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## Child Labor and the International Policy Debate

Number

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The Education/Child Labor Trade-  
Off and the Consequences of Trade  
Sanctions



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## Abstract

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This paper provides an overview of the current academic and public debate on child labor. There is growing impetus to impose international minimum labor standards banning child labor. However, this paper argues that while partial bans such as trade restrictions, voluntary codes of conduct and labeling schemes may improve the working conditions of a small percentage of child laborers in developing countries, this approach might ultimately do more harm than good. Total or partial bans on child labor have the potential to lower household welfare under realistic assumptions, as will be shown in a simple model. We argue that the underlying economic determinants of child labor supply must be addressed directly, taking into account the interrelationship between the market for schooling and that for child labor. The paper emphasizes that, with limited resources available for combating child labor, it is important to carefully judge which policies will have the greatest impact. However, as our model has also shown, under certain circumstances, major causes for the emergence and existence of child labor may be credit market imperfections and the high costs of education, so that resources should be allocated accordingly.

**Keywords:** Child Labor; Market for Schooling; Credit Market Imperfections; Trade Sanctions; Policy Implications.

## Kurzfassung

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Diese Studie gibt einen Überblick über die gegenwärtige akademische und öffentliche Debatte zum Thema Kinderarbeit. Industrieländer fordern zunehmend, daß Handelssanktionen auf Entwicklungsländer, die Kinder bei der Produktion von Exportgütern beschäftigen, verhängt werden müssen. Allerdings wird in dieser Studie argumentiert, daß Handelsbeschränkungen und Handelssanktionen kaum geeignete Instrumente zur Anhebung von Sozialstandards in Entwicklungsländern sind. Sie vermögen zwar die Arbeitsbedingungen für einen kleinen Prozentsatz von arbeitenden Kindern zu verbessern, *können* aber letztlich mehr Schaden anrichten als Nutzen bringen. Totale oder partielle Sanktionen auf Kinderarbeit können die Wohlfahrt eines Haushaltes unter realistischen Bedingungen reduzieren, wie anhand eines einfachen Modells gezeigt wird. Statt mittels Sanktionen auf die Nachfrage nach Kinderarbeit zu wirken, sollte den ökonomischen Bestimmungsfaktoren des Angebotes von Kinderarbeit, wie dem Zugang zu Schulen, mehr Aufmerksamkeit geschenkt werden. Die Wechselbeziehung zwischen dem Markt für Ausbildung und dem Markt für Kinderarbeit ist somit stärker zu berücksichtigen. Die Studie betont, daß es wichtig ist, bei einem begrenzten Budget, das zur Bekämpfung von Kinderarbeit zur Verfügung steht, vorsichtig abzuwägen, welche Politikmaßnahmen den größten Erfolg versprechen. Allerdings hat das Modell auch gezeigt, daß das Versagen des Kreditmarktes oder hohe Kosten von Ausbildung Hauptursachen für das Auftreten und das Bestehen von Kinderarbeit sein können, so daß finanzielle Ressourcen dementsprechend zugeteilt werden müssen.

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Children have the right to an education that develops the child's personality, talents and mental and physical abilities, ... respect for human rights, for their parents, cultural and national identity and values, [respect for] the environment, and the preparation for responsible life in a free society based on understanding, peace, tolerance and equality.

**Convention on the Rights of the Child, Article 29 (ILO, 1989)**

For Mrs Tratiwoon, an uneducated [Indonesian] woman, the sweatshops in the area around the garbage dump look so exalted now - in the aftermath of the financial crisis - that she worries that a job in one for her [3 year old] son might be too high an aspiration. „He's not going to get an education," said Mrs. Traitwoon, „so I don't know whether he can ever get a job like that."

**International Herald Tribune (June 16, 1998)**

## 1 Introduction

In the debate on international labor standards and economic globalization there is no more emotionally evocative issue than that of child labor. According to the latest ILO estimates, a quarter of a billion children aged between 5 and 14 throughout the world work, and about half of these work full time. The extent of child labor varies regionally, with about 40% of working children in this age group being in Africa, about 20 percent each in Asia and in Latin America, including the Caribbean, and 10% in the Pacific region. In absolute terms, the incidence of child labor is highest in Asia, which has about 54 million economically active children, compared to about 31 million in Africa. In addition, child labor exists in Southern Europe and increasingly in the transition economies of Central and Eastern Europe (ILO, 1998).

Voters and the mass media in the industrialized countries have expressed strong concern that competitive pressures brought about by expanded world trade might lead to increased exploitation of children in developing countries. There is thus growing momentum in the West to impose international minimum labor standards banning child labor. While the legislation proposed in different countries varies in detail, it generally follows the same basic principle of lowering the demand for child labor by restricting the sale of goods known to be so produced.

The purpose of this paper is to shed light on the debate over the effectiveness of trade sanctions in combating the problem of child labor. In particular, we focus on the moral or ethical aspects of this debate, which are grounded in the humanitarian concern of the citizens of richer countries with higher labor standards about working conditions and the employment of children in developing countries. Further, we confine ourselves to the consideration of non-exploitative child labor and explore the conditions that determine a household's rational choice to send a child to work. It must be noted that this ethical debate over child labor is distinct from the economic debate, which focuses on unfair competitive advantage of those countries that employ children in their exportable sectors. Both the ethical and economic debates over child labor are off-shoots of a larger debate on the usage of trade sanctions to establish uniform labor standards from one country to another.

During the Uruguay round, a good deal of pressure was put on the General Agreement on Tariffs and Trade (GATT) to introduce environmental and social standards as a legitimate basis for trade intervention. With the establishment of the World Trade Organization (WTO) in January 1995, the discussion about the consideration of standards continues. Some economists contend that international standards are merely hidden protectionism. Bhagwati (1994) and Srinivasan (1996) argue that the economic rationale

behind the developed countries' demand for a social clause enforced through the threat of trade sanctions, is essentially a protectionist device. Increased competition from low-cost imports originating from developing countries imposes an adjustment cost in terms of declines in output and employment in import-competing industries of developed countries. Thus, forcing developing countries to raise their labor standards will shift the cost of adjustment, through increased production costs, onto the developing countries. Bhagwati and Srinivasan argue that such a social clause is tantamount to a violation of the notion of free trade based on comparative advantages.

Still others contend that the imposition of trade sanctions by WTO can be viewed as a means of enforcing fair trade founded on basic human rights and acceptable working conditions. The approaching accession of the People's Republic of China into the WTO will fuel the controversy surrounding core labor standards and basic human rights. Particularly since China, with a population of more than 1.2 billion, is considered by many to disregard human rights and have low-level working conditions.

This paper provides a general overview of both the public and academic debates surrounding child labor in the developing world and suggests some further avenues for research and policy evaluation. Within the context of a simple model where education and child labor are the only alternatives for households facing borrowing constraints, we point out that a trade sanction can be an effective tool to alter the incentives in favor of education. This argument should be considered with caution, however, for such a trade sanction must not be considered a partial ban on child labor, but must be enforced permanently in order to have any effect. We argue that the underlying economic determinants of child labor supply must be addressed directly, taking into account the interrelationship between the market for schooling and that for child labor. In view of the limited availability of resources for dealing with the issue of child labor, it is important to target funding efficiently and to set hard priorities that both acknowledge the existing limitations of policy and focus on obtaining the best outcomes possible in both the short and long run.

The paper proceeds as follows: section 2 presents a brief international survey of legislation, resources and research devoted to combating child labor; section 3 provides a discussion on the link between the market for education and the market for child labor; section 4 develops a formal model for identifying the variables that affect the education/child-labor trade-off and extends the model to include the linkages in production in order to analyze the channels through which trade sanctions alter schooling incentives. Further, it summarizes our findings and discusses the robustness of our results. Based on our results, section 5 outlines a framework for policy analysis and highlights some alternative avenues for research and policy approaches. Our conclusions are summarized in section 6.

## 2 Legislation, Resources and Research Devoted to Combating Child Labor

### 2.1 International legislation and resources

The concern over core labor standards and basic human rights is not new. Since 1919, the International Labor Organization (ILO) has defined labor standards and established conventions with a set of core labor standards which are binding for the countries that ratify them<sup>1</sup>. The enforcement of the conventions basically depends on international pressure and advice; there are no provisions for sanctions that withdraw rights of access to international markets from countries that fail either to ratify the conventions or to comply with those that have been ratified. However, a new legal basis for using trade interventions as an enforcement device has been created through the conclusion of bi- or multilateral agreements like the North American Free Trade Agreement (NAFTA).

NAFTA includes an ancillary agreement on labor, the North American Agreement on Labor Cooperation (NAALC). The NAALC recognizes the right of each country to make its own labor laws and promotes compliance with and enforcement of those laws. It also '...does provide the ability to invoke (trade) sanctions as a last resort for non-enforcement of labor law by a Party', which includes violations of child labor and occupational health and safety standards' (Golub, 1997). In 1995, the US House of Representatives suggested the Child Labor Deterrence Act. If this type of legislation were approved, it could prohibit imports of goods produced abroad by children under 15 years of age or under other specified circumstances (Brown et al., 1997).

Thirty years ago a United Nations Convention formulated 54 articles on the rights of children. Since then, there have been four major international conventions and/or programs that directly address the problem of child labor. Domestic policy measures focus on minimum age of employment, access to education and elimination of the worst forms of child exploitation. In addition, further trade legislation in some industrialized countries seeks to curb the economic exploitation of children among trading partners.

The ILO's *Minimum Age Convention (No.138)* and *Minimum Age Recommendation (No.146)* of 1973 defined internationally accepted policy guidelines that set the minimum age for full-time employment at 15 years and stress the importance of accessible primary education and consistency in labor and education laws. Over 75% of the 173 ILO member countries have ratified at least one convention on minimum-age legislation. Moreover, the

<sup>1</sup>The core labor standards defined by ILO include freedom of association, collective bargaining, prohibition of forced labor, elimination of exploitative child labor, and non-discrimination. OECD and the World Social Summit in Copenhagen, 1995, agreed to these core standards, which are perceived as raising human rights.

European Union drafted in 1988 and revised in 1990 a Community Charter of Fundamental Social Rights for Workers, and incorporated the protocol on social policy in the Maastricht treaty. The Charter includes a minimum working age of 16 and rights to such things as vocational training after leaving school. The Social Charter was adopted by all EU members except the United Kingdom (Brown et al., 1997, and Golub, 1997).

The idea that all children should have a right to an education was codified in 1989 with the ratification of the *Convention on the Rights of the Child (CRC)* by 191 signatory countries. Article 28 of the CRC guarantees the right to free primary education. Article 32 obligates countries to establish and enforce minimum-age requirements and otherwise seeks to safeguard children from economic exploitation and "from performing any work that is likely to be hazardous or to interfere with the child's education or to be harmful to the child's health or physical, mental, spiritual, moral, or social development". Article 29 goes even further, agreeing to provide an education that develops "the child's personality, talents and mental and physical abilities, ... respect for human rights, for their parents, cultural and national identity and values, [respect for] the environment, and the preparation for responsible life in a free society based on understanding, peace, tolerance and equality". The importance of education was again the focus in 1990, when the heads of UNDP, UNESCO, UNFPA, UNICEF, and the World Bank came together to produce the *World Declaration On Education For All*.

In 1991, the ILO launched the *International Programme for the Elimination of Child Labor (IPEC)*, which funds projects and research specifically aimed at eliminating child labor. IPEC is now operational in more than 30 countries, and focuses on strengthening the capacities in individual countries and creating worldwide movements to combat child labor. The current focus, comprising about 77% of all IPEC programs, is on the most damaging forms of underage activity such as bonded labor and work involving health and safety hazards (Lansky, 1997). In April 1997, IPEC launched the *Statistical Information and Monitoring Programme on Child Labor (SIMPOC)* to facilitate the collection and dissemination of statistical data on child labor in over 40 countries (Lansky, 1997). IPEC has also provided technical assistance to the Amsterdam Child Labor Conference, which took place in February 1997, and the International Conference on Child Labor in Oslo in October 1997 (ILO, 1996).

The OECD and ILO have also developed international codes of conduct for multinational enterprises, which apply labor standards and minimum working conditions to factories in developing countries. In addition, some international companies have voluntarily developed their own codes of conduct, for example the US multinationals Levi Strauss, Liz Claiborne, Nike, Reebok, Sears and Timberland. (Brown et al., 1997) When Nike Inc. was found to employ children working under substandard conditions in Asia, poor publicity and pressure from western groups such as the Child Labor Coalition convinced Nike to improve its record by instituting a number of measures that included raising the minimum age for new workers to 16, admitting outsiders to inspect factories

and improving air filtration to meet U.S. standards. (International Herald Tribune, June 16, 1998). Work on the ILO's *International Programme on the Elimination of Child Labor (IPEC)* is also proceeding, with technical assistance being deployed to a variety of countries (Langille, 1997).

Although most international and domestic efforts to curb child labor have been primarily legislative activities, increasing amounts of financial resources have also been devoted to this issue over the past decade. In the 1992-97 period, the ILO allocated US\$ 1.3 million of its regular budgetary resources to eliminating child labor, compared to US\$ 200,000 during the period 1986-91. By the mid-1990's, extra-budgetary resources made available by the governments of several donor countries had increased from almost nothing to some US\$ 85 million, with Australia contributing US\$ 100,000, Belgium BF 3 million, Germany DM 50 million for the years 1992-96 (plus confirmation of a contribution of DM 50 million for the years 1997-2001), France FF 1 million, Norway US\$ 300,000, Spain US\$ 12.5 million and the United States US\$2.1 million (ILO, 1996).

