relevant factors-which, of course, they don't-this would be conclusive evidence against the hypothesis that children are slower at folding than adults. Indeed, it would be the reverse, and this finding would corroborate the impression of employers, documented in the previous chapter, that children are indeed faster at this task. Added to the lower piece rate received by children, the conclusion would have to be that, in the absence of any reason to suppose the quality of their work is lower, child workers are generating lower unit labour costs (direct and indirect) for their employers.

Table 9: Regression on Folding Hours, Pyrotechnics

Dependent Variable: Ratio of folding hours to total hours (t-statistics in parentheses)

N=84

Variable	(1)	(2)	(3)
Ratio, child folding hours to total folding hours	-.355*** (-4.00)	-.329*** (-3.65)	-.373*** (-4.21)
Fireworks is the primary source of income for employer's household	.134** (2.50)	.125** (2.33)	.130** (2.45)
Pieces of fivestar produced for order in December 2003	.000** (-2.24)	.000** (-2.41)	.000** (-2.03)
Sawa is a primary product	.096*** (2.84)	.097*** (2.88)	.081** (2.34)
Received loan within last 12 months		.055 (1.44)	
November is a peak month		.053 (1.62)	
Constant	.289*** (5.21)	.250*** (4.06)	.272*** (4.87)
Adj. R2	.227	.238	.243

The second approach was to run a (partial) "reverse regression", examining the effect of the prominence of folding among an enterprise's activities on

the extent to which they employ children to do this. Here, however, the relative piece rates of adults and children can be brought in, since this is a plausible explanatory factor for child employment as well. Two models are summarized in Table 10. The first includes only “objective” measures; the second includes the subjective explanations given by employers for their decision to hire children.

Table 10: Regression on Child Labour in Folding, Pyrotechnics

Dependent variable: Ratio of child hours to total hours at folding (t-statistics in parentheses)
N=52

Variable	(1)		(2)	
Ratio, child to adult piece rate in folding	.083*	(1.74)	.057	(1.17)
Children’s speed at folding	-.020	(-1.11)	-.028	(-1.49)
Ratio, folding to total hours	-.283***	(-2.86)	-.273***	(-2.75)
Fireworks is primary source of income for employer’s household	.078	(1.57)	.080	(1.55)
Sawa is a primary product	.098***	(3.06)	.086**	(2.59)
Children hired because they are productive			-.029	(-1.35)
Children hired because they are available			-.020	(-1.27)
Children hired because they are obedient			.020	(1.26)
Constant	.252***	(3.93)	.344***	(2.81)
Adj. R2	.216		.234	

As before, the strong negative relationship persists between the importance of folding relative to other activities and the role of children relative to adults. Of considerable interest, however, are the coefficients on the ratio of child to adult piece rates. We see weak evidence that cost may play a role in employment decisions, although the magnitude should be put in context. For instance, a sizeable standard deviation in the child-to-adult piece rate ratio (.357) would account for a shift in the child employment share of only 2-3% based on these two regressions, setting aside the confidence placed in the coefficients. In conclusion, despite the rather strong evidence that employing children cuts production costs, there is weak evidence that employers take this into account.

Fashion Accessories

The data in this sector were less productive than in pyrotechnics, because they encompassed a smaller share of the productive activities carried on by the enterprises. In pyrotechnics there is one dominant product, fivestar, and just a few activities with one, folding, commanding the bulk of child labour. In fashion accessories there is a wide range of products requiring many activities. We have data on just two of these, stringing beads onto wire and transferring them onto nylon thread. Thus the relationship between productivity, wages and employment in stringing and transferring will be obscured by the inability to incorpo-

Child labour wages and productivity: Results from demand-side surveys

Table 11: Regression on Child Labour in Stringing, Fashion Accessories

Dependent variable: Ratio, child to total hours in stringing (t-statistics in parentheses)

N=99

Variable		
Ratio, child to adult piece rate in stringing	.169***	(3.72)
Pieces of necklace produced to fill orders, Dec. 2003	-2.10x10 ⁻⁶	(-1.64)
Received a loan within last 12 months	-.055**	(2.25)
Children stringing beads are supervised by an adult	.055*	(1.80)
Children are hired because they are inexpensive	.007**	(2.09)
Children are hired because they are productive	.008***	(2.90)
Children are hired because they need work	.002	(1.36)
Constant	-.090	(-1.34)
Adj. R2	.193	

Table 12: Regression on Relative Earnings in Stringing, Fashion Accessories

Dependent variable: Ratio, child to adult piece rate in stringing (t-statistics in parentheses)

N=100

Variable		
Ratio, perceived child to adult speed at stringing	.124***	(3.08)
Ratio, child to total hours at stringing	.495**	(2.37)
Children stringing beads are supervised by an adult	-.109	(-1.57)
Children are hired because they are productive	-.015**	(-2.49)
Children are hired because they need work	-.006	(-1.65)
Constant	.951***	(8.22)
Adj. R2	.164	

rate information about other products and activities that are part of the same work environment.

Nevertheless, partially successful regressions were run on wages and employment in stringing beads. The first, which looks at the factors that are associated with relatively greater use of child labour in this activity, is summarized in Table 11.

If a principal attraction of children were their lower piece rates, we would expect to see a negative relationship between this variable and their relative employment, but the opposite appears to hold. Workshops that rely most on children to string beads also pay them more in comparison to adults. Note that, while the coefficient on the employer's ranking of inexpensiveness as a reason for hiring children is significant, it contributes little to the overall employment ratio. (The mean value of this explanatory variable is about .9.) Judgments about these variables should be qualified by the observation that the model does not explain much of the variation in employment.

The reverse approach is to examine the determinants of the piece rate ratio, one of which is employment. This is displayed in Table 12.

Again we find that the model is weak in its explanatory power, and this casts a shadow over the individual coefficients, whatever their p-value. Within these limitations, the most important finding is that relative productivity is related to relative earnings in a predictable manner. (Once more it is assumed that speed of work should have an impact on enterprise profitability.) The relation is about one-to-eight, however: it would take an eight-point difference in the productivity ratio to give rise to a one-point difference in the piece rate ratio. Whether this reflects the muted effect of speed on revenues is an empirical matter for which the data are not sufficient.

Ecological Variables

One aspect of the two Philippine surveys deserves special mention: a set of questions was asked twice with identical wording, the first time concerning the importance of children's attributes in the employer's own decision to hire them, the second concerning the importance other employers were thought to give to them. They therefore provide a test of the effectiveness of the ecological approach to asking sensitive questions, an important issue in the methodology envisioned in this research. Table 13 provides correlation coefficients and significance levels between the "self" and "other" forms of each question.

