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# ABSTRACT

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We present a general model of child labor that incorporates the various components presented in the literature as explanations for its existence. Our proposal is to mitigate the phenomenon by encouraging temporary emigration. It emerges that the remittances sent by the emigrating parents might enable not only their children, but also others, to stop working. We show how this equilibrium can be sustained even upon the return of the emigrant parents to their home country.

JEL Classification: D62, F22, I30, J13, J20, J24, O15

Keywords: child labor, temporary emigration

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## I. Introduction

According to the International Labor Organization (ILO), about 250 million children between the ages of 5 and 14 are working in developing countries. Out of that 250 million, at least 120 million work full time. Sixty-one percent are in Asia, 32% in Africa, and 7% in Latin America. Tragically, these children have no hope of benefiting from the booming global economy.

As people become informed about the widespread phenomenon of child labor in the developing world, the natural reaction is to take measures against it. The three main explanations in the literature for the existence of child labor are: *(i)* parents' concern for the household's survival coupled with substitutability in production between child and adult labor (Kaushik Basu and Pham Hoang Van, 1998); *(ii)* poverty combined with the absence of credit markets ( Priya Ranjan, 1999, 2001); and *(iii)* poverty together with low-ability children or low returns to education (Marigee P. Bacolod and Priya Ranjan, 2006).

Depending on the theoretical underlying economic forces that give rise to the phenomenon of child labor, diverse policy strategies have been proposed, including the following:

- A legislative ban on child labor;
- Banning the import of products made using child labor;
- Imposing international labor standards to be monitored by international organizations;
- Providing income support to compensate for the forgone earnings of children;
- Improving credit markets;
- Imposing minimum wage restrictions.

Most of these proposed policies have weaknesses: while there is evidence that in developing countries, improvement in the economic conditions of adult workers results in the decline of child labor, since parents can afford to take their children out of the labor force, minimum wage legislation to bolster adult wages may have a reverse effect if the wage increase causes some adults to be unemployed and thus send their children to work, which in turn displaces more adult labor and sends more children to work (see Kaushik Basu, 2000). Income supports to the poor or improving credit markets are liable to be used to buy land or open a business, which in turn would increase child labor by creating a production environment conducive to employing children.[1] A legislative ban on child labor is liable to deflect the economy to a superior equilibrium in which children do not work; however, such laws may deprive children of work that is unfortunately essential to their survival. International measures to stop child labor in the production of traded goods will simply drive children into the non-traded sectors, which may well be worse for the children.

In the literature, no single policy is proposed that will end child labor. We suggest coping with the problem by encouraging temporary emigration of one of the parents. It turns out that the remittances sent by emigrating parents might enable not only their children, but also others, to stop working. The basic idea is that temporary emigration results in a leftward shift in the labor supply, where the extent of the shift is a function of the quantity of emigrants. If the labor supply decreases sufficiently, wages increase to a level where parents can afford to take their children out of the labor force. In the long run, upon return of the emigrants, in a multiple-equilibria situation, wages decrease, yet are still sufficiently high to prevent child labor. In the

[1] However, schooling has responded to rewarding children who goes to school instead of working in most of the programs (for a detailed discussion see Kaushik Basu and Zafiris Tzannatos, 2003).

unique bad equilibrium situation, more conditions are required in order to sustain an equilibrium without child labor. In this paper, we discuss those conditions.

A vast literature deals with the impact of migration and temporary emigration on the host country. Herein we focus on the effect of migration, specifically temporary emigration, on the source country. One of the justifications for temporary emigration to Europe and the United States is the benefits gained by the origin country from the increased human capital of the returning emigrants (see for example, Tito Boeri, Gordon Hanson, and Barry McCormick, 2002). In this paper, we raise an additional argument for temporary emigration: the decline of child labor in the source countries.

We start by presenting a simple dynamic general equilibrium model that incorporates all factors mentioned in the literature that may cause child labor. We then turn to discussing the possibility of temporary emigration and its effect on child labor in both the short and long run.

## II. Child Labor: The Dynamic Model

Assume $N$ identical households in the economy. In the first period, each household consists of two unskilled adults (the two parents) and two children. Following Kaushik Basu (1999), we consider an overlapping generations model in which each person lives for two periods: in the first as a child, and in the second as an adult. At the start of the second period, each couple gives birth to two children. An adult always works no matter what the wages are. A child can either work or go to school (that is, acquire human capital).

