

Opportunity, Inequality and the Intergenerational Transmission of Child Labour

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This paper presents a model in which opportunity differences within society result in child labour, where ‘opportunity’ is broadly defined but can include school quality, access to higher paying jobs, access to information about the returns to education and actual discrimination. If opportunity differences exist, child labour and poverty are shown to be symptomatic of this underlying socioeconomic condition. It is then shown that policies that ban child labour and/or introduce compulsory education laws can actually reduce dynastic welfare, increase poverty and further exacerbate income inequality within society, because they treat the symptom rather than the disease: the lack of opportunity.

INTRODUCTION

The economics of child labour has become one of the most intensely studied subjects in development economics over the past few years, coinciding with increased attention to globalization and free trade issues. The explosion in the recent literature on child labour can be traced back to the seminal work of Basu and Van (1998), who explained how labour market feedbacks can lead to multiple equilibria in labour markets and child labour in developing countries. The key assumption in the Basu–Van paper, which has been repeated in virtually every other subsequent theoretical work on child labour, is that child labour is a consequence of familial poverty. Other dynamic models have emphasized the contributing role of incomplete capital markets in conjunction with poverty. For example, Ranjan (2001), Baland and Robinson (2000) and Basu (1999) demonstrate that child labour may result from unenforceable contracts between child and parent with respect to human capital investments and intergenerational transfers.

There is also a large and growing body of empirical evidence that addresses this potential link between parental income (and wealth) and child labour. Fallon and Tzannatos (1998) present cross-country evidence suggesting that for low-income countries child labour incidence and GDP per capita are negatively correlated; however, for countries with GDP per capita over US \$600 the negative correlation ceases, though there remain large variations in the child labour data. Ray (2000) finds evidence to support the positive relationship between child labour and poverty in Pakistan, but finds no evidence of such a relation in Peru. Both of these studies, however, rely on cross-sectional data, and the results are therefore best considered suggestive.

A new and growing body of literature, which overcomes this weakness, studies the effectiveness of cash transfer programmes in low-income countries on schooling and child labour. While this evidence is still being received, early studies suggest that these programmes are less effective at reducing child labour than they are at increasing schooling. Unconditional cash transfer programmes have been found to have relatively small marginal effects on both child labour

and school enrolment (e.g. Behrman and Knowles 1999; Nielsen 1998), though Edmonds (2004) finds evidence that the receipt of large anticipated cash transfers significantly increased schooling and reduced child labour in South Africa. Ravallion and Wodon (2000) find that a food-for-education programme in Bangladesh did indeed increase schooling among the participants, but the concomitant reduction in child labour was quite small. Bourguignon *et al.* (2002), in their study of the Bolsa Escola educational subsidy programme in Brazil, find similar results. Schultz (2004) and Skoufias and Parker (2001), however, find that the conditional transfer programme, PROGRESA, in Mexico showed significant effects on both school enrolment and child labour.¹

Given this evidence, it seems reasonable to conclude that, while familial poverty is certainly a leading cause of child labour, it is not the *only* cause. In fact, in a direct test of this proposition, Emerson and Souza (2003), in their examination of intergenerational child labour persistence, find that, while income has a significant effect on the transmission of child labour, it cannot *alone* explain the observed high degree of persistence. It leaves as an open question what other mechanisms might cause child labour to be transmitted through the generations of a family.

One assumption of the received literature on child labour that immediately stands out as questionable is that the same *amount* of education for children with identical abilities always results in the same payoffs in the adult labour market. This assumption ignores a number of other issues that may be important in determining why some families choose to send their children into the labour market while others do not.

First, the return to education may be lower across different social states because the quality of education is different across income classes, regions or ethnic groups within a given country. Therefore, a lower quality of education could result in a lower return to education for a given time investment. For example, Behrman and Birdsall (1983) find evidence that the quality of education varies significantly in Brazil; Bedi and Edwards (2002) find that school quality has a strong positive affect on adult earnings in Honduras; Psacharopoulos and Velez (1993) find a positive relationship between school quality and earnings in Colombia; and Card and Krueger (1992) present similar results for the United States.

Second, different regions within a country may have fundamentally different labour markets. One region may have a labour market that supports a high wage for educated workers, and another region's labour market may offer a low wage because of demand differences and low migration, such as the differences between urban and rural labour markets. This argument also has empirical support: Behrman (1999), Squire (1981) and Rosenzweig (1978) all provide overviews of labour markets in developing countries and note the evidence of segmented labour markets.

Third, differences in the return to education across individuals may be the result of actual discrimination in the labour market. A paper by van de Walle and Gunewardena (2001) offers some empirical evidence that returns to education vary systematically across different ethnic groups in Vietnam after controlling for other individual characteristics.

Finally, there may also be significant differences in the amount and quality of information that different groups in an economy have, or have access to,

concerning the return to education in different parts of the country (urban versus rural areas for example, or information that comes from relatives or friends in modern labour markets). This informational gap may not only result in different returns to education, but may also suggest a slow transition to a fully informed economy if information disseminates slowly. Empirical support for this proposition is also strong: Levy and Wadycki (1974) and Schwartz (1976) examine the role of information in decisions to migrate (look for higher paying jobs), while Corcoran *et al.* (1990) and Korpi (2001) study the effects of social networks on job market outcomes.

While school quality and labour market segmentation are more than likely community level differences, discrimination and informational differences are more than likely individual characteristics. Whether the variation in returns to education is based on community or individual characteristics, as developing countries are often characterized by these conditions, differences in payoffs for similar levels of education and identical abilities are quite likely under any of these circumstances.

On the basis of these arguments, this paper offers an alternative explanation for the incidence of child labour in developing countries. Formally, we develop an altruistic dynamic overlapping-generations model where varying degrees of access to what is termed 'opportunity' result in heterogeneous returns to education, which simultaneously determines the incidence of child labour, poverty and income inequality. In other words, opportunity, or lack thereof, may serve as an intervening variable that determines all three of these characteristics.

Within this context, we demonstrate that, *if* poverty is not the root cause of child labour, then programmes that ban child labour or introduce compulsory education laws may actually end up harming the child labour households and exacerbating societal inequality, because the access to opportunity has not changed. In these situations, it is only by providing increased access to opportunity, such as access to a quality education or higher paying jobs for those individuals who receive an education, that a government or society can improve the welfare of the poor and simultaneously eliminate child labour.

This paper also explores the issue of social mobility by allowing households the possibility of transition from low levels of opportunity to higher levels. In this case it is shown that social mobility eventually decreases poverty, child labour and inequality over time as more households gain access to opportunity. However, it is also shown that poverty, child labour and inequality can persist during the transition, in which case, as before, a ban on child labour or the introduction of compulsory education laws may actually decrease the welfare and possibly the income of the child labour households during the transition.

The paper proceeds as follows. The next section presents the general set-up of the model. Section II presents a benchmark economy that demonstrates that there are three child labour–education typologies when opportunity is identical across individuals in an altruistic setting. In two of these cases the intergenerational persistence of child labour and low education attainment levels are the result of poverty; in the third case, which is the case we focus on in this paper, child labour cannot be the result of poverty. Section III then formally introduces opportunity differences into the model. It is here that we

show that opportunity differences within society can also explain the incidence and persistence of child labour, poverty and income inequality across generations. Section IV introduces social mobility and shows that opportunity differences may still explain the incidence and persistence of child labour. Section V discusses the implications of increasing and decreasing returns to scale in the human capital production function. Finally, Section VI summarizes the essential findings of the study.