Despite the abundance of international and domestic legislation and the growing financial resources directed at curbing child labor, the problem clearly persists in many developing countries. Some researchers have pointed to the serious lack of enforcement and resources as two reasons why laws are not observed (ILO, 1996). Other researchers favor policies that increase educational opportunities. For example, a study conducted in India (Weiner, 1991) argued that high investments in expanding the enforcement of child labor laws would constitute a serious misallocation of resources. Instead, the author claimed, the same amount invested in achieving universal education would be more effective in terms of abolishing child labor. Pressure groups in industrialized countries (such as the Child Labor Coalition) and some politicians favor banning imports of goods produced with child labor. This is an important point since the debate has primarily revolved around whether ethical considerations dictate the banning of products from developing countries that employ children in their exportable sector. However, if such an ethical argument for using trade sanctions to solve the problem of child labor is to have any merit, then trade sanctions should be imposed not only against countries that use child labor in the exportable sector but also against those developing countries that use child labor in the importable sector. There is considerable evidence from Latin America (see Portes, et al., 1989), that child workers (especially those engaged in collecting and recycling scrap metal and plastic) produce intermediate inputs for multinational corporations that operate in the import-competing sectors of Argentina, Brazil and Peru. If it is unethical to buy products that have been produced by child labor, it should therefore also be considered unethical to sell to countries that use child labor in the import-competing industries.

## 2.2 Research on child labor

While most research on child labor has been primarily empirical in nature, some theoretical analysis serves to show clearly why a ban on child labor may not have the intended effect in all cases. As a result, economists have generally been highly critical of such a ban. For instance, Srinivasan (*op. cit.*) points out that a country being threatened with sanctions aimed at compelling it to raise its labor standards might conceivably respond not by raising its standards, but by choosing instead to forgo gains from trade. He also suggests that instead of relying on the indirect means through trade linkages, a more effective direct means is through income transfers to the parents of the children sent to work. Since it can be assumed that the welfare of the children weighs significantly in the choices made by the parents, they are aware of and take into account the cost of putting their children to work, in terms of their health and education, relative to the income they bring home. If some parents still choose to send their children to work, it reflects more than anything else the limitations of their resources and opportunities, viz., their poverty.

The above sentiment is echoed by Basu and Van (1998), who developed a formal model of child labor to posit that if children are sent to work out of their parents' concern for household survival and if child and adult labor are substitutable in production, the labor market exhibits multiple equilibria. In one equilibrium, the adult wage is low and children are sent to work, while in the other equilibrium, the adult wage is high and children do not work. In this situation, a trade sanction may lead to a decline in the adult and child wage, thereby worsening household welfare. On the other hand, prohibiting child labor in one sector could push the adult wage up, possibly to the point where families no longer want their children to work.

Counter to the view that it is essentially concern about their subsistence that compels poor households to send their children to work, a number of economists have argued that children are sent to work either due to a lack of educational opportunities or because the returns on education are low. For instance, based on the efficient, competitive markets hypothesis, Ehrenberg (1994) showed that the total compensation received by child workers is equal to the value of their marginal product, and the children/families make a rational choice between working and pursuing formal education. Ehrenberg concludes that labor standards cannot raise the welfare of a country as a whole, although they can increase the prosperity of some workers at the expense of other workers, consumers or employers. Grootaert and Kanbur (1995) model child labor as a rational time-allocation decision made jointly by children and their families. Child labor standards in this scenario could alter the bargaining power and welfare of children, while weakening the economic position of their families. In a study done for the ILO, Hemmer et al. (1996) use a Beckerian household Time-allocation model to show that the interaction between substitution and income effects generated by changes in adult and child wages plays a crucial role in determining a household's choice between educating children and sending them to work.

## 3 Market for Child Labor

The literature on child labor has tended to bunch together different forms of children's economic activities that really have little more in common than the fact that children are involved. In terms of appropriate policy responses, the enslavement of children in the sex trade really has no more in common with a family having their children work in a factory than an armed bank robber has in common with a bank customer who has excessive credit card debt. On both sides of the comparison, the former case is a crime against society motivated by greed, while the latter case is an (admittedly unsatisfactory) outcome of a complex series of decisions made by agents, generally without malice or criminal intent. The policies most effective in curbing or preventing the former cases will not necessarily work for the latter, and vice versa.

In this paper, we focus on the latter category of child labor, i.e. children who are economically active of their own (or their family's) free will. This includes children who work either as wage laborers, self-employed or family workers, and those who work for in-kind remuneration. By focusing on this group, we can analyze policies in terms of their effects on the underlying problems of poverty and economic uncertainty, which lead children to become economically active. In particular, we consider the following categorization of child-labor types:

Table I: Categories of Child Labor

Status of child	Full time labor	Part time labor	
Non-family based	No schooling	Hindered schooling	Full time schooling
Family based	No schooling	Hindered schooling	Full time schooling

Source: Own classification.

### 3.1 The benefits of child labor

Why might a family choose to send a child to work rather than invest in human-capital accumulation in the form of schooling? Is this choice always sub-optimal from the society's point of view? Is it also an irrational choice on the part of the family in the sense that their long-term interests would always be better served by schooling? While most researchers agree that the household decision to send children to work is generally driven by economic need, rather than greed, the possibility that this decision might be optimal at the household and/or even at the societal level has not generally been considered seriously.



However, child labor has several important functions in many developing countries. The most important function may be facilitating the survival of the poorest families. Anker and Melkas (ILO, 1996) cite evidence from ILO research in India in 1993 that found each working child to contribute an average of 20-25 percent of the family income, quite a considerable proportion, which could make the difference between survival and starvation. Similar figures have been found in Africa (Peel, 1998). In addition, the working experience gained by the children may even enhance the chances of both the child and the family surviving in the future, more than a few years of formal education would.

Even if a child's contribution to the family income is not needed continuously, the possibility of this additional economic activity may provide some security against fluctuations in the adults' income. If there are adequate returns on formal education and if children are allowed to enter and leave school as needs dictate, their roles as providers of last resort might interfere with schooling only temporarily. In practice, however, this is very difficult. Once a child has fallen behind in his/her studies, it is difficult to catch up, and low marks themselves may often lower the expected return on schooling, thus further discouraging attendance. Often, however, it is institutional constraints that make this kind of arrangement impossible. Anker and Melkas (ILO, 1996) cite evidence from a study by Kamal et al. (1993) in Bangladesh that school authorities often refuse to admit children who are trying to return to school due to over-age. Thus, a one-time crisis such as that in Southeast Asia could lead to permanent introduction of children into the labor force.

This discussion highlights why it is so important to carefully examine the underlying causes of child labor and to take into account the important role that children may play in their own and their families survival, before implementing policies designed to curb child labor. The same household study by Kamal et al. (1993) in Bangladesh noted that when thousands of children were fired from garment factories as the result of international pressure on the industry, the overwhelming majority of the children simply found work elsewhere. As they had initially chosen garment work over these alternatives, it is not surprising that the replacement jobs were often more strenuous, less safe and lower paying. Thus, if the underlying economic mechanisms compelling these children to work are not addressed, they will simply seek employment in the (by definition) unregulated informal sector, where jobs are generally more dangerous and lower paid, as regulation of the formal sector increases.

These observations are particularly relevant to the question of whether industrialized countries should ban the import of products produced with child labor. This amounts in most cases to a partial ban. It should be clarified at this point that by 'partial ban', we refer not only to direct legislation in the home country, but also to international efforts to increase production standards on tradable goods, including voluntary codes of conduct by private firms. These measures affect only the tradable sector, have limited coverage and thus would constitute a partial ban in the Basu and Van model. In particular, as

Lansky (1997) points out:

Though consumers may get the impression that child labor can be eliminated through selective buying, market-based schemes generally target only a small share of child labor - that which produces certain goods for export. Obviously, only few exported goods are amenable to labeling ...so the direct leverage that can be exerted is limited. ....It is clear that while labeling and other market-based schemes can contribute directly to reducing child labor, they typically do so on a very small scale' (p. 254)

The proportion of children working in the export sector is estimated to amount to about 5-7% (Federal Ministry for Economic Cooperation and Development, 04/1997 and 10/1997). Trade-policy measures that can be used to combat child labor include not only trade bans, but also the labeling of goods made without child labor and trade preferences for countries that meet labor standards. These measures are therefore not only very limited, but also target the consequences of child labor, rather than its causes.

In this context, it should also be noted that the other sectors where most children work are just as difficult to target. The rates of children's participation in economic activities have been found to be twice as high in rural areas as in urban areas; recent ILO survey results from 26 developing countries indicate that about 70% of all children are engaged in agricultural, hunting, forestry or fishing activities. However, given the rapid urbanization and migration of children to megacities in many developing countries, the share of urban centers in the total volume of child labor is expected to rise in the future. In urban areas, most child-labor activities take place in the informal sector. The relative level of the child workforce in trade and services amounts to an average of close to 20%, while about 10% work in the manufacturing and construction industry (ILO, 1998). Both the rural areas and the informal markets in the urban areas where most children work are difficult to cover and target with policy measures against child labor.

If complete bans on child labor are not feasible (nor necessarily desirable) and partial bans have the potential to backfire in terms of their welfare effects on children, then what kinds of policies might enhance the welfare of children in developing countries and allow them to develop into healthy and fully contributing adults? Less extreme policies such as those that pressure firms to improve conditions and/or provide some schooling for employed children should enhance welfare for both households and children without running as much of a risk of unintended negative consequences.



### 3.2 Dual markets of child labor and schooling

As we have already argued, child labor is really a very heterogeneous concept. Again, apart from criminal exploitation, we can consider several alternative choices of time allocation that a family might choose for a child. In particular, the types of child labor outlined in Table I can be thought of as the *observed outcome* of equilibrium in the market for child labor (related to the market for adult labor) and the education market. Both markets have a supply curve and a demand curve, which depend on various factors. From our discussion above, we can collect a partial list of these factors and their hypothesized/hypothetical effect.

#### Market for Child Labor

Supply curve:

- **Child wage level (+):** By child 'wage', we mean the monetary equivalent of whatever benefit the child or family receives from child labor. As this amount increases, more and more children will choose work over the set of alternatives.
- **Adult wage level (-):** If adults can earn enough to support the family, the added marginal benefit to family welfare obtainable through child labor will be smaller, making schooling a more attractive option.
- **Uncertainty of adult income (+):** Child labor may provide a type of security against fluctuations in family income.
- **Number of children per family (+):** The more children there are, the bigger will be the available child-labor force and the more thinly spread the family resources. While the number of children is endogenously determined in the long run, fertility and mortality determine the number of children per family over the short and medium term.
- **Availability of schooling (-):** The easier it is to attend school, the lower will be the cost.
- **Returns to schooling (-):** The higher the perceived rewards of schooling are, the greater will be the opportunity cost of work
- **Enforcement of truancy laws (-):** Increases costs of alternatives to schooling.

Demand curve:

- **Wage gap between adults and children (+):** The greater the cost savings in hiring children are, the higher will be the demand for child labor.
- **Degree of substitutability of child and adult labor (+/-):** In most cases, the greater the degree of substitutability between child and adult labor, the higher will be the demand for child workers. In some selected cases in which adults are not considered to have the ability to do specific tasks done by children, this perceived lack of substitutability could increase demand for child labor.
- **Intensity of labor-law enforcement (-):** The greater the penalties for hiring underage workers and the higher the probability of being caught, the higher will be the cost of child labor for companies.

#### Market for Schooling

Supply curve:

- **Government spending on education (+):** We assume that increased spending translates into greater availability and higher quality education.
- **Private spending on education (+):** This may in turn depend on the returns on schooling.

Demand curve:

- **Returns on schooling(+):** The greater the reward for an extra year of school is, the higher will be the opportunity cost of alternatives to schooling such as work.
- **Direct costs of schooling (-):** Direct costs of schooling such as school uniforms, books and transportation costs lower the demand for schooling.
- **Child wage level (-):** The higher the child wage level is, the greater will be the opportunity cost of schooling.
- **Intensity of truancy laws (+):** Increases costs of alternatives to schooling and thus makes education more attractive.
- **Access to credit markets (+):** For families whose long-term welfare would be increased through sufficient education of their children, but who are faced with liquidity constraints, access to credit markets would allow them to make these inter-temporal choices.

We follow up on the analysis provided above and use certain variables to build a theoretical model which helps determine a household's choice between education and child labor.

## 4 The Model

The model (see also Appendix) focuses on the following variables: returns on schooling (skilled or educated wages), the child wage, the cost of education and the degree of difficulty in obtaining funds for education. We also determine the equilibrium number of child laborers in the economy, which helps us analyze the effectiveness of trade sanctions in altering the incentives in favor of schooling. In addition, we focus on the fact that inequality in asset distribution across households coupled with credit market imperfections (borrowing is costlier than lending due to difficulty in monitoring loans) lead relatively poor households to opt for child employment. The assumptions concerning the inequality of asset distribution and credit market imperfections which we used to generate the equilibrium number of children who work, were based on two observations: First, in low income countries, perfect credit markets are rare, making education a costly alternative for poorer families; and second, the existence of credit market imperfections helps provide an explanation for certain empirical observations highlighted by Krueger (1996) regarding the extent of child labor activity in developing countries. He shows that child employment rates are the highest in countries with low Gross Domestic Product (GDP) (Burundi (49%), Uganda (45%) and Rwanda (42%) with GDP per-capita around US\$ 500), while in high-GDP countries (GDP per-capita US\$ 5,000 and above), child labor is negligible. Thus, the employment of children decreases as per-capita GDP rises. Krueger's analysis also sheds light on a couple of interesting phenomena: (i) there is considerable variability in child-employment rates among countries with the same per-capita GDP. Kenya and Ghana, with per-capita GDPs of around US\$ 1,000, have child-employment rates of 41% and 14%, respectively, and (ii) this variability is much smaller in countries with very low or relatively high GDPs.

