

**CHILD LABOUR: ISSUES, FACTS, AND A FLEXIBLE SCHOOLING MODEL**

**by**

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## **Introduction**

The incidence of child labour worldwide has been declining for the last fifty years; however, it is still widespread. According to the ILO, approximately 215 million children currently work. For individual children, having to work is detrimental to their health, and to their future opportunities as either uneducated, or less educated individuals. A number of studies have shown that working as a child is detrimental to adult health (Cigno & Rosati, 2005; Giuffrida, Iunes & Savedoff, 2005; Kassouf, McKee, & Mossialos, 2001). Using data from Brazil, Kassouf, McKee, and Mossialos (2001) found that entering the labour market early in life is detrimental to income as an adult as well.

Many oppose child labour out of concern for the wellbeing of the child. Narasimha Rao, former Prime Minister of India, referred to child labour as an 'evil' and a 'curse' which has caused 'lakhs of our children...(to be) denied their basic rights to education and good life,' (Mishra, 2000, p. 218). Psacharopoulos (1997) describes one of the issues with child labour as being 'the immediate, short-term unpalatable human aspect of a very young person having to do manual work beyond his/her physical capability or wishes' (p. 378). While the reduction of child labour may be desirable because of its morally distasteful nature, it should be attempted carefully. Poverty is more often than not the reason why children work, and if their option to work is removed without addressing this fact, their survival, and that of their families, might be threatened.

Moral reasons aside, there are a number of economic arguments for why the elimination of child labour is desirable. Traditionally, it has been argued that there are externalities to child labour that make its social cost exceed its private cost. An educated child benefits society, but parents may not internalize these benefits and so may choose not to educate their child (Basu, 1999). Another argument against it is that having

children work limits competition. This could happen on two levels, either locally with competition between children and adult unskilled workers (Doepke & Zilibotti, 2005), or internationally, because higher labour standards can be seen as disadvantaging countries without working children (Basu, 1999). The reason for eliminating child labour that motivates this essay is that having children work limits their ability to accumulate human capital (Psacharopoulos, 1997). Lack of human capital is a barrier to development.

Work and school are the two main uses of a child's time, and poverty is the main reason why work is chosen over school. Child labour is often necessary for the children and their families to afford basic needs. If parents in poverty could borrow against the future, they might be able to send their children to school, depending on the expected returns to education; however, access to credit markets is often limited in developing countries. It is often the combination of poverty and lack of access to credit markets that prevents children from attending school, and instead has them working.

Some empirical facts about child labour, poverty, credit markets, and education are provided in the following. Part of this evidence will later be used to support the theoretical framework of the model I will propose. The countries in each sample are listed in table 1 of the appendix.<sup>1</sup> Figure 1 shows data from 71 countries with positive rates of child labour. It shows that per capita GDP is negatively correlated with the child labour rate. This relationship seems to be highly non-linear. Countries with lower per capita GDP are more likely to have a significant amount of their population living in poverty, so this supports that poverty and child labour are positively correlated. Figure 2 shows data from 79 countries with positive rates of child labour. It shows that the child labour rate is

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<sup>1</sup> The different sample sizes are due to data limitation.  
Table 2 in the appendix provides some descriptive statistics.

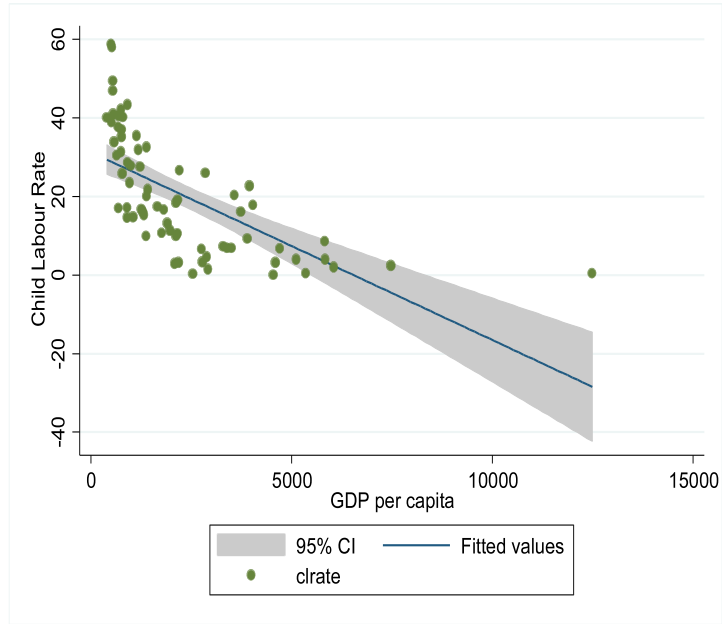


Figure 1

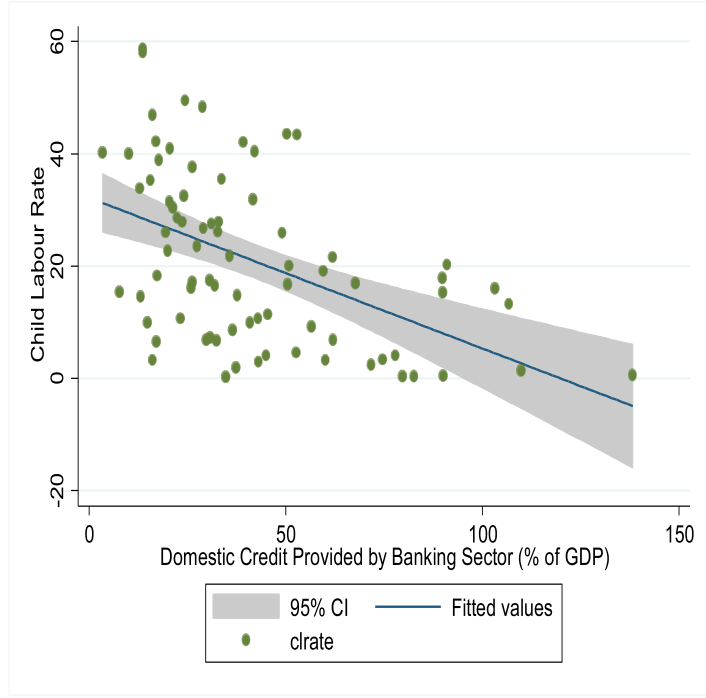
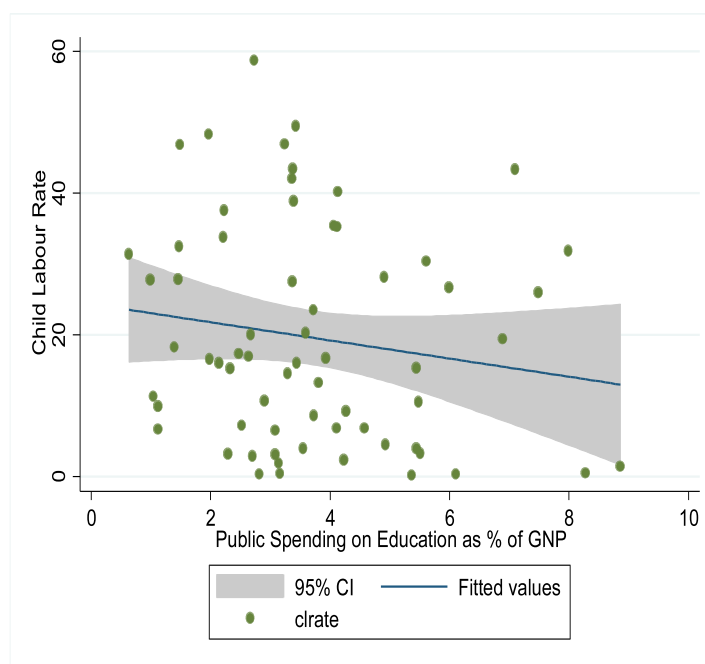


Figure 2

negatively related to the amount of domestic credit provided by the banking sector as a percentage of GDP. In this figure, observations are concentrated around the regression line. This will later be used to justify the lack of savings or access to credit in my model.

Public spending on education is negatively correlated with child labour. This is shown in Figure 3 using data from 65 countries with positive child labour rates.<sup>2</sup> This relationship displays more variability than those in figures 1 and 2.



**Figure 3**

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<sup>2</sup> Data for the child labour rate is from the ILO, and is defined as the percentage of children aged 10-14 who are economically active. Data for GDP per capita is from the Penn World Tables, public spending on education is from UNESCO, and domestic credit provided by the banking sector is from the World Bank. All data is for 1990.

If more developed countries with child labour rates of zero had been considered as well, the relationships would have been even stronger.

Proposed methods of reducing child labour include measures such as regulations, increasing the returns to education, compulsory schooling, and alternative education systems. The latter two could fall in the category of public spending on education, if they were publicly funded. Implementation and maintenance of all these measures would be costly. Because financial limitations, which are part and parcel with poverty, are at the heart of the child labour problem, it is difficult to conceive of an effective solution that is not costly. Any solution which aspires to effect a large scale reduction in child labour, in a short period of time, with minimal negative side effects, would require at least enough funds to compensate families for lost child income.

The model I propose, the two-tuition model, provides a low cost method of reducing child labour in countries where school is not free. It recommends that a second lower tuition option be provided which would entitle children to attend half of every school day. This second option would mainly benefit families who cannot afford whole day tuition, but who could afford half day tuition. Children from these families might start to attend at least some school, and work a little less. Even if it does not guarantee a large scale reduction of child labour, I will show that in certain circumstances, a second tuition option would effect some reduction. For countries without the funds to take aggressive actions against child labour, a small rearrangement of the current school system could at least provide some improvement. Since half day children would still be paying tuition, any extra teachers or facilities needed to accommodate them might be largely funded by this tuition, so introducing a two-tuition system should not be costly for the government.