I. THE GENERAL MODEL

We consider a stylized economy with overlapping generations that live for two periods in an altruistic unitary household setting. While the unitary model is not the most realistic model of household behaviour, especially in a developing country context, we utilize it here to abstract from the intra-household decision-making process. This allows us to focus our attention on other possible determinants of child labour, poverty and inequality within the paper. This unitary model also highlights the dynamic implications of the final household choice. It is important to note that in the present unitary household model heterogeneity exists both between communities (e.g. from school quality differences, differentiated labour markets, etc.), and within communities (e.g. from differences in race, class, ethnicity, caste, etc.). Incorporating household bargaining in the current model would introduce within-household heterogeneity as well.² This variation is not unimportant, but its exclusion does not affect the main results of the paper.

In the first period of life, the child of the household either receives an education and accumulates human capital, h , or participates in the labour market. If the child is in the labour market, he or she earns a fraction $\rho \in [0, 1]$ of an adult's earnings with no human capital w , where w is the equilibrium wage rate paid for each unit of effective labour. In the second period of life, the adult of the household supplies his or her human capital to the labour market (plus a unit of physical labour), earning $w(1 + h)$, and has one child. The adult also decides whether the child will receive an education or work in the labour market, and chooses current household consumption c . As in Laitner (1992) and Loury (1981), we abstract from fertility choice in our current framework and normalize the set of households to a measure one.³

The objective is the same for all households in the economy. An adult-child pair maximizes a Barro (1974)-style dynastic utility function given by

$$E_0 \left[\sum_{t=0}^{\infty} \beta^t u(c_t) \right],$$

subject to the following set of constraints:

$$c_t = w(1 + h_t) + w\rho(1 - e_t)$$

$$e_t = \{0, 1\}$$

$$h_{t+1} = A(\bar{h}_t; s)e_t$$

$$s = \{L, H\}.$$

The first two constraints define the household's consumption–education possibility set in a given period t . In particular, the second constraint defines the child's time spent receiving an education, e_t , which also determines the child's earnings contribution to the household, $w\rho(1 - e_t)$, in the first constraint. For the purpose of transparency, we restrict the education decision to a binary choice of either full-time education, $e_t = 1$, or full-time participation in the labour market, $e_t = 0$, but this restriction could be relaxed without changing the qualitative interpretation of the results.⁴ Implicit in this specification is a linear technology that pays each worker a wage w depending on their relative productivity, which is determined by their level of human capital.

The third constraint, $h_{t+1} = A(\bar{h}_t; s)e_t$, describes the human capital production function, where \bar{h}_t is average level of human capital of the parents. This function maps the time spent receiving an education, $e_t = \{0, 1\}$, into an education return set, $R = \{0, \alpha A(\bar{h}_t; L), A(\bar{h}_t; H)\}$, where $\alpha \in [0, 1]$. The last two elements in the return set define the return to education for those households who choose to send their children to school in the different social states, $s = \{L, H\}$, respectively. A household in the high social state, $s = H$, receives a return of $A(\bar{h}_t; H)$, where $A(\bar{h}_t; H) \in (1, M]$ and $1 < M < \infty$, and a household in the low social state, $s = L$, receives a (potentially) proportionally lower return to education, $\alpha A(\bar{h}_t; L)$. Finally, the first element of the return set is when the child is sent into the labour market.⁵

For most of what follows, we assume a constant returns to scale human capital production function. This implies that the positive general equilibrium externalities that may result from an increase in society's average level of human capital, \bar{h}_t , (direct productivity effects, lower crime, better health, etc.), are exactly offset by the potential labour market effects of a lower return on education in a better educated society (diminishing returns). Technically, this implies that $A(\bar{h}_t, H) = A \in (1, M]$, where A is some constant strictly greater than $\rho \in [0, 1]$. We examine the other potential cases, namely increasing returns to scale, $\partial A(\bar{h}_t, H) / \partial \bar{h}_t > 0$, and decreasing returns to scale, $\partial A(\bar{h}_t, H) / \partial \bar{h}_t < 0$, in Section V.

The parameter $\alpha \in [0, 1]$ is our theoretical measure of opportunity and captures any socioeconomic heterogeneity in education returns. If, for example, we interpret α as a lower quality of education for those individuals in the low social state, $s = L$, then the productivity effect is direct; that is, lower education quality reduces productivity. If we interpret α in the context of segmented labour markets, for example urban versus rural, then payments to educated labour are lower as a result of market conditions (less demand for educated labour in the rural sector). Finally, if we interpret α as discrimination, then this parameter represents pure exploitation. All of these interpretations are consistent with our theoretical construct.

Finally, let $s = \{L, H\}$ follow a Markov process with a transition matrix $\Pi(s_t, s_{t+1}) = [\pi_{ij}]$, where $i, j = L, H$ and $\pi_{ij} = \text{Prob}\{s_{t+1} = j | s_t = i\} \in [0, 1]$. This transition matrix determines how society evolves over time and how households perceive their children's probability of success. It is, in fact, this heterogeneity in social states that will generate persistence in child labour, poverty and income inequality, rather than multiple equilibria in the labour market (e.g. Basu and Van 1998), or poverty and dynastic liquidity constraints

(e.g. Ranjan 2001; Baland and Robinson 2000; Basu 1999). This transition matrix may also depend on our interpretation of opportunity, an issue we address shortly. Finally, assuming that the utility function $u : \mathfrak{R}_{++} \rightarrow \mathfrak{R}$ is C^2 and strictly concave, the discount factor is $\beta \in (0, 1)$, and E_0 is the adult's conditional expectation over Π in period zero, which denotes the current period.⁶

At this point, it is useful to specify the household's problem in recursive form:

$$(1) \quad v(\bar{h}, h, s) = \max_{c, h'} \{u(c) + \beta E v(\bar{h}', h', s') | s\},$$

subject to

$$(2) \quad c = w(1 + h) + w\rho(1 - e),$$

$$(3) \quad h' = A(\bar{h}, s)e,$$

where the prime denotes next period's human capital and social state, respectively. The solution to this problem provides the household's decision rule or policy function, $h' = g(\bar{h}, h, s)$, which also describes the household's decision on whether to educate their child or send the child into the labour market via equation (3). We also assume that households behave as if their education decision does not affect the average level of human capital for the next generation, which is consistent with a population of measure one. With this setup in hand, we now proceed to describe the benchmark economy.

II. THE BENCHMARK ECONOMY

The purpose of the benchmark economy described in this section is to establish the conditions under which poverty can explain child labour when households are non-paternalistically altruistic towards their offspring.⁷ In doing so, we can then establish the conditions that, *ex ante*, rule out poverty as the explanatory factor of child labour. It is this latter case where we show that child labour, poverty and inequality may all result from opportunity differences within society.

The household's decision rule when opportunities are equal

Using the theoretical construct described in Section I, we now show that there are three different child labour–education scenarios within the model when opportunity is identical across households and the human capital dynamics are governed by a constant returns to scale production function, $A(\bar{h}_t, H) = A \in (1, M]$. In terms of our model, equal opportunity across social states implies that $\alpha = 1$ and that the education technology is identical in both states, $A(L) = A(H) = A$. This also implies that social mobility and labels are inconsequential to the household's problem described by equations (1)–(3), although we employ the labels here for future reference.

Without loss of generality, let the economy begin at time 0 and assume there are two types of household. As we will demonstrate, these two cases are sufficient to describe the dynamic behaviour of the stylized economy. Type 1

households (wealthy) enter the current period with A units of human capital. This implies that the initial head of the household was a non-child labourer, and we associate this type of household with the high social state $s = H$. Type 2 households (poor) enter the current period with 0 units of human capital. This implies that the initial head of the household was a child labourer, and we associate this type of household with the low social state $s = L$. Since the households in the two different social states enter with different initial values of the state variable (human capital), they solve different recursive problems.