### 4.1 Education versus child labor

We start by considering a developing economy with a finite number of households, say  $N$ . In any given time period, each household consists of three generations: an old adult (who only consumes), a young adult (who works and consumes) and a child (who is either being educated or working as a child laborer and who of course also consumes). Total population size in the economy, in any given time period, is thus  $3N$ . An individual in this economy lives for three time periods.

- During the first period, an individual is born and sent to school or to work as a child laborer.
- The second period of an individual's life is the decision-making period. In this period, an individual is either an educated adult (if he was sent to school) or uneducated (if he was sent to work). If educated, he works as a skilled adult and earns a wage

$w_s$ . If uneducated, he works as an unskilled adult and earns a wage  $w_a$ . For the moment, (let us) assume  $w_s > w_a$ . During this period, he provides for his parents' consumption and in return receives a bequest. This bequest is therefore his *net* income in this period (his own income minus the parents' consumption equals the size of the bequest). He also has a child during this period. Depending on the size of the bequest, the cost of education, the adult skilled and unskilled wage differential, the child wage and the prices of the consumption goods, he makes two decisions: (i) he maximizes his utility to choose both his and his child's consumption in the *current* period and his own consumption and the size of the bequest he wants to leave his child in the *next* period and (ii) he decides to send his child to school or to work. If the child goes to work, it earns a wage  $\nu w_a$ , where  $0 < \nu < 1$ . Thus, a child laborer earns a fraction of the unskilled adult wage.

- In the third period, this individual does not work. He subtracts his own consumption from his child's income (who is now a skilled or an unskilled adult), leaves a bequest and dies at the end of the period.

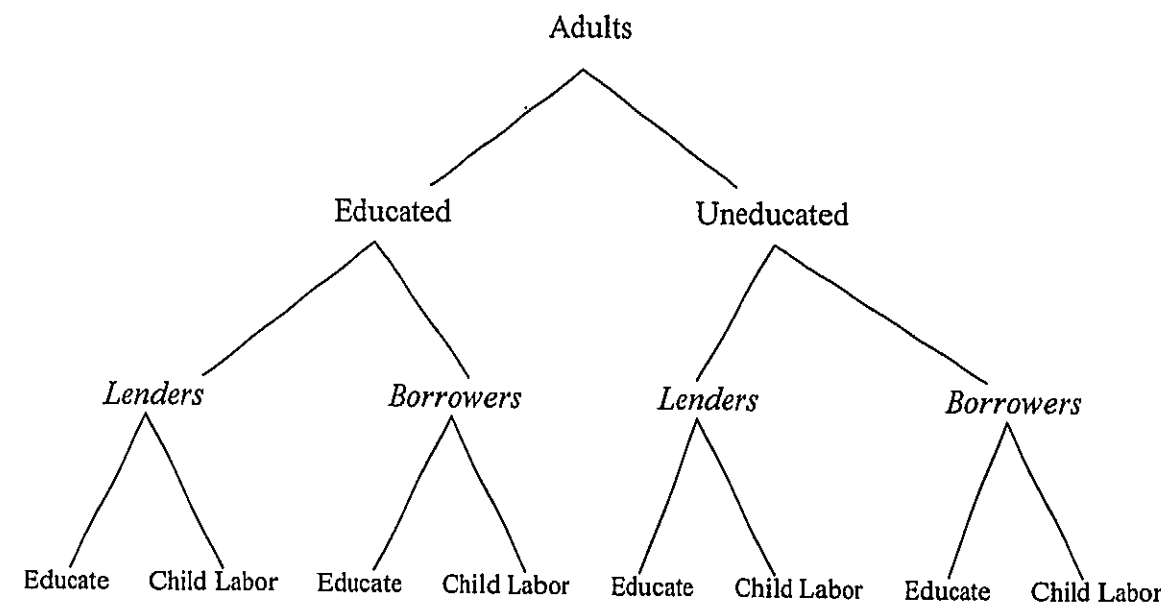
There are three crucial elements in the above depiction of an individual's lifetime. First, in any given time period, there are only  $N$  working adults. A fraction  $\phi$  ( $0 < \phi < 1$ ) of them are educated (and therefore skilled) while the rest are uneducated (and therefore unskilled). Second, individuals are altruistic. They care about their children and derive a positive utility from leaving a bequest for the future generation. If individuals were not altruistic and did not have a stake in the next generation's income (in the sense that their consumption in the last period of their life depends on it), then all adults would send their children to work. Third, an adult in the second period of his life provides for his parent's consumption and receives a bequest. Therefore, the starting endowment of an adult in the second period, whether skilled or unskilled, is just the size of his bequest. As a result, his decisions about consumption, child education and bequest for the future generation are contingent upon the amount of money he receives from his own parents. Consequently, whether a child is sent to school or to work depends not on whether his parents were educated or uneducated, but on the amount his parents inherited.

We now turn to the decision of an adult to educate his child. A representative adult, irrespective of his own educational level, has a bequest,  $x$ . The cost of educating his child is fixed and equals  $h > 0$ . If the adult has  $x \geq h$ , he can send his child to school and, after accounting for household consumption expenses, can lend the excess amount at the ongoing market (internationally given) rate of interest,  $r > 0$ . We shall call this representative adult a lender.

Consider now the decision of an adult with  $x < h$  to educate his child. Since the bequest level is lower than the cost of education, this adult will have to borrow to send his child to school. However, the borrowing rate of interest,  $i > 0$  is *greater* than the lending rate by a factor  $\Omega > 0$ . This wedge between the lending and borrowing rates of interest is introduced to capture the fact that loans in developing countries are difficult to monitor, either because lenders cannot keep perfect track of borrowers or due to a lack of adequate

financial institutions at the micro level. The borrowing interest rate covers exactly the lender's interest rate and the cost of tracking borrowers. Financial institutions, therefore, operate at zero profits, and credit market equilibrium ensures  $i = r + \Omega$ . Figure I, below, depicts the distribution of working adults and their education/ child labor alternatives.

Figure I: Education/child labor choice of an individual adult



Source: Own classification.

benefits derived from education are higher than the opportunity cost of education for a lender. Otherwise, no child in this economy will be educated.

Now, given credit market imperfection, a borrower will choose to send his child to school if and only if

$$w_s - w_a \geq \nu w_a(1 + r) + h(1 + r) + (h - x)(i - r) \quad (2)$$

The left-hand side of the above equation again captures the benefit derived from educating a child, while the right-hand side contains an additional term distinguishing it from the opportunity cost for a lender. The term  $(h - x)(i - r)$  measures the amount forgone in the process of borrowing for education. Rearranging equation (2), we obtain

$$x \geq \frac{(1 + \nu(1 + r))w_a + h(1 + i) - w_s}{\Omega} = x^* \quad (3)$$

Equation (3) is vital to our analysis as it provides a cut-off point on the distribution of bequests. All adults, skilled or unskilled, will send their children to school as long as the size of their bequests exceeds or equals  $x^*$ . Of course, adults with bequests between  $x^*$  and  $h$  will have to borrow to do so, while adults with bequests above  $h$  will send their children to school and be lenders in this economy. On the other hand, all adults with bequest size less than  $x^*$  will send their children to work. If the cumulative distribution function of  $x$  is given by  $F(x)$ , then the fraction of adults sending their children to school is  $[1 - F(x^*)]$ , while the fraction of adults sending their children to work is  $F(x^*)$ . Since there are  $N$  households, each with one child, the total number of children in school in any time period is simply  $N[1 - F(x^*)]$ , while the total number of child workers is  $NF(x^*)$ . Figure II below depicts the cut-off point on the distribution of bequests that determines the equilibrium number of children who work and the number who are educated.

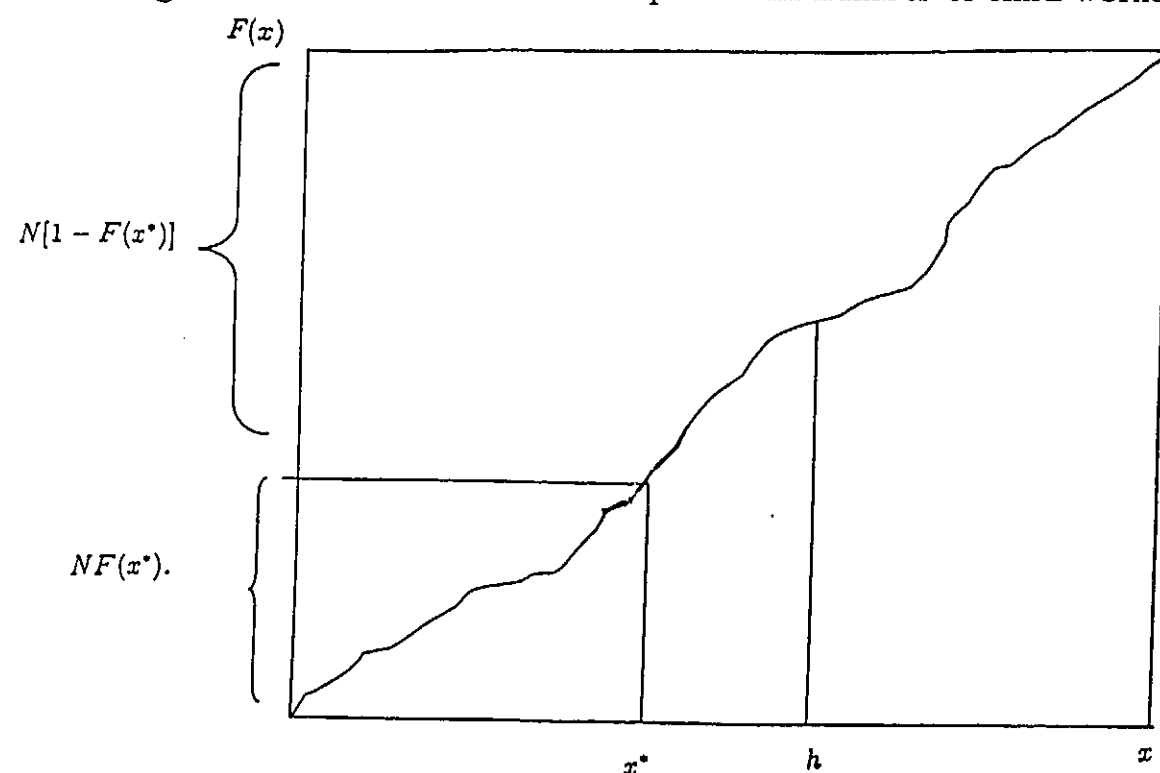
Given that the adult skilled wage is  $w_s$  and the adult unskilled wage is  $w_a$ , a lender will send his child to school if and only if his indirect utility (a function of the skilled and unskilled wages, prices of consumption goods and the size of the bequest) from educating his child is greater than or equal to his indirect utility from sending the child to work; or<sup>2</sup>

$$w_s - w_a \geq \nu w_a(1 + r) + h(1 + r) \quad (1)$$

The left-hand side of the above inequality shows the benefit derived from educating a child, while the right-hand side shows the opportunity cost of education for a lender, since  $\nu w_a(1 + r)$  is the amount of income forgone by not sending the child to work, while  $h(1 + r)$  is the amount spent on education, which he would otherwise have been able to lend. We assume that the above inequality holds true for all adults with  $x \geq h$ , i. e., the

<sup>2</sup>For the sake of simplicity, we assume the discount rate to be unity, i.e. 1. The discount rate does not vary with income and is the same for skilled and unskilled adults.

Figure II: Determination of the equilibrium number of child workers



Notice that a population segmented into those who educate their children and those who do not, exists merely because of the credit market imperfection. Even given the inequality in the distribution of bequests, if the borrowing and the lending rate of interest were the same, i. e.,  $i = r$ , then equation (2) would reduce to equation (1). In other words, the opportunity cost of educating one's child is the same for both borrowers and lenders, and since by assumption all lenders send their children to school, every child in this economy will be educated. Thus, even though all adults have the same preferences and all children are born equally, i.e., with the same abilities, the presence of the credit market imperfection prevents some of them from getting educated.

In addition, a few points about the above analysis should be noted.

- We assume that adults in the last period of their lives do not earn, but depend on their offspring's income. This is not a restrictive assumption, and one can modify the analysis to let individuals earn in the last period of their lives. In this case, our analysis remains unchanged except for the fact that the amount of bequests left for future generations by both skilled and unskilled adults is higher, and the number of working adults in the economy during any time period is  $2N$ . However, we would still need to ensure that adults in the last period of their lives have a stake in their offspring's income.
- Apart from assuming that the starting endowment or *net* income of an adult in the second period of their lives is just the bequest level, we could also modify the analysis to include the adult's income (skilled or unskilled wage) in the second period along with the bequest in their decision to educate their child or not. In this situation, two cases arise. First, if the adult gets paid at the *end* of the second period, then

the decision to educate hinges solely on the amount of bequests that adult received and once again, our analysis remains unchanged. Second, if the adult gets paid in the *beginning* of the second period, then the decision to educate depends on both the bequest level and wage of the adult (depending on whether he earns a skilled or an unskilled wage). In this case, the decision problem of a lender (skilled or unskilled) remains Unchanged, but the decision problem of a borrower is different because a skilled adult needs to borrow less than an unskilled adult, assuming they have both received the same amount of bequest. This in turn leads to two cut-off points on the distribution of bequests, one for skilled adults and the other for unskilled adults, with unskilled adults sending a higher fraction of children to work.