Denoting a full workday by unity and the unskilled adult wage by $w_A$. A child who works for a fraction $e \in [0,1]$ of the workday, goes to school for the rest of the

day, $1-e$, and earns as an adult a wage $g(1-e)w_A$. $g(1-e)$ is an increasing, concave function of the investment level of education, $1-e$, and $g(0)=1$. Like Kaushik Basu and Pham Hoang Van (1998) and Priya Ranjan (1999), we assume that an unskilled adult and a child are perfect substitutes in production subject to an unskilled adult equivalence correction denoted by $\gamma$ , $0<\gamma<1$, i.e., each unskilled adult, working all day, produces one unit of labor, whereas each child, working all day, produces $\gamma$ units of labor.

In the first period, the demand for labor of firm $i$ is given by:

$$f'(A_i+\gamma C_i)=\min(w_A,\ \frac{w_C}{\gamma}), \tag{1}$$

where $w_C$ is a child wage, $A_i$ and $C_i$ are respectively the number of adult and child laborers employed by firm $i$, and $f(A_i+\gamma C_i)$ is firm $i$'s output of the only consumption good in the economy. It is assumed that the marginal product is positive and decreasing, i.e., $f'>0$ and $f''<0$. The unit of the good is chosen such that its price happens to be 1.

Given that there are $n$ identical firms and that $w_A=\frac{w_C}{\gamma}$, the aggregate demand for adults and children labor, $D^A$ and $D^C$, is derived by multiplying each firm's demand by $n$, thus:

$$f'(\frac{D^A+\gamma D^C}{n})=w_A=\frac{w_C}{\gamma}. \tag{2}$$

A child has negligible bargaining power in the household, and thus the parents, who all have the same preferences, decide whether to send their children to work. Parents are altruistically concerned about their children's welfare. Following

Kaushik Basu and Pham Hoang Van (1998), the household preference is given by the Stone–Geary utility function:

$$U(c_1, y_2) = \begin{cases} (c_1 - s)y_2 & \text{if } c_1 \geq s \\ c_1 - s, & \text{if } c_1 < s \end{cases}, \tag{3}$$

where $c_1$ is the consumption of the household in Period 1. Consumption is equally divided between the parents and the children. $y_2$ is the earnings of the children as adults in Period 2, and $s > 0$ is a parameter.

Living in a developing economy, the household faces credit constraints (i.e., wants to borrow in order to smooth consumption, yet cannot); so the household maximizes utility $U$ with respect to $e \in [0,1]$ subject to the following budget constraints:[2]

$$c_1 = 2w_A + 2\gamma w_A e \tag{4}$$

and

$$y_2 = 2w_A g(1-e)\,. \tag{5}$$

(4) and (5) are equivalent to:

$$y_2 = 2w_A\, g\left(\frac{2w_A(1+\gamma) - c_1}{2\gamma w_A}\right).^{3} \tag{6}$$

Given that $\frac{g'}{g} > \gamma$, the first-order condition for an interior solution is:[4]

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[2] Following Kaushik Basu and Pham Hoang Van (1998), workers have no share in the profits of the firm. Kenneth A. Swinnerton and Carol Ann Rogers (1999) assumed the other polar extreme case wherein the workers own all shares.

[3] For simplicity's sake, we assume that the only cost of schooling is the forgone earnings of children. The model can be easily extended to include the direct cost of schooling.

[4] $\frac{dy_2}{dc_1} = -\frac{g'}{\gamma} < 0$ and $\frac{d^2 y_2}{dc_1^2} = \frac{g''(e)}{2\gamma^2 w_A} < 0$, thus, the second-order condition for maximization is satisfied.

(7) $$w_A = \frac{0.5sg'}{(1+\gamma e)g' - \gamma g}.$$

Thus,

(8) $$\frac{dw_A}{de} = \frac{\gamma sgg'' - 2(g')^2 \gamma s}{2\left[(1+\gamma e)g' - \gamma g\right]^2} < 0,$$

and

(9) $$\frac{d^2 w_A}{de^2} = \frac{3\gamma sg'g'' - \gamma sgg'''}{2\left[(1+\gamma e)g' - \gamma g\right]^2} - \frac{2\gamma g' - g''(1+\gamma e)}{\left[(1+\gamma e)g' - \gamma g\right]^3}.$$

From (8) and (9), it follows that for the case of an interior solution, child labor fraction $e(w_A)$ is a decreasing function of the parent's wage, and if $g''' \geq 0$, it is convex in $w_A$ (i.e., $\frac{d^2 w_A}{de^2} < 0$); otherwise the sign of $\frac{d^2 w_A}{de^2}$ is ambiguous.