Wealthy households solve the following problem with respect to their child's education or labour force participation:⁸

$$(4) \quad v(A, H) = \max_{e \in \{0,1\}} \{u[w(1+A) + w\rho(1-e)] + \beta v(Ae, H)\}.$$

The solution to this problem results in the following decision rule:

$$(5) \quad h' = g(A, H) = \begin{cases} A & \text{if } v(A, H)_{e=1} \geq v(A, H)_{e=0} \\ 0 & \text{if } v(A, H)_{e=1} < v(A, H)_{e=0} \end{cases}.$$

This rule simply states that the adults of a wealthy household will choose to educate their child if the incremental increase in dynastic utility from doing so is greater than the incremental increase in dynastic utility from sending their child into the labour market. Expressing this rule in terms of utility implies that the wealthy household will choose to educate their child (i.e. choose $e = 1$) if the following condition holds:

$$(C1) \quad u[w(1+A+\rho)] - u[w(1+A)] \leq \frac{1}{\lambda} (u[w(1+A)] - u[w(1+\rho)]).$$

The left-hand side of (C1) represents the current-period utility gain from sending the child into the labour market. The right-hand side of (C1) is the present value of the future generations' utility gain from educating the child in the current period, where $\lambda = (1-\beta)/\beta$ is the households rate of time preference.

Poor households solve a similar problem with respect to their child's education or labour force participation:

$$(6) \quad v(0, L) = \max_{e \in \{0,1\}} \{u[w + w\rho(1-e)] + \beta v(Ae, L)\}.$$

The solution to their problem results in the following decision rule:

$$(7) \quad h' = g(0, L) = \begin{cases} A & \text{if } v(0, L)_{e=1} \geq v(0, L)_{e=0} \\ 0 & \text{if } v(0, L)_{e=1} < v(0, L)_{e=0} \end{cases}.$$

Again, this rule states that the adults of a poor household will choose to educate their child if the incremental increase in dynastic utility from doing so is greater than the incremental increase in dynastic utility from sending the child into the labour market. Or in terms of utility, these households will choose to educate their children (i.e. choose $e = 1$) if the following condition holds:

$$(C2) \quad u[w(1+\rho)] - u[w] \leq \frac{1}{\lambda} (u[w(1+A)] - u[w(1+\rho)]).$$

Three different child labour–education scenarios

Using conditions (C1) and (C2), we can derive three child labour–education typologies for our benchmark economy, which we summarize with the following definition.

Definition 1. There are three possible child labour–education outcomes in the stylized economy when opportunity is equal across social states, $A(L) = A(H) = A$, and households are altruistic towards their offspring:

1. *a complete child labour–no education economy:* this case is realized under the following set of inequalities:

$$(11) \quad \begin{aligned} u[w(1 + A)] - u[w(1 + \rho)] &< \lambda(u[w(1 + A + \rho)] \\ &- u[w(1 + A)]) < \lambda(u[w(1 + \rho)] - u[w]); \end{aligned}$$

2. *a partial child labour–education economy:* this case is realized under the following set of inequalities:

$$(12) \quad \begin{aligned} \lambda(u[w(1 + A + \rho)] - u[w(1 + A)]) &\leq u[w(1 + A)] \\ - u[w(1 + \rho)] &< \lambda(u[w(1 + \rho)]u[w]); \end{aligned}$$

3. *a no child labour–complete education economy:* this case is realized under the following set of inequalities:

$$(13) \quad \begin{aligned} \lambda(u[w(1 + A + \rho)] - u[w(1 + A)]) &< \lambda(u[w(1 + \rho)] - u[w]) \\ &\leq u[w(1 + A)] - u[w(1 + \rho)]. \end{aligned}$$

The first economy type, (I1), is representative of economies where households are less altruistic towards their offspring (a high value of λ), where the return to education is low in general (a low value of A), and/or where a child is relatively productive (a high value of ρ). In this economy child labour is prevalent and education is completely absent. This first economy type (I1) also shows that when a wealthy household decides to send its child into the labour market a poor household will make the same decision. This result follows from the strict concavity condition placed on the household's utility function and ensures that the complete child-labour economy is self-perpetuating, since all households are poor next period.

In the second economy type, (I2), wealthy households choose to educate their children, but poor households choose to send their children into the labour market. This case implies that the return to education and current income for the wealthy households, along with the necessary concavity in the household's utility function, is sufficient to eliminate the need to send the child into the labour market. On the other hand, poverty is sufficient to induce poor households with identical preferences to send their children into the labour market. This economy is also self-perpetuating, because each generation in the future, for each household type, solves an identical problem.

These two cases show that, under certain conditions, a unique interior child labour equilibrium may exist in a non-paternalistically altruistic setting, with

equal opportunity, as the result of poverty.⁹ In the first scenario, (I1), the degree of altruism and the return to education may be too low. This scenario can represent a child labour poverty trap economy, where child labour is complete and poverty is extreme. In the second, and perhaps more interesting, scenario, (I2), the wealthy households decide to educate their children and the poor decide to send their children into the labour market. This result holds because the marginal utility gain that a wealthy household receives from sending its child into the labour market, i.e. $u[w(1 + A + \rho)] - u[w(1 + A)]$, is strictly less than the marginal utility gain that a poor household receives from sending its child into the labour market, $u[w(1 + \rho)] - u[w]$. This second scenario indirectly motivates the recent research by Ranjan (2001), Baland and Robinson (2000) and Basu and Van (1998), where child labour and the persistence of child labour is the result of poverty.

Finally, in the third economy type, (I3), there is no child labour under the assumption of equal opportunity. Using the same arguments as above, this case demonstrates that all households will choose to educate their children and child labour is non-existent. This economy type is representative of economies where households are more altruistic towards their offspring (a low value of λ), where the return to education is high (a high value of A), or where a child is relatively less productive (a low value of ρ). Also, note that, because poor households choose to educate their children, we know that the wealthy households will make the same decision, which implies that the no child labour–complete education economy is also self-perpetuating because all households are wealthy next period.¹⁰

Since the objective of this study is to better understand the potential relationship between opportunity differences within society and child labour, we assume from now on that, when the return to human capital is independent across social states, i.e. $\alpha = 1$, all households will choose to educate their children independent of income. In other words, we assume that the inequalities described in (I3) are satisfied throughout the remainder of the paper. This allows us to demonstrate that familial poverty is not the only potential source of child labour. In fact, we show that child labour may actually serve as an indicator or symptom of some other underlying socioeconomic structural problem, which we define as a lack of opportunity for certain groups within a society.

III. OPPORTUNITY DIFFERENCES, CHILD LABOUR AND INCOME INEQUALITY

As already mentioned, we focus our attention solely on the third economy type, (I3). By doing so, for the purposes of exposition, we are essentially ruling out, *ex ante*, poverty as the explanation of child labour and low educational attainment in an altruistic household. This third economy type demonstrates how the existence of different social states and opportunity differences within society can explain the presence and persistence of child labour, income inequality and poverty. That is, the presence of opportunity differences within a society offers an *alternative* explanation for all three of these phenomena.

We completely restrict social mobility in this section, an assumption implicitly made in the last section. This case is consistent with, although not

limited to, discrimination or a caste system interpretation of opportunity. Thus, the diagonal elements of Π are set equal to one and the off-diagonal elements are set equal to zero, and each household remains in the same state indefinitely. This distribution simplification allows us to concentrate our attention on the opportunity differential $\alpha \in [0, 1]$. We relax this assumption in the next section, where we address the issue of social mobility.