According to Hillman and Jenkner (2004), many poor countries do not have free education. They suggest that governments may lack the resources needed to provide free education “either because there is a large, untaxed shadow economy and the tax base is



small, or because tax administration and collection are ineffective,” (Hillman & Jenkner, 2004). This suggests that the two-tuition model has real world applicability.

The body of this essay is comprised of four sections. Section I examines in more depth the relationship between education and child labour, section II reviews proposed methods of reducing child labour, section III summarizes a few ways in which child labour and education have been modeled, and section IV presents the two-tuition model.

## **I Education and Child Labour**

By exploring the relationship between education and child labour, this section provides a context for the two-tuition model. The basis of the model is the decision parents make whether to send their children to school, work, or both. Empirical findings relevant to this decision are summarized, and their significance commented on.

Working as a child is in most cases detrimental to educational attainment, which in turn leads to limited employment and earning opportunities. From an empirical analysis of household surveys in Bolivia and Venezuela, work was found to reduce a child's educational attainment by about two years of schooling. This study used ordinary least squares to regress years of schooling on age, gender, indigenous background, if the head of the household was female, household income, and of course, whether or not the child worked (Psacharopoulos, 1997). Different studies measure differently the extent to which work negatively impacts schooling, but there is a general consensus that such a negative impact exists (Patrinos & Psacharopoulos, 1997; Bass, 2004; Bromley & Mackie, 2009).

Bass (2004) showed with a standard regression analysis that lower adult literacy rates were correlated with higher rates of children working. Her sample included 18 African countries. Regressing percentage of children working on the adult literacy rate, the equation of the regression line was  $y = -0.26x + 41.95$  with  $R^2 = 0.309$ . She suggested that this might be because educated adults have a higher income, and can afford to send their children to school. Ilon and Moock (1991) had similar findings in rural Peru. Taking data on rural residents between the ages of 6 and 14 from the Peru Living Standards Survey, and using a logit model, they found that parental schooling and family wealth positively influenced early enrollment in school. Since working is detrimental to

educational attainment, it follows that working children will become adults with lower literacy rates, and in turn will not be able to afford education for their children. This situation was discussed by Basu (1999), and is known as a child labour trap.

Is the decision not to educate children simply a matter of affordability? In short, no. Basu and Van (1998) made the assumption that if a parent's income is enough for the subsistence of their household, they will not send their children to work. However, Cigno and Rosati (2005) pointed out that even where household incomes are above subsistence, child labour persists. If we assume that work and school are the only two uses of a child's time, then parents will compare the relative benefits and costs of each. For example, if a rural household's income is above subsistence, but the closest school is 30km away, the net benefit of attending school might be outweighed by the net benefit of working in a nearby field. This kind of situation has been found to exist in rural Peru where transportation costs for getting to school are high, and the opportunity cost of a child's time is also high (Patrinos & Psacharopoulos, 1997). Using data from the Human Development of India survey, and an instrumental-variable bivariate probit model, Cigno and Rosati (2005) found that increasing school availability would increase the probability that a child attends school. Their suggested explanation for this was that increasing school availability lowers the fixed cost of access to education. The model proposed by Doepke and Zilibotti (2005) showed that if the returns to education are increased, new families will have fewer children, and will send their children to school. For example, if technological progress raises the return to skilled labour, parents will be more likely to educate their children in anticipation of future returns. Many of the above factors affecting returns to education, valuation of human capital, or opportunity cost of a child's time are important in analyzing the implications of the two-tuition model.

A commonly overlooked fact is that school and child labour are not necessarily mutually exclusive. In many countries, children do both. This is a key consideration, because child labour can prevent children from attending school, but it can also make school attendance possible. Without their earnings from working, children may not be able to afford the costs of school. In Ghana, over two thirds of working children also attend school. In Cote d'Ivoire one third of working children combine work with schooling (Bass, 2004), and in Lima, the majority of children who work also attend school (Patrinos & Pscacharopoulos, 1997). These findings support the applicability of the two-tuition model, since it is designed to accommodate both work and school. They also highlight that the decision parents make about their children's time is not either school or work; there is the option of both.

## **II Methods of Reducing Child Labour**

Many methods for reducing child labour could be effective, given sufficient funds. The methods described in this section illustrate how a multitude of costs are associated with the different aspects of the child labour problem. Finding an effective reduction method, which does not require significant funding, is difficult. This accentuates the usefulness of the inexpensive two-tuition system.

### *Regulations*

The most obvious solution to the problem of child labour is to ban it. Recent arguments suggesting consideration of child labour bans say that there might be multiple equilibria. The undesirable equilibrium is one where adult wages are low, so parents must send their children to work for the family's survival. Having children compete with unskilled adults in the labour market keeps adult wages low. As previously discussed, education contributes to higher income as an adult. Working children become unskilled adults whose wages are too low to educate their children in turn. In this undesirable equilibrium, parents have many children and send them to work. The desirable equilibrium is one where adult wages are high enough for them to keep their families above subsistence, so they have fewer children and send them to school. Many authors suggest that government intervention might move the economy to the equilibrium without child labour (Basu & Van, 1998; Basu, 1999; Doepke & Zilibotti, 2005; Dessy, 2000).

Mishra (2000) provides evidence of the difficulties faced when trying to lower child labour through regulations. In India, many children are employed in direct violation of regulations. For example, matchmaking is prohibited as a form of employment for

children, but many children work in match factories. Mishra summarizes studies on match factories in Sivakasi, and finds that poverty in the area is widespread. Parents must send their children to work for supplementary income. For a formal legal ban to be effective, costly monitoring is needed. Furthermore, as mentioned by Cigno & Rosati (2005), forcing children out of work might be morally difficult for authorities knowing that the alternative for families is starvation. Rather than spending money in policing, governments can use those funds to provide free education, or devise other strategies for inciting parents to send their children to school. If enforcement of a ban is attempted without addressing the causes of child labour, children may simply be shifted from factories to household work, or they may supply semi-finished products from the household to the factories (Mishra, 2000). Basu (1999) points out that working is generally not the desired use for a child's time, and if parents do choose it for their children, the alternative is likely worse.

Mishra (2000) suggests that governments should accompany a ban with “free, compulsory, and universal primary education with the added incentives of free meals, uniforms, and textbooks,” (p. 128). Patrinos and Psacharopoulos (1997) suggest that subsidies be given to working children so that they can attend full time schooling.

Overall, an effective ban would be costly both in terms of enforcement, and in terms of measures necessary to aid children released from work, and compensate their families for lost child income.

### *Compulsory Education*

Compulsory education mirrors the idea of banning child labour. If children are

effectively forced to attend school, they will be simultaneously forced not to attend work, where school and work have overlapping schedules. Like bans, if compulsory education is implemented without addressing that children not in school often come from poverty stricken families, it could be ineffective, or even detrimental. Investing in human capital acquisition makes no sense if the children are starving. To make compulsory education effective, the same kinds of expensive measures necessary for a ban would be needed: free education, aid for children released from work, compensation for their families, and investments in monitoring and enforcement.

Compulsory education legislation is typically in place in developed countries; however, high returns from education, social assistance programs, and better credit markets make it not binding for the vast majority of households.

### *Alternative Schools*

The two-tuition model proposes a variation to the existing school system. Although it would operate within the main school system, it was inspired by alternative schools that accommodate both school and work. It was also inspired by the structure of the school system in Peru. A few alternative schooling systems are described in this section, as well as Peru's school system.

Mishra (2000) articulates the importance of alternative schooling:

The problem of educating the vast mass of 100m. plus working children cannot be solved in one stroke through a single model of alternative schooling. We need to experiment with a variety of alternatives to formal school education, to make these alternatives known to the children and their parents, and implement these with their full knowledge and approval. (p. 39)

In 1994, National Child Labour Projects were launched in India, (Mishra, 2000).

They target areas with high concentrations of child labour. These projects include non-formal education for children released from work. The goal of this education is to bring the children's literacy up to the level of their peers in the formal school system, and to provide them with vocational training. In theory, midday meals are provided, as well as stipends for working children so that their families can afford to send them to school full time. Psychological rehabilitation is also part of the projects. The Indian government in partnership with NGOs orchestrates these projects. Evaluations done in 1996 and 1998 showed that some projects seemed to be successful, and others did not. Factors such as lack of funding, poor teaching, not providing the stipend or midday meal, and not providing the vocational training prevented certain projects from being successful. One evaluation suggested that vocational curricula needed to be developed in alignment with the socio-economic opportunities in and around the districts. Ensuring that the children did not work outside of school was also a challenge for some projects.

One successful model of schooling was implemented by the M.V. Foundation as part of the National Child Labour Projects. Known as the camp approach, its goal was to give former child labourers non-formal education for four months prior to the start of the formal school year, and encourage them to enroll. For those four months, the children were at the camps day and night, and all their needs were attended to. As well as academic education, extracurriculars such as sports and games were provided for the children.

For children who work at railway station platforms, the Ruchika School Social Service Wing established non-formal education centres on the platforms. Classes were held for two or three hours every day. Many of the children's parents preferred that they work, so counseling the parents and adding incentives such as food and weekly visits



from a doctor helped to build interest in the program. The platform schools were part of a larger scheme to shift children to full-time day centres, and then to formal schooling.