In the case where the parent's wage is sufficiently high or sufficiently low, we obtain corner solutions, i.e.,

(10) $$e(w_A) = \left\{ \begin{array}{ll} 0 & \text{if} \quad w_A \geq \dfrac{0.5sg'(1)}{g'(1) - \gamma g(1)} = \overline{w}_A \\ 1 & \text{if} \quad w_A \leq \dfrac{0.5g'(0)s}{(1+\gamma)g'(0) - \gamma} = \underline{w}_A \end{array} \right\}.$$

The aggregate labor supply functions of the adults and the children are respectively:

(11) $$S^A = 2N$$

and

(12) $$S^C(w_A) = 2Ne(w_A).$$

Keeping in mind that the adult always works full time, according to (8), (9), and (10), for an adult wage of $\overline{w}_A$ and above, the aggregate labor supply curve is perfectly inelastic, and only the $2N$ adults want to work. For an adult wage of $\underline{w}_A$ and below, the aggregate labor supply curve is perfectly inelastic at a level of $2N(1+\gamma)$. Otherwise, the aggregate labor supply is decreasing in the adult's wage (see Figure 1), i.e., the labor supply curve is backward-bending.[5]

Labor-market equilibrium is a wage $w_A^* = \frac{w_C^*}{\gamma}$ such that:

(13) $$D^A(w_A^*) = S^A = 2N$$

and

(14) $$D^C(w_A^*) = S^C(w_A^*) = 2Ne(w_A^*).$$

To sum up,

*There may be three equilibriums. It is clear that the first and third (points G and B in Figure 1) would be stable, while the second would be unstable (point F in Figure 1).*

*If the adult wage is greater than* $\overline{w}_A$*, then only adults work, and if their wages are lower than* $\underline{w}_A$*, all children work. If adult wages are between* $\overline{w}_A$ *and* $\underline{w}_A$*, there will be partial child labor.*

**[Insert Figure 1 here]**

## III. Child Labor and Temporary Emigration

In the following section, we discuss the positive externalities that may occur due to temporary emigration and its implications. It is shown that sizeable temporary

[5] Note that if $\frac{s}{2(1+\gamma)} < w_A = \underline{w}_A$, we get that $c_1 > s$ but if $w_A \leq \frac{s}{2(1+\gamma)}$, we get that $c_1 \leq s$.

emigration may remove from the workforce not only children of temporary emigrating workers, but all child laborers in the country.[6]

Let us demonstrate the minimum quantity of temporary emigrants (only one of the parents) required to end child labor. Based on the model presented above (see also Kaushik Basu ,1999), assume first the case wherein the labor market has three equilibria, where one is unstable (point $F$ in Figure 1) and the two stable ones are depicted by $G$ and $B$ in Figure 1. If the economy is at point $B$, all children will be working $(e=1)$, whereas the economy can be in equilibrium at point $G$, where children do not work $(e=0)$. We focus on the case wherein the economy is caught in equilibrium at point $B$ with full child labor.

Temporary emigration (of one of the parents) results in a leftward shift in the labor supply. At the departure point, the excess labor supply, $\Delta(w_A)$, is a function of the unskilled adult wage, $w_A \in \left[w_A^B,\ w_A^F\right]$ (see Figure 1), and is given by:

$$\Delta(w_A) = S(w_A) - D\ (w_A), \tag{15}$$

where $S(w_A)$ and $D\ (w_A)$ are the aggregate labor supply and demand respectively.

Assuming that the remittances sent by emigrating parents enable their children to stop working[7], each additional emigrant reduces the excess labor supply by

[6] Temporary contracted workers enter the host country for a given period of time, and at the end of that period, return home. Intent of temporary stay is reflected in families left behind, and in the local employer often taking responsibility for housing, health care, and other services during the temporary stay. In Germany, the employment of a temporary worker can be arranged only under bilateral agreements made by Germany with the worker's home country. Germany limits the duration of workers' stays: Workers employed under a contract for services are employed for a maximum of two years (three in some exceptional cases). The UK also permits the employment of temporary workers and sets similar restrictions to the German ones. The majority of the temporary workers in the EC countries in 1999 were seasonal workers rather than skilled workers. In Israel in the 1990s, for example, contracted temporary migration guest worker programs were a result of sector-specific labor shortages, i.e., nurses and infirm care providers from the Philippines; construction workers from Romania; agricultural workers from Thailand, and specialized services from Russia and the Ukraine. In Israel, an employer who receives approval to import temporary workers may do so for a period of five years, but must renew the permit after two years. After five years, the worker must leave Israel for at least one year before s/he can return. Temporary workers in Israel are mostly low skilled. They receive health care financed by the employer.