The incidence of child labour

As before, a type 1 household enters the current period with A units of human capital and remains in the social state $s = H$ for ever. Since the type 1 household's problem and decision rule remain the same, condition (C1) and the inequality in (I3) summarize the type 1 household's optimal choice. The type 2 household's problem, however, has changed. These households now receive a proportionally lower return to education in social state $s = L$, the degree of which is determined by the opportunity parameter $\alpha \in [0, 1]$.

The new problem facing type 2 households with respect to their child's education and labour force participation decision is as follows:

$$(8) \quad v(0, L) = \max_{e \in \{0,1\}} \{u[w + w\rho(1 - e)] + \beta v(\alpha Ae, L)\},$$

with the following decision rule:

$$(9) \quad h' = g(0, L) = \begin{cases} \alpha A & \text{if } v(0, L)_{e=1} \geq v(0, L)_{e=0} \\ 0 & \text{if } v(0, L)_{e=1} < v(0, L)_{e=0} \end{cases}.$$

In terms of utility, the type 2 households will choose to educate their children in the presence of the opportunity differential if the following condition holds:

$$(C3) \quad u[w(1 + \rho)] - u[w] \leq \frac{1}{\lambda} (u[w(1 + \alpha A)] - u[w(1 + \rho)]),$$

As before, the left-hand side of (C3) equals the current-period utility gain from sending the child into the labour market. The right-hand side of (C3) equals the present value of the future generations' utility gain from educating the child, with the additional restriction that the return to education is proportionally lower than that received by the individuals in social state $s = H$ by the factor α .

Decision rule (C3) provides us with the following proposition.

Proposition 1. Assuming that condition (I3) is satisfied, there exists an opportunity threshold $\alpha^* \in (0, 1)$, such that a type 2 household will choose to send its child into the labour market if $\alpha < \alpha^*$ and will choose to educate its child if $\alpha \geq \alpha^*$.

Proof. The proof of this proposition is shown in Figure 1. First, consider the case where $\alpha = 0$ (complete absence of opportunity). This implies that the following condition must be true if the type 2 households are to choose education for their children over labour market participation:

$$0 < u[w(1 + \rho)] - u[w] \leq \frac{1}{\lambda} (u[w] - u[w(1 + \rho)]) < 0,$$

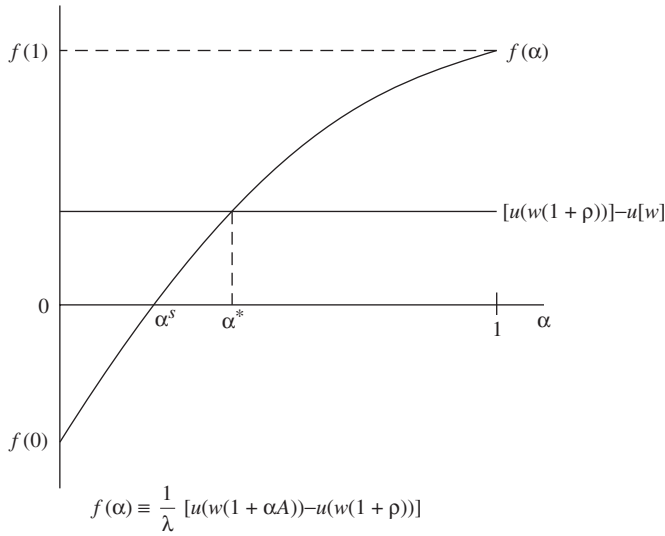


FIGURE 1. Threshold level of opportunity.

which follows from (C3). This is a contradiction. Therefore, the type 2 households send their children into the labour market when $\alpha = 0$. Next, consider the case where $\alpha = 1$ (equal opportunity). In this case all households educate their children, by (I3). Now, by continuity and the strict concavity of $u(c)$, there exists an $\alpha^* \in (0, 1)$ that satisfies the following interior condition:

$$(C4) \quad u[w(1 + \alpha^*A)] - u[w(1 + \rho)] = \lambda[u[w(1 + \rho)] - u(w)]. \quad \blacksquare$$

This proposition demonstrates that child labour, if it exists in the current context, is the result of the opportunity differences between the two social groups or states in society. The households in the low social state $s = L$ now optimally choose to send their children into the labour market because of the disproportionately low return to education for their children.

Proposition 1 also has important policy implications, which we summarize in Proposition 2.

Proposition 2. If $\alpha < \alpha^*$, a government ban on child labour and/or the implementation of compulsory education laws (assuming enforcement) will eliminate the incidence of child labour in the economy, but will also reduce the dynastic welfare of the poor households.

Proof. This follows directly from the poor household’s decision rule in equation (9), Proposition 1, and given $\alpha < \alpha^*$. This choice was initially in the feasible set but was not chosen by the household; therefore, household welfare is unambiguously lower by the axiom of revealed preference. \blacksquare

The problem in this context with policies that ban child labour and/or implement compulsory education laws is that these policies treat the symptom—child labour—and not the disease—the lack of opportunity for poor households. In the current framework, it is the socioeconomic

'fundamentals', or lack of opportunity within society for the type 2 households, that in effect retards economic development, resulting in poverty *and* child labour. Without changing the structural characteristics that result in the opportunity differences, these types of policy can only make the initial poor worse off. On the other hand, if the government wants to eliminate child labour and increase the welfare of its citizenry, an appropriate policy would be to increase the degree of opportunity within society (e.g. raise the quality of education, provide better access to higher paying jobs and to information about higher paying jobs, reduce discrimination, etc.) for all households so that $\alpha \geq \alpha^*$. These types of policy have the potential not only to eliminate the incidence of child labour and increase overall productivity in the economy, but to reduce poverty at the same time. This is an issue we now formally address.

The persistence of child labour, poverty and income inequality

The actual incidence of child labour depends on the proportion of type 2 households in society—obviously, assuming $\alpha < \alpha^*$. For our measure, we define $\sigma_H(t)$ as the fraction of households in social state $s = H$ and $\sigma_L(t)$ as the fraction of households in social state $s = L$ at time t , where $\sigma_L(t) + \sigma_H(t) = 1$. Given our current assumptions about the transition matrix Π , the proportion of the population in each category remains constant, and the same subset of households continue to represent each group. This implies that the incidence of child labour also remains constant through time at $\sigma_L(0)$, unless the government (or perhaps society, through a change in social norms) changes the current socioeconomic environment. Thus, type 2 households continue to send their children into the labour market, and we observe child labour persistence across generations as a result of the lack of opportunity.

Under the current assumptions of the model, and using the above distribution of households, we can derive the income distribution for a country with child labour. Each generation $t \geq 0$ in a type 2 household earns a total income of $w(1 + \rho)$. Each generation $t \geq 0$ in a type 1 household earns a total income of $w(1 + A)$. Each segment of society (or social state) then receives the following income shares:

$$(10) \quad \eta_H(t) = \frac{\sigma_H(t)(1 + A)}{\sigma_H(t)(1 + A) + \sigma_L(t)(1 + \rho)},$$

$$(11) \quad \eta_L(t) = \frac{\sigma_L(t)(1 + \rho)}{\sigma_H(t)(1 + A) + \sigma_L(t)(1 + \rho)},$$

$$(12) \quad \eta_H(t) + \eta_L(t) = 1.$$

Since, by assumption, $A > \rho$, this implies that a typical type 1 or wealthy household will earn more than a typical type 2 or poor household. Thus, we can conclude that the set of wealthy households commands a disproportionate amount of society's income, as shown in equations (10) and (11). It is important to note that this income pattern of inequality is also a symptom of the underlying fundamentals or structural problems within society, i.e. the lack of opportunity, and is not the direct result of poverty.