Table 13: Correlations between self and other motives for hiring child labour (two-tailed significance levels in parentheses)

Motive	Pyrotechnics		Fashion accessories	
they are paid a lower piece rate	–		.253	(.011)
they work faster	.533	(.000)	.586	(.000)
they do better quality work	.454	(.000)	.751	(.000)
they have more nimble fingers	.700	(.000)	.637	(.000)
they provide incentive for adults to improve productivity	.482	(.000)	.662	(.000)
they work better as a team with adults	.537	(.000)	.626	(.000)
they are more creative	.431	(.000)	.624	(.000)
they have more initiative	.653	(.000)	.734	(.000)
they have sharper eyes	.344	(.000)	.278	(.005)
they have more energy	.210	(.037)	.620	(.000)
they have no vices	.407	(.000)	.617	(.000)
they have no obligatory household work	.566	(.000)	.695	(.000)
they are more obedient	.296	(.003)	.430	(.000)
they learn fast and are more teachable	.213	(.034)	.550	(.000)
they accept work that adults reject	.166	(.100)	.442	(.000)
they are easier to monitor and supervise	.332	(.001)	.487	(.000)
they are more available when out of school	.471	(.000)	.490	(.000)

Child labour wages and productivity: Results from demand-side surveys

Table 13: (cont.)

Motive	Pyrotechnics		Fashion accessories	
they are faster to respond to work when need arises	.412	(.000)	.302	(.002)
they are more abundant than adults	.473	(.000)	.543	(.000)
they are more loyal or will serve longer	.460	(.000)	.342	(.000)
they are apprentices and will continue in the trade in the future	.095	(.351)	.151	(.133)
they don't create problems by forming unions	.840	(.000)	.586	(.000)
they are less likely to organize against the employer	.428	(.000)	.398	(.000)
they are more dependable than adults	.521	(.000)	.226	(.023)
they help their families	.519	(.000)	.721	(.000)
there is less need to pay taxes and benefits	.493	(.000)	.318	(.001)

It is striking how close a correspondence there is between these two essentially subjective responses. Employers are attributing to others the attitude they describe themselves as possessing. In most cases these correlations would be strong enough to justify the use of the ecological form of the variable (the motives of others) in individual-level analysis if there were some impediment to using self-observations. Of course, the sample means are nearly identical, so the use of ecological variables, on this evidence, is unproblematic for descriptive purposes. Further analysis could illuminate the few exceptions to the pattern of high correlation, such as the apprenticeship question for both sectors.

INDIA

Vehicle Repair

As we observed in the section on description, Delhi and Patna provide very different contexts for the study of child labour wages and productivity. Thus it will simplify our analysis to consider them separately.

Delhi

Table 14 summarizes two regressions on the natural log of daily wages. They use different methods to differentiate between the age of the worker and the content of his work. In regression 1 a dummy variable is introduced to identify the effect of being classified as a helper; in 2 this role is taken by a variable which is valued at 1 if the worker performs tasks characteristic of children and 0 otherwise. While neither is statistically significant, they both have the expected signs and are of non-negligible magnitude. Meanwhile, as we saw in the descriptive section, trainee status is associated with substantially lower wages for both children and adults, and this justifies its inclusion. It is interacted with age to capture the quite different effects traineeship has on adults compared to children.

Table 14: Wage Regressions in India Auto Repair, Delhi
 Dependent variable: Ln of daily wages (t-statistics in parentheses)
 N=523

Variable	(1)		(2)	
Worker is a child	-.926***	(-25.42)	-.929***	(-25.51)
Worker is paid monthly	.045	(1.02)	.042	(.95)
Revenue per week	5.65x10-6*	(1.93)	5.93x10-6**	(2.01)
Revenue squared	-3.35x10-11	(-1.01)	-3.71x10-11	(-1.12)
Worker receives non-wage benefit	-.201	(-1.13)	-.198	(-1.11)
Value of assets	-1.04x10-6***	(-2.73)	-1.02x10-6***	(-2.67)
Worker is an adult trainee	-1.405***	(-7.82)	-1.404***	(-7.82)
Worker is a child trainee	-.437***	(-5.40)	-.439***	(-5.43)
Worker is a helper	-.025	(-.76)		
Does work of child			-.035	(-1.11)
Constant	4.539***	(74.27)	4.549***	(73.11)
Adj. R2	.644		.644	

The two models perform well in explaining the variance in wages, and most of the coefficients have the expected signs. Being paid on a monthly basis in India is associated with “regular” employment; it marks the worker as having a more secure position in the enterprise. The wage-establishment size effect, captured by the coefficient on revenue per week, appears here as it does in most labour market contexts around the world. There is weak evidence for compensating wage differentials-lower wages to offset the payment of non-wage benefits. The only anomaly is the significantly negative sign on the level of capitalization of the worker’s enterprise. Its measured effect on wages is substantial, recalling that the average asset valuation in this sector is somewhat over 40,000 rupees. It may be the case that more expensive equipment is employed to reduce the need for worker skill, but the data available in this study are not sufficient to test this hypothesis.

Turning to the variable of greatest interest, when other factors are controlled, being a child, but not a trainee, results in a 60% reduction in earnings from the adult non-trainee level. The reduction is even greater for child and adult trainees, although the regression models over predict this effect in light of the near-equality of child and adult trainee wages observed in the descriptive section. Since most children are not trainees, it is reasonable to use the 60% figure as our benchmark for subsequent analysis.

One analytical issue can be disposed of briefly. Does the inclusion of dummy variables for being paid monthly, receiving non-wage benefits, being a helper or doing the work of a child result in a diffusion of the differentials associated with age? This would be the case if these variables were significantly correlated with age status. For instance, if being a helper were highly correlated with being a child, a portion of the wage-diminishing effect of helper status

Child labour wages and productivity: Results from demand-side surveys

might properly be attributed to being a child. (Designation as helper would be another channel by which age differentials made themselves felt.) In fact, however, none is significantly correlated with whether the worker is a child, so this concern can be set aside.

The evidence on relative productivity is presented in Table 15.

The first four regressions provide alternative estimations of a Cobb-Douglas production function of the general form

$$Q = \alpha x_1^{\beta_1} x_2^{\beta_2} x_3^{\beta_3} + \epsilon$$

where Q is a measure of output, x_1 , x_2 and x_3 are inputs into production, α is a scaling parameter, and the β 's represent the elasticity of substitution of the inputs. By taking the natural log of both sides of this equation, the form is rendered linear (estimable by OLS), and the regression coefficients estimate α and the elasticities. The first two equations employ revenue as the metric for output; the second two employ value added. The odd-numbered equations use child and adult hours as labour inputs, while the even-numbered use the hours of those designated as helpers and non-helpers. In both cases a measure of the enterprise's capitalization is also used as an input.

None of these models performs particularly well, although those that distinguish labour according to task perform better than those that distinguish according to age. In all cases the more valuable labour (adult or non-helper) accounts for nearly all the labour productivity, whereas the less valuable labour's contribution is not significantly different from zero. Ironically, as we have just seen, whether or not a worker is a helper seems to play a small role in how much he is paid.