- It is necessary to emphasize that an adult in the last period of his life, regardless of whether he earns or not, must have a stake in the income of his offspring. As a result, we cannot have adults leaving bequests for their offspring solely out of their own savings. This is because savings are always higher if household income is higher, which in turn is the case if the children are sent to work. Thus, the assumption of bequests out of savings would imply that no child in the economy will get educated, irrespective of whether their parent is educated or not.
- In our model, education is an asset, and the choice to invest in a child's education can therefore be viewed as an effort to optimally allocate income for inter-temporal consumption for adults in the second and third periods of their lives. An adult who invests in his child's education consumes less in the second period of his life, but enjoys a greater amount of consumption in the last period of his life, compared to an adult who sends his child to work. However, we have refrained from including any other modes of consumption smoothing (apart from the investment in education and the attendant credit market imperfection), even though in some developing countries credit and insurance markets exist to hedge against consumption fluctuations (see von Braun et.al (1996) for a survey of the credit programs for the rural poor in China).

We now focus on equation (3), which highlights the variables determining a household's choice between education and child labor. Since  $x^*$  varies with the unskilled wage, the cost of education, the child wage and the degree of credit market imperfection, a rise in any of these variables increases  $x^*$ , thereby also increasing the number of families that do not find education an attractive proposition. Conversely, since  $x^*$  is inversely related to the skilled wage, education becomes an attractive option for a larger number of families if the skilled wage increases. The above discussion is summarized below.

- An increase in the skilled wage will alter the incentives in favor of education, and therefore fewer children will be sent to work.
- An increase in the unskilled wage will alter the incentives in favor of child labor.
- An increase in the child wage leads to more children going to work.
- An increase in the cost of education leads to more children working.
- An increase in the cost of monitoring will make borrowing for education costlier, and therefore send more children to work.

Thus far, we have assumed that all children who are educated find employment in the skilled sector in the next period. This is a simplistic assumption. In developing economies, the probability of an educated adult finding employment in the skilled sector is usually less than one. Children who are being educated in this period have a certain probability, let us say  $p$ , of finding a job in the skilled sector and earning a wage  $w_s$  during next period, but have the complementary probability  $(1 - p)$  of having to work in the unskilled sector and earning  $w_a$ . Introducing educated adults' probability of unemployment in the skilled sector thus reinforces the incentives against education in our model. The higher the probability is that educated workers will fail to get skilled employment, the larger will be the number of child laborers in the economy.

This basic framework of our model also sheds light on the empirical observations of Krueger (1996). We can, in terms of our model, predict that two countries with the same per-capita Gross Domestic Product (GDP) (whereby the distribution of skilled and unskilled workers will have to differ, as well as the skilled- unskilled wage differential), the same distribution of bequests and bequests of the same size, will send different numbers of children to work if the countries differ in either the (i) cost of education or (ii) degree of credit market imperfection. The degree of development of credit institutions therefore makes a difference. Countries that are relatively less developed have similarly high degrees of credit market imperfections, and there is consequently little variability in child-employment rates between these countries. At the other extreme, developed countries have well-developed credit institutions and once again, the variability in child-employment rates is low. In intermediate stages of development, different countries are likely to have different degrees of credit market imperfections, and a country with a less imperfect credit market will therefore have a relatively lower number of child workers. Certainly, the correlation between the stage of development and the extent of child labor in a country is not solely based on credit market imperfections. There are other, albeit not competing causes like the extent of poverty, income redistribution or development of the legal system. However, the model is based on the inability of some adults to borrow for education, and thus highlights the degree of market imperfections and the cost of education.

It is noteworthy that sound macroeconomic policies play a crucial role in determining the number of child workers in an economy. For instance, observers argue <sup>3</sup> that the Asian financial crisis might have led to an increase in the number of child workers in that region. It is easy to understand why. A financial crisis like the Asian one leads to an increase in the international or lending rate of interest. With monitoring costs for lenders remaining unchanged, this leads to an increase in the borrowing rate of interest, which in turn impinges upon the incentives to educate children.

<sup>3</sup> *International Herald Tribune*, (June 16, 1998).

## 4.2 Production and trade

In the previous subsection, we highlighted the variables affecting a household's choice between sending a child to school or to work. We shall assume that the cost of education, monitoring cost of loans and the lending (and therefore the borrowing) rate of interest are constants. The cost of education may be assumed to depend on the supply and demand for education and can be endogenously determined within the model. Since incorporating the market for schooling will unnecessarily complicate our model, we assume the cost of education to be exogenous as well. This leaves us with only two variables in equation (3) that need to be determined ( $w_s$  and  $w_a$ ), as well as the distribution of workers — adults (skilled and unskilled) and child laborers across the sectors of the economy. Our focus, then, is on how trade sanctions affect the wages of skilled and unskilled workers and thereby alter the incentive for education.

Our economy has three sectors: the skilled sector ( $S$ ), where educated adults work and earn a wage ( $w_s$ ), a  $Z$ -sector or informal sector where unskilled adults and children work and the agricultural or  $A$ -sector where only unskilled adults work. We restrict child labor in the informal sector, even though estimates by ILO suggest that 80% of child laborers work in agriculture, because evidence from Latin America also suggests that a significant portion of child laborers in that region are engaged in the manufacturing and the informal sector. This distinction is of little concern to us because in our model, the  $Z$ -sector produces an intermediate input for either the skilled or the agricultural sector, and child labor is consequently an indirect input in production in either of the sectors. Note also that an unskilled adult earns the same wage  $w_a$ , irrespective of the sector (agricultural or  $Z$ ) in which he works. The  $S$ -sector and the  $A$ -sector produce a final consumption good which is internationally traded and hence the prices of their respective products,  $P_s$  and  $P_a$ , are internationally given. Since the  $Z$ -sector produces an intermediate good that is used in the production of either the  $S$ -sector or the  $A$ -sector, the price of the intermediate input,  $P_z$ , is determined by the input demand functions of the  $S$ - and the  $A$ -sectors. We shall assume that the skilled sector good is the importable good, while the agricultural good is the exportable. We start by describing the production structure of the informal sector.

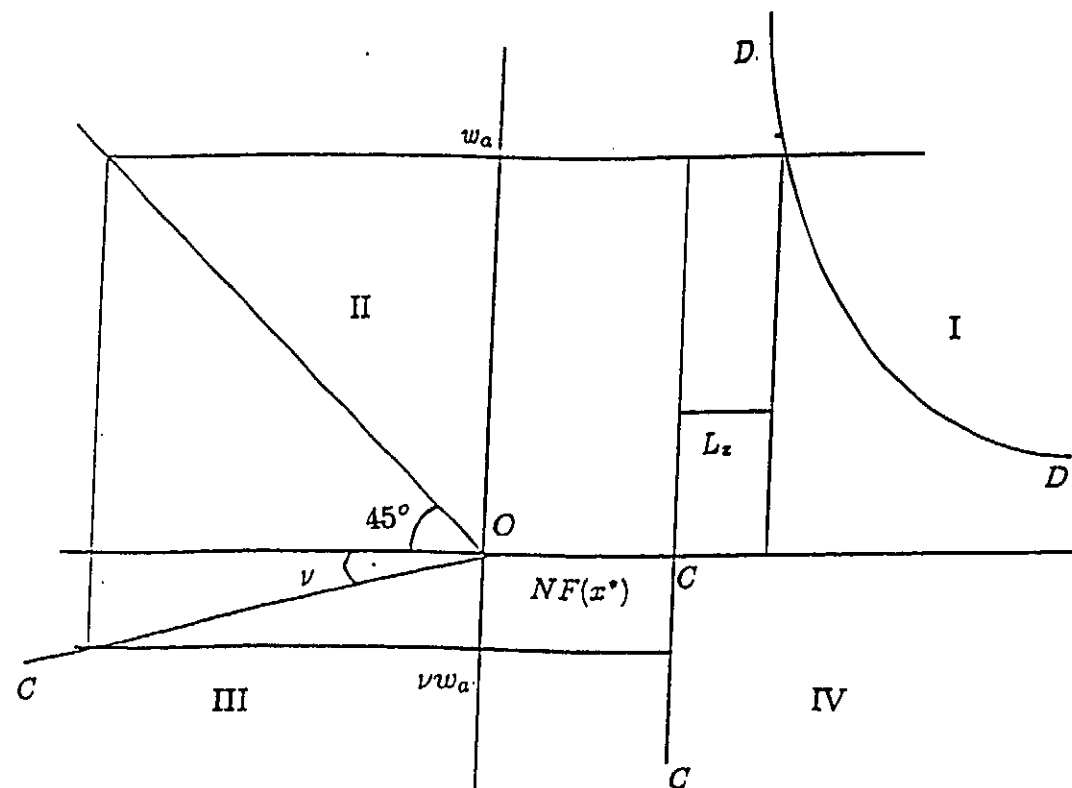
**Z-Sector:** The production function of this sector can be written formally as:

$$Z = (L_z + \frac{NF(x^*)}{b})^\delta; \quad 0 < \delta < 1; \quad b > 1$$

This is a standard decreasing-returns-to-scale production function with  $\delta$  as the scale parameter.  $L_z$  is the number of unskilled adults who work in this sector and  $NF(x^*)$  is the number of children. Note that adult unskilled and child labor are substitutes in production. The parameter  $b$  captures the fact that child laborers have a lower productivity than adult laborers. Thus, the lower wage they get is a direct consequence of this assumption, rather than the notion that they are being exploited by employers. Notice, however, that since both adults and children are being paid according to their marginal products, an individual producer in the  $Z$ -sector is indifferent as to whether he hires

adults or children or a mixture of both. Thus, there is no guarantee that all children who are sent to work will find employment. However, we shall assume that all children who are sent to work will find employment in this sector. As a result, employers in the  $Z$ -sector first hire all the children who are sent to work and then meet their residual labor demand by hiring unskilled adults. Figure 2 explains the mechanism through which labor hiring in the informal sector works. In quadrant IV, the line  $CC$  depicts the inelastic supply curve of child labor. Given the child wage,  $\nu w_a$ , quadrant III transforms the child wage to the adult wage, with the slope of the line  $OC$  being  $\nu (= \frac{1}{b})$ , the inverse of the marginal productivity of children. With the demand curve for labor  $DD$  in quadrant I,  $w_a$  determines the employment level in the  $Z$ -sector. With the number of children fixed at  $NF(x^*)$ , the residual demand for adult unskilled labor is then simply  $L_z$ .

Figure III: Residual demand for adult labor in the  $Z$ -sector



Below, we shall consider two examples in which trade sanctions are used against the importable and the exportable sector and identify not only how trade sanctions affect the incentives for education, but also the factor allocation and output effects of such sanctions for each of the cases.

#### Child Labor as an Intermediate Input in the Importable Sector:

As stated earlier, the economy consists of three sectors. During any given time period, the skilled sector uses as inputs of production educated adults and the  $Z$ -sector output. Mathematically, the production function of the  $S$ -sector can be written as:

$$S = \Pi(\phi N)^\sigma (Z)^{(1-\sigma)}; \quad 0 < \sigma < 1$$

This is a standard constant-returns-to-scale production function with diminishing marginal productivity of the inputs.  $\phi N$  is the number of educated adults, while  $\Pi > 0$

is a technological parameter. To keep our example simple, we shall assume that the input-output coefficient in the agricultural sector is fixed. Therefore,

$$A = aL_a$$

where  $L_a$  is the number of uneducated adults in agriculture, while  $a > 0$  is a parameter that captures both the average and marginal productivity of laborers in the agricultural sector. As pointed out earlier, the  $Z$ -sector output is produced according to,

$$Z = (L_z + \frac{NF(x^*)}{b})^\delta; \quad 0 < \delta < 1; \quad b > 1$$

Finally, the allocation of uneducated adults across the  $A$  and the  $Z$  sectors is:

$$L_a + L_z = (1 - \phi)N$$

First, suppose that this economy is engaged in free trade at given international prices  $P_s$  and  $P_a$  for the  $S$ - and  $A$ -sectors, respectively. The price of the  $Z$ -sector output,  $P_z$ , is determined by the input demand function of the skilled sector. With the given international prices, the unskilled adult wage is determined from the agricultural sector, and given the unskilled wage, total labor demand in the  $Z$ -sector is also determined. The only unknowns in this system are then the skilled wage,  $w_s$ , the price of the  $Z$ -sector output,  $P_z$ , and the allocation of unskilled adults across the  $A$ - and the  $Z$ -sectors. However, since the marginal product of the skilled adults depends on the amount of  $Z$ -sector output used in the production of the skilled sector output,  $w_s$  is determined by substituting for  $Z$  into  $S$ . Once  $w_s$  is determined, the number of child laborers and  $L_z$  are also determined, which in turn, determine the  $Z$ -sector output and  $P_z$ . Given  $L_z$  and the fact that the number of adult unskilled laborers is fixed, the number of unskilled adults who work in the agricultural sector is also determined.

