

Child Labor and School Policies*

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This paper investigates whether child labor is socially inefficient. Baland and Robinson (2000) show that child labor might be inefficient when parents care for their children's welfare. In their model, child labor is explained by two factors: poverty and capital market imperfections. However, education in their model is readily available in terms of access, affordability and quality. This paper shows that the incidence of child labor is negatively related to school quality and positively related to the labor market conditions for children. It also shows that when children have no access to school or their access is limited, child labor is socially efficient. Therefore, a ban on child labor is not necessarily Pareto improving.

Este artigo investiga se o trabalho infantil é socialmente ineficiente. Em recente artigo, Baland and Robinson (2000) mostram que, quando os pais se preocupam com o bem-estar dos filhos, o trabalho infantil é ineficiente. O emprego de crianças, no modelo desses autores, é explicado por dois fatores: pobreza e imperfeições no mercado de crédito. No entanto, educação é prontamente disponível na economia de Baland e Robinson, tanto em termos de acesso, quanto de qualidade. Contudo, nos países em desenvolvimento, escolas não são disponíveis para todas as crianças, principalmente nas áreas rurais, onde o problema de emprego de menores é mais acentuado. Este artigo mostra que o grau de incidência de trabalho infantil nas sociedades depende da qualidade do sistema educacional e das condições de mercado de trabalho para as crianças. O artigo demonstra, ainda, que quando o acesso à escola é limitado, o trabalho infantil é socialmente eficiente. Assim, restrições legais de emprego de menores não necessariamente implicam uma melhora de Pareto.

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*Since Joseph's earnings were not enough to allow him to hire an apprentice, it was only natural that he make his children work. Besides, this was his fatherly duty, for just as the Talmud says, just as man must feed his children, he must also teach them to work, otherwise he turns his sons into good-for-nothings... A child's service is little, yet he is not little fool that despises it. [This is what was later named child labor.]*¹ Saramago, J. (1994:105-6)

1. Introduction

Child labor is viewed as a pervasive problem throughout the world and is especially concentrated in Asia, Africa and Latin America (ILO, 1993).² Though almost everyone would agree that children must attend school and enjoy childhood instead of being used in profitable activities, they still are an important source of family income. The overall contribution of children to the total family income is about 20% in some developing countries, such as Paraguay, a percentage higher than the one during the industrial revolution in England (Patrinos and Psacharopoulos, 1995). Nevertheless, besides the low wages, children, in general, endure work conditions which are inadequate for a proper physical and mental development, including health hazards and potential abuse (Bequele and Boyden, 1988). These are a few of the reasons why the international community, represented by humanitarian organizations such as UNICEF, has increasingly proposed a ban on child labor around the world. Of course, those are not the reasons behind the solutions proposed by some developed countries through the World Trade Organization (WTO) (e.g. 'international labor standards'). In this case, the effort of the WTO is to protect the jobs and vested interests of developed countries and not the well-being of children in the developing world (Basu, 1999).

In order to understand why child labor exists, how to eradicate it, and its role in society, it is important to study the economics behind this practice. This is the main motivation behind the model economies developed by Basu and Van (1998) and Ranjan (1999). Following this line Baland and Robinson (2000) investigate whether or not child labor is inefficient. By efficiency they use the standard Pareto concept. They show that child labor might be inefficient even when parents are altruistic. In their model, child labor may arise in equilibrium either because parents are so poor that they cannot leave bequests to their children or because

¹The term in brackets is from the original Portuguese version.

²In 1985 about 95% of the working children were in these regions and the labor force participation rate of children between the ages of 10 and 14 years was 15%, 22% and 7.9%, in Asia, Africa and Latin America, respectively (ILO, 1993).

capital markets are imperfect. Therefore, as in Ranjan (1999), a combination of *poverty and capital market imperfections* generates the phenomenon of child labor. The basic idea is that children cannot borrow resource to compensate parents for foregoing the income from child labor. Baland and Robinson also derive a few conditions under which a simple ban on child labor is Pareto improving.

However, if everybody will be at least as well off as in the case where child labor is present why do not countries banish such working practice? First of all, I believe that a ban on child labor is not self-enforcing and is hard to be implemented, unless parents are compensated for sending their children to school. Nardinelli (1980), for instance, found that the Factory Acts in the 19th century England were not the main factors explaining the decline of child labor. Indeed, the Acts were a consequence and not the cause of this decline. Similarly, Moehling's (1999) study of child labor revealed that legal interventions contributed little to the long-run decline in child labor in the United States at the turn of the 20th. Also, in some developing countries child labor is not legal, though it is still present in rural areas and in some industrial activities.³ To give an example, in 1990 about 20% of the children in Brazil between 10 and 14 were working (Barros et al., 1996) and Basu (1999), though the 1988 Brazilian Constitution states (*article 7, XXXIII*) that children up to 14 years old are prohibited to work and it is the government's duty to provide public education to all children in the country (*article 208, II*).

In addition, for some of the poor parents in most of developing countries the choice is not only to *send or not send* their children to school. The important issue is not only why parents send their children to work instead of sending them to school despite the high returns on education. In some developing countries education is not readily available in terms of access, affordability and quality. Those that have visited a rural village in any developing country know that either there is no school in the area or the schools are only to prevent future parents to be illiterate and not to provide an adequate formal education.⁴ In the same way that capital markets are incomplete, '*school markets*' are also imperfect.