The disadvantage with Cobb-Douglas formulations is that they can be estimated only for enterprises possessing all of the inputs, since output is their weighted product. This explains why there are fewer observations in regressions 1-4 than in 5-8. A corollary is that ever finer differentiations among the inputs will exclude ever more observations from the sample. For this reason regressions 5-8 move to a simple linear, rather than a log-linear, structure. The same pair of output measures are employed, but the number of workers is used rather than the number of hours, and an alternative specification takes advantage of a four-way differentiation between children and adults along one dimension and helpers and non-helpers along another.

Once again, none of the models explains much of the variance in output, although the four-way differentiation of labour appears to be superior. Focusing on regressions 6 and 8, we find a minimal contribution from helping labour, whether on the part of adults or children. Surprisingly, however, the relatively few children in a non-helping capacity appear to be twice as productive as their adult counterparts—a conclusion tempered by the lower level of significance attached to the coefficients on child non-helping labour hours. A possible interpretation is that enterprises whose volume of orders strains their capacity will shift children into more productive tasks, and that these will also be the enterprises that get the most productive output from all their resources. If so, to a con-

Table 15: Productivity Regressions in India Vehicle Repair, Delhi
(t-statistics in parentheses)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable	In revenue	In revenue	In value added	In value added	revenue	revenue	value added	value added
In adult hours	.256** (2.40)		.260** (2.23)					
In child hours	.038 (.24)		.098 (.57)					
In assets	.311*** (5.09)	.308*** (5.91)	.303*** (4.54)	.293*** (5.14)				
In non-helper hours		.268*** (2.79)		.259** (2.47)				
In helper hours		-.001 (-.01)		.045 (.37)				
number of adults					3711*** (3.66)		3072*** (3.17)	
number of children					2187 (1.23)		2326 (1.37)	
assets					.106*** (4.34)	.088*** (3.65)	.092*** (3.94)	.075*** (3.27)
adult helper hours						-4.847 (-.47)		-2.984 (-.30)
adult non-helper hours						23.34*** (5.12)		20.08*** (4.59)
child helper hours						7.711 (.92)		9.920 (1.24)
child non-helper hours						43.56 (1.45)		48.01* (1.66)
constant	4.911*** (4.36)	5.083*** (5.47)	4.507*** (3.70)	4.912*** (4.85)	7132** (2.10)	6613*** (2.22)	6450** (1.99)	5398* (1.89)
Adj. R2	.212	.268	.180	.216	.208	.267	.172	.229
N	138	150	138	150	164	165	164	165

Child labour wages and productivity: Results from demand-side surveys

siderable extent the “child non-helper” variable is a proxy for other unmeasured differences between employers. On the other hand, the coefficient on child helper hours is also greater than that on adult helper hours (which is negative) for both output measures. While these coefficients are mostly insignificant, or just significant in the case of child helper hours for value added, an F-test demonstrates that the child coefficients are significantly different in both equations from the adult ones (p 's of .09 and .005). Again, it may be the case that shops with insufficient work orders may shift adults to helping tasks.

Overall, it is clear from both data sets that two related factors play a role in both wage determination and productivity in this sector, the worker's age and task responsibility. Children are paid substantially less than adults, even controlling for other factors, including the content of their work. Trainees are paid less than those not so designated. On the production side, the “helper” category (more inclusive than trainee) is associated with lower contribution for both child and adult, and the impact of being a child per se is uncertain. Putting these two together, it appears that children's lower wage, whatever their task status, is not explained by commensurately lower output. This judgment is somewhat cloudier among those whose role is helping, however.

Patna

Table 16 summarizes two wage regressions for auto repair workers in the Patna district. Both perform well in explaining the variance in wages, but they represent different approaches to isolating the child/adult wage differential. In the first, several variables are used that embody alternative reasons for wage differences in order to avoid the possibility that the “worker is a child” variable will pick up other influences. The result is a relatively low coefficient on being a child which translates into an 18% wage differential when adjustment is made for the binary form of this variable. However, as Table 17 demonstrates, three of the explanatory variables are themselves highly correlated with being a child. Consider, for instance, the “worker is a helper” variable. It has a powerful effect on wages; its coefficient is almost five times that of “worker is a child” in regression 1. On the other hand, these two variables are rather tightly correlated. Thus two polar interpretations are possible. It may be that it is helper status, rather than age status, that truly plays the major role in determining wage outcomes, and that it is important to include the helper variable in order to eliminate spurious explanatory power from the child variable. On the other, perhaps the differential assignment of children to helper status is one component of their overall differential treatment, and introducing it as an alternate source of explanatory power is misleading. This leads to the second regression, in which only the adult effects of helper, payment and task statuses are incorporated. As expected, the coefficient on the child dummy is much larger, corresponding to a 66% wage differential.

Without knowing much more about the workings of these shops-how decisions are made about what status workers will be given, what tasks they are

Table 16: Wage Regression in India Vehicle Repair, Patna

Dependent variable: ln of daily wages (t-statistics in parentheses)
N=497

Variable	(1)	(2)
Worker is a child	-.203*** (-3.93)	-1.067*** (-12.79)
Worker is paid on a share basis	.471*** (9.88)	
Worker is adult paid on share basis		.461*** (6.09)
Worker is a child paid on a share basis		1.229*** (11.68)
Revenue per week	3.95x10 ⁻⁵ ** (2.43)	6.16x10 ⁻⁵ *** (2.83)
Revenue per week squared	-8.22x10 ⁻¹⁰ (-.97)	-1.96x10 ⁻⁹ * (-1.74)
Years in existence	.004* (1.89)	.004 (1.38)
Worker receives non-wage benefit	.023 (.64)	-.017 (-.345)
Value of assets	-3.47x10 ⁻⁸ * (-1.67)	-4.19x10 ⁻⁸
Worker is an adult trainee	.212 (1.10)	.043 (.166)
Worker is a helper	-1.029*** (-22.72)	
Worker is an adult helper		-.829*** (-7.07)
Does work of child	-.053 (-.91)	
Worker is an adult doing work of child		-.039 (-.501)
Constant	3.975*** (43.79)	3.940*** (31.32)
Adj. R2	.789	.625

Table 17: Selected Correlations in Patna Vehicle Repair Data

	Worker is a child
Worker does child's work	.526***
Worker is a helper	.614***
Worker is paid on a share basis	-.353***

asked to perform, and how payment methods are chosen—it is difficult to choose between these two measures of age/payment differential. They can stand for now as end points along a spectrum.

When we turn to productivity, the evidence assembled in Table 18 paints a picture in which children are hardly beneficial at all to their employers, and may even be a burden. All coefficients on child labour input are negative, sometimes significantly. However, none of the models explains more than a third of the variation in either revenue or value added, so this result must be regarded as tentative. Nevertheless, on the basis of this evidence, it is difficult to say that the child labour wage differential, so strongly documented in Table 16, justifies the conclusion that employment of children is profitable in this sector.