A common recommendation for alternative schools is that they be designed to accommodate the local economic cycle. A study on the *beedi* industry in India suggested that local schools “be given the autonomy to change their working hours and months to suit the requirements of the local economy,” (Mishra, 2000, p. 64). In Mali, state schools in rural areas were inadequate, so rural parents organized their own schools. They created a school calendar that complements their farming activities (Bass, 2004). If children were available to help on farms at key times, such as during harvests, this would lower the opportunity cost of their attending school.

In Peru, the educational system is designed to accommodate children who work. It is organized into part-time shifts: morning, afternoon, and evening. Officially, children are not allowed to attend evening classes, but many do (Patrinos & Psacharopoulos, 1997). Work is illegal for children under 12, but again, many do (Bromley & Mackie, 2009). Interestingly, one study in Peru found that child labour is not detrimental to schooling (Patrinos & Psacharopoulos, 1997). Bromley and Mackie (2009) found with another study, also in Peru, that child work is detrimental to schooling because time for homework is limited, children are tired, and some school is missed despite the accommodating schedule. However, Bromley and Mackie found that only one third of working children missed some school each week. One explanation for contradictory findings in Peru might lie in the design of the school system. Since it accommodates work, the negative impact from lost attendance due to work is largely mitigated. In the study reported by Patrinos and Psacharopoulos, age-grade distortion was used as the measure of negative impact on education. This could understate the negative impact of

work on schooling. Working children may not perform as well as their non-working peers, but not so badly that they fall grades behind. Another explanation for the contradictory findings in Peru is that different kinds of child work have different levels of negative impact. The work of the street traders studied by Bromley and Mackie (2009) may be relatively light compared to, for example, the agricultural work of Ghana's children. If most child work in Peru is not extremely arduous, this might explain why if measured in some ways it is found detrimental, and if measured in other ways, it is not. Either way, Peru illustrates that providing schools, which accommodate working children's schedules, is something that should be considered.

The alternative schooling schemes described above show that funds may be needed for stipends to make up for lost income, meals, uniforms, learning materials, and doctors visits. As Basu (1999) pointed out, collaborative interventions by the government would be beneficial, but they may not be feasible due to lack of government funds. Peru's system is simple and realistic. By accommodating work, children can work to afford school, and for the most part, not miss school due to work. The second tuition option of the two-tuition model essentially provides children with the kind of education they could receive in Peru. The model assumes that morning would be the best time for working children to attend school, but this could be changed to whichever block of the day is most convenient for the working children of a certain area without changing the implications of the model.

### **III Modeling Child Labour and Education**

Child labour has been dealt with in a variety of models, which explore topics such as fertility, credit markets, mortality, international trade, and of course, education. As discussed above, some present the possibility of multiple equilibria, but whether or not transitioning from one equilibrium to another through government intervention should be attempted, is controversial. The main challenge faced by transition attempts is that parents cannot instantaneously change their fertility decision (Cigno & Rosati, 2005). Because of this, measures which theoretically would instantly reduce the child labour rate, such as bans, are often more criticized than measures which gradually incite parents to have less children and educate them (Grootaert, 1998).

Throughout the literature, there is a general consensus that constraints such as credit market imperfections and subsistence constraints can cause inefficiently high levels of child labour. This comes up in the models of Baland and Robinson (2000) and Cigno and Rosati (2005). Also commonly agreed on is that to effectively tackle child labour, a multi-pronged approach would be most effective. Reducing child labour should be combined with increasing education, increasing returns to skilled labour, and compensating families of previously employed children (Dessy, 2000).

Here I will review some contributions that have features in common with the two-tuition model. Basu and Van (1998), Baland and Robinson (2000), and Cigno and Rosati (2005) introduce assumptions that are used in the two-tuition model of education. Dessy (2000) provides concepts that are useful for discussing the implications of the two-tuition model. In all of these models, parents are the decision makers.

*Basu & Van (1998)*

Basu and Van designed their model to show that the economy can be in either of two equilibria: one with high wages and low rates of child labour, and the other with low wages and high rates of child labour. They made two main assumptions. The first is 'the Luxury Axiom' which states that parents only send their children to work if their income is too low to maintain their family's consumption at or above subsistence levels. Each adult consumes  $c$ , and their subsistence level is  $s$ . Each child consumes  $\beta c$ . The second main assumption is 'the Substitution Axiom' which states that child labour can be substituted by adult labour at a rate of  $\gamma$  child hours per 1 adult hour,  $\gamma \in (0,1)$ . Each family has one adult, and  $m \geq 1$  children. The amount of time a child spends working is denoted by  $e \in [0,1]$ ; time spent not working is spent in leisure. Wages are  $w_c$  for children and  $w_a$  for adults.

The household preference is given by:

$$u(c,e) = \begin{cases} (c - s)(1 - e) & \text{if } c \geq s \\ c - s & \text{if } c < s \end{cases}$$

Subject to the budget constraint:

$$c + m\beta c = mew_c + w_a$$

The first order conditions give the effort function, which states how much a child will work depending on  $w_a$ ,  $w_c$ , and  $m$ . Basu and Van went on to find the aggregate supply of child labour and the aggregate supply of adult labour, assuming all adults work. They then found aggregate demand, equating the marginal production benefit to the marginal production cost. Since adult and child labour are substitutes, whether the firms employ all adults, all children, or some of both depends on the value of  $w_a$  relative to  $w_c/\gamma$ . With equations for aggregate demand and supply, conditions for an equilibrium could be found.

Using these conditions, Basu and Van graphically showed that two equilibria can arise: one where children do not work and  $w_a$  is high enough to keep the family above subsistence, and one where the children must work.

The main idea taken from Basu and Van for the two-tuition model is that if adult wages are not high enough to keep the family at or above subsistence, children must work to bring household income at least to that level. Basu and Van assumed that children would work just enough to bring the household to subsistence. Above subsistence, they assumed that leisure time for children is always preferable to work. This assumption was not used in the models by Baland and Robinson, and by Cigno and Rosati. Instead, they assumed that school was the alternative to work. Above subsistence, the returns from school and work were compared to determine how much of each the child should engage in.

### *Baland & Robinson (2000)*

Baland and Robinson's model was designed to show that if capital markets are imperfect, or parents abilities to save or leave bequests are constrained, then child labour can be at an inefficient level. An inefficient level of child labour exists when the marginal returns to education are greater than the opportunity cost of education, but children cannot be bound to compensate their parents in the future, or altruistic parents do not have the means to invest in education by substituting present for future consumption.

Baland and Robinson started their model with exogenous fertility and altruistic parents. They later made altruism two-sided, and fertility endogenous. I will focus on the exogenous fertility version of their model, because its structure inspired that of the two-

tuition model.

Each family is made up of one parent and one child. There are two periods, and the future is not discounted. In period one, children have a unit time endowment, and use it to either go to school or work. The amount of time a child spends working is denoted  $l_c \in [0,1]$ . Parents supply  $A$  efficiency units of labour in each period. Parental consumption is  $c_p^1$  and  $c_p^2$  in periods one and two respectively. Children do not consume in period one, and consume  $c_c$  in period two. Children's efficiency in period two depends on how much human capital they accumulated in period one, that is, how much they went to school. The amount of efficiency units a child supplies in period two is denoted  $h(1-l_c)$ . If a child does not attend school, he enters adulthood with one unit of human capital, so  $h(0) = 1$ . Wages are exogenous, and are all set to one. Parental altruism is denoted  $\delta \in (0,1)$ . Parents can choose to give bequests to children in period two, denoted  $b \geq 0$ , and can choose to save  $s \geq 0$ .

Parental utility is given by:

$$W_p(c_p^1, c_p^2, W_c(c_c)) = u(c_p^1) + u(c_p^2) + \delta W_c(c_c)$$

Subject to the budget constraints:

$$\begin{aligned} c_p^1 &= A + l_c - s \\ c_p^2 &= A - b + s \\ c_c &= h(1-l_c) + b \end{aligned}$$

Child labour is at an efficient level when  $h'(1-l_c) = 1$ , that is, when the marginal return to education equals its opportunity cost. Baland and Robinson showed that if constraints on bequests and savings are binding then  $h'(1-l_c) > 1$ , and the level of child labour is inefficiently high. On the other hand, if bequests and savings are interior, then the level of child labour is efficient. Lower values of  $A$  and  $\delta$  are more likely to coincide with

inefficient levels of child labour. After introducing transfers from children to parents into the model, and altruism from the children towards their parents, Baland and Robinson showed that imperfect capital markets lead to inefficiently high child labour even if transfers are interior.

The two-tuition model shares some features with the models of Baland and Robinson and Cigno and Rosati. Cigno and Rosati propose a framework that builds upon Baland and Robinson's. However, it is more general because it includes child consumption in period 1, a family constitution, monetary inputs for education, interest on savings, and subsistence constraints.

#### *Cigno & Rosati (2005)*

Like Baland and Robinson, Cigno and Rosati explored the conditions under which child labour is at an inefficient level. As well as showing that imperfect credit markets can cause inefficiencies, they showed that access costs to education and work might also cause inefficiencies, as can extreme poverty. Cigno and Rosati's most unique contribution with their model was the introduction of a family constitution. A family constitution is a set of rules, usually both unwritten and unspoken, to which family members must adhere. Cigno and Rosati's family constitution stated that parents must give children at least  $z$  in the first period, and adult children must give their aging parents  $x$  in the second period. Anyone who broke the family constitution would be punished in the next period by their children. If parents did not give their children  $z$ , by the family constitution, children would not be obliged to give their parents  $x$ . If children received  $z$ , and then as adults did not give their parents  $x$ , their children in turn would not be obliged to give them  $x$  in their

old age.