Let us now consider a trade sanction. Since this economy has only two tradable sectors, imposing a ban on either the importable or the exportable sector transforms the economy into a closed one since the balance of trade requires that the value of imports must equal the value of exports. Therefore, imposing a sanction against this economy leads to excess domestic demand for the importable good and excess supply of the exportable good. As a result,  $P_s$  rises and  $P_a$  falls. As the price of the importable good rises, it increases demand for both its inputs (skilled labor and the  $Z$ -sector output). As a result,  $w_s$  rises, as does also  $P_z$ . On the other hand, since there is an excess supply of the exportable,  $P_a$  falls. This leads to a decline in the unskilled adult wage,  $w_a$ . The benefits to be derived from educating one's child therefore increase and fewer children are sent to work. Given that fewer children are sent to work, coupled with an increased demand for adult unskilled labor in the  $Z$ -sector (generated by an increase in  $P_z$ ), employment of unskilled adults increases in the  $Z$ -sector and falls in the agricultural sector. Thus, by increasing the benefits of education, trade sanctions are effective in decreasing the number of child laborers in the economy <sup>4</sup>.

<sup>4</sup>Note that once the wages are endogenously determined in the economy, the bequest levels of skilled



### Child Labor as an Intermediate Input in the Exportable Sector:

In this example, we assume that the input-output coefficient in the skilled sector is fixed. Therefore,

$$S = a_s(\phi N)$$

where  $a_s > 0$  denotes both the average and marginal productivity of skilled labor in the  $S$ -sector. The production function for the agricultural goods sector is now written as:

$$A = ((1 - \phi N))^\rho (Z)^{(1-\rho)}; \quad 0 < \rho < 1$$

This is again a standard constant-returns-to-scale production function with diminishing marginal productivity of the inputs. The production function of the  $Z$ -sector output remains unchanged, as does the materials-balance equation for labor.

$$Z = (L_z + \frac{NF(x^*)}{b})^\delta; \quad 0 < \delta < 1; \quad b > 1$$

and

$$L_a + L_z = (1 - \phi)N$$

Again, with the international prices given, the skilled wage is determined. The labor demand functions for the  $Z$ - and  $A$ -sectors can then be solved simultaneously to obtain the unskilled adult wage. Once the unskilled adult wage has been determined, the number of child workers is determined, as are also the number of adult workers in the  $Z$ - and the  $A$ -sectors. Once the number of unskilled adults working in the  $Z$ -sector and the number of child workers are known, the input demand function of the agricultural sector for the intermediate good ( $Z$ -sector output) yields  $P_z$ .

Imposing a trade sanction in this case has a similar effect, raising the skilled wage, lowering the unskilled one and thereby increasing the incentives in favor of education. However, the unskilled adult labor allocations across the  $A$ - and  $Z$ -sectors will vary with the elasticity of output of these two sectors in regard to unskilled adult labor and the degree of substitution between unskilled adult and child labor in the  $Z$ -sector. This is because a decrease in the price of the exportable good reduces demand for both the  $Z$ -sector output and unskilled adults in agriculture. Since a decrease in the unskilled wage also reduces the number of child workers, the degree of substitution between adult unskilled and child laborers will be the crucial determinant of the employment level of unskilled adults in the  $Z$ -sector. Note, however, that we cannot *à priori* conclude whether a ban on the importable or a ban on the exportable sector will have a greater impact on the number of child laborers. It will depend, once again, on the output elasticities of these two sectors with respect to adult labor and the intermediate input, and on the elasticity of substitution between adult and child labor in the  $Z$ -sector.

and unskilled adults will also have to depend endogenously on the skilled and the unskilled wage, thereby making a dynamic trade model necessary to determine the equilibrium number of child workers (and hence skilled and unskilled adults) in subsequent periods. For the sake of simplicity, we consider only a static, snapshot trade model and dispense with an analysis of the long-term dynamics resulting from the trade sanction.

### $S$ -sector as the Exportable Sector:

In the above two examples we have shown how trade sanctions, by increasing the skilled/unskilled wage differential, lead to a decrease in the number of child workers in the economy. This was because skilled labor was being used in the importable sector, and the excess domestic demand generated by a trade sanction led to an increase in its price. If, however, the skilled adults were engaged in the exportable sector, a trade sanction would lead to a decrease in the price of the skilled-sector output and consequently in the skilled wage. This, in turn, would reduce the incentive to educate one's child, and cause more children to be sent to work.

### 4.3 Discussion of the model results

The conclusion that trade sanctions alter the incentive in favor of education through their effect on the skilled/unskilled wage differential should be treated with caution. Given our assumptions that skilled workers are employed only in the importable sector and that education or child labor are the only two alternatives for a household, this is an obvious conclusion. At the other extreme, if the decision to send a child to work depends on a household's subsistence income as was the case in Basu and Van (*op. cit.*), then a trade sanction that places unskilled workers at a disadvantage would lead to a greater number of children being sent to work. In this sense, the Basu-Van model and ours capture the two polar views of the debate. It remains a challenging task to generate multiple cut-off points on the distribution of bequests such that subsistence consumption is of primary importance for some households. In such a scenario, an increase in the skilled/unskilled wage differential would lead some families to opt for education, while others would opt for child labor. In the same vein, our model does not allow the time worked by a child to vary, but instead assumes that a child allots all his time to work (i.e. the supply of child labor is inelastic). If we allow the time worked by a child to vary, interesting results can be generated. For instance, the decline in the child wage brought about by a trade sanction would lead to an income effect that increases the amount of time a child must work. On the other hand, since the opportunity cost of education has declined, the substitution effect will prompt a child to devote a greater amount of time to education. The net effect could then go either way.

Note that *à la* Basu and Van, a trade sanction in our model is only a partial ban on child labor. Children still work in this economy, albeit in smaller numbers. A total ban on child labor can come about only through the enactment and enforcement of domestic laws regarding child labor. Even though most developing countries have direct and/or indirect child-labor laws in the form of either a minimum age for work or compulsory schooling, it is easy to see why enforcement is lax. If we set the number of child laborers in the informal sector equal to zero, the informal sector output falls. Since the informal sector produces an intermediate input for the importable and the exportable sectors, the output of these sectors falls too, leading to a lower volume of trade and therefore reduced per-capita income. Of course, with the credit market imperfection present, a direct ban



on child labor leads to those children who would otherwise have worked remaining uneducated (unless a concurrent effort is made to reduce the cost of education). This might lead, as advocates against trade sanctions warn, to these children engaging in risky and illegal activities.

We also need to evaluate our results in terms of some other important issues. First, the fact that a trade sanction results in a greater number of children going to school leads to an important question: should such trade sanctions be permanent, or would a temporary ban suffice to alter the incentive in favor of education *permanently*? Note that, since the primary channel through which a trade sanction increases the skilled/unskilled wage differential is through an increase in the relative price of the importable vis-à-vis the exportable good, removal of the sanction would have the opposite effect of lowering the relative price of the importable, decreasing the skilled/unskilled wage differential and thus leading to a renewed increase in the number of child workers. In this scenario, therefore, a trade sanction would have to be permanent in order to fulfill the objective of reducing the number of child workers in an economy. The only case in which a temporary sanction could permanently alter the incentives in favor of education is if the skilled sector were to be subject to increasing returns to scale and a household's private return on educating a child consequently diverged from the social return. In this case, a temporary ban could release an economy from a low-level education trap.

Second, we have ignored the issue of uncertainty. Uncertainty in the decision making process of a household is relevant for differences between the wages of skilled and unskilled workers, concerning employment opportunities and with respect to life expectancy. For example, the possibility of unemployment, particularly in the skilled sector is a very common phenomenon in developing economies due to structural bottlenecks (labor contracts, unions, etc.). If the probability of unemployment exists, then a trade sanction would leave a relatively large number of educated workers either facing unemployment or seeking work in the informal or agricultural sectors, thus compounding the decline in the unskilled adult wage and therefore the child wage.

Third, we need to discuss the effect on consumption of the two goods among the three groups of households in our model (lenders (who educate their children), borrowers and those who send their children to work) consequent to a trade sanction.

- Since the price of the good produced by the skilled sector rises and that produced by the unskilled sector falls, households that send children to work will have to reduce their consumption of the skilled-sector good, while the substitution effect will encourage them to consume more of the unskilled-sector good (since its price has fallen) and the income effect will encourage them to reduce consumption (since unskilled wages have fallen). Assuming the unskilled good to be normal in consumption, the net effect would be to increase consumption of the unskilled-sector good.
- For borrowers, the substitution effect will encourage them to consume less of the skilled-sector good (since the price of the skilled good has increased), while the income effect will encourage them to consume more (since the skilled wage has in-

creased). Assuming again that the skilled-sector good is normal, the net effect would be a decline in the consumption of the skilled-sector good. The consumption of the unskilled-sector good unambiguously rises since the substitution effect and the income effect reinforce each other.

- Following the same line of reasoning as above, lenders' consumption of the skilled-sector good falls, while that of the unskilled-sector good rises. It is noteworthy that the decline in consumption of the skilled-sector good by borrowers is larger than the decline in consumption of the same good among lenders. However, the case is just the opposite for the unskilled-sector good; the increase in consumption of the unskilled-sector good is larger among borrowers than among lenders.

Fourth, we need to ask whether the existence of multiple exportable sectors leads to a change in our qualitative conclusion. Since there are only two sectors in our model, a trade sanction has the effect of transforming the economy into a closed one. However, if a country has multiple export sectors (assuming for the sake of simplicity that they all employ only unskilled adult labor) and only one of them uses child labor through an intermediate input, then imposing a sanction solely against this sector does not translate into autarky. Nevertheless, imposing a sanction on even one exportable sector will lead to a decrease in the volume of exports and therefore of imports. This, in turn, would raise the relative domestic price of the importable good and hence give rise to an increase in the skilled wage, altering the incentive in favor of education. Once again, we need to exercise caution in advocating this result as the concerns raised in regard to our original model remain.

Fifth, the skilled/unskilled wage differential could be increased by improving technology in the skilled-goods sector, instead of by imposing a trade sanction. Note that an increase in  $\Pi$  or  $a_s$  leads to a shift in the production function of the skilled sector. This directly implies that the marginal productivity of skilled workers increases, which in turn means that the skilled wage increases. Thus, technological improvements in the skilled-goods sector has the effect of altering the incentives in favor of education.

Sixth, the fundamental feature of our model that segments households into the two categories of those who educate their child and those who do not, is the presence of the credit market imperfection. Since the first and best policy is always to tackle the problem at its source, resources should be directed toward reducing the cost of monitoring loans. As we showed earlier in this paper, a higher degree of efficiency in the credit market will automatically prompt more households to favor education. Along the same lines, a concurrent policy would be to reduce the cost of education by increasing the availability of schools.

Seventh, a distinction between the "demand for children and the "demand for child labor is important to address two issues of relevance in developing countries, namely old age insurance and population growth. In our analysis, the demand for child labor solely

derives from the producers of the informal sector, and the demand for children depends on the household needs, i.e. the poorer a household the higher will be the demand for children as kind of an insurance in old age. However, the distinction in the model is immaterial, since (a) every family has only one child and (b) education and child labor are the only two alternatives; the demand for child labor exactly matches the number of children who are sent to work.

Lastly, the implications of a variation of the discount rate, which can i.e. depend on the family's income level, have not been further analyzed. In general, poor households have a higher rate of time preference. With respect to intertemporal decision making they can thus be expected to act differently as compared to households being better off.

## 5 Policy Implications

### 5.1 Framework for policy analysis

Tables II and III below categorize various policy approaches according to whether they are aimed primarily at curbing the supply or the demand of child labor and schooling.

Table II: Categorization of measures against underage economic activity in terms of their effect on the market for child labor

Demand side	Supply side
<ul style="list-style-type: none"> <li>• Subsidies to cover school-related expenses</li> <li>• Increased access to credit markets and market or low interest loans</li> <li>• Cash stipends to school children</li> <li>• Food programs (such as free lunches) at schools</li> <li>• Increased intensity and enforcement of truancy laws</li> </ul>	<ul style="list-style-type: none"> <li>• Increase physical access to public schooling</li> <li>• Improve quality of public schooling, e.g. by having adequate pupil/teacher ratios and job-oriented curriculums</li> <li>• Encourage private and community initiatives aimed at extending and improving schooling</li> </ul>

Source: Own classification.

Most programs affecting the supply of child labor pursue the objective of sustainably improving the economic situation of families and/or communities and therefore have the result of making families more independent of child-labor income (Table II). These include income-generating programs such as the provision of support to small- and medium-scale enterprises, credit schemes, preferably combined with savings schemes, employment training and apprenticeships programs. The latter increase job opportunities for children in the formal market. However, there is also a danger of employers exploiting children as a cheap labor force, instead of promoting their development and education.