Table 18: Productivity Regressions in India Vehicle Repair, Patna

(t-statistics in parentheses)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable	In revenue	In revenue	In value added	In value added	revenue	value added	revenue	value added
In child hours	-.182* (-1.95)		-.149 (-1.42)					
In adult hours	.268*** (3.25)		-.242*** (2.60)					
In assets	.120*** (3.71)	.152*** (5.08)	.071* (7.93)	.099*** (2.83)				
In helper hours		-.128 (-1.54)		-.148 (-1.54)				
In non-helper hours		.326*** (3.99)		.301*** (3.18)				
child hours					-3.064** (-2.27)	-1.466 (-1.15)		
adult helper hours					1.642 (1.19)	1.389 (1.07)		
adult non-helper hours					4.305*** (5.02)	2.737*** (3.38)		
assets					.001*** (3.31)	.001* (1.78)	.001*** (2.96)	.001 (1.58)
number of children							-117.8 (-.34)	-36.05 (-1.05)
number of adults							1293*** (7.35)	723.0*** (4.12)
Constant	6.405*** (11.47)	5.598*** (9.66)	6.578*** (10.46)	6.098*** (9.08)	2779*** (4.66)	2102*** (3.73)	1065 (1.55)	1390*** (2.02)
Adj. R2	.245	.309	.111	.154	.251	.105	.350	.130
N	126	131	126	131	150	150	150	150

Zardosi

As we saw in the descriptive section, adults receive nearly six (5.9) times the monthly wages of children. We observed that their hours per month were higher on average (26.4%) and that payment was also related to the tasks different workers performed. Here our purpose is two-fold, to determine the extent of the “pure” difference in pay attributable solely to the worker’s status as adult or child, and to examine the relative contributions of adults and children to the enterprise’s productivity.

We begin with the wage regressions reported in Table 19, where the unit of analysis is the individual worker, but in which certain characteristics of the employer have also been incorporated. Two different measures of the enterprise’s output are tested, revenue and value added (revenue minus operating but not labour costs). As can be seen, they perform almost identically. The default task is Ari; that is, any task coefficient indicates the extent to which pay would be raised or lowered relative to the worker whose only task was preparing the sewing borders. Overall explanatory power is very high, and all the variables have signs in the appropriate direction.

Since the dependent variable is the natural log of wages, coefficients should be interpreted as altering the percentage rather than the absolute value of wages. Adjusting for the fact that the child variable is binary, the estimated impact of being a child is to lower the wage by 79% from what would otherwise be the adult level, controlling for the other factors in these models. Indeed, the unadjusted average child wage (76.8 rupees) represents a reduction of 83% from the unadjusted average adult wage (452.5). Hence the regression models attribute only about 5% of the wage differential to the combined effect of enterprise and task characteristics.

Of course, a worker’s productivity depends not only on the tasks performed and the productive environment of the workshop, but also his (or her) individual proficiency. One aspect of proficiency is experience; as we observed in the section on description, lack of experience is the primary justification for the lower wages of children given by their adult co-workers. Unfortunately, it was not possible to include work experience in the wage regression, since these data are available for only a subset of workers, those who responded to the worker questionnaire. To examine other aspects of proficiency we must turn to productivity analysis.

Productivity is not well represented by physical measures of output in zardosi production because different garments will use a variety of patterns and materials and capture a wide range of prices. Instead, we consider two economic measures of output, total revenue and value added, where value added is defined as total revenue minus all operating expenses other than labour. Standard production function analysis is not applicable to this data set, since a large percentage of the workplaces have no child workers; thus the functional form must be additive. Moreover, hours of labour perform far less successfully than number of workers as the metric for labour input. Thus we have the four regressions sum-

Child labour wages and productivity: Results from demand-side surveys

Table 19: Wage Regression in the Zardosi Sector

Dependent variable: ln of wages (t-statistics in parentheses)

N=711

Variable	(1)		(2)	
Enterprise existence (years)	.001	(.47)	.001	(.67)
Value of capital	-3.86*10-6	(-1.48)	-3.00*10-6	(-1.16)
Monthly revenue	3.11*10-6 **	(2.45)		
Monthly value added			2.22*10-6	(1.61)
Task: sewing fabric	.050 **	(2.06)	.043 *	(1.80)
Task: tracing	-.064 **	(-2.35)	-.067 **	(-2.48)
Task: threading	.032	(1.13)	-.034	(1.20)
Task: sewing ornaments	-.043	(-.99)	-.047	(-1.09)
Task: zari	.179 ***	(5.40)	.183 ***	(5.51)
Task: zardosi	.157 ***	(4.90)	.156 ***	(4.84)
Is the worker a child?	-1.544 ***	(-41.33)	-1.548 ***	(-41.35)
Constant	3.955	(54.44)	3.979	(55.15)
Adj R2	.897	.897		

* = significant at .10 ** = significant at .05 *** = significant at .01

marized in Table 20. Columns 2 and 3 use revenue as the dependent variable; columns 4 and 5 use value added. Columns 2 and 4 use the number of child workers as the measure of child labour input; columns 3 and 5 use binary variables for enterprises with one, two or more than two child workers. This latter approach permits the coefficient on children's input to vary with the number of children employed.

Typical indicators of significance have little meaning in this context. Output in the labour-intensive sector is strongly responsive to the number of employees in the workshop; thus R2 should be relatively high. The reported significance of individual labour input coefficients is also misleading: what matters is not whether they are different from zero, but how large they are relative to one another. On the other hand, it is reassuring that the signs are all in the predicted direction. (Other variables, such as the number of years the enterprise has been in existence, were tested but found to have little explanatory value.)

That said, the results of regressions 1 and 3 are not credible. Even if we assume that the measured returns to children may be channelled through increased performance of adults, it is not possible that there should be so much more output resulting from an additional child's employment compared to an additional adult's. (To check this potential channel, an interaction term between child and adult employment was tested but found to be insignificant.) Yet even the coefficients in 2 and 4 likely underestimate the true productive difference between children and adults. Regression 2 implies that the average adult worker is 56% more productive than the first child employed and 34% more than the second. The corresponding figures for regression 4 are 123% and 28%. Given

Table 20: Productivity Regression in the Zardosi Sector

Dependent variable: total revenue (2 and 3), value added (4 and 5) (t-statistics in parentheses)

N=160

Variable	(1)	(2)	(3)	(4)
Value of capital	.260**	.248 **	.203**	.187*
Number of adult workers	2859***	2872 ***	2485***	2460***
Number of child workers	4088***	3171 ***	(6.15)	(9.56)
Enterprise has one child	1836 *	(1.86)	1103	(1.20)
Enterprise has two children	3986 ***	(6.66)	3025***	(5.43)
Enterprise has more than two children	4157 ***	(4.83)	3377***	(4.22)
Constant	-689	651	-1017	281
Adjusted R2	.575	.590	(.46)	(-.84)
		.534		

Child labour wages and productivity: Results from demand-side surveys

the very large difference in wages (either unadjusted or controlled for other factors), it is unlikely that the productivity difference could be so small. In addition, it is unlikely that the second child employed would have substantially greater value to the enterprise relative to adults than the first.