Cigno and Rosati's model has three periods. Before the first period, fertility decisions are made. In the first period, parental decision on medical care, food, and attention determine whether or not the child survives till school age. In the second period, parents decide whether to send their child to school or work, and in the third, the children are adults. Thus, entering the second period, the number of children per family is given. Cigno and Rosati analyze their model through backwards induction. They begin by considering periods two and three, and use the parents' utility maximizing choices at this stage to determine what they will choose earlier on. For example, the amount of schooling and consumption parents will allow their children in period two will affect their fertility decision, before period one.

Since periods two and three concern schooling and human capital, these are the periods of relevance to the two-tuition model. I will summarize the portion of Cigno and Rosati's model that corresponds to these periods. For ease of comparison, I will refer to Cigno and Rosati's periods two and three as the first period and second period respectively, since these are the only two periods being considered.

Net transfers from parents to children are denoted  $m$ . Each family has one parent and  $n$  children. Because the family constitution requires children to offer their parents  $x$  in period two,  $m$  may be negative if the parents choose to accept part or all of this  $x$ . Human capital accumulation is given by  $h = h_o + g(e, k)$  where  $h_o$  is natural talent,  $k$  is other inputs for education such as books and tuition, and  $e = 1 - l_c$ . Wages are denoted  $w_c^1$ ,  $w_c^2$ ,  $w_p^1$ , and  $w_p^2$  for children and parents in periods one and two respectively. The cost of accumulating  $h$  units of human capital is given by  $Q(h, w_c^1, p_k) = \min_{e, k} (ew_c^1 + kp_k)$



where  $p_k$  is the cost of the other educational inputs.  $Q$  is increasing in output, and increasing and concave in input prices. Children's consumption in period two is their income:  $hw_c^2 + m$ . Parental consumption in period one is denoted as in Baland's model. In period two parents consume  $sr - mn$  where  $s$  is savings, and  $r$  is the interest rate. Children consume  $c_c^1$  in period 1, and  $y$  in period two. Subsistence levels of consumption are given by  $c_{ps}^1$ ,  $c_{ps}^2$ ,  $c_{cs}^1$ , and  $c_{cs}^2$  for parents and children in periods one and two respectively.

Parental utility is given by:

$$W_p(c_p^1, c_p^2, W_c) = u_1(c_p^1) + u_2(sr - mn) + \delta W_c(c_c^1, hw_c^2 + m)n$$

Subject to the constraints:

$$h \geq h_o$$

$$c_c^1 + Q(h, w_c^1, p_k) \geq z$$

$$x + m \geq 0$$

$$c_p^1 + [c_c^1 + Q(h, w_c^1, p_k)]n + s = w_p^1 + w_c^1 n$$

$$s_o \leq s \leq s_1$$

$$c_p^1 \geq c_{ps}^1, \quad sr - mn \geq c_{ps}^2, \quad c_c^1 \geq c_{cs}^1, \quad hw_c^2 + m \geq c_{cs}^2$$

All the utility functions are increasing and concave in inputs, with subsistence giving a utility of 0, but infinite marginal utility. Cigno and Rosati showed that lack of access to credit markets can result in inefficiently high or low levels of child labour, or an inefficiently high investment in education. They also showed that when the conditions from the family constitution are binding, this could be a source of inefficiency. They characterized extreme poverty by making the constraints relating to subsistence binding, and showed that this too can be a source of inefficiency. If an efficient solution lies below subsistence, it is not feasible. This is reminiscent of the subsistence requirements in Basu and Van's model, and will be relevant in the discussion of who may benefit from the two-

tuition model.

One interesting contribution from Cigno and Rosati concerns idleness. In reality, many children neither work nor go to school. Cigno and Rosati explained this by introducing access cost to both work and school into their model. In the two-tuition model, being idle is not an option, and work will have no access cost. The focus is on allowing working children to substitute some of their work for some school. By providing a lower tuition option, some idle children may be induced to attend school; however, this beneficial side effect of the two-tuition model would not help to lower the child labour rate, and so will be ignored.

The main differences between the two-tuition model and Cigno and Rosati's model are that the two-tuition model does not allow for savings or transfers, and the two-tuition model does not include a family constitution. Also, in the two-tuition model there is the initial fixed cost of tuition before any human capital can be accumulated. The tuition does not contribute to how much human capital is accumulated; it just provides the chance to accumulate it. Actual human capital accumulation in the two-tuition model depends only on the time spent being educated,  $e$ , and not on any variable monetary inputs like  $k$ . Inputs like  $k$  are left out for simplicity, and could be added without changing the results of the model.

The two-tuition model focuses on the relationships between present household income, costs of schooling, and subsistence. Unlike both Baland and Robinson's and Cigno and Rosati's models, it does not allow for saving, borrowing, or transfers. The people who the two-tuition model is designed to help are those who are living with the very inefficiencies that Baland and Robinson and Cigno and Rosati described: they are supplying an inefficiently high level of child labour because they do not have access to

credit markets or any other means to borrow against the future.

*Dessy (2000)*

Dessy's model explored how an economy can transition from being in an under-development trap, to being in a steady state with no child labour. His under-development trap is similar to Basu's child labour trap. Dessy used a dynastic utility function, where a parent's utility is a function not only of their own and their children's consumption, but recursively of their children's children's consumption as well, and all of their descendants. Aside from the dynastic aspect of Dessy's utility function, the fact that fertility is endogenous, and the division of parents time between working and child rearing, many of his assumptions are similar to those of Baland and Robinson and Cigno and Rosati. Children either work or go to school, parents are altruistic, and families have one parent. Dessy's function for human capital accumulation depends on time spent in school, and on the education level of the children's parents as well. The latter dependency reflects the transitional nature of the model. Parents with higher human capital are able to provide more schooling and human capital for their children, so as human capital increases, schooling increases, child labour decreases, and the economy moves towards a steady state with no child labour. There is a regime switching adult wage that corresponds to the level of human capital that would just be high enough to move the economy towards no child labour.

Dessy compared regimes with and without mandatory schooling. He suggested that to make compulsory education effective, it should be accompanied with improved access to education, better employment opportunities for the educated, sufficient enforceability, and short-term compensation for lost child income. As previously

discussed, effective compulsory education is expensive. Dessy found that if compulsory education legislation is partially enforceable, it drives down the child labour rate and fertility rates, and has no effect on adult consumption. He argued that adult consumption is not affected because the lowering of fertility offsets the income lost from children working. Since fertility cannot instantaneously adjust, there would be some initial losses in income, and families might have to be compensated.

Dessy's regime switching wage is an important concept for exploring the implications of the two-tuition model.

#### **IV Two-Tuition Model**

Consider a school system where children pay a set tuition fee to enroll. Once the tuition fee is paid, they may attend classes as much or as little as they want, but the amount of human capital they acquire will increase with attendance. If the marginal benefit from attending school outweighs the marginal cost, families will choose to pay the tuition and send their children to school, unless paying the tuition would bring them below subsistence.

The two-tuition model suggests that the school day be structured with the first half independent of the second. That is, if a child only attends the first half of every school day, he will not miss information required for understanding. The first half could contain all the most basic information for human capital acquisition, such as reading and math, and the second half could be supplementary. As the name of the model suggests, there would be two tuition options. Paying the whole tuition would give a child the option to attend any amount of full days, and paying the reduced tuition would give the child the option to attend any amount of the first half of every school day. Where paying the full tuition brings households below subsistence, paying the reduced tuition may not. Children who might otherwise have to work full time, because school is infeasible, would be able to go to school for part of the day, and work the rest of the day. The two goals of the two-tuition model are to lower the supply of child labour, and to raise per capita human capital.

Initially the model will assume all families are completely homogeneous. Later, there will be three categories of parent wages that place a family in one of three situations. This will aid in interpreting the implications of the model.

### *The Model*

Each family has one child and one parent. There are two periods. In the first, parents work and children either work, go to school, or do both. Parents and children each have one unit of time endowment. The child attends school for  $e \in [0,1]$  of his time, and works for the rest. In the second period, parents have passed away and adult children work. Adult children again have one unit of time endowment. Because there is no saving or transfers in the model, if parents were to live in period two, they would only consume their own income, and this would not affect their period one decisions. A parent's period one decision, whether to send their child to school or work, is the main concern of the model. As for the two-tuitions, families have the option of paying either  $M_H$ , (half the money), to obtain  $e \leq 0.5$  units of education, or  $M_w$ , (the whole amount of money), to obtain  $e > 0.5$  units of education. So as to simplify the comparison of present consumption and the child's future earnings, the consumptions of both parent and child in period one are combined into family consumption,  $c_f$ . Wages are exogenous, and are denoted  $w_p^1$  and  $w_c^1$ , for the parent and child in period one respectively, and  $w_c^2$  for the child in period two. The child's period two wage,  $w_c^2$ , is a base wage that corresponds to no education in period one. The child's actual income in period two depends on how much education he received. Income is  $h(e)w_c^2$  where  $h(e)$  is the amount of human capital he is endowed with entering adulthood. The function  $h$  is increasing and concave in  $e$ , and  $h(0) = 1$ .

The parent's utility function is given by:

$$W_p = u_p(c_f) + \delta u_c(w_c^2 h(e)) \quad (1)$$

Parents are completely altruistic towards their children in period one, that is, they value

their child's consumption as much as they value their own. This facilitates the combining of parent's and child's period one consumptions into family consumption. Parents may be less altruistic towards their children's period two return from education,  $0 < \delta \leq 1$ .