Further measures that affect the supply of child labor include income-replacing policies, poverty-alleviating measures as well as growth-oriented and family-planning policies. These policies differ in terms of their short- and longer-term effects. While income-replacing policies promise to reduce child labor in the short term, Hemmer et al. (1996) stress the importance of poverty-alleviation strategies in reducing child labor over the longer term. These refer to the determinants of absolute poverty, such as the endowment of resource ownership, productivity in using resources and the net earnings realized through the productive use of resources (Hemmer, 1994). Over the longer term, there is also ample evidence that labor standards rise as countries achieve higher levels

of economic development and per-capita incomes. By definition, poor countries must experience economic growth in order to reach a level of economic well-being in which child labor is not utilized. The faster these countries grow, the more quickly will poverty-related problems such as child labor disappear. Acknowledging that the phenomenon of child labor is complex and likely to differ from country to country, we consider the merits of policies promoting overall growth and stability in comparison to directly targeted legislation that determines demand for child labor.

Most policy measures having an impact on the demand side of the child-labor market, for example the use of codes of conducts, increased enforcement measures or trade sanctions, have been discussed in previous sections of the paper. Furthermore, awareness-building campaigns have been identified as useful activities at the community level, but affect the demand side of the child-labor market and might have the effect of a partial ban.

Table III: Categorization of measures against underage economic activity in terms of their effect on the market for schooling

Supply side	Demand side
<ul style="list-style-type: none"> <li>• Replacing income of child labour to poor families.</li> <li>• Employment training and apprenticeships programs</li> <li>• Income-generating policies, incl. microfinance.</li> <li>• Poverty reduction and distributional policies.</li> <li>• Growth-oriented (i.e. trade and technology) policies.</li> <li>• Family planning policies</li> </ul>	<ul style="list-style-type: none"> <li>• Trade sanctions restricting imports of products using child labour inputs (has the effect of a partial ban)</li> <li>• Use of labeling schemes or codes of conducts for enterprises that prohibit child labour</li> <li>• Increased staffing, training and equipment for labour inspection authorities</li> <li>• Public awareness campaigns with action against products made with child labour (may have the effect of a partial ban)</li> </ul>

Source: Own classification.

As can be seen from Table III, there are a variety of policy measures that affect the demand side of the market for schooling. For example, there are different forms of income-substitution activities that aim at encouraging children to go to school and keeping them in school (Anker and Melkas, 1996). School feeding programs count as one of the most common and effective measures among them. It is necessary to devote attention to the timing of meals in order to prevent children from merely coming for the meal and then leaving again, and to increasing the childrens' capacity for learning. Target groups of the food programs include not only child laborers, but also children who are most in

need of food. The selection of the target group depends on the goal of the program as well as on the available resources. School lunch programs may also have a positive impact on the employment opportunities of mothers, since they no longer have to prepare lunches for their children.

Perhaps of greater importance for keeping children at school, however, are other measures affecting the demand side of the schooling market as free tuition, free textbooks, uniforms, transport or housing. A disadvantage of some of these programs is that payments in kind can be sold instead of being used by the child specifically targeted.

Cash stipends or cash grants to school children, on the other hand, have to be used by a specific target child in a family. Also advantageous is the fact that girls can be more easily reached, as families are often selective in deciding which children to send to school. Cash grants can be given to children or to families to compensate for the child's lost earnings. Cash grants enable families to allocate the money according to their needs, but misuse of grant money is still possible, e.g. the father spends it on alcohol. If the grant is paid directly to the targeted child, there is also the danger that the child might give it to his family, who might not spend it accordingly, or the child himself might use the money for other things than schooling. Cash grants can be paid in regular, either weekly or monthly, installments, or in a lump sum at the end of the semester, depending on the child's school attendance and/or success/achievement. Some of these policy measures such as income-substitution programs can also prompt parents to intentionally send their children to work in order to qualify for a benefit. Further research in this respect is needed.

On the supply side, improving the quality of schooling is one possible approach toward improving school attendance and retention. Schools must therefore provide the relevant skills, and curriculums should be job-oriented. In case schooling is not seen as appealing enough, work leading to visible assets will be favored.

## 5.2 Interdependence of policy approaches

Analysis of the markets for child labor and schooling has led us to very different policy implications with the same results, depending on the underlying economic forces. If an unmet excess demand for schooling is increasing child labor, then simply increasing the supply of education may solve the problem naturally. If this is not an affordable option for the country in question, a more effective anti-child-labor policy on the part of the industrialized countries would be to subsidize local educational budgets, rather than to impose a ban on child labor.

As we have seen, if the education market clears, increasing the supply may have little effect on child labor. In these cases, we must consider either (1) increasing the demand for schooling (when supply is adequate), or (2) decreasing either the demand or

supply of child labor. As we have discussed above, decreasing the demand for child labor in the absence of complementary income policies may actually lower household welfare. A case for this approach might be made if the overall benefit to society from the externalities induced by the resulting increased demand for schooling were greater than the direct welfare loss to families. However, in cases where education supply is deficient or demand for education is very low due to other factors such as low returns on schooling, the overall impact of such a policy is more likely than not to be negative.

Most international policies are geared towards reducing the demand for child labor, which again might actually lower household welfare. For example, labeling laws and outright bans on child-labor products all fall into this category. Increasing the perceived returns on schooling is less a policy option than a complex process that is intrinsically interrelated with overall economic and social development. In as much as overall economic growth can contribute to this process, however, policies that promote healthy economic conditions and income mobility may indirectly do more to reduce child labor than some forms of direct intervention. In other cases, if the perceived returns on education are sufficient to justify schooling, but families either face prohibitive liquidity constraints or lack sufficient incentives to send children to school, the problem may be resolved by increasing access to credit markets and subsidizing schooling costs through school-lunch and fund for education programs (as in Bangladesh).

In economies with sizable informal sectors, it is difficult to implement policy measures to increase adult wages without having a negative influence on employment. However, increases in productivity and efficiency and consequent economic growth will give rise to natural increases in wages without direct government intervention in the labor market. This is an important point as increases in (adult) wages brought about by increased productivity and/or an increase in demand may have very different effects on child labor than those resulting from a government-mandated wage increase. In particular, the latter may result in a downward shift in the adult labor demand schedule, which could lead to increased child-labor demand among firms as well as increased supply of child-labor by poor families in which the adults have lost their jobs. An endogenous increase in adult wages resulting from economic forces may have two effects on child labor. On the one hand, there is an income effect in which the higher income of the parents allows the children not to work or to work less (and this may be complemented by overall increased adult employment). On the other hand, there could also be a substitution effect in which the demand for child labor increases, as long as child and adult labor are substitutable, if the wage gap between them increases.

### 5.3 Targeting school enrollment rates

One major economic argument against child labor is that it detracts from schooling, which in turn harms the country's long-term accumulation of human capital. Endogenous growth theories based on human-capital accumulation argue that economy-wide

externalities of education are not captured at the individual level, and individuals consequently under-invest in human-capital accumulation relative to the society's optimum. Based on this class of theories, one can argue that child labor not only harms the individual's well-being, but may actually slow the economic growth of the whole economy as well. If one accepts this line of argument, there is a strong case to be made for targeting school-enrollment rates rather than child-labor rates directly.

The major argument promoted by this line of thought is that the primary harm to society resulting from child labor is the loss/non-realization of potential human capital represented by educational attainment. Policies which increase school-enrollment rates will in the long run not only contribute to reducing poverty and child labor, but even in the short term should reduce child labor since school attendance is incompatible with full-time and often the most onerous forms of economic activity.

However, there is a strong case to be made for paying extra attention to school-enrollment rates. We suggest that social-development economists use school-enrollment rates as intermediate targets for reducing child labor. Not only is schooling easier to measure (in fact, some argue that child labor can never be accurately measured), but there is comparable historical data for many countries which makes possible both cross-country, time series or panel data research into the determinants of schooling. This implies that the efficacy and success of alternative policies is more transparent and easier to study than policies whose objective function is to reduce something that cannot be effectively measured. Table IV below provides a glimpse of school participation in developing countries classified according to level of per-capita income.

Table IV: School participation in developing countries by level of per-capita income

Country	Per capita GNP (US-\$)	Primary school enrollment (net)	Children reaching grade V	Adult literacy (%)
<b>Africa</b>				
Burundi	160	52	74	35
Chad	180	38	28	48
Egypt	790	78	98	51
Ghana	390	70	80	65
Kenya	280	84	68	78
Uganda	240	64	55	62
<b>Asia</b>				
Bangladesh	240	82	47	38
India	340	68	62	52
Nepal	200	61	52	28
Philippines	1050	90	70	95
Thailand	2740	87*	88	94
<b>Latin America</b>				
Brazil	3640	93	70	83
Mexico	3320	100	85	90
Peru	2310	91	n.a.	89

\* Primary school Gross enrollment rate

Source: Own composition with data from UNICEF, 1998.

As can be seen from Table IV, countries with low per-capita GNP generally have lower rates of primary-school enrollment and higher drop-out rates. However, there are exceptions like Kenya, which has relatively high rates of enrollment of 84% and drop-out rates of 80%. Also India and Nepal belong to this category, however, as their drop-out rates are relatively high, ranging between 52 and 62%. It is important to clarify that (1) enrollment rates should be analyzed in combination with drop-out rates, and (2) the idea that researchers should make better use of school-enrollment and drop-out rates as a research tool for understanding child labor implies neither that schooling and child labor are mutually exclusive nor that increasing schooling will automatically decrease child labor. There is a difference between using schooling as an intermediate target and indicator, and holding schooling up as the ultimate objective. Government policy attempting to impose higher enrollment rates without taking into account the underlying economic supply and demand forces which led to poor schooling outcomes in the first place have a high probability of failure. In general, only in those cases in which inadequate schooling supply is the main culprit can direct government spending on education be completely effective. For example, Alan Krueger (1996, p. 297) has shown tremendous non-compliance (even in historical UK data) with mandatory compulsory schooling. Thus, just passing laws and building schools may often not be enough.

Our contention here is that in the context of our supply and demand analysis, a better understanding of the market for schooling cannot help but improve our ability

to customize anti-child-labor policies to the particular situation of each country. By studying whether there is excess demand for schooling, for example, it will be possible to determine whether increases in schooling accessibility will affect child labor or not, as per our previous analysis. This kind of information allows policy-makers to direct resources to the points where they are likely to have the biggest impact. In those more difficult cases where supply of schooling is adequate, a better understanding of the determinants of the demand for schooling will contribute enormously to our understanding of the supply determinants of child labor. This is easily seen by the fact that most of the determinants of schooling demand are also explanatory factors of child labor supply, and it is sensible to assume that in fact these two decisions are made simultaneously. Thus, by addressing educational decisions, policy-makers must indirectly deal with the decisions leading to child labor. Unlike child labor, however, the educational outcomes of these decision processes are easily observed and studied, and policies may thus be more finely tuned to achieve the desired results.

#### 5.4 Optimizing the marginal impact of available resources

A point that has come up repeatedly throughout this paper is the argument that the best method of eliminating child labor has been to achieve economic prosperity. There is ample evidence that labor standards rise as countries achieve higher levels of economic development and per-capita incomes. By definition, poor countries must experience economic growth in order to reach a level of economic well-being where child labor is not utilized. The faster growth is, the more quickly will poverty-related problems such as child labor disappear.

Despite the seeming clarity of this line of argument, this theory has detractors, for which there are several possible explanations. First, the statement that economic growth is an excellent way to reduce child labor is based on a long-term relationship that is almost an identity, and does not necessarily imply that short-term fluctuations in the growth rate will be correlated with fluctuation in child-labor rates. In addition, there are many reasons why it might be econometrically difficult to find an inverse short-term relationship between child labor and growth, even if one existed. For example, recent research from the IDB cited in the Economist (March 21, 1998) showed that economic growth in Latin America has been at its highest rates since 1982. At the same time, however, unemployment in the region has increased from an average of 5% to almost 8% explained by increased efficiency in both the public and private sectors brought about by trade liberalization and reforms.

If the slower job growth were due to diminishing demand for labor, however, wages would also be expected to fall, but in fact, the IDB found that overall real wages have increased 15% since 1991. Instead, one major reason for the increase in informal-sector work and slower creation of formal-sector jobs seems to be the heavy cost inflicted on formal-sector firms by labor laws. According to the IDB, these costs may constitute up

to 70% of total costs in Brazil and make it difficult to dismiss workers. Both of these measures discourage hiring in the formal sector and promote the growth of informal arrangements. If more families lack economically active adults or the adults are pushed into the lower-paying informal sector, it might be expected that child labor could increase. Thus, paradoxically, labor standards meant to protect workers (including children) may actually be a contributing factor in increasing the wage gap between skilled and unskilled workers and increasing overall adult unemployment and child labor. Since more flexible labor markets should eventually lead to increased employment and growth of the formal sector, one possible solution might be to loosen existing labor laws to allow the more marginalized workers to derive greater benefit from the economic growth of the economy. This general point is repeated by Alan Krueger (1997)

The costs of labor standards are probably borne by the country with the standards, in the form of lower wages, higher product prices, or devalued currency. Many labor standards are normal goods, for which demand is likely to increase with economic growth. Thus standards that sacrifice economic growth could have a negative effect on working conditions in the long run (p.299).

At any rate, this example illustrates why it might be possible to observe no short- or even medium-term correlation between growth and child labor, even if one does in fact exist. It may be the case that once one controls for the extent of the informal sector and unemployment, the Latin American countries with higher growth rates do in fact display lower rates of child labor. While this is purely speculative at this point, it does illustrate the difficulty involved in properly untangling the economic correlates of growth, especially in the short run.

For now, let us accept that, at least in the long run, the most effective method of combating child labor in a country is to improve its wealth and economic prosperity. However, short-term direct interventions may or may not improve household welfare or may even have a negative impact on growth; for example, a labor policy that indirectly inhibits economic growth, will have a diminished and conceivably even a negative long-term effect on child labor.