One possibility is that the difference in coefficients between the one-child and two-child dummies reflects an overall increasing returns to scale in the sector as a whole. To test this, models were estimated with squared terms for labour inputs. As expected, these additional coefficients were positive, but they were not significant, nor did they alter the unrealistic relative productivities of the first child and adult employed. Thus we are uncertain regarding comparisons between the contributions of children and adults to output. It is probable that the adult productivity advantage falls short of the wage differential, but perhaps by less than Table 20 may indicate. Thus we can accept the hypothesis that demand-side incentives, as we have defined them in this study, exist in this sector, even though the evidence probably overstates its magnitude.

UGANDA

Fishing

As was demonstrated in the previous chapter, while the definition of “child labour” in the Uganda survey does not correspond precisely to ILO definitions, it has a noticeable sociological content. Workers under the age of 18 display different characteristics from those 18 and above, and it is interesting to investigate the extent to which these differences survive an analysis that controls for other relevant factors. Additionally, we found that males and females have noticeably different outcomes in both sectors, and this too deserves a more careful look. Here we report the results of regressions probing the pay and employment characteristics of fishing in Uganda.

We begin with pay. Table 21 reports two models used to predict the payment reported by employers for the main activity of the worker throughout the sample. The unit of analysis is therefore the individual worker, and the pay period in question is 30 days. Equation 1 includes demographic data pertaining to the worker, information on whether the worker is part time, hours per day allocated to the worker’s primary activity and which activity wage class the worker is in. Of course, there will be spurious correlation between the activity wage class (constructed, as the previous chapter describes, from the average wages corresponding to various activities), but including them is useful as a strategy to isolate the “pure” wage and gender effects. That is, controlling for how well-paid an individual’s main activity is, how much does his or her pay vary in response to demographic and other factors?

Both models perform moderately well in the context of wage regressions in general (which typically account for approximately 20-40% of wage variation). There is modest evidence of an age effect and very strong evidence of a

gender effect. Indeed, the absolute magnitude of the coefficient on maleness is about 85% of the average wage in this sample. The other principal determinant is hours per day, as would be expected. A one standard deviation change in this variable accounts for between 14-18% of the mean value of the wage. There is a strong bivariate correlation between hours and part time status, which helps explain the low significance attached to the latter variable.

The activity wage classes were dropped from the second model to estimate the direct and indirect age and gender effects-not only the pay differences within types of activities attributable to these factors, but also the different probabilities that different categories of workers will end up in different sorts of activities. It is interesting however, that evidence of such indirect effects does not appear. The age effect remains roughly the same, and the gender effect falls. It appears that the sorting of workers into different activities is not accounted for by any of the variables available to be tested.

Table 21: Wage Regression in the Fishing Sector

Dependent variable: payment in the past 30 days for the worker's primary activity
(t-statistics in parentheses)

Variable	(1)		(2)	
Worker is a child	-22,258*	(-1.96)	-20,872*	(-1.77)
Worker is male	52,179***	(3.79)	40,430***	(3.09)
Worker is part time	-16,756	(-1.27)	-16,086	(-1.18)
Hours per day on main activity	4,681***	(2.76)	3,983**	(2.43)
Maximum employment	11,066***	(7.40)	11,315***	(7.52)
Class 2	-38,789***	(-2.72)		
Class 3	5,682	(.31)		
Class 5	54,101**	(2.51)		
Constant	-59,903***	(-2.65)	-56,471**	(-2.57)
Adj. R2	.341	.276		
N	239	239		

Wage regressions were also run separately for adult and child sub samples, as Table 22 reports. Wage determination operates differently for these two groups. Hours per day, for instance, seems to be irrelevant for children, whereas it plays a noticeable role for adults. The opposite appears to be true for part time status. The most interest result, however, has to do with the claim by some employers that they pay children and adults equally. Controlling for other factors, employers who make this claim are likely to pay adults more and children the same or less. This casts doubt on this instance of self-reporting.

A second question pertains to whether employers are induced to hire children by virtue of their lower (relative) wage. This is roughly tested by the regression reported in Table 23. Three factors are taken into account: the ratio of the child to adult wage (measured by the ratio of child earnings to hours in his or her

Child labour wages and productivity: Results from demand-side surveys

Table 22: Wage Regression by Age, Fishing
 Dependent variable: payment in the past 30 days for the worker's primary activity (t-statistics in parentheses)

Variable	Children		Adults	
	(1)	(2)	(3)	(4)
Hours per day	-170.0	1,355	8,103**	4,093*
Worker is part time	-32,738*	-18,922	-18,275	-18,969
Maximum employment	6,936***	4,795**	11,892***	13,339***
Class 2	-7,890		-49,114*	
Class 3	20,625		10,082	
Class 5	-39,105		57,361	
Children paid same	-6,758		42,042**	
Constant	12,801	-7,358	-172,850***	-79,458**
Adj. R2	.184	.125	.392	.292
N	69	88	115	151

Table 23: Employment Regression, Fishing

Dependent variable: ratio of child to adult hours by enterprise (t-statistics in parentheses)

N=76

Variable		
Ratio of child to adult wage	-.140**	(-2.12)
Number of employees	-.143***	(-3.47)
Main activity is actual fishing	-.454***	(-3.13)
Constant	1.806***	(8.08)
Adj. R2	.257	

main activity divided by the corresponding adult ratio), the number of employees reported by the employer during peak activity, and whether the main activity of the enterprise is “actual fishing” as opposed to a range of support activities. (About half of the enterprises in this sample chose “actual fishing” as their main activity.) The dependent variable is the ratio of total child hours (across all activities) to total adult hours. Here the unit of analysis is the enterprise, which is why there is a smaller number of observations.

It appears as though the relative child wage is consequential in the expected direction. It is interesting that this ratio is slightly greater than one, indicating perhaps that either relative child earnings are overstated or relative child hours are understated; this apparent measurement error should be kept in mind. Nevertheless, it is plausible that an increase in the ratio of child to adult earnings per hour should lead to a smaller (about one-seventh) decrease the child-to-adult employment mix. The number of employees variable captures the size and, to a lesser extent, the dynamism of the enterprise. The average value for this variable is approximately 4.4, and the standard deviation 1.7. Thus, larger, and perhaps more successful, enterprises are likely to use relatively less child labour, and this effect is somewhat greater than the relative wage effect. Finally, the most important determinant of how much child labour an enterprise employs is whether it is organized around the actual catching of fish. Children apparently are far more likely to remain on land than adults.

In addition, various models were estimated to assess the impact of child labour on various measures of output, but none of these proved to have an acceptable level of explanatory power, either in this sector or in construction. It is likely that the output measures themselves are faulty, since at the sample mean they result in annual revenues measured in millions of PPP dollars.

Construction

Because of a high degree of wage compression in the construction sector, wage regressions have little variance to explain. As Table 24 shows, there is little evidence of either a wage or a gender effect, and only differences in hours or part-time status play a significant role in wage determination. (It should be

Child labour wages and productivity: Results from demand-side surveys

remembered that correlations between the activity wage class and the wage itself are spurious. Since few construction workers are in any but the lowest wage class, even these coefficients tend to be of lesser significance.) There is moderate evidence for an employer size effect, but it is not large.