The children of adult children are not explicitly included in the model, but neither does the model assume they do not exist. The portion of adult children's utility represented by  $u_c(w_c^2 h(e))$  should not be read as their entire utility, but only as the utility they derive from their own income, whether or not this is consumed by them or their children. Because this model is not concerned with the transitioning of the economy, dynastic preferences like those found in Dessy (2000) are not needed. Parents are not altruistic towards their grandchildren. Beyond their families' period one consumptions, parents are only concerned about the period two returns their children receive from being educated, which is reflected in their period two incomes.

Assume  $u_p$  and  $u_c$  are increasing and concave in inputs.

The budget constraint for period one is:

$$M_H + c_f = w_p^1 + (1 - e)w_c^1 \quad \text{if } 0 < e \leq 0.5 \quad (2)$$

$$M_W + c_f = w_p^1 + (1 - e)w_c^1 \quad \text{if } 0.5 < e \leq 1 \quad (3)$$

$$c_f = w_p^1 + w_c^1 \quad \text{if } e = 0 \quad (4)$$

The subsistence constraint is:

$$c_f \geq c_{fs} \quad (5)$$

Assume there is no subsistence constraint for period two. If children survive to adulthood, their income will be at least  $w_c^2$ . Assume this is enough for them to live on. If more is needed to feed their children they will send them to work and  $w_c^2 + w_c^1$  will keep the second-generation family above subsistence.

*The One Tuition Case*

First, assume there is only the whole tuition option,  $M_w$ , and the budget constraints are:

$$M_w + c_f = w_p^1 + (1 - e)w_c^1 \quad \text{if } 0 < e \leq 1 \quad (6)$$

$$c_f = w_p^1 + w_c^1 \quad \text{if } e = 0 \quad (7)$$

Also, assume that the upper bound of  $e$  is not binding, and neither is the subsistence constraint. Maximizing (1) with respect to  $e$  and  $c_f$ , subject to (6) and (7), the first order conditions give:

Either  $e > 0$  and:

$$\frac{(w_c^2 \partial h / \partial e)}{w_c^1} = \frac{(\partial u_p / \partial c_f)}{(\delta \partial u_c / \partial h)} \quad (8)$$

Or  $e = 0$ .

The condition (8) states that parents educate until the marginal return to education equals the marginal rate of substitution of present family consumption for future adult child income, discounted by the level of altruism. The impact of a binding subsistence constraint will be explored later, graphically. The effect of adding the upper bound on  $e$  is that if parental utility is maximized at  $e = 1$ , (8) becomes:

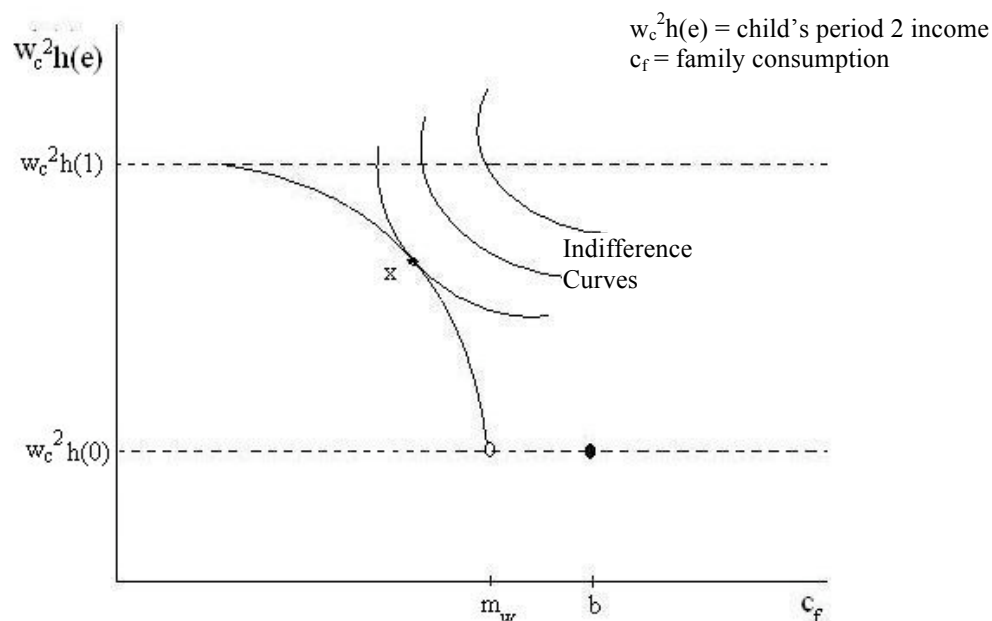
$$\frac{(w_c^2 \partial h / \partial e)}{w_c^1} \geq \frac{(\partial u_p / \partial c_f)}{(\delta \partial u_c / \partial h)}$$

That is, it may be that the marginal return to education is now greater than the marginal rate of substitution of present family consumption for future adult income, but adding more education is not feasible.

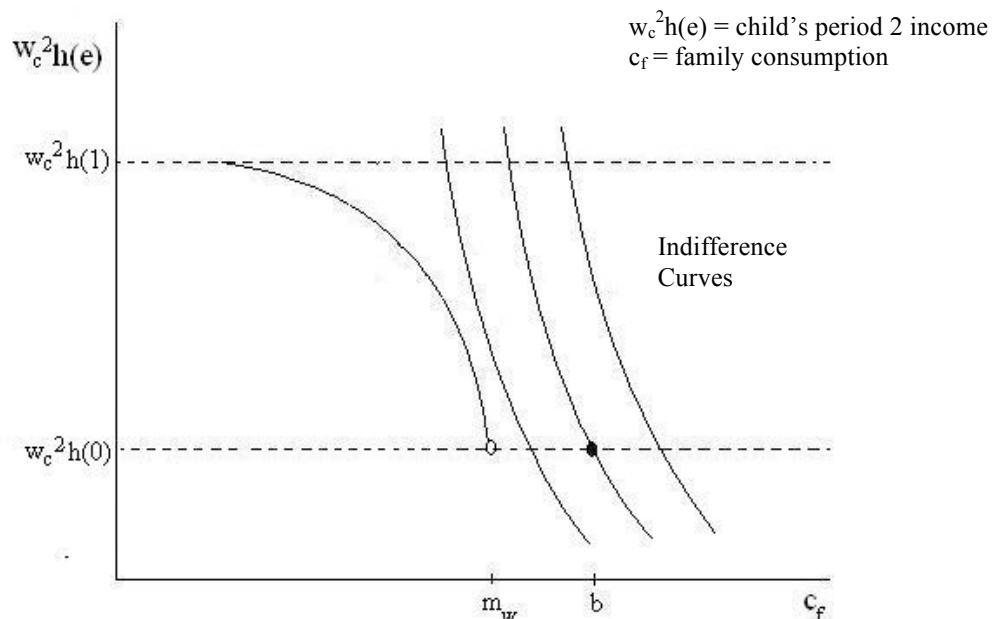
The parent's choices are depicted graphically in Figure 4. The concave curve is the domestic possibilities frontier representing the constraint (6). Since  $0 < e \leq 1$ , the curve is



bounded above by  $w_c^2 h(1)$ , and bounded below by  $w_c^2 h(0)$ . The point above  $b$  is the family's consumption if  $e = 0$ . The point above  $m_w$  is the family's consumption after paying  $M_w$ . The possibilities frontier rises up from the point above  $m_w$  since at that point, tuition has been paid, and the family can begin to trade period one consumption for human capital accumulation. Parents will choose the levels of  $h(e)$  and  $c_f$  that correspond to the intersection of the possibilities frontier, and the indifference curves. This point is marked as  $x$ . If indifference curves are very steep, parents might choose  $e = 0$ , and children will not go to school. This situation is shown in Figure 5.



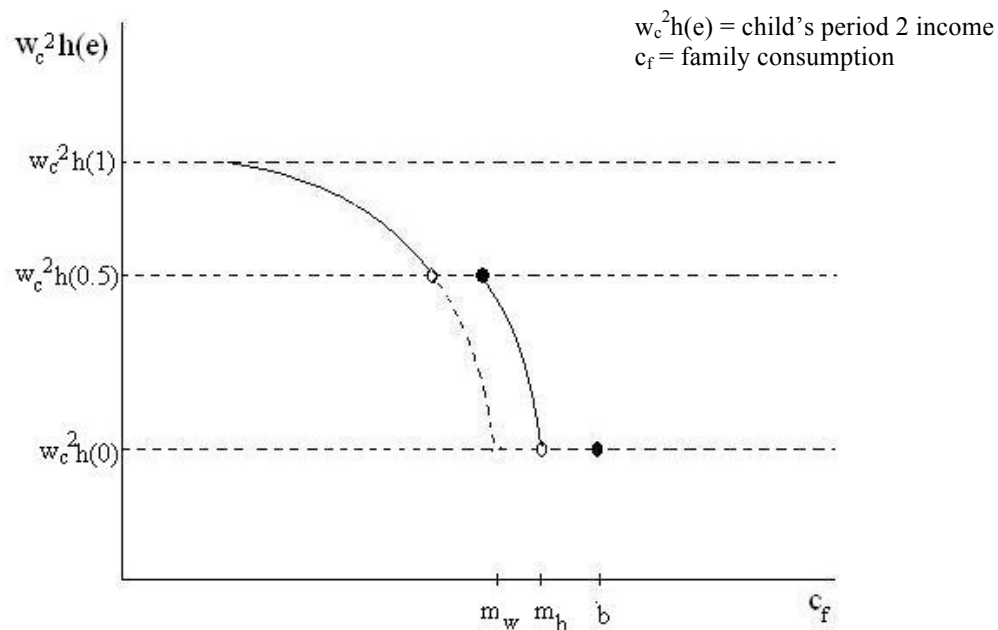
**Figure 4** *Domestic Possibilities Frontier*