With this in hand, we now demonstrate that a ban on child labour or the implementation of compulsory education laws may in fact exacerbate societal income inequality. To do so, we introduce the following lemma, where we define the opportunity parameter α^s as the threshold value of the opportunity where the return on education for low social state households is lower than the return to child labour.

Lemma 1. A sufficient condition for the presence of child labour is $\alpha^s \leq \rho/A < \alpha^*$.

Proof. This follows directly from (C4) and is also shown in Figure 1. ■

This results in the following proposition with respect to income inequality.

Proposition 3. Assume that $\alpha < \alpha^s$. A ban on child labour or the introduction of compulsory education laws will not only make the poor households worse off in terms of dynastic welfare, but will also increase income inequality and poverty for all future generations, $t \geq 1$.

Proof. From Lemma 1, we know that $\alpha A < \rho$ and that the poor households' income in the future, $t \geq 1$, will decrease from $w(1 + \rho)$ to $w(1 + \alpha A)$, given $\alpha < \alpha^s$. This implies that the type 1 households' income share must increase as a percentage of total income, because poor households are now poorer; i.e.

$$\eta_H^B(t) = \frac{\sigma_H(t)(1 + A)}{\sigma_H(t)(1 + A) + \sigma_L(t)(1 + \alpha A)} > \eta_H(t).$$

The superscript *B* denotes a ban on child labour or the introduction of compulsory education laws. It also follows that the income share for type 2 households must decrease:

$$\eta_L^B(t) = 1 - \eta_H^B(t) < 1 - \eta_H(t) = \eta_L(t).$$

Thus, a ban on child labour or the introduction of compulsory education laws will exacerbate income inequality for all future generations. ■

This proposition shows that, if type 2 households are forced to educate their children rather than send them into the labour market, if and the return to education is below that of child employment, these households in fact will become poorer under the regulation in the future. In other words, if the government bans child labour without providing the appropriate education facilities, resources for children and opportunities in the labour market, this ban will not reduce poverty or income inequality in the future. Thus, arguments supporting bans on child labour or mandating education based on future reductions in poverty and income inequality at the expense of the current generation are potentially misguided if opportunity differences within a society are present.

IV. SOCIAL MOBILITY, OPPORTUNITY DIFFERENCES, CHILD LABOUR AND INCOME INEQUALITY

The previous section demonstrated that child labour, poverty and income inequality are all theoretically consistent with the existence of opportunity differences within society when social mobility is completely restricted. We also found that a ban on child labour or the introduction of compulsory education laws can, in fact, make households worse off in terms of dynastic utility and exacerbate income inequality for all future generations under certain conditions. This case is consistent with opportunity differences that stem from discrimination arising from, say, caste, where it may be impossible to switch from one social state to the other. It may be only through direct government action (e.g. reserved government jobs, to take an example from India) that a reduction in child labour could occur. However, if opportunity differences stem from segmented labour markets, heterogeneity in school quality and/or incomplete information, for example, there might be migration or a natural dispersion of information over time that can alter the social state of a household. Thus, opportunity differences may not be permanent.

To address this issue of social mobility, we consider the case where type 2 households in the low social state $s = L$ can make the transition to the high social state $s' = H$ with a probability of $\delta \in [0, 1]$, where δ represents the degree of social mobility. Specifically, we assume a non-degenerate transition matrix $\Pi(s_t, s_{t+1}) = [\pi_{ij}]$, where $\text{Prob}(s' = H | s = L) = \delta$ and $\text{Prob}(s' = H | s = H) = 1$. Thus, the high social state H is an absorbing state.

The problem facing type 2 households now includes an element of uncertainty over the future social state of their child, and their child's child, ad infinitum. This problem represented in recursive form is as follows:¹¹

$$(13) \quad v(0, L) = \max_{e \in \{0,1\}} \{u[w + w\rho(1 - e)] + \beta\delta v(Ae, H) + \beta(1 - \delta)v(\alpha Ae, L)\}.$$

The decision rule for this problem is similar to the rules in the previous section, except that future payoffs are now weighted by the second row of the transition matrix Π :

$$(14) \quad h' = g(0, L) = \begin{cases} A \text{ if } v(0, L)_{e=1} \geq v(0, L)_{e=0}, \text{ if } s' = H \\ \alpha A \text{ if } v(0, L)_{e=1} \geq v(0, L)_{e=0}, \text{ if } s' = L. \\ 0 \text{ if } v(0, L)_{e=1} < v(0, L)_{e=0} \end{cases}$$

This rule states that the adults of a poor household will choose to educate their child if the expected dynastic utility with an educated child is greater than the expected dynastic utility when the child participates in the labour market. Also, the realized return on human capital defined by the policy function $h' = g(0, L)$ in equation (14) may depend on the realization of the social state next period.

This rule can also be indirectly expressed in terms of utility; i.e. educate the child ($e = 1$) if the following condition holds:

$$(C5) \quad u[w(1 + \rho)] - u[w] \leq \beta\delta[v(A, H) - v(0, H)] + \beta(1 - \delta)[v(\alpha A, L) - v(0, L)].$$

The left-hand side of condition (C5) once again equals the current-period utility gain from sending the child into the labour market. The right-hand side of (C5) equals the expected present value of the future generations' utility gain from educating the child. If the expected gain from educating the child, in terms of dynastic utility, is greater than the current gain from sending the child into the labour market, as before, the parents will choose to educate their child.

Given the Markov structure of the problem, this policy or decision rule persists across time for a dynasty in the low social state. This results in the following proposition.

Proposition 3. Assume that $\alpha < \alpha^*$. Then there exists a social mobility threshold value $\delta^* \in (0, 1)$, such that a type 2 household in social state $s = L$ will choose to send its child into the labour market if $\delta < \delta^*$ and will choose to educate the child if $\delta \geq \delta^*$.

Proof. The proof of this proposition is similar to the one for Proposition 1 and is shown in Figure 2. First, consider the case where $\delta = 1$ (complete mobility). The decision rule (C5), for this particular case, can be expressed in terms of the utility function

$$\lambda(u[w(1 + \rho)] - u[w]) \leq u[w(1 + A)] - u[w(1 + \rho)].$$

From (C2) and (I3), this condition is satisfied, and type 2 households will choose to educate their children. Next, consider the case where $\delta = 0$ (no mobility). The decision rule (C5) is identical to (C3). By assumption, $\alpha < \alpha^*$; this implies that poor households will choose to send their children into the labour market. Thus, we can conclude there exists a $\delta^* \in [0, 1]$ satisfying the following condition:

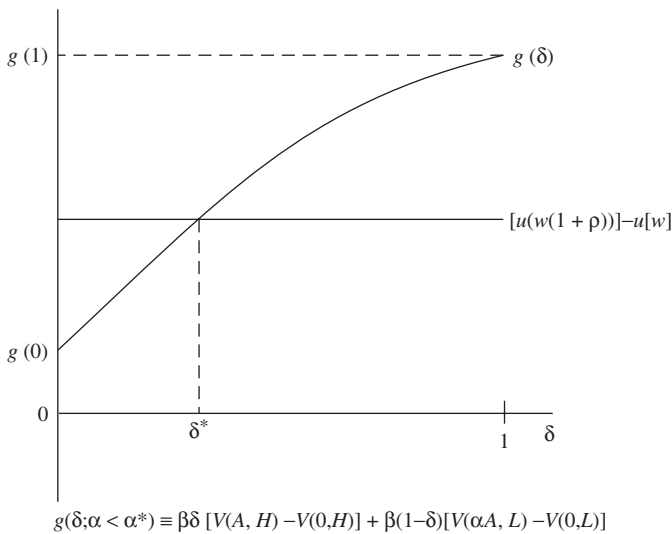


FIGURE 2. Threshold level of social mobility.

$$(C6) \quad u[w(1 + \rho)] - u[w] = \beta\delta^*[v(A, H) - v(0, H)] + \beta(1 - \delta^*)[v(\alpha A, L) - v(0, L)]. \blacksquare$$

Assuming that $\alpha < \alpha^*$, this proposition shows that child labour can persist in an economy with some social mobility as long as δ is less than some critical threshold value δ^* .