Table 24: Wage Regression in the Construction Sector

Dependent variable: payment in the past 30 days for the worker's primary activity
(t-statistics in parentheses)

Variable	(1)		(2)	
Worker is a child	-9,084	(-.76)	-9,377	(-.78)
Worker is male	-3,317	(-.22)	1,105	(.07)
Worker is part time	-37,751***	(-3.02)	-37,673***	(-2.99)
Hours per day in main activity	7,992**	(2.05)	5,534**	(2.26)
Maximum employment	802.6*	(1.75)	866.9*	(1.87)
Class 2	5,922	(.12)		
Class 3	71,373**	(2.57)		
Class 4	90,494	(1.48)		
Constant	38,333	(1.47)	33,449	(1.27)
Adj. R2	.135	.114		
N	228	228		

Desegregation by age, as in Table 25, has less effect than in fishing. Hours per day again seems to have little effect on those under age 18, but part time status is important for both. The biggest contrast, however, has to do with the correspondence between claims of equal payment for adults and children and the underlying reality. Employers who make this claim in the construction sector do seem to reduce the wage gap, but primarily by paying adults less rather than children more. All the preceding conclusions are qualified, however, by the limited explanatory power of th

An attempt was made to investigate differences in the child/adult labour mix of enterprises in this sector as was done in fishing, but it proved unsuccessful. Overall, there is too little variation in the employment practices represented in this sample to justify this type of analysis.

Table 25: Wage Regression by Age, Construction
 Dependent variable: payment in the past 30 days for the worker's primary activity (t-statistics in parentheses)

Variable	Children		Adults	
	(1)	(2)	(3)	(4)
Worker is male	43,031 (1.57)	39,254 (1.54)	-17,079 (-.76)	-17,558 (-.90)
Hours per day	-5,849 (-1.17)	-673 (-.15)	7,715** (2.15)	7,568*** (2.46)
Worker is part time	-72,719*** (-2.90)	-63,466*** (-2.75)	-33,623* (-1.74)	-34,225*** (-2.16)
Maximum employment	1,302 (1.50)	898.0 (1.09)	1,009 (1.55)	953* (1.69)
Class 3	148,996*** (2.75)		43,674 (.81)	
Class 4		49,417 (.53)		
Children paid same	-17,473 (-.96)		-27,508* (1.90)	
Constant	110,334** (2.17)	55,644 (1.25)	59,859 (1.45)	29,338 (.90)
Adj. R2	.175	.114	.120	.110
N	69	84	112	144

CONCLUSION

7

The purpose of this study is to explore the possibility that, in some contexts, employers have an economic incentive to hire children rather than adults. While many factors need to be taken into account, the two most important are wages and productivity. In general, children earn less than adults. In general, they are less productive. Whether the productivity difference is large enough to offset the wage difference is an empirical question, and in Chapter 6 we described efforts to extract empirical evidence from the data sets collected in our four study countries. Here we will briefly review that evidence and consider the implications for research and policy.

We begin with a short, non-technical review of the key points from Chapter 6.

A. EVIDENCE ON THE PROFITABILITY OF CHILD LABOUR.

Ghana

As in most other sectors we examined, the wage-productivity relationship in chop bars is complicated by the division of labour within the enterprise. There are many jobs to be done in an eating establishment, and children and adults are allocated to them differently. We developed a rough measure of productivity within each task, the number of additional clients that would be required to hire an additional worker (child, adult) at each task. (This variable is described in greater detail in Chapter 5.) Thus we were able to partially disentangle the factors of principal interest.

Overall, when other relevant factors are controlled, there does not seem to be a wage differential associated with either age or gender, at least according to standard wage regressions. This result is corroborated by the finding that there is a strong correlation between the ratios of child to adult productivity and child to adult wages across enterprises and within specific job activities. On the other

Child labour wages and productivity: Results from demand-side surveys

hand, we found that the wage gap between children and adults significantly exceeds the corresponding productivity gap in most of these activities, raising the possibility of an economic incentive to employ children. The difference between these findings stems from different sets of control variables. The view that employers are sensitive to children's lower earnings is supported by an analysis of their hiring patterns: the higher the wage earned by children, the less likely were employers to take on a second or third child, all else held constant. The balance of the evidence, then points toward demand-side incentives.

The fishing sector gives an entirely different picture. Here, where the productivity of each member of the crew is critical, few distinctions can be seen between children and adults. Their earnings are fairly similar, and little evidence suggests that adults contribute more to the enterprise. Although children are found predominantly in the least responsible tasks, they perform well in them. It is difficult to escape the conclusion that employers select only the most productive children to go out to sea with them, and they treat them similarly to the way they treat adults.

Philippines

In the pyrotechnic sector, children are concentrated in the folding of fivestar, a simple, inexpensive product. They are paid a lower piece rate than adults performing the same activity. This immediately suggests an economic motive for the employer, but care needs to be taken, because of the nature of the industry. It is highly seasonal; orders are unpredictable and may need to be filled rapidly in peak season. If children are slower than adults, or if they produce a higher proportion of defective products, profitability may suffer. There is no objective measure of speed in the data, but a potential proxy is the proportion of labour time going into the tasks most often performed by children. If enterprises that rely on children must allocate more labour time to these tasks, this would constitute evidence that children are less efficient. Analysis shows that this is not the case, however; indeed both the subjective impressions of employers and the (indirect) objective evidence indicates that, if anything, children do this work even more efficiently than adults. Taken together with the piece rate differential, this suggests a profitability motive. On the other hand, there is no statistical evidence to support the hypothesis that firms that pay a higher child to adult piece rate ratio will rely less on children. This may reflect the presence of other, unmeasured costs of hiring children, or it may be due to the requirement that, if they want to employ more children, firms may have to offer a sufficiently attractive piece rate. In any event, the overall evidence for a profitability motive is substantial but not conclusive.

The situation in the fashion accessories sector is somewhat more obscure. As in pyrotechnics, children receive lower piece rates, but we did not have the data to test hypotheses about child versus adult productivity. Also as in pyrotechnics, there is little indication that low piece rates induce more hiring of children, but the proper interpretation of this result is unclear. Overall, there is a prima

facie case for suspecting a demand-side motive, but more evidence would be required to have confidence in it.

In addition, the Philippines were the one country that included a set of ecological variables in its employer survey. Employers were asked about their own motives for hiring children, and also the motives they suspected in other respondents. The wording was identical for both, making it possible to test for the extent to which the ecological questions predict the self-reported ones. For almost all of them the correspondence was very high, and sample averages were nearly identical. This is highly favourable evidence for the use of ecological methods to get at sensitive information that respondents are unwilling to offer directly.

India

The vehicle repair sector operates quite differently in Delhi and Patna, so the analyses were undertaken separately.