**Figure 5** *Children Do Not Attend School*

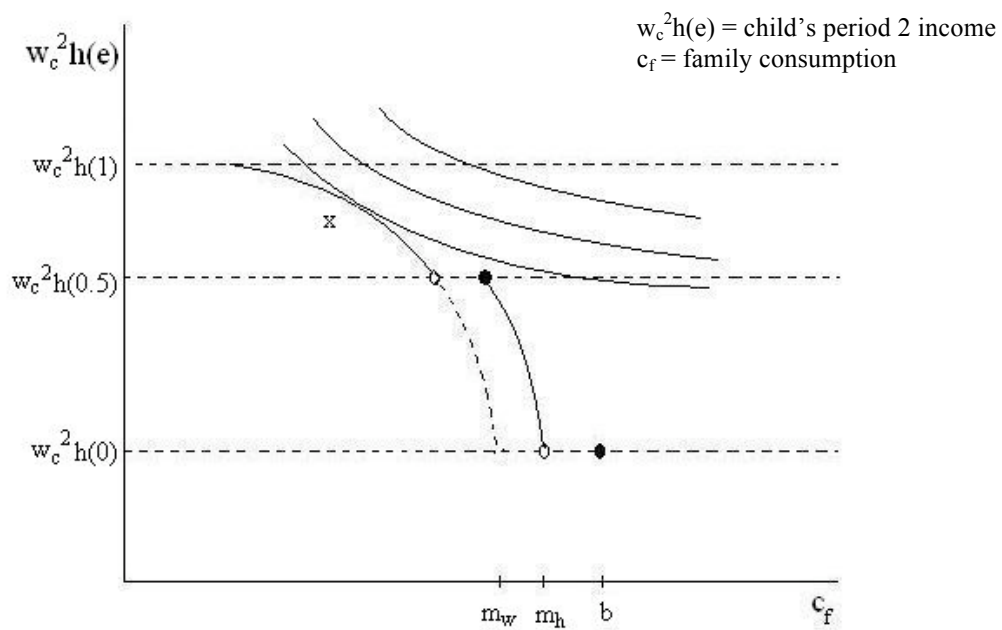
### *The Two Tuition Case*

Bringing in a second tuition level, the domestic possibilities frontier now consists of two parts. Figure 6 shows the situation. The segment of the frontier above  $m_h$  corresponds to (2), half day tuition, and the one above  $m_w$  to (3), whole day tuition. Below  $w_c^2 h(0.5)$ , the dotted line indicates where the frontier would have been without the half day option. The segment of the frontier corresponding with the half day choice is bounded above by  $w_c^2 h(0.5)$ . If parents only pay half day tuition, children cannot attend more than  $e = 0.5$  of school, and the maximum level of human capital that can be accumulated is  $h(0.5)$ .

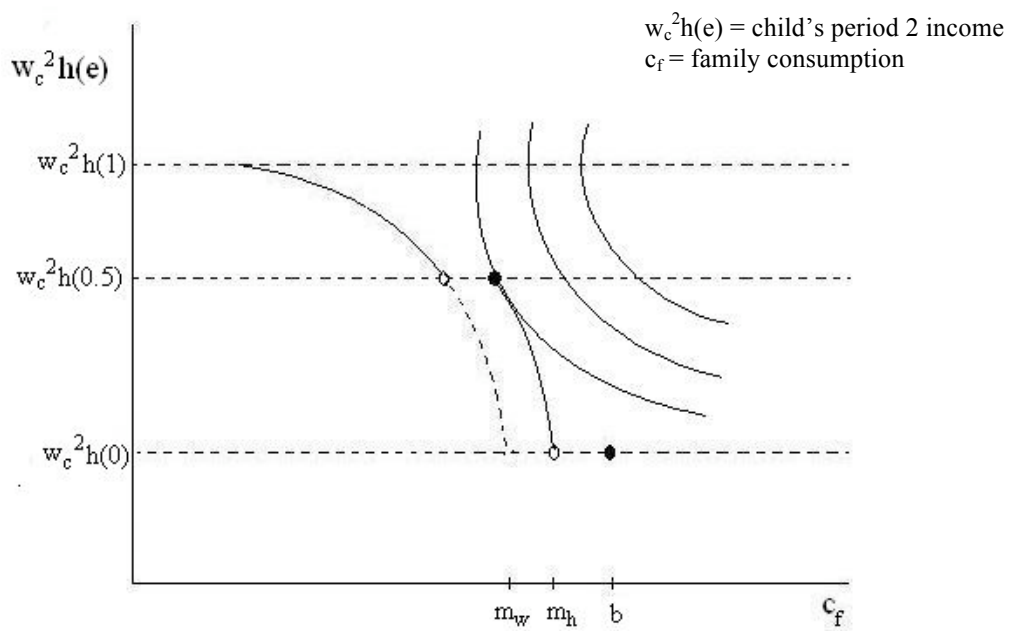


**Figure 6** *Two Tuition Levels*

Whether the parents choose to pay  $M_w$ ,  $M_H$ , or neither depends on the shape of the indifference curves. Flatter indifference curves correspond to a situation where the value of human capital is relatively greater than the value of present consumption, as shown in Figure 7. Here, parents would choose to pay  $M_w$  and send their child to school for  $e > 0.5$ . Steeper indifference curves correspond to a situation where present consumption is more valuable relative to human capital, as shown in Figure 8. Parents would choose to pay  $M_H$  and send their child to school for  $e \leq 0.5$ . If indifference curves were so steep that the highest one attainable passed through  $(b, w_c^2 h(0))$ , this would correspond with human capital being worth very little. In this situation, parents would choose  $h(0)$ , and not educate their children at all. Factors that might affect the steepness of the indifference curves are discussed later.



**Figure 7** *Human Capital is Valuable*



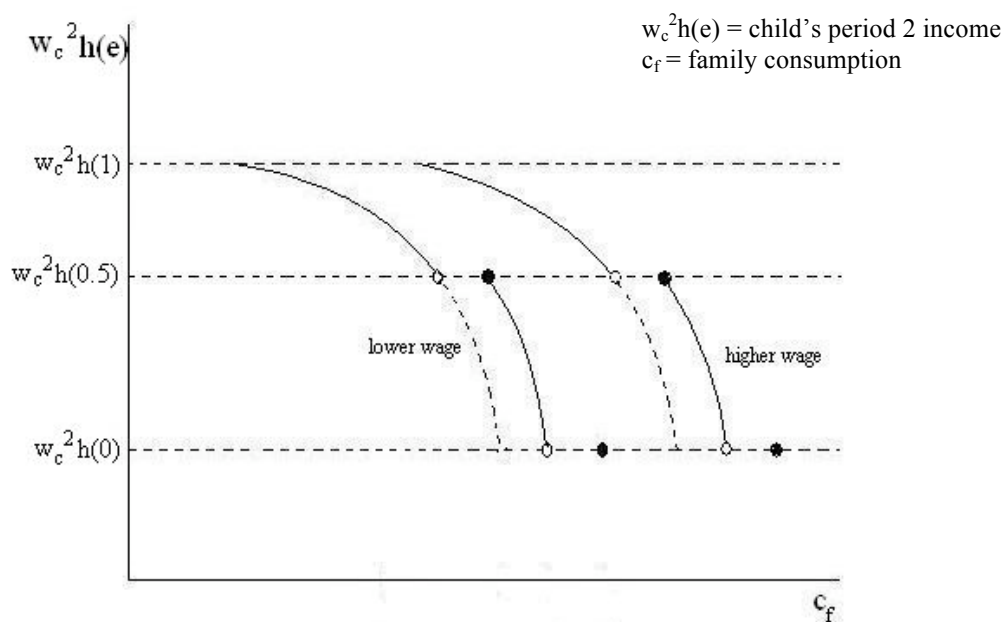
**Figure 8** *Present Consumption is Valuable*

If complete homogeneity is maintained, and if indifference curves are as in Figure 8, then all families will choose the half day option. This may or may not decrease the total amount of school attended. If at the intersection of the half day segment of the possibilities frontier with the indifference curves, the slopes of both are equal, then as in Figure 8, less education would have been chosen without the lower tuition option. Although the slope on the higher tuition segment of the frontier is the same as that of the lower tuition segment of the frontier for every value of  $w_c^2 h(e)$ , since preferences are concave, not horizontally quasilinear, the utility maximizing combination of  $h(e)$  and  $c_f$  is not the same on both segments. Since preferences move outwards from the origin, it must be that the utility maximizing level of  $h(e)$  on the whole day possibilities frontier prior to the second tuition option is lower than the utility maximizing level of  $h(e)$  on the half day segment of the possibilities frontier. In this case, parents will choose a higher  $e$  with the introduction of the half day option. The total amount of school attended will increase. This is because the money saved by paying less tuition allows for both an increase in consumption, and a decrease in income from the child working. On the other hand, if the intersection of the half day segment of the possibilities frontier with the indifference curves happens at  $h(0.5)$ , the slope of the indifference curve may be steeper than the slope of the half day segment of the possibilities frontier. In this situation, the utility maximizing combination of  $h(e)$  and  $c_f$  on the whole day frontier prior to the second tuition option could occur at a point above, below, or at  $h(0.5)$ , depending on how steep the indifference curves are. Thus the effect of introducing the half day option on total school attended is ambiguous. If indifference curves are relatively flat, but just steep enough that parents choose  $M_H$  and  $h(0.5)$ , then the introduction of the half day option will reduce total school attendance. As this would increase child labour, this result is not

desirable. If human capital is valued highly enough, this will not happen. Next the effect of different levels of household resources, in the form of parent's wages, will be considered. I will show that although some children may end up working more with the lower tuition option, this is only one of many possibilities.