Given that there is a continuum of households, and assuming that $\delta < \delta^*$ and $\alpha < \alpha^*$, we can now describe the income distribution and child labour dynamics in the current setting with the following vector difference equation, $\sigma(t) = \Pi^T \sigma(t - 1)$, where $\sigma(t) = [\sigma_H(t) \sigma_L(t)]^T$ and T is the transpose operator. Given an initial population distribution $\sigma(0) = [\sigma_H(0) \sigma_L(0)]^T$, we can express this system as follows:

$$(15) \quad \sigma_H(t) = 1 - \sigma_L(0)(1 - \delta)^t,$$

$$(16) \quad \sigma_L(t) = \sigma_L(0)(1 - \delta)^t.$$

Equation (15) defines the fraction of the population in the high social state in period t . On the basis of the above arguments and assumptions, these households optimally will choose to educate their children. The key property here is that, as $t \rightarrow \infty$, child labour, poverty and inequality will gradually disappear, given that $\delta \in (0, 1)$. In other words, when social mobility is present, these factors will gradually disappear without government intervention although it is worth noting that the length of the transition depends critically on the probability of transitioning into the high social state, which may be low for most developing countries. Finally, equation (16) defines the percentage of the population still in the low social state, and the incidence of child labour.

As in the previous section, a policy that increases social mobility and/or opportunity for the poor (type 2) households can effectively eliminate child labour and reduce inequality at a faster rate over time as shown in equations (15) and (16). This result is in contrast to a ban on child labour or the implementation of compulsory education laws, which we formalize in Proposition 4.

Proposition 4. If $\delta < \delta^*$ and $\alpha < \alpha^*$, a government ban on child labour and/or the introduction of compulsory education laws will eliminate the incidence of child labour, but it will also reduce the expected dynastic welfare of the poor households that remain in the poor or low state, $s = L$.

Proof. The proof of this proposition is equivalent to Proposition 5. \blacksquare

There are two possible ways to view social welfare under a child labour ban and/or compulsory education laws when $\delta < \delta^*$ and $\alpha < \alpha^*$. The first approach is *ex ante* analysis (prior to the realization). This is the case we consider in Proposition 4. Therefore, this proposition also determines the value of the opportunity parameter, δ , above which a ban on child labour and/or a compulsory schooling law would actually end up being Pareto improving in

terms of expected dynastic welfare. If $\delta \geq \delta^*$, then such legislation would make those households initially in the high social state at least no worse off in terms of expected dynastic welfare, while those households initially in the low social state will be strictly better off as a result of the policy. Perhaps the most interesting point is that, if $\delta \geq \delta^*$, then a ban on child labour or mandatory education would, in fact, be unnecessary, because households in the low social state would optimally choose to educate their children in this case.

The second approach is an *ex post* analysis (after next period's social state has been revealed). In this case we need to look at three potential outcomes. First, the households in the high social state are obviously no worse under a policy that bans child labour or mandates education. Second, the households in the low social state are strictly better off *ex post* under this policy if in fact they do make the transition; i.e. $s' = H$. This is because their children will realize the full return on education A . Third, households in the low social state, i.e. those that fail to make the transition to the high social state, or $s' = L$, are strictly worse off *ex post* under this policy. This is because their children only realize the proportionally lower return on education, αA . Thus, *ex post* welfare analysis also suggests that a ban on child labour and compulsory education laws are not welfare improving in the Pareto sense.¹²

In either case, the general conclusion here is as before: a ban on child labour, or the introduction of compulsory education laws when child labour is present, will unambiguously increase poverty for those households that do not make the transition to the high social state as long as $\delta < \delta^*$ and $\alpha < \alpha^*$. Thus, a policy that changes the socioeconomic fundamentals within society is necessary for social welfare to be unambiguously improved.

V. A NOTE ON INCREASING AND DECREASING RETURNS TO SCALE

Throughout the preceding analysis, a CRS human capital production function was assumed. This implied that the positive externalities associated with a better educated society (direct productivity effects, lower crime, better health, etc.) is exactly offset by the labour market effects of a lower return to education (diminishing returns). This section discusses the implication of relaxing this assumption. First, however, some additional notation and conditions to the model economy need to be introduced.

To begin with, the type 2 households' decision rule as of time $t = 0$, for simplicity, now depends on society's current level of average human capital \bar{h}_0 :

$$(17) \quad h' = g(\bar{h}_0, 0, L) = \begin{cases} A(\bar{h}_0, L) & \text{if } v(\bar{h}_0, 0, L)_{e=1} \geq v(\bar{h}_0, 0, L)_{e=0}, \text{ if } s' = H \\ \alpha A(\bar{h}_0, L) & \text{if } v(\bar{h}_0, 0, L)_{e=1} \geq v(\bar{h}_0, 0, L)_{e=0}, \text{ if } s' = L \\ 0 & \text{if } v(\bar{h}_0, 0, L)_{e=1} < v(\bar{h}_0, 0, L)_{e=0} \end{cases}$$

The type 1 households' decision rule also now depends on society's current level of average human capital, \bar{h}_0 ; but their actual decision does not change, given the restriction that the return to education, $A(\bar{h}_t; H) \in (1, M]$, for all $t = 0, 1, 2, \dots$, is strictly greater than the return to sending the child into the labour market, $\rho \in [0, 1]$, and satisfies condition (I3) in Definition 1.¹³ As mentioned, this implies that education has a strictly positive net return per unit

of time investment for those households that have access to high-quality education environments and the appropriate employment opportunities.

Second, assume $\delta < \delta^*$ and $\alpha < \alpha^*$, which implies that child labour is present in the stylized economy. Thus, the following condition is satisfied (which is the opposite of (C5)):

$$(C7) \quad \begin{aligned} &u[w(1 + \rho)] - u[w] > \\ &\beta\delta[v(\bar{h}_0, A(\bar{h}_0, H), H) - v(\bar{h}_0, 0, H)] + \beta(1 - \delta)[v(\bar{h}_0, \alpha A(\bar{h}_0, L), L) \\ &\quad - v(\bar{h}_0, 0, L)] \end{aligned}$$

This condition suggests that there exists a return to education $A^*(\bar{h}, H)$ for a given α and δ such that the following is true for type 2 households:

$$(C8) \quad \begin{aligned} &u[w(1 + \rho)] - u[w] = \\ &\beta\delta[v(\bar{h}, A^*(\bar{h}, H), H) - v(\bar{h}, 0, H)] + \beta(1 - \delta)[v(\bar{h}, \alpha A^*(\bar{h}, L), L) \\ &\quad - v(\bar{h}, 0, L)] \end{aligned}$$

In other words, there exists a return to education $A^*(\bar{h}, H)$, and a proportionally lower return $\alpha A^*(\bar{h}, L)$, sufficient to induce those households in the low social state to optimally choose to educate their children even in the presence of the opportunity differential and incomplete social mobility. This begs the question, what happens in the presence of increasing or decreasing returns to scale?