$1+2\gamma e(w_A)$. Thus, the quantity of emigrating parents, $K(w_A)$, (no more than one from each household) needed to close the excess labor supply is:

$$K(w_A) = \frac{\Delta(w_A)}{1+2\gamma e(w_A)}. \tag{16}$$

Let $w_A^*$ be the solution to the following problem:

$$\begin{aligned} &\underset{w_A}{Max}\ K(w_A) \\ &s.t.\ \ w_A^B \le w_A < w_A^F \end{aligned} \tag{17}$$

Denote by $\left[K\left(w_A^*\right)\right]$ the truncated integer value of $K\left(w_A^*\right)$. Therefore, $\left[K\left(w_A^*\right)\right]+1$, if smaller than $N$, is the number of temporary emigrants needed to remove the economy from a child labor equilibrium to a unique stable equilibrium without child labor (see Figure 1 point $G''$).

Notice that the emigration is temporary, and after a certain period of time, the parents return to their families. Upon return, the labor supply curve will shift back to its original location, yet the economy will shift to a new, stable equilibrium without child labor (see point $G$ Figure 1).

**[Insert Figure 2 here]**

The analysis presented above holds also when in the initial situation, there is a unique bad equilibrium with child labor (see point $B$ Figure 2) with the one exception of the parents returning home and joining the labor market, the economy moving back to the initial child labor equilibrium (point $B$ in Figure 2). In order to prevent this, what is needed is that either *(a)* the parents do not return until the children grow up, *(b)* if

[7] One claim is that the objective of the emigrants is to earn sufficient funds to enable their children to acquire education.

they return before their children grow up, then they do not join the labor force. This would happen if they earned sufficient funds abroad so that they do not need to work once home; or *(c)* a new wave of temporary emigrants substitutes for those who have returned. In any case, if the equilibrium without child labor can be sustained until the children grow up to be more productive worker-parents ($g(1)>1$), which is equivalent to a reduction in the productivity of the new generation of children in terms of their parents $\gamma$, then in the second generation, child labor may be partially or even fully eliminated. This will occur since from (10) it follows that $\frac{d\,\overline{w}_A}{d\gamma}>0$, and if $g'(0)<1$, then also $\frac{d\,\underline{w}_A}{d\gamma}>0$. Thus, if the return to schooling ($g(1)$) is sufficiently high such that the reduction in $\gamma$ results in a sufficient decrease in $\overline{w}_A$ to at least $\overline{w}_A^*$ (see Figure 2), in the second generation, a stable equilibrium without child labor will also emerge, i.e., the new starting point will be multiple equilibria. Moreover, if $g'(0)<1$ and the decrease in $\gamma$ results in a significant decrease in $\underline{w}_A$, i.e., to $w_A^B$ or below (see Figure 2), then the incidence of child labor will decline or may even disappear.

## IV. Emigration Decision and Public Policy

On the one hand, temporary low-skilled emigrants increase the household utility by increasing substantially the income of their families left behind through the remittances they send, thereby preventing their children (fully or partially) from working. On the other hand, since not all family members emigrate together, there is a loss of utility from not being together. Thus, there is a discount factor to the household utility function due to the family's temporary separation, reflecting the tightness of the family's relations. Taking these two factors into account, the

household decides whether to send one of the spouses to work in a developed country for a given period. Since households may differ in their preferences, it is clear that not all of them will send one of the spouses to work temporarily abroad. Moreover, the household disregards the effect of their decision on other children's fates, i.e., they do not take into consideration the externalities that their emigration has on the economy. Thus, the quantity of temporary, low-skilled emigrants may be insufficient to end child labor in the source country. Public intervention may well be needed to cause and sustain temporary emigration in order to enable the reduction of child labor. In such a case, in order to curb child labor, the source country should encourage temporary emigration, for example, by helping potential emigrants to obtain relevant temporary work permits and pursuing bilateral engagements between countries.