In addition, policy-makers should take into account the opportunity costs of direct policies and legislation aimed at reducing child labor. The same resources could be utilized in more general, growth-enhancing, short-term measures such as income-replacing or income-generating policies, school feeding programs, cash stipends or other subsidized school supply and skill training programs. Thus, we should compare alternative uses of resources in terms of their respective degrees of efficacy in achieving the objective of reducing child labor. The indirect marginal impact on child labor produced per dollar spent on policies that support more efficient allocation of resources and economic growth could conceivably be greater at some level, especially in the long run, than the marginal impact of additional legislation directed specifically at child-labor practices. This does not mean that direct policies should not be used or that they have no value; it means

only that the marginal impact on child labor of additional money spent on direct intervention might be greater at some point in the long run if this funding were instead directed toward improving economic efficiency and growth potential. If it is in fact the case that industrialized countries' policies to curb exploitative labor practices in developing countries have an impact on only a small proportion of the people affected and only strong economic fundamentals and growth can bring about long-term systemic labor reform, policy-makers in the industrialized countries should recognize that direct efforts going beyond a certain point are primarily for easing the conscience of the West and not necessarily the most efficient approach toward solving the problems entailed in child labor.



## 6 Conclusion

As was discussed, most international programs focusing on underage economic activity are aimed primarily at curbing the demand for child labor at the company level and increasing the accessibility of schooling. The latter involves explicit costs borne directly by the government or policy agency, while the former entails more hidden costs borne by the companies. It is not surprising, therefore, that more attention is paid to pressuring companies into abiding by tougher labor standards. However, as we have shown, this approach may ultimately do more harm than good. Total or partial bans on child labor have the potential to lower household welfare under realistic assumptions. In addition, reduced labor flexibility may slow overall economic growth, which may in turn prolong the period in which conditions favoring child labor continue to prevail. We have argued that the underlying economic determinants of child labor supply must be addressed directly, and if they are not, a ban on child labor may not be effective in raising household welfare even if combined with policies aimed at increasing the supply of schooling. We do not claim that such efforts are bad or even always undesirable, but simply that they have the potential of backfiring in some cases and that more in-depth analysis is required before too many resources are devoted to this approach. In particular, some policies may be effective in helping families that would otherwise not have quite enough to decide to send their children to school, while being ineffective or even harmful to extremely poor families.

Using a very simplistic framework, we have shown that if the only alternative to child labor is education and if all educated workers are employed in the importable sector, then a trade sanction could lead to an increased number of children opting for education. However, such a trade sanction would have to be a permanent one. This model, therefore, provides a counter argument to the subsistence-consumption theory of child labor. We have also highlighted the factors which need to be taken into account before drawing conclusions based on either of these simple models. A sanction may have far-reaching consequences if it fails to take into account all the proper variables.

Although a workable solution to the problem of child labor is clearly very complex and difficult to achieve, we have made several concrete suggestions. In particular, we advocate more in-depth research into the demand and especially the supply determinants of child labor. Due to the lack of high quality data on child labor, we have suggested that studies on the demand for schooling could provide a great deal of insight into the factors that affect the supply of child labor. In addition, child-enrollment rates and drop-out rates could be used as a type of intermediate target for analyzing the effectiveness of alternative policies.

In addition, we acknowledge that with limited resources, it is important to judge carefully which policies will achieve the greatest impact. We have argued that economic growth is crucial to solving child-labor problems over the long term and that policies which directly or indirectly affect growth will consequently also have an impact on labor standards.

Just as economic liberalization and growth-oriented policies will influence the prevalence of underage economic activity and labor standards in general, we have emphasized in this paper that the reverse is also true. Golub (1997) points out that, 'low labor standards and low wages both reflect the abundance of unskilled labor and low productivity in developing countries .... Forcing poor countries to adopt and enforce tougher labor standards may raise their labor costs if the implementation of such standards in effect lowers the labor-intensity of production and reduces the comparative advantage of the country in this sector.' (p. 21) Thus, policy-makers should carefully consider and take into account the impact of alternative policies on overall economic growth.

Finally, our emphasis on analyzing the underlying economic forces that drive the market for child labor stems from the belief that the way in which change in certain economic variables is brought about is at least as important as the change itself in terms of the impact it may have on child labor. We have consequently argued that wage increases resulting from endogenous productivity increases will have very different effects on the incidence of child labor than will a government-mandated wage increase. Analogously, an increase in school enrollments resulting from a rise in the underlying demand for schooling via endogenous economic processes will have a better outcome than a government-mandated schooling requirement in the absence of such economic changes. In fact, we have shown how it is possible for many well-meant interventions to have negative welfare effects on the very people they are intended to help if the underlying economic mechanisms at work are ignored.

In sum, partial bans such as multinational voluntary codes of conduct and market-based labeling schemes may improve the working conditions of a small percentage of child workers in developing countries, and in some marginal cases may even result in some families sending their children back to school. However, the underlying economic conditions that have led the poorer families in those countries to send their children to work must be addressed directly within the context of overall economic-development policy if permanent and comprehensive solutions to the phenomenon of child labor are to be found. Our basic conclusion reinforces the view of Srinivasan (*op. cit.*), in that the best method of eliminating child labor is not through trade sanctions, but through a greater allocation of resources toward eliminating the market imperfections that lead to the emergence and persistence of child labor.



## Appendix A Formal Model of Child Labor

### Education/Child-Labor Trade-Off:

The education/child-labor trade-off model presented in section 2 is a variant of the Galor and Zeira (1993) model of income distribution and macroeconomics. Since all individuals in the economy, unskilled or skilled, have the same utility function and face the same prices for the two final consumption goods, we write the utility function of a representative agent as:

$$U = \alpha \log C + (1 - \alpha) \log x \quad (4)$$

where  $C = (S)^\beta (A)^{(1-\beta)}$ ;  $0 < \beta < 1$  and  $x$  is the level of bequests. We shall assume that  $x \in [0, \infty]$  with a finite mean and that the cumulative distribution function of  $x$  is given by  $F(x)$ .  $\alpha > 0$  is the weight an individual attaches to his/her own and his/her child's consumption in the current period and his/her own consumption in the next period. Maximizing an individual's utility function subject to the budgetary constraint yields the indirect utility function:

$$V = \log \hat{w} - \epsilon_P + \epsilon_\alpha \quad (5)$$

where

$$\begin{aligned} \epsilon_P &= \alpha \beta \log P_s + \alpha(1 - \beta) \log P_a \\ \epsilon_\alpha &= \alpha \beta \log \alpha \beta + \alpha(1 - \beta) \log \alpha(1 - \beta) + (1 - \alpha) \log(1 - \alpha) \end{aligned}$$

Note that  $\hat{w}$  depends on whether the adult is skilled or unskilled, a lender or a borrower, the amount he has inherited and whether he chooses to send his child to school or to work. Consider, therefore, the indirect utility of a skilled adult who is a lender. Assuming a lending rate of interest of  $r$ , a cost of education of  $h$ , a skilled wage of  $w_s$  and an unskilled wage of  $w_a$ , an adult choosing to send his child to school has the following indirect utility  $V_{E_l}^e$  and bequest level  $x_{E_l}^e$ :

$$\begin{aligned} V_{E_l}^e &= \log((x - h)(1 + r) + w_s) - \epsilon_P + \epsilon_\alpha \\ x_{E_l}^e &= (1 - \alpha)[(x - h)(1 + r) + w_s] \end{aligned}$$

where the discount rate is assumed to be unity.  $(x - h)(1 + r)$  is the current period cost of educating the child, while  $w_s$  is the next period income of the educated child as a skilled adult. Similarly, consider the indirect utility and bequest level of an educated lender,  $V_{E_l}^c$  and  $x_{E_l}^c$ , who sends his child to work.

$$\begin{aligned} V_{E_l}^c &= \log((x + \nu w_a)(1 + r) + w_a) - \epsilon_P + \epsilon_\alpha \\ x_{E_l}^c &= (1 - \alpha)[(x + \nu w_a)(1 + r) + w_a] \end{aligned}$$

where  $\nu w_a$  is the child wage (a fraction of the adult unskilled wage).

An educated lender will therefore send his child to school if and only if  $V_{E_l}^e \geq V_{E_l}^c$  or,

$$w_s - w_a \geq \nu w_a(1 + r) + h(1 + r)$$

which is equation (1) in section 4. Now consider the decision of an educated borrower, whose indirect utility and bequest level,  $V_{E_b}^e$  and  $x_{E_b}^e$ , from sending his child to school are:

$$\begin{aligned} V_{E_b}^e &= \log((x - h)(1 + i) + w_s) - \epsilon_P + \epsilon_\alpha \\ x_{E_b}^e &= (1 - \alpha)[(x - h)(1 + i) + w_s] \end{aligned}$$

where  $i = r + \Omega$  is the borrowing rate of interest. Similarly, an educated borrower's indirect utility and bequest level from sending his child to work,  $V_{E_b}^c$  and  $x_{E_b}^c$ , are:

$$\begin{aligned} V_{E_b}^c &= \log((x + \nu w_a)(1 + r) + w_a) - \epsilon_P + \epsilon_\alpha \\ x_{E_b}^c &= (1 - \alpha)[(x + \nu w_a)(1 + r) + w_a] \end{aligned}$$

An educated borrower will therefore send his child to school if and only if

$$w_s - w_a \geq \nu w_a(1 + r) + h(1 + r) + (h - x)(i - r)$$

which is equation (2) in section 4.

Following the same calculus as above, we can pin down/determine the indirect utility and bequest levels of an uneducated lender who sends his child to school:

$$\begin{aligned} V_{U_l}^e &= \log((x - h)(1 + r) + w_s) - \epsilon_P + \epsilon_\alpha \\ x_{U_l}^e &= (1 - \alpha)[(x - h)(1 + r) + w_s] \end{aligned}$$

If he sends his child to work, the corresponding indirect utility and bequest level are:

$$\begin{aligned} V_{U_l}^c &= \log((x + \nu w_a)(1 + r) + w_a) - \epsilon_P + \epsilon_\alpha \\ x_{U_l}^c &= (1 - \alpha)[(x + \nu w_a)(1 + r) + w_a] \end{aligned}$$

An uneducated lender will therefore send his child to school if and only if  $V_{U_l}^e \geq V_{U_l}^c$  or,

$$w_s - w_a \geq \nu w_a(1 + r) + h(1 + r)$$

which is again equation (1) in section 4. An uneducated borrower's pay-offs, similarly, are:

$$\begin{aligned} V_{U_b}^e &= \log((x - h)(1 + i) + w_s) - \epsilon_P + \epsilon_\alpha \\ x_{U_b}^e &= (1 - \alpha)[(x - h)(1 + i) + w_s] \end{aligned}$$

and

$$\begin{aligned} V_{U_b}^c &= \log((x + \nu w_a)(1 + r) + w_a) - \epsilon_P + \epsilon_\alpha \\ x_{U_b}^c &= (1 - \alpha)[(x + \nu w_a)(1 + r) + w_a] \end{aligned}$$

Therefore, an uneducated borrower will send his child to school if and only if

$$w_s - w_a \geq \nu w_a(1+r) + h(1+r) + (h-x)(i-r)$$

which is again, equation (2) in section 4.

Note that the decision to send a child to school or to work does not depend on the education level of the parent but on his bequest, the cost of education and the degree of the credit market imperfection. Since by assumption, all lenders educate their children, we can derive equation (3) in section 5 from the comparison of a borrower's indirect utilities. Therefore, rewriting equation (3),

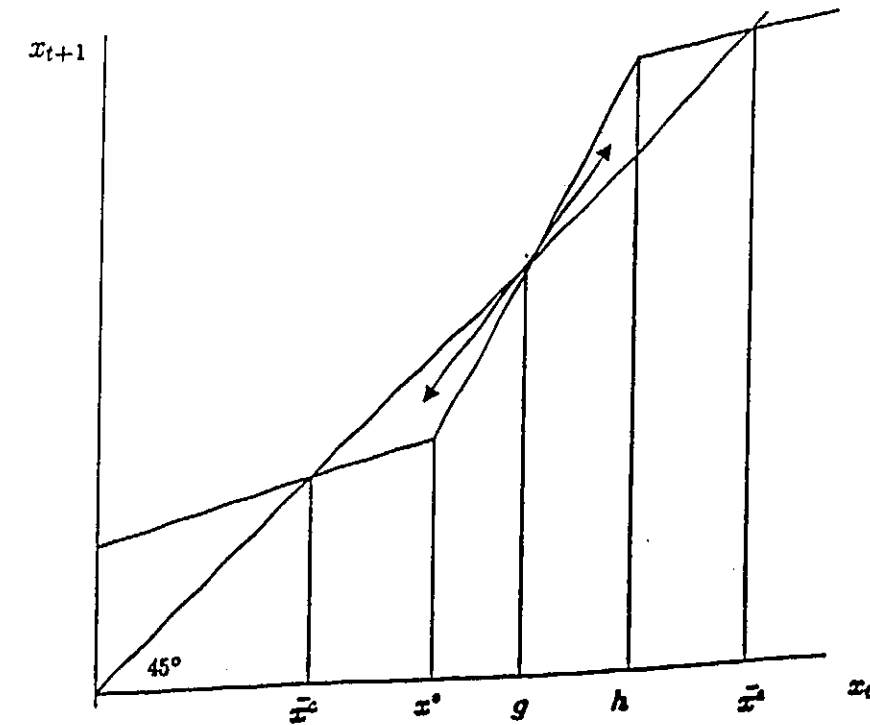
$$x \geq \frac{(1 + \nu(1+r))w_a + h(1+i) - w_s}{\Omega} = x^*$$

gives us the number of children who work as  $NF(x^*)$ . Note that in order to keep the analysis tractable, we consider only the situation where the adult is the sole decision-maker in any time period. For instance, one could think of situations where the child chooses an action (education or labor) which produces a payoff for the household. The adult observes the child's choice and then decides on the level of bequests (the *Rotten-Kid Theorem* of Becker (1974)) or lets the child choose the amount she wants to save from her income as an adult laborer and then, after observing the child's choice, decides on the level of bequests just before she dies (the *Samaritan's Dilemma* of Buchanan (1975)). Finally, our model has the same long-term dynamic evolution of bequests as that of Galor and Zeira (1993). Since the adult population is divided into three groups: (i) those with bequests  $x \geq h$ , (ii) those with  $x^* \leq x < h$  and (iii) those with  $x < x^*$ , the long-term evolution of bequests are:

$$x_{t+1} = \begin{cases} (1-\alpha)[(x-h)(1+r) + w_s] & \forall x \geq h \\ (1-\alpha)[(x-h)(1+i) + w_s] & \forall h > x \geq x^* \\ (1-\alpha)[(x + \nu w_a)(1+r) + w_a] & \forall x < x^* \end{cases}$$