To answer this, we consider the following argument. Assume that the initial conditions are sufficient to induce child labour, $A(\bar{h}_0, H) < A^*(\bar{h}, H)$ and $\alpha A(\bar{h}_0, L) < \alpha A^*(\bar{h}, L)$. If the human capital production function exhibits increasing returns to scale, which implies that $\partial A(\bar{h}_t, H) / \partial \bar{h}_t > 0$, then as time passes the sequences $\{A(\bar{h}_t, H), \alpha A(\bar{h}_t, L)\}_{t=0}^\infty$ increase and eventually converge to a finite upper bound $\{\bar{A}(1, H), \alpha \bar{A}(1, L)\}$. To see this result, note that by assumption $A(\bar{h}_t; H) \in (1, M]$ satisfies inequality (I3) for all $t = 0, 1, 2, \dots$, which implies that type 1 households always choose to educate their children, and from equation (15) we know that $\sigma_H(t) = 1 - \sigma_L(0)(1 - \delta)^t$ asymptotes towards a value of one. That is, the fraction of the population in the high social state, i.e. those households choosing to educate their children, is increasing and approaching a value of one. Since the average level of human capital evolves as follows,

$$(18) \quad \bar{h}_{t+1} = \sigma_H(t + 1)A(\bar{h}_t, H),$$

this implies that the sequence $\{\bar{h}_t\}_{t=0}^\infty$ is also converging to the value $\bar{A}(1, H)$, given a population of measure one. This confirms the above dynamic properties of the sequences $\{A(\bar{h}_t, H), \alpha A(\bar{h}_t, L)\}_{t=0}^\infty$.

There are two possible cases of interest here. First, let the upper bound for the elements in the education return (sub)set $\{A(\bar{h}_t, H), \alpha A(\bar{h}_t, L)\}_{t=0}^\infty$ converge to a value below $A^*(\bar{h}, H)$ and $\alpha A^*(\bar{h}, L)$, respectively. This implies that the qualitative properties of the child labour dynamics are the same as in the previous section, although inequality is increasing over time as the earnings gap between those who are educated and those who are not increases as a result of

the increasing-returns-to-scale property. Second, now let the upper bound for the elements in the education return (sub)set $\{A(\bar{h}_t, H), \alpha A(\bar{h}_t, L)\}_{t=0}^{\infty}$ converge to a value above $A^*(\bar{h}, H)$ and $\alpha A^*(\bar{h}, L)$, respectively. In this case, the dynamics are the same as above as long as $A(\bar{h}_t, H)$ and $\alpha A(\bar{h}_t, L)$ remain below $A^*(\bar{h}, H)$ and $\alpha A^*(\bar{h}, L)$. However once $A(\bar{h}_t, H)$ and $\alpha A(\bar{h}_t, L)$ reach $A^*(\bar{h}, H)$ and $\alpha A^*(\bar{h}, L)$, which is in finite time, we observe a discrete move to a zero child labour equilibrium via equation (C8), although inequality will persist as a result of the different returns to education across social states.

We can now apply the same logic to the decreasing returns to scale case, where $\partial A(\bar{h}_t, H)/\partial \bar{h}_t < 0$. Again, assume that the initial conditions are sufficient to induce child labour, i.e. $A(\bar{h}_0, H) < A^*(\bar{h}, H)$ and $\alpha A(\bar{h}_0, L) < \alpha A^*(\bar{h}, L)$. Now, however, let the sequences $\{A(\bar{h}_t, H), \alpha A(\bar{h}_t, L)\}_{t=0}^{\infty}$ decrease over time and eventually converge to a finite lower bound, $\{\underline{A}(1, H), \alpha \underline{A}(1, L)\}$. These dynamic properties once again follow from the fact that the high social state is an absorbing state and condition (I3) applies. In this case, child labour persists but inequality decreases as the return to education falls relative to the return to child labour. Another possible case is for the return to education in the high social state to fall sufficiently that the households in the high social state would choose not to educate their children, a violation of condition (I3). This is highly unlikely, given the concavity of the utility function and the fact that oscillations between a complete child labour economy and an incomplete child labour economy would reduce welfare. In other words, society would not invest so much in education that it becomes optimal not to invest in education. Given this, we do not pursue this issue any further.

Another assumption that we could relax is that adult and child labour are perfect substitutes after conditioning on productivity differentials (a linear final output/goods technology). But the results discussed above, under most scenarios, would remain as long as there is a persistent positive wage differential between an educated adult and an uneducated child. This persistent wage differential could be the result of different technologies (e.g. Hazan and Berdugo 2002), or an employment preference for educated adults. In either case, since it is relative wages that determine households' education choices and the dynamic properties of our model, it does not matter if these changes are the result of productivity differentials, as above, or are related to supply and demand effects. While this latter case could provide greater insight into the dynamic process, if, say, multiple sectors were introduced, it is beyond the scope of the present study.

VI. CONCLUSION

Empirical evidence on the intergenerational persistence of child labour suggests that poverty alone may not be the root cause of child labour. This paper presents a model that proposes a different mechanism through which child labour may be transmitted through the generations of a family: differences in opportunity. 'Opportunity' is broadly defined to encompass such things as differences in educational quality, access to high paying jobs, access to information on the returns to education and discrimination against some groups in an economy. If such opportunity differences exist, it is shown that families can become stuck in child labour traps that are associated with, but

not caused by, poverty. It is then shown that, if there is some social mobility in a country, families that previously sent children to the labour market can make the transition to a higher social state where the returns to education are higher, allowing them to withhold their children from the labour market.

Understanding that child labour may be a result of differential returns to education, unequal access to higher paying jobs, information about returns to education or discrimination sheds new light on appropriate policy responses. In general, policies that ban child labour but do not change the fundamental source of the opportunity differential may serve to further impoverish already poor families and exacerbate income inequality within society.

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NOTES

1. In a related study, Jacoby and Skoufias (1997) find considerable seasonal fluctuations in school attendance among rural Indian children in response to seasonal income fluctuations, but that these fluctuations led to an insubstantial loss of overall human capital.
2. Haddad *et al.* (1997) provide an overview of intra-household bargaining models and Emerson and Souza (2005a,b) provide some empirical evidence on the child labour effects of birth order and gender.
3. Hazan and Berdugo (2002) and Emerson and Knabb (2005) study the interaction between fertility and child labour.
4. Similar restrictions appear in Emerson and Souza (2003), Ranjan (2001) and Basu and Van (1998).
5. Note that by assumption $A(\bar{h}_t; H) > \rho$ given the current parameterization of the economy. This implies that the return to education strictly dominates the return to child labour for all levels of average human capital \bar{h}_t in the high social state. This condition does not necessarily hold for the low social state given the proportionally lower return to education.
6. It is also worth noting that we are implicitly assuming a lack of contemporaneous credit markets. Households in the low social state cannot borrow from those in the high social state to finance their child's education. This may be due to either missing markets or actual discrimination in financial markets. While a polar assumption, severely limited access to credit for poor and uneducated families in developing countries is well established (see, e.g. Swain, 2002; Rose, 2000; Rosenzweig and Wolpin, 1993; and the review of micro evidence on credit markets in developing countries in Banerjee, 2001).
7. See Rangel (2003) for a brief discussion on the differences between paternalistic altruism and non-paternalistic altruism.
8. As a result of our constant returns to scale human capital production function we drop the average level of human capital, \bar{h}_t , from the set of state variables in the next four sections.
9. In other words, the existence of child labour in the current altruistic setting does not depend on corner solutions or multiple equilibria.
10. Formally, these three inequalities verify the dynastic time consistency implicit in the decision rules (C1) and (C2). If (I3) is satisfied, then a type 1 household will choose to educate their child. The next generation of a type 1 household will solve an identical problem and therefore make the same decision. This is true for all $t \geq 1$. Also under (I3), a type 2 household will choose to educate their child. Next period's type 2 household will become a type 1 household with $h' = A$. Therefore, all future generations of an initial type 2 household will continue to educate their children. Thus, the decision rules under (I3) are time consistent. A similar argument can be made when (I1) holds. When (I2) holds, each generation and household type continually solves the same problem, and time consistency follows directly from the preceding arguments.
11. The problem facing the type 1 households remains the same given that the high state is an absorbing state.
12. As a possible extension, we could introduce a social welfare function by choosing appropriate weights for the different social classes and then conduct ex-post analysis. We do

not attempt to do this here because the weights chosen for the different social classes would be subject to debate and would take us beyond the scope of the current paper.