The evidence is very strong that children generate extra profits for their employers in Delhi. Productivity appears to be related almost entirely to one's position within the enterprise; thus helpers do peripheral tasks and contribute less to the firm's revenue. But most children are not helpers, and the evidence indicates that they are as productive as adults who do the same work. On the earnings side, children who are not trainees are paid 60% less than non-trainee adults, holding all other factors constant, and the gap is even greater between child and adult trainees. Thus there is little doubt that the incentives this study is designed to investigate are at work in this sector.

The situation is less clear in Patna. Here children tend to enter a more gradual process of integration into the productive work of the shop, and their productivity during this phase is minimal. This finding offsets their much lower wages and lends the impression that they are essentially apprentices, whether or not they assume this status officially.

There is considerable reason to suspect a profitability motive in the *zardosi* sector, on the other hand. Here children are paid far less than adults: the raw earning differential of approximately 80% is essentially unchanged when more sophisticated analytical techniques are used to parse these data. Adults are more productive than children, but not nearly enough to erase the enormous difference in pay. Indeed, the incentives for employers arising from this data set are so strong that they seem overstated.

Uganda

The analysis in Uganda is complicated by the fact that the survey was based on an age cut-off of 18 rather than 15 years. Nevertheless, the wage and employment patterns differ according to whether the worker is above or below that age, particularly in the fishing sector, and so wage and productivity analysis is justified. Greater sensitivity to gender is also called for, as we will see, and the Uganda data are extensive in this respect.

Child labour wages and productivity: Results from demand-side surveys

The evidence for demand-side incentives in fishing is at least suggestive. Children are more likely to work in lower-paid activities than adults, and even within these activities (and controlling for different hours of work) they are paid less. We do not have the productivity data that would round out the analysis, but employers do respond to lower relative child wages by increasing the proportion of their workforce that is under 18. There is even stronger evidence for gender discrimination; in fact, the differentials between men and women (both adult and child) are about twice as large as those between children and adults.

Much less can be said about the construction sector, since nearly all its workers receive very low wages. There are age and gender differences, but they are too small to be subjected to statistical scrutiny.

B. PATTERNS IN THE EVIDENCE.

We can divide these nine sectors into three groups. In one group, fishing in Ghana and construction in Uganda, there is little difference in pay between children and adults. This seems to result from different causes—highly selective employment in Ghana, extreme wage compression in Uganda—but the result is the same. Children enter employment on more or less similar terms compared with adults. It would not take extensive data-gathering to identify other cases; it should be apparent to most knowledgeable observers (or participants) when conditions like this exist.

The second group is on the opposite end of the spectrum. Here children are paid less than adults, and the difference is not sufficiently offset by greater adult productivity. In this study, chop bars in Ghana, pyrotechnics in the Philippines and vehicle repair (Delhi) and Zardosi in India correspond to this profile to a greater or lesser extent. It is not so easy to demonstrate that employers actually respond to these profit incentives, but their presence is (mostly) established.

The third group consists of those remaining sectors in which a substantial child-adult pay gap exists, but in which an offsetting productivity gap cannot be ruled out. Some of these may eventually prove to belong in the second group as new information is gathered. Others may be found to adhere to the view of labour markets conventionally held by economists, as sketched in Chapter 2. For now, we can only be agnostic.

With such a small number of sectors to assess, any claim regarding an overall pattern must be highly qualified, yet some generalizations suggest themselves.

(1) Light manufacturing. Two of the three cases of light manufacturing surveyed, pyrotechnics in the Philippines and Zardosi in India, belong to group of probable demand-side incentives. While not going so far as to assent to the “nimble fingers” argument (Anker et al.), we can anticipate that children will not be much less adept at such tasks than adults. Moreover, the highly competitive nature of subcontracting arrangements encourages employers to take advantage of any profit opportunities available to them.

(2) Urban services. The competitive character of markets for urban services creates incentives similar to those in light manufacturing. Although children may enter the workforce performing peripheral tasks, they may graduate to more productive work before long, earning a child's wage but doing an adult's job.

(3) Distressed labour markets. The counterexample of construction in Uganda demonstrates a different point that age differentials may dissolve in extremely unfavourable labour market conditions. With a surplus of available labour of all ages, and with low-productivity work systems, such sectors impose hardship on all workers.

It would be interesting to speculate on the role of international competition, since two sectors, Philippine fashion accessories and Indian Zardosi, compete for exports and against imports, but the data are not sufficient to observe any effects attributable to it. (Pyrotechnics in the Philippines also competes against imports, but it is not clear whether this plays a role in the outcomes seen in the data.) This is a topic for further research.

C. IMPLICATIONS FOR POLICY.

Policies for combating child labour operate almost exclusively on the supply side of the market. Households are encouraged to not send their children to work, but to school instead. There is no reason to stint on these efforts. Nevertheless, the current study indicates that many children may be pulled into the workforce due to the incentives faced by their employers. This is doubly disturbing: not only does it lead to the greater use of child labour in particular sectors, but it leads to the tendency for children to be exploited in the conventional economic sense of this term: insufficiently paid in view of their contribution to output. Thus, where demand-side incentives are substantial there is a case for demand-side policy.

Note also that many of the sectors examined in this study are geographically concentrated. This is the case for pyrotechnics and fashion accessories in the Philippines, Zardosi in India and fishing in both Ghana and Uganda. Demand-side incentives in such regions can give rise to distinctive local patterns of child labour beyond the capability of household-based programmes alone to address.

Policies targeting employers have a bad reputation, often for good reasons. Inspection programs are expensive, difficult, authoritarian and on occasion prone to corruption. To the extent that the causes of child labour lie within the household, pressure on the employer does not get at the root problems and may make the child's situation worse. Inspection is regarded more positively in the context of the worst forms of child labour, but that is not a particular focus of this study. (Some of the work surveyed is indeed hazardous, however, as pointed out in Chapter 5.)

There are other approaches to demand-side policy besides inspection, however. Three stand out in particular:

Child labour wages and productivity: Results from demand-side surveys

1. Participatory regulation. As we have just seen, sectors with demand-side pressures for the employment of children are often geographically concentrated. Enterprises may belong to self-help associations, and it is often public policy to promote this type of cooperation for a variety of purposes. To this list of purposes could and should be added child labour. Entrepreneurs could be canvassed for their views on the factors that lead to the use of children beyond the “light work” and apprenticeship models outlined in Convention 138. They could exert their collective influence to shift peak production periods away from the school year, and to smooth out the fluctuation of orders in a way that would encourage full-time permanent adult employees to take the place of children. Most entrepreneurs want to see children receive education and live productive lives; they should be allies in a demand-side strategy.

2. Informal sector support. One of the great revolutions in development policy in the past generation has been the shift from viewing the informal sector as solely a “parking lot”, housing workers until they can find formal employment, to a more balanced approach that recognizes the potential for informal enterprises to become economically fulfilling in their own right. But will policies that support informal sector development lead to even more demand-side pull, drawing more children into the labour market? This will depend on how the policies are chosen, and whether their impact on children is taken into account. This is an enormous subject that lies mostly beyond the scope of this study, but it should be clear that integrating child labour concerns into informal sector development should be a priority. As suggested above, programmes that even out the flow of orders and promote a steady supply of full-time jobs could have a positive effect. Excessive competition that forces employers to cut labour costs below what adults are willing to accept can sometimes be muted. The ILO has a history of working with employer organisations on these issues, and its experience can be mined for examples of effective practice.