Now consider Figure IV below, in which the upward sloping lines capture the bequests of the three segments of the population. Under the stability conditions  $1 > (1-\alpha)(1+r)$  and  $(1-\alpha)(1+i) < 1$ , there are two long-term equilibria,  $\bar{x}^e$  and  $\bar{x}^c$ . All adults with bequests between  $x^*$  and  $g$ , i.e. those who are currently borrowing to send their child to school, will have their future generations ultimately choosing child labor, while the future generations of the borrowers with bequests between  $g$  and  $h$  will end up educating their children.

Figure IV



In the above figure, the values of  $\bar{x}^e$ ,  $\bar{x}^c$  and  $g$  are given by:

$$\begin{aligned} \bar{x}^e &= \frac{(1-\alpha)[w_s - h(1+r)]}{1 - (1-\alpha)(1+r)} \\ \bar{x}^c &= \frac{(1-\alpha)[1 + \nu(1+r)]w_a}{1 - (1-\alpha)(1+r)} \\ g &= \frac{(1-\alpha)[w_s - h(1+i)]}{1 - (1-\alpha)(1+i)} \end{aligned}$$

**Digression:** We wish to show that if an adult in the second period of his life gets paid at the beginning of the period, the decision to educate depends on the adult's wage and the bequest level. In this case, there are two cut-off points on the distribution of bequests, one for educated borrowers and the other for uneducated borrowers. Consider, then, the indirect utility and bequest level of an educated lender who sends his child to school:

$$\begin{aligned} V_{E_t}^e &= \log((w_s + x - h)(1+r) + w_s) - \epsilon_P + \epsilon_\alpha \\ x_{E_t}^e &= (1-\alpha)[(w_s + x - h)(1+r) + w_s] \end{aligned}$$

Similarly, the corresponding values for an educated lender who chooses to send his child to work are:

$$\begin{aligned} V_{E_t}^e &= \log((w_s + x + \nu w_a)(1+r) + w_a) - \epsilon_P + \epsilon_\alpha \\ x_{E_t}^e &= (1-\alpha)[(w_s + x + \nu w_a)(1+r) + w_a] \end{aligned}$$

Therefore, an educated lender will always send his child to school if and only if:

$$w_s - w_a \geq \nu w_a(1+r) + h(1+r)$$

Similarly, an uneducated lender will also send his child to school if and only if,

$$w_s - w_a \geq \nu w_a(1+r) + h(1+r)$$

Thus, the lender's choice remains unaffected, regardless of whether he/she is educated or uneducated.

However, consider the indirect utilities and bequest levels of an educated borrower who sends his child to school or to work, respectively:

$$\begin{aligned} V_{E_b}^e &= \log((w_s + x - h)(1+i) + w_s) - \epsilon_P + \epsilon_\alpha \\ x_{E_b}^e &= (1-\alpha)[(w_s + x - h)(1+i) + w_s] \\ V_{E_b}^c &= \log((w_s + x + \nu w_a)(1+r) + w_a) - \epsilon_P + \epsilon_\alpha \\ x_{E_b}^c &= (1-\alpha)[(w_s + x + \nu w_a)(1+r) + w_a] \end{aligned}$$

An educated borrower will therefore send his child to school if and only if,

$$w_s - w_a \geq \nu w_a(1+r) + h(1+r) + (h - x - w_s)(i - r)$$

Notice that the last term on the right-hand side now includes  $w_s$ . Similarly, an uneducated borrower will send his child to school if and only if:

$$w_s - w_a \geq \nu w_a(1+r) + h(1+r) + (h - x - w_a)(i - r)$$

Note from the above equation that the decisions to send a child to school made by educated and uneducated adults are no longer the same. Since  $w_s > w_a$ , a higher fraction of children born to educated adults will be sent to school.

#### Production and Trade:

We shall consider only the case where the intermediate good is used in the importable skilled-goods sector and leave the solution of other cases to the interested reader. Consider the production functions of the three sectors and the materials-balance equation for unskilled adult labor:

$$S = \Pi(\phi N)^\sigma (Z)^{(1-\sigma)} \quad (6)$$

$$A = aL_a \quad (7)$$

$$Z = (L_z + \frac{NF(x^*)}{b})^\delta \quad (8)$$

$$L_a + L_z = (1-\phi)N \quad (9)$$

The marginal productivity of the three sectors can be written as:

$$P_s \frac{\partial S}{\partial(\phi N)} = P_s \sigma \Pi(\phi N)^{(\sigma-1)} (Z)^{(1-\sigma)} = w_s \quad (10)$$

$$P_s \frac{\partial S}{\partial Z} = P_s (1-\sigma) \Pi(\phi N)^\sigma (Z)^{-\sigma} = P_z \quad (11)$$

$$P_z \frac{\partial Z}{\partial L_z} = P_z \delta (L_z + \frac{NF(x^*)}{b})^{\delta-1} = w_a \quad (12)$$

$$P_z \frac{\partial Z}{\partial(NF(x^*))} = P_z \delta (L_z + \frac{NF(x^*)}{b})^{\delta-1} = b\nu w_a \quad (13)$$

$$P_a = \frac{w_a}{a} \quad (14)$$

As soon as equation (14) determines  $w_a$ , total labor demand in the  $Z$ -sector is known, which means that, substituting for  $Z$  in equation (10), we have one equation in one unknown  $w_s$ . Once  $w_s$  has been determined,  $NF(x^*)$  is determined, as is also  $L_z$ . Once  $L_z$  has been determined, equation (9) determines  $L_a$ . With  $L_z$  and  $NF(x^*)$  determined, equation (8) determines  $Z$ , which in turn determines  $P_z$  from equation (11).

Now, substituting for  $w_a$  from equation (14) into equation (12) and solving for  $Z$ , we obtain,

$$(\frac{aP_a}{\delta})^{\frac{\delta}{(1-\delta)}} = Z \quad (15)$$

Again substituting for  $Z$  from equation (15) into equation (10) and totally differentiating yields,

$$\sigma \Pi(\phi N)^{(\sigma-1)} (Z)^{(1-\sigma)} dP_s - \sigma(1-\sigma) \Pi(\phi N)^{(\sigma-1)} (Z)^{-\sigma} \frac{a}{(1-\delta)} (\frac{aP_a}{\delta})^{\frac{1}{(1-\delta)}} dP_a = dw_s$$

Thus,  $\frac{dw_s}{dP_s} > 0$  and  $\frac{dw_s}{dP_a} < 0$

#### Consumption

Consider the three groups of adults in the economy: the lenders, the borrowers and those who send their children to work. Aggregate demand for  $S$ , given by  $Q_D^s$ , equals:

$$\begin{aligned} N \int_0^{x^*} \frac{\alpha \beta \cdot [(x + \nu w_a)(1+r) + w_a]}{P_s} \\ + N \int_{x^*}^h \frac{\alpha \beta \cdot [(x - h)(1+i) + w_s]}{P_s} \\ + N \int_h^\infty \frac{\alpha \beta \cdot [(x - h)(1+r) + w_s]}{P_s} \end{aligned}$$

where the individual demand curves are derived from the indirect utility function by using Hotelling's lemma. Similarly, the aggregate demand for good  $A$  given by  $Q_D^a$  is given by:

$$\begin{aligned} N \int_0^{x^*} \frac{\alpha(1-\beta) [(x + \nu w_a)(1+r) + w_a]}{P_a} \\ + N \int_{x^*}^h \frac{\alpha(1-\beta) [(x - h)(1+i) + w_s]}{P_a} \\ + N \int_h^\infty \frac{\alpha(1-\beta) [(x - h)(1+r) + w_s]}{P_a} \end{aligned}$$

Differentiating the above demand functions with respect to  $P_s$  and  $P_a$  gives the price effects on demand of each group of adults in the economy.

## References

- Anker, Richard and Helina Melkus (1996); Economic Incentives for Children and Families to Eliminate or Reduce Child Labor, *International Labor Office*, Geneva.
- Basu, Kaushik and Hoang Pham Van (1998); The Economics of Child Labor, Forthcoming *American Economic Review*.
- Becker, Gary (1974); A Theory of Social Interactions, *Journal of Political Economy*, 82, pp 1063-1093.
- Bhagwati, Jagdish (1994); Policy Perspectives and Future Directions: A View from Academia, in "International Labor Standards and Global Economic Integration: Proceedings of a Symposium, *Bureau of International Labor Affairs*, U.S Department of Labor.
- Bonnet, Michel (1993); Child labor in Africa, *International Labor Review*, 132.
- von Braun, Zhu Ling, Jiang Zhongyi (eds.) (1996); Credit Programs for the Rural Poor in China, Proceedings of a Workshop by Research Center for Rural Economic Policies, Ministry of Agriculture (RCRE), Chinese Academy of Social Sciences (CASS) and the International Food Policy Research Institute (IFPRI), Washington D.C.
- Brown, D.K., Alan V. Deardorff, and R.M. Stern (1997); Issues of Environmental and Labor Standards in the Global Trading System. Mimeo, *University of Michigan, Ann Arbor*.
- Buchanan, James (1975); "Samaritan's Dilemma in Altruism, Morality and Economic Theory, E. Phelps (ed), New York: Russell Sage Foundation.
- Ehrenberg, Ronald (1994); Labor Markets and Integrating Global Economies, *Brookings Institution*, Washington, D. C.
- Federal Ministry for Economic Cooperation and Development (10/1997); Promotion of Young People and Overcoming Child Labor, Strategy paper 086, Bonn.
- Federal Ministry for Economic Cooperation and Development (04/1997), Child Labour in Developing Countries, Position paper of the Scientific Advisory Body, Bonn.
- Galor, Oded and Joseph Zeira (1993); Income Distribution and Macroeconomics, *Review of Economic Studies*, 60, pp 35-52.
- Golub, S. (1997); International Labor Standards and International Trade. IMF, Washington D.C.
- Grootaert, Christiaan and Ravi Kanbur (1995); Child Labor: An Economic Perspective, *International Labor Review*, 134, pp 187-204.
- Hemmer, Hans-Rimbert, Thomas Steger and Rainer Wilhelm (1996); Child Labor in the Light of Recent Economic Development Trends, study prepared for the *International Labor Organisation (ILO)*, Geneva.
- Hemmer, Hans-Rimbert (1994); Possible approaches of a poverty-oriented development policy: a general survey. In: *Economics*, Vol. 49/50, pp.56-79.
- International Labor Organization (ILO) (04/1998), Bureau of Statistics, Statistics on Working Children and Hazardous Child Labor in Brief. Geneva, Revised version.
- International Labor Organization (ILO) (12/1996), Child Labor, 264th Session, Governing Body Document on Child Labor, Committee on Employment and Social Policy (GB.264/ESP/1).
- Kamal, Ghulam, Paul Majumder, Pratima and Rahman M. Khalilur (1993); Economic Active Children in Bangladesh, unpublished report, *Dhaka, Associates for Community and Population Research*.
- Krueger, Alan (1996); International Labor Standards and Trade. Annual World Bank Conference on Development Economics. World Bank, Washington D.C.
- Langille, Brian (1997); Eight Ways to think about International Labor Standards, *Journal of World Trade*, 31, pp 27-53.
- Lansky, Mark (1997); Child labor: How the challenge is being met, *International Labor Review*, 136.
- Peel, Michael, "ILO warns of global rise in child labor. In: *Financial Times*, Feb.4, 1998.
- Portes, Alejandro, Manuel Castells and Lauren A. Benton (eds.) (1989); The Informal Economy: Studies in Advanced and Less Developed Countries, Johns Hopkins Press, Baltimore, MD.
- Srinivasan, T. N. (1996); Developing Countries and the Multilateral Trading System: From GATT (1947) to the Uruguay Round and the Future Beyond, *Economic Development Institute of the World Bank*, Washington, D.C.
- Weiner, M. (1991); The child and the state in India: Child labor and education policy in comparative perspective, Delhi, Oxford University Press.

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