13. Specifically, $\lambda(u[w(1 + A(h_t, H) + \rho)] - u[w(1 + A(h_t, H))]) \leq u[w(1 + A(h_t, H))] - u[w(1 + \rho)]$ for all $t = 0, 1, 2, \dots$, which implies those households in the high social state will always choose to educate their children given the $\text{Prob}(s' = H | s = H) = 1$.

REFERENCES

- BALAND, J.-M. and ROBINSON, J. A. (2000). Is child labour inefficient? *Journal of Political Economy*, **108**, 663–79.
- BANERJEE, A. V. (2001). *Contracting Constraints, Credit Markets and Economic Development*. MIT Economics Department Working Paper no. 2–17.
- BARRO, R. J. (1974). Are government bonds net wealth? *Journal of Political Economy*, **82**, 1095–1117.
- BASU, K. (1999). Child labour: cause, consequence, and cure. *Journal of Economic Literature*, **37**, 1083–1119.
- and VAN, P. H. (1998). The economics of child labour. *American Economic Review*, **88**, 412–27.
- BEDI, A. S. and EDWARDS, J. H. Y. (2002). The impact of school quality on earnings and educational returns: evidence from a low-income country. *Journal of Development Economics*, **68**, 157–85.
- BEHRMAN, J. R. (1999). Labour markets in developing countries. In O. Ashenfelter and D. Card (eds.), *Handbook of Labour Economics*, Vol. 3B, Amsterdam: Elsevier, pp. 2859–2939.
- and BIRDSALL, N. (1983). The quality of schooling: quantity alone is misleading. *American Economic Review*, **73**, 928–46.
- and KNOWLES, J. C. (1999). Household income and child schooling in Vietnam. *World Bank Economic Review*, **13**, 211–56.
- BOURGUIGNON, F., FERREIRA, F. H. G. and LEITE, P. G. (2002). *Ex-ante evaluation of conditional cash transfer programmes: the case of Bolsa Escola*. Mimeo: Pontifícia Universidade Católica do Rio de Janeiro.
- CARD, D. and KRUEGER, A. B. (1992). Does school quality matter? Returns to education and the characteristics of public schools in the United States. *Journal of Political Economy*, **100**, 1–40.
- CORCORAN, M., GORDON, R., LAREN, D. and SOLON, G. (1990). Effects of family and community background on economic status. *American Economic Review*, **80**, 362–6.
- EDMONDS, E. (2004). *Child labour and schooling responses to anticipated cash transfers in South Africa: a test of the unconstrained human capital investment model's application to child labour decisions*. Mimeo: Dartmouth College, NH.
- EMERSON, P. M. and KNABB, S. D. (2005). *Self-fulfilling expectations, child labour and economic development*. Mimeo: University of Colorado at Denver.
- and SOUZA, A. P. (2003). Is there a child labour trap? Intergenerational persistence of child labour in Brazil. *Economic Development and Cultural Change*, **51**, 375–98.
- and ——— (2005a). *Child labour, school attendance and intra-household gender bias in Brazil*. Mimeo: University of Colorado at Denver.
- and ——— (2005b). *Birth order, child labour and school attendance in Brazil*. Mimeo: University of Colorado at Denver.
- FALLON, P. and TZANNATOS, Z. (1998). *Child Labour: Issues and Directions for the World Bank*. Washington, DC: World Bank.
- HADDAD, L., HODDINOTT, J. and ALDERMAN, H. (eds.) (1997). *Intrahousehold Resource Allocation in Developing Countries*. Baltimore: Johns Hopkins University Press.
- HAZAN, M. and BERDUGO, B. (2002). Child labour, fertility and economic growth. *Economic Journal*, **112**, 810–28.
- JACOBY, H. G. and SKOUFIAS, E. (1997). Risk, financial markets and human capital in a developing country. *Review of Economic Studies*, **64**, 311–35.
- KORPI, T. (2001). Good friends in bad times? Social networks and job search among the unemployed in Sweden. *Acta Sociologica*, **44**, 157–70.
- LAITNER, J. (1992). Random earnings differences, lifetime liquidity constraints and altruistic intergenerational transfers. *Journal of Economic Theory*, **58**, 135–70.
- LEVY, M. B. and WADYCKI, W. J. (1974). Education and the decision to migrate: an econometric analysis of migration in Venezuela. *Econometrica*, **46**, 377–88.

- LOURY, G. C. (1981). Intergenerational transfers and the distribution of earnings. *Econometrica*, **49**, 843–67.
- NIELSEN, H. S. (1998). *Child Labour and School Attendance: Two Joint Decisions*. Working Paper no. 98-15, Center for Labour Market and Social Research and the University of Aarhus School of Business, Aarhus, Denmark.
- PSACHAROPOULOS, G. and VELEZ, E. (1993). Educational quality and labour market outcomes: evidence from Bogota, Colombia. *Sociology of Education*, **66**, 130–45.
- RANGEL, A. (2003). Forward and backward intergenerational goods: why is social security good for the environment? *American Economic Review*, **93**, 813–34.
- RANJAN, P. (2001). Credit constraints and the phenomenon of child labour. *Journal of Development Economics*, **64**, 81–102.
- RAVALLION, M. and WODON, Q. (2000). Does child labour displace schooling? Evidence on behavioral responses to an enrolment subsidy. *Economic Journal*, **110**, C158–C175.
- RAY, R. (2000). Child labour, child schooling and their interaction with adult labour: empirical evidence for Peru and Pakistan. *World Bank Economic Review*, **14**, 347–67.
- ROSE, E. (2000). Gender bias, credit constraints and time allocation in rural India. *Economic Journal*, **110**, 738–58.
- ROSENZWEIG, M. R. (1978). Rural wages, labour supply and land reform: a theoretical and empirical analysis. *American Economic Review*, **68**, 847–61.
- and WOLPIN, K. I. (1993). Credit market constraints, consumption smoothing and the accumulation of durable production assets in low-income countries: investments in bullocks in India. *Journal of Political Economy*, **101**, 223–44.
- SCHULTZ, T. P. (2004). School subsidies for the poor: evaluating the Mexican Progresa poverty programme. *Journal of Development Economics*, **74**, 199–250.
- SCHWARTZ, A. (1976). Migration, age and education. *Journal of Political Economy*, **84**, 701–20.
- SKOUFIAS, E. and PARKER, S. W. (2001). Conditional cash transfers and their impact on child work and schooling: evidence from the PROGRESA programme in Mexico. *Economía*, **2**, 45–96.
- SQUIRE, L. (1981). *Employment Policy in Developing Countries: A Survey of Issues and Evidence*. Oxford: Oxford University Press.
- SWAIN, R. B. (2002). Credit rationing in rural India. *Journal of Economic Development*, **27**, 1–20.
- VAN DE WALLE, D. and GUNewardena, D. (2001). Sources of ethnic inequality in Vietnam. *Journal of Development Economics*, **65**, 177–207.