### *Three Kinds of Parent Wages*

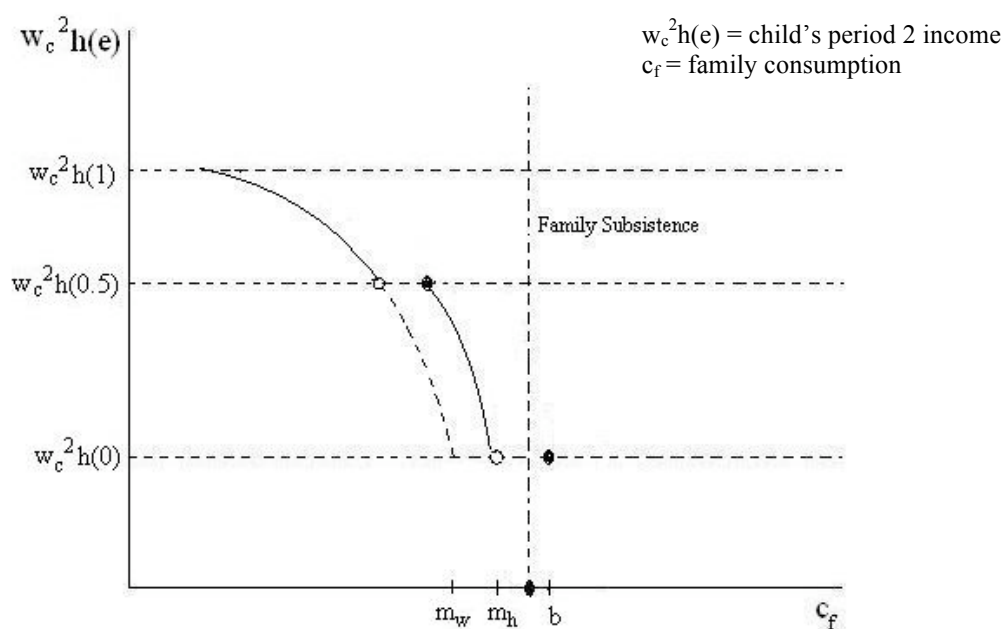
Allowing the parent's wage to vary moves the possibilities frontier out or in. With a higher parent's wage, the possibilities frontier is farther out because higher values of family consumption are possible with each value of human capital acquired. Figure 9 shows a lower wage frontier and a higher wage frontier.



**Figure 9** *Two Levels of Parent Wage*

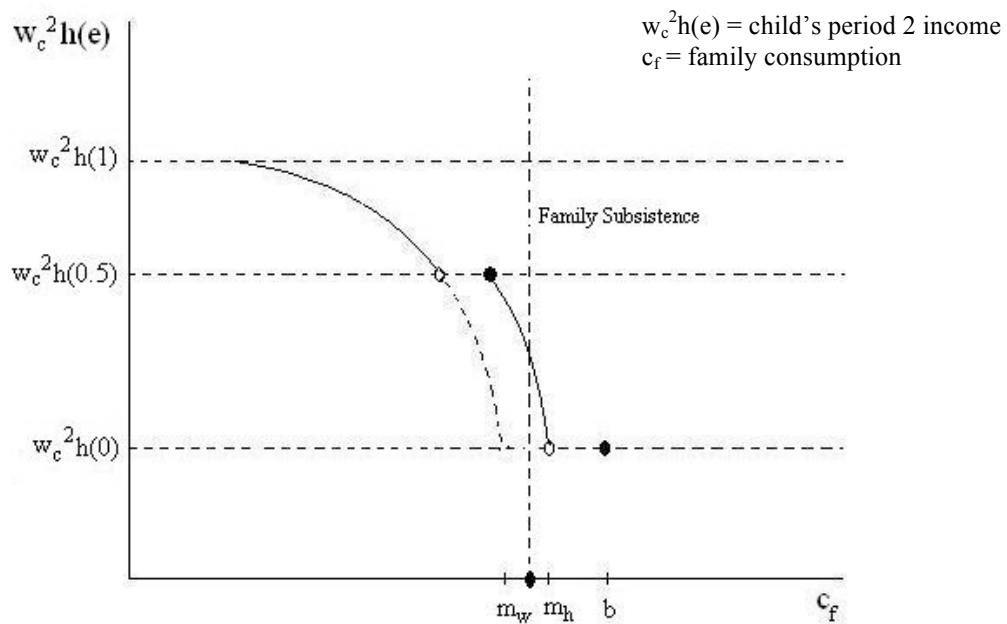
The subsistence constraint will now be considered. Any given family cannot survive on less than  $c_{fs}$ . For a certain family, whether the subsistence level of

consumption lies below  $m_w$ , between  $m_w$  and  $m_h$ , between  $m_h$  and  $b$ , or above  $b$  depends on how far out the possibilities frontiers are located. If  $c_f$  is above  $b$ , the family cannot survive, so this situation will be ignored. The other three situations are shown in Figures 10, 11, and 12. I will refer to them as situations A, B, and C respectively. The three corresponding levels of wage categories a family may be in are low parent wage, medium parent wage, and high parent wage. No distribution of parent wages is assumed. The purpose of varying the wage is only to explore how the two-tuition system might impact different families.

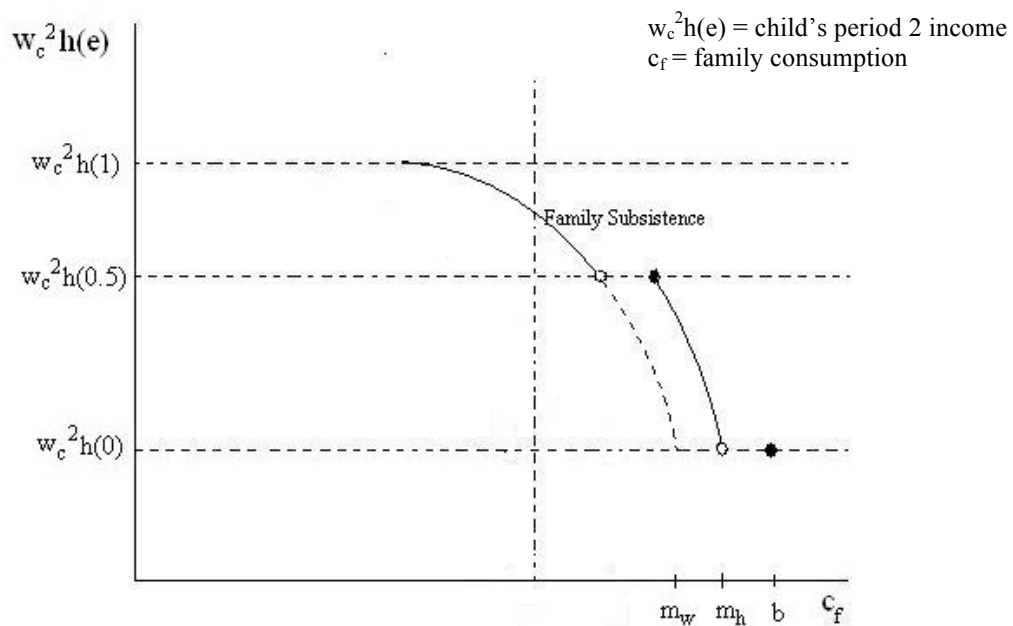


**Figure 10** *Situation A: Low Parent Wage*

In situation A, paying either level of tuition would bring the family below subsistence. With or without the lower tuition option, families in this category will not send their children to school. Therefore, the introduction of the lower tuition option will not affect them, and the amount of child labour they supply will not change.



**Figure 11** *Situation B: Medium Parent Wage*



**Figure 12** *Situation C: High Parent Wage*



In situation B, families could pay  $M_H$  without falling below subsistence, but they could not pay  $M_w$ . Unless the indifference curves are very steep, these families would prefer some amount of education to none, if having some did not bring them below subsistence. The two-tuition model was designed to aid families in this category. These are families for whom the marginal return to education is higher than the marginal cost, (post tuition payment). Lack of access to credit markets or other means of borrowing against the future prevent them from investing in education. With the introduction of the two-tuition system, these families are now able to send their child to school at least some of the time. The amount of child labour they supply may still be inefficiently high, but not as high as it would be without the second tuition option. If indifference curves are so steep that with or without the two-tuition system these families would not educate their children, introducing the second tuition option will not affect them. For families in situation B, the supply of child labour will either be reduced, or it will not change.

Families in situation C could pay either tuition without going below subsistence. Depending on how close to the origin the subsistence level is, it may still impose an upper bound on  $e$  that is less than one, as shown in Figure 12, but this possibility does not affect the implications of a second tuition level for families in this category. Because these families have the option of either tuition level, their choice will depend on the shape of the indifference curves. Following from the analysis of Figures 7 and 8, the effect of the introduction of a second tuition option on the supply of child labour is ambiguous. The supply of child labour may increase, but only for a certain range of possible indifference curves. If human capital is sufficiently valuable, families who can pay  $M_w$  will pay it. If human capital is of low relative value, then even without the second tuition option

families would have chosen an amount of education as small or smaller than that chosen with the new option.

Overall, the two-tuition model has no effect on families in situation A, either reduces or does not change the supply of child labour from families in situation B, and had an ambiguous effect on families in situation C. However, if human capital is valued sufficiently highly or sufficiently little, the two-tuition model either will not affect families in situation C, or it will reduce their supply of child labour.