## V. Conclusion

In this paper we presented a general model of child labor. This model incorporates the various factors presented in the literature for the explanation of the phenomenon of child labor. Depending on the theoretical underlying economic forces that give rise to the phenomenon of child labor, diverse policy strategies have been proposed, yet no single policy proposed would end child labor. We propose temporary emigration as an additional way to curb child tabor. It turns out that the remittances sent by emigrating parents might enable not only their children, but also all others in the origin country, to stop working. The basic idea is that temporary emigration results in a leftward shift in the labor supply, where the extent of the shift is a function of the quantity of emigrants. If the labor supply decreases sufficiently, wages increase up to a level such that parents can afford to take their children out of the labor force. The household does not take into consideration the externalities that their emigration

has on the economy. Thus, the quantity of temporary, low-skilled emigrants may be insufficient to end child labor. Therefore, public intervention may well be needed to cause and sustain the required quantity of temporary emigrants. This can be done, for example, by governments' obtaining adequate temporary work permits for emigrants, and pursuing bilateral engagements between countries.

In the long run, upon return of the emigrants, in a multiple-equilibria situation, wages decrease, yet still are sufficiently high to prevent child labor, while in a unique bad equilibrium situation, more conditions are required in order to sustain an equilibrium without child labor. In this paper, we also present ways to sustain this equilibrium for the long run.

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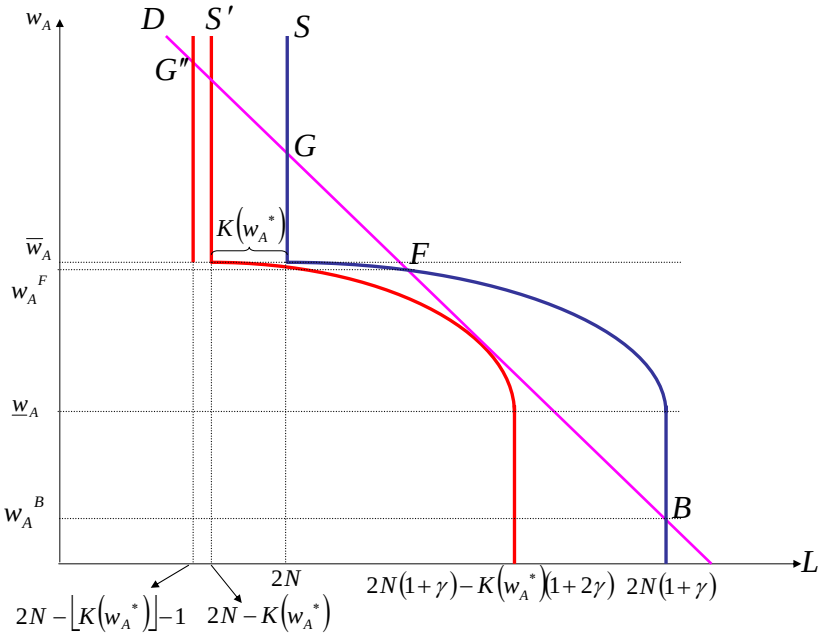


**FIGURE 1. MULTIPLE EQUILIBRIA AND TEMPORARY EMIGRATIOM**

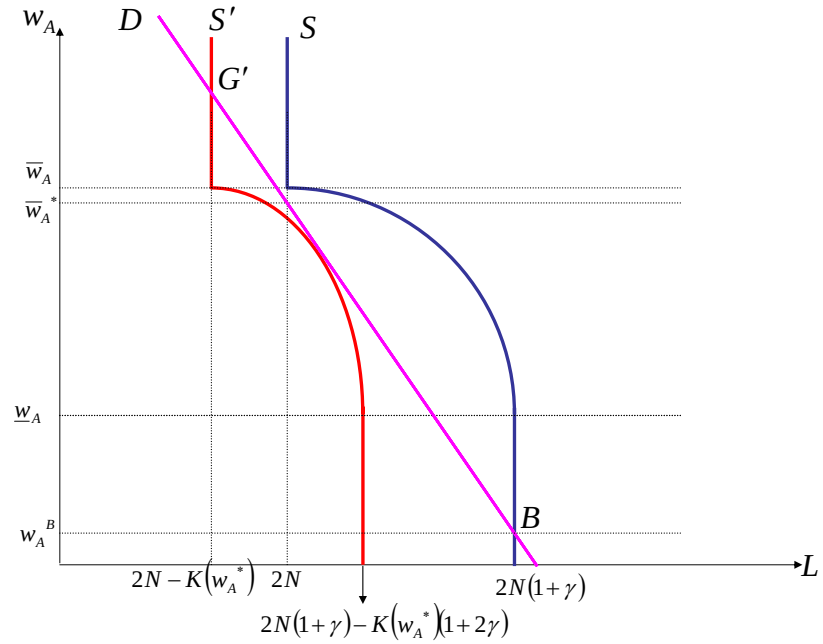


**FIGURE 2. A UNIQUE BAD EQUILIBRIUM AND EMIGRATION**