3. Technical assistance. Historians who have studied the secular decline of child labour in the industrialized world have recognized technical change as an important cause. Activities that children used to perform have disappeared as more efficient methods have taken hold in production. Children are rarely found squeezing their bodies into narrow openings in factories or mines in Europe, North America or Japan, nor is there as much call for their hands to perform simple assembly tasks. The sectors we have surveyed in this report, however, rely on less productive work arrangements, and the skills of children are still in high demand. Technical assistance in general can help employers make the transition to more profitable production systems that shift employment demand from children to adults, and it can be targeted on particular improvements relevant to children’s work in particular. This could be the case in Filipino fashion accessories, for instance, where children are concentrated in stringing and transferring shell beads. If such tasks could be even partially automated, adults could continue to work at the more creative and skilled aspects of the process, while the use of children could be minimized. Recommendations for particular technical improvements should emerge from careful study of the industry in question, of course,

but it should be recognized that this type of policy has the potential to address child labour in situations where demand-side pressures are evident.

The general point is this: demand-side policy may entail regulation, but this is not the only form it can take. Just as the best supply-side policy supports and encourages households, the best demand-side policy can strengthen the performance of enterprises.

D. IMPLICATIONS FOR RESEARCH.

The most important lesson of this study is that systematic research on children's wages and productivity is possible. This was not a given for those working on this project; we did not know in advance whether informal sector enterprises could generate the data we needed, nor whether employers would be willing to report it. On both counts we were pleasantly surprised.

1. Enterprise data. The employers surveyed in this study rarely keep formal records of their production system. They were asked instead to estimate employee hours, assignment to various tasks, output and revenue. If the raw data are inspected they reveal many round numbers. There would be every reason to doubt the accuracy of the information these respondents provided. In a few instances such doubts were substantiated, and some of the data had to be rejected. Most of it, however, was highly plausible in its overall contours, and detailed statistical analysis based on it was productive. This is encouraging news for all students of the informal sector.

2. Employer willingness. When developing the methodology for this study, a principal concern was that employers would be unwilling to provide sensitive information concerning their employment of children. This practice is formally illegal in every sector we examined, and respondents might well question how confidential their information would remain. It was for this reason that the method of ecological questions (Chapter 3) was developed. We found, however, that, in every survey we implemented, employers were willing to enumerate child employees, identify their activities, report wages and hours, and discuss their motivations for giving them work. This should provide encouragement to future researchers: it should not be more difficult to gather data on working children than adults. We hope this will lead to an ongoing stream of research in this field, including the extension of existing labour market research to younger age groups. Moreover, in the event that certain questions do prove too sensitive for respondents to answer directly, the results from the Philippines indicate that ecological methods offer an acceptable substitute.

This study is not definitive on the core questions of child earnings and productivity, not even with respect to the data we have collected ourselves. We invite more researchers to take up the task, so that our understanding of the dynamics of child labour will be deepened and our policies made more enlightened.

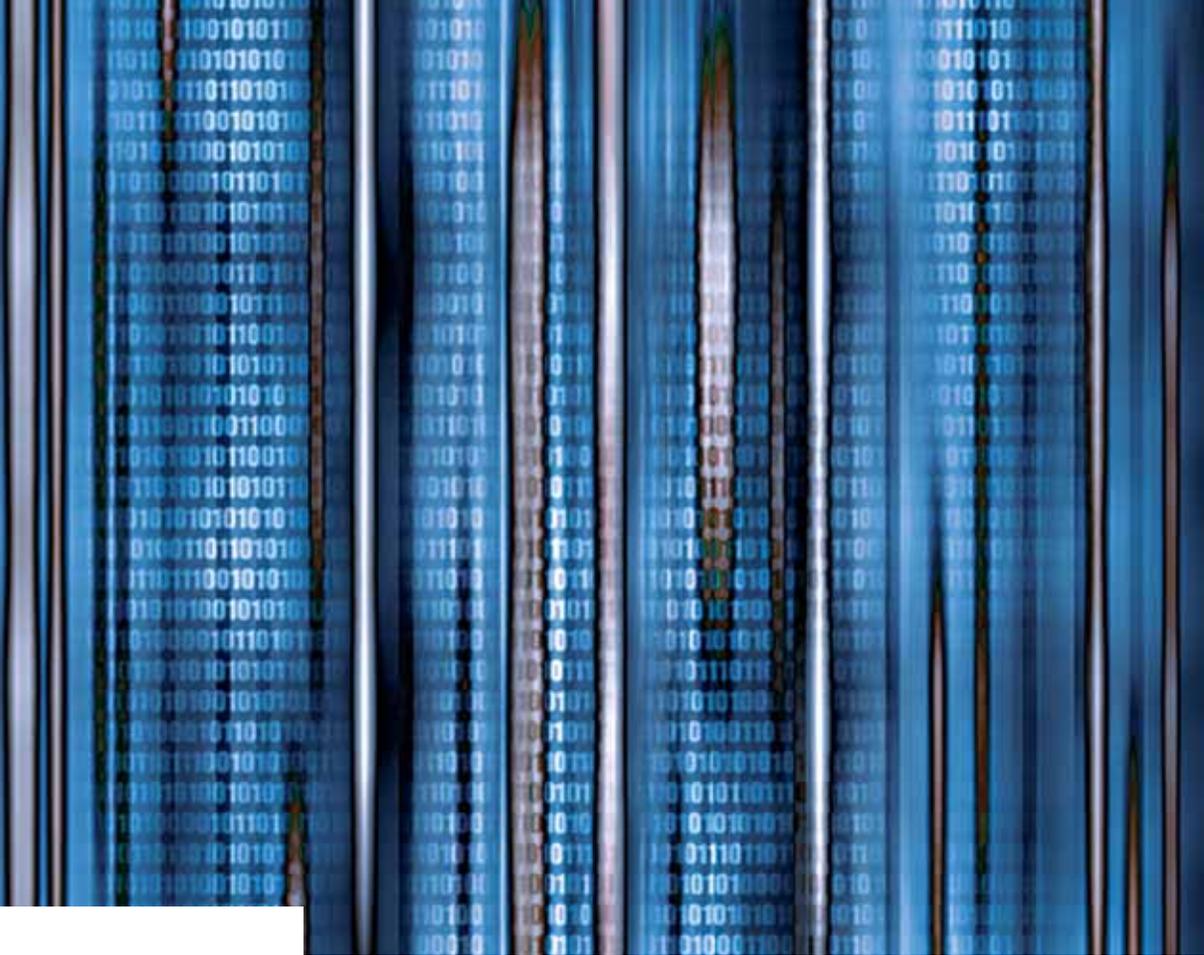
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