### *Discussion*

In the preceding analysis, it was assumed that the possibilities frontiers always had the same shape. If  $h(e)$  does not change, this is indeed the case. For the following discussion, returns to education are considered. If the returns to education are greater, this means that a certain level of  $e$  will yield higher  $h$ . A possibilities frontier with higher returns to education would be relatively steeper. This makes it more likely that its intersection with the indifference curves would occur at a higher  $h(e)$ . So if returns to education are greater, parents choose to educate more. Lower returns to education would have the opposite effect. The analysis has shown that the two-tuition model would be most beneficial where human capital is valued highly, or where its value is relatively small. Through the same analysis as that done with Figures 7 and 8, except with indifference curves given and changing the shape of the possibilities frontiers, it can be shown that educational returns give a parallel result. If returns to education are sufficiently high, or sufficiently low, the situation where child labour could increase with the introduction of the two-tuition model will not be possible.

By examining factors that effect the valuation of human capital or returns to education, policymakers may be able to determine whether or not the two-tuition system would benefit them. A factor that affects returns to education is quality of education. Quality of education includes quality of teachers, facilities, materials, and student teacher ratio. Two factors that affect valuation of human capital are return to skilled labour, and any inherent value the populace places on being educated. As previously discussed, technological progress may affect returns to skilled labour. If the quality of education is high, if the populace values education inherently, and if there are abundant employment opportunities for educated individuals, it is likely that a two-tuition system would be beneficial. Similarly, if quality of education is low, if returns to skilled labour are low, and if the populace does not inherently value education, it is likely that a two-tuition system would again be beneficial.

The concavity of  $h(e)$  may also affect the results. If  $h(e)$  is more concave, then returns to education are higher. Given certain indifference curves, this will tend to yield a higher choice of  $e$  before the second tuition option is introduced. With the introduction of the second tuition option, if the indifference curves are such that parents choose the lower tuition option, more concave returns to education are more likely to yield the situation where child labour could increase.

Another factor for policymakers to consider is how much of the population is in each of situations A, B, and C. Situation B, medium parent wage, is the situation with the highest potential for reducing child labour. If a relatively large amount of the population fits in this category, the two-tuition system would be beneficial. On the other hand, if most of the population fits in category A, small parent wage, the two-tuition system would have little if any impact. If most of the population is category C, high parent wage,

other factors would have to be considered to determine the probability of the two-tuition system increasing child labour.

Increasing school attendance is not only important for the lives of individual children, but also for the economy as a whole. If the implementation of a two-tuition system succeeds in increasing per capita human capital, it might help the economy to reach the regime switching level analyzed by Dessy (2000) beyond which families choose to have less children, and educate them. Whether or not this would happen depends on the human capital returns from more education. Suppose that prior to the implementation of the two-tuition system, an economy is in an equilibrium with a certain level of per capita human capital. When the system is implemented, a certain amount of children will receive more education than they otherwise would have. Per capita human capital for their generation will be higher than it was for their parents. How much higher depends on  $\partial h/\partial e$ . Whether or not this would initiate the transition of the economy depends on where the new level of per capita human capital is relative to the regime switching level. If it is at or above the regime switching level, the economy will transition. If it is below, the economy will enter a new equilibrium with higher per capita human capital than the previous one, but there will still be child labour.

Benefits from the two-tuition model mostly derive from the introduction of a second lower tuition option. However, even if education is free, structuring the day so that understanding the first half is not contingent on attending the second may still be beneficial. As many children must work to keep their families above subsistence, minimizing the negative impacts of having to miss part of every school day could be a good strategy for increasing the human capital returns from attending a reduced amount of school.

## **Conclusion**

There are many reasons, both moral and economic, why the reduction and ultimate elimination of child labour is desirable. The reason, which is of the most significance to this work, is that child labour prevents human capital accumulation, and lack of human capital is a barrier to development. Studies have been discussed which show work to be detrimental to educational attainment.

The main cause of child labour is poverty. This is widely accepted to be the case, and I have provided empirical evidence linking poverty to higher child labour rates. Parents generally send their children to work out of necessity, but the decision whether to send their children to work or school also depends on the relative returns of both. Research has been discussed that shows that lowering the fixed costs to education, or raising the expected returns to education, would raise school attendance.

In some circumstances, a child's ability to pay school fees is contingent on their income. In many countries, children both work and attend school. When exploring possible strategies for the reduction of child labour, accommodating the necessity of combining school and work might be beneficial.

Many solutions have been proposed for reducing child labour, such as regulations, compulsory education, and alternative schools. All of these solutions could be effective if appropriate actions were taken with their implementation; however, appropriate actions include such costly measures as subsidies for families with previously employed children, free education, rehabilitation for previously employed children, and in the cases of regulations and compulsory schooling, monitoring. If a country does not have the funds to take such measures, less costly tactics must be devised.

The two-tuition model for reducing child labour is simple and cost effective. Since it would function within existing school systems, and be largely, if not completely funded by tuition payments, it is a realistic option for countries that lack funding for large scale subsidized action against child labour.

I have shown that if education is valued very highly and returns to education are high, or if education is valued very little and returns to education are low, then the two-tuition model will reduce the total amount of time children spend working. By studying the valuation of human capital and returns to education in their country or region, policymakers may be able to determine if the two-tuition model would benefit them. Furthermore, if a country does have some funds available, it might consider taking measures to raise the returns to education and the valuation of human capital, and it might combine these measures with the implementation of a two-tuition system. Such measures might include ensuring that jobs are available for skilled workers, spreading awareness about the value of education, and ensuring that teachers are well trained and facilities are adequate.

Lack of funding is an inconvenient reality. However, if creative solutions are found to make small improvements wherever possible, lack of funding need not render impossible the reduction and eventual elimination of child labour.

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**Appendix****Table 1.** Countries used in the samples for figures 1, 2, and 3

<u>Figure 1:</u> Child Labour Rate vs. GDP per capita	<u>Figure 2:</u> Child Labour Rate vs. Domestic Credit	<u>Figure 3:</u> Child Labour Rate vs. Public Spending on Education
Algeria	Algeria	Algeria
Argentina	Argentina	Angola
Bangladesh	Bangladesh	Argentina
Benin	Benin	Bangladesh
Bolivia	Bolivia	Bolivia
Brazil	Brazil	Botswana
Burkina	Burkina	Burkina
Burundi	Burundi	Burundi
Cameroon	Cameroon	Cameroon
Cape Verde	Cape Verde	Central African Republic
Central African Republic	Central African Republic	China
Chad	Chad	Colombia
China	China	Congo, Republic of
Colombia	Colombia	Costa Rica
Comoros	Comoros	Ecuador
Congo, Republic of	Congo, Republic of	Egypt
Costa Rica	Costa Rica	El Salvador
Dominican	Dominican	Ethiopia
Ecuador	Ecuador	Gambia
Egypt	Egypt	Ghana
El Salvador	El Salvador	Guatemala
Gabon	Ethiopia	Haiti
Gambia	Gabon	Hungary
Ghana	Gambia	India
Guatemala	Ghana	Indonesia
Guinea	Guatemala	Iran
Guinea-Bissau	Guinea-Bissau	Italy
Honduras	Honduras	Jamaica
Hungary	Hungary	Jordan
India	India	Kenya
Indonesia	Indonesia	Lesotho
Iran	Iran	Madagascar
Italy	Italy	Malawi
Jamaica	Jamaica	Malaysia
Jordan	Jordan	Mauritius
Kenya	Kenya	Mexico
Lesotho	Lesotho	Morocco
Madagascar	Liberia	Mozambique
Malawi	Madagascar	Namibia
Malaysia	Malawi	Nepal
Mali	Malaysia	Nicaragua
Mauritania	Mali	Niger
Mauritius	Mauritania	Nigeria
Mexico	Mauritius	Pakistan
Morocco	Mexico	Panama
Mozambique	Morocco	Paraguay

Namibia	Mozambique	Peru
Nicaragua	Myanmar	Philippines
Nigeria	Namibia	Portugal
Pakistan	Nepal	Romania
Panama	Nicaragua	Senegal
Papua	Niger	Sri Lanka
Paraguay	Nigeria	Sudan
Peru	Pakistan	Suriname
Philippines	Panama	Swaziland
Portugal	Papua	Syria
Rwanda	Paraguay	Tanzania
Senegal	Peru	Thailand
Sierra	Philippines	Togo
Sri Lanka	Portugal	Turkey
Sudan	Romania	Uganda
Syria	Rwanda	Uruguay
Thailand	Senegal	Venezuela
Togo	Sierra	Zambia
Turkey	Sri Lanka	Zimbabwe
Uganda	Sudan	
Uruguay	Suriname	
Venezuela	Swaziland	
Yugoslavia	Syria	
Zambia	Tanzania	
Zimbabwe	Thailand	
	Togo	
	Turkey	
	Uganda	
	Uruguay	
	Venezuela	
	Yemen	
	Zambia	
	Zimbabwe	

**Table 2.** Means and standard deviations for the variables in figures 1, 2, and 3

	Mean	Standard Deviation
<u>Figure 1</u>		
Child labour rate	20.27	15.08
GDP per capita	2303.93	2050.36
<u>Figure 2</u>		
Child labour rate	21.12	15.40
Domestic credit provided by the banking sector (% of GDP)	41.53	29.96
<u>Figure 3</u>		
Child labour rate	19.63	15.43
Public Spending on Education (% of GNP)	3.69	1.86