Since Baland and Robinson assume that education is readily available, they clearly neglect an important issue related to child labor. This paper contributes to the literature by investigating the relationship between child labor and school policies (access and quality). As well as poverty and capital market imperfections,

³Even today there is some form of child labor in the United States (Kruse and Mahony, 2000).

⁴Though in 1990, 20% of the children in the 10-14 age group were laborers in Brazil, this percentage was only 12% for children living in metropolitan regions (Barros et al., 1996). This implies that the incidence of child labor in Brazil is higher in rural areas than in metropolitan regions.

school policies are a key to explain the high incidence of child labor in developing countries. In addition, the paper shows that when children have no access to school or their access is limited, child labor is socially efficient, even when capital markets are not perfect, bequests are zero, and parents are altruistic, which stand in contrast to the findings of Baland and Robinson. In this case, a ban on child labor, even if it is self-enforcing, is not Pareto improving. In order to be Pareto improving, the ban on child labor must be followed by public actions that improve the availability and quality of schools. This is in accordance to Margo and Finnigan (1996), who found that child labor restrictions are especially effective when combined with educational policies.

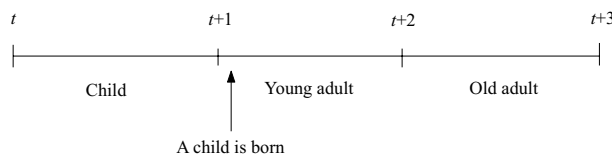
2. The Model

This model is a modified version of Baland and Robinson's (2000). Consider an infinite horizon (i.e., $t = 0, 1, 2, \dots$) Overlapping Generation economy populated by a continuum of measure one of three period lived agents who are identical. In the first period, agents are children and they make no important decisions. Children can help their parents working $l_c \in [0, 1]$ hours with marginal productivity A_c . The rest of their time endowment, $1 - l_c$, is used to acquire formal education.⁵ In the second period, each agent is a young adult and each one has n children, which I assume to be exogenously determined and normalized to 1. The productivity of a young adult, $\theta h(1 - l_c)$, depends on the time spent in school when he/she was a child and on the quality of schooling, $\theta \in [0, 1]$. $h(\cdot)$ is strictly increasing, strictly concave and twice continuous differentiable with $\theta h(0) = A_p \geq A_c$. Young adults care about the consumption of their family, $\bar{c}_y = c_y + c_c$, receive bequests from their parents, $b \geq 0$, and can save, $s \geq 0$, in outside markets at a given interest rate, r , which by simplicity is equal to zero. In the third period, agents are old adults and have A_p efficiency units of labor.⁶ Old agents care about their own consumption, c_o , and about the welfare of each of their n children when they become young adults. The figure summarizes the timing of this economy.

⁵Notice that I abstract from leisure. Though the introduction of leisure would certainly change quantitatively the results, it does not change the main qualitative implications of this paper.

⁶Notice that productivity has a life-cycle behavior. Young adults are at least as productive as old adults, and old agents are more productive than children.

Figure 1



The preferences of a young adult at period t follow Becker (1991) and are described by

$$U^t(c_y^t, c_c^t, c_o^{t+1}, W_y(\bar{c}_y^{t+1})) = u_y(\bar{c}_y^t) + u_o(c_o^{t+1}) + n\delta W_y(\bar{c}_y^{t+1}), \bar{c}_y = c_y + c_c \quad (1)$$

where $\delta \in (0, 1)$ measures the extent to which parents are altruistic. The functions $u_y(\cdot)$, $u_o(\cdot)$, and $W_y(\cdot)$ are strictly increasing, strictly concave and twice continuously differentiable. I assume that the INADA conditions are satisfied, such that consumption is strictly positive in every period.

The production sector is characterized by a representative firm that has a linear technology, such that profits are zero, and firm ownership is unimportant. In this case the wages of young adults, parents and children are $w_y = \theta h(1 - l_c)$, $w_p = A_p$, and $w_c = A_c$, respectively.

Agents face the following budget constraints

$$\bar{c}_y^t = c_y^t + c_c^t = \theta_{t-1}h(1 - l_c^{t-1}) + A_c l_c^t + b^t - s^t, \quad s^t \geq 0 \quad (2)$$

and

$$c_o^{t+1} = A_p + s^t - b^{t+1}, \quad b^{t+1} \geq 0 \quad (3)$$

The problem of each young adult at period t is to choose $\bar{c}_y^t, s^t, c_o^{t+1}, l_c^t, b^{t+1}$ to maximize (1) subject to (2) and (3). The first order conditions for this problem are

$$u'_y(c_y^t) = u'_o(c_o^{t+1}) \quad \text{and} \quad s^t > 0 \quad (4)$$

$$u'_y(c_y^t) > u'_o(c_o^{t+1}) \quad \text{and} \quad s^t = 0 \quad (5)$$

$$\delta W'_y(\bar{c}_y^{t+1})\theta_t h'(1 - l_c^t) = A_c u'_y(\bar{c}_y^t) \quad (6)$$

and

$$u'_o(c_o^{t+1}) = \delta W'_y(\bar{c}_y^{t+1}) \quad \text{and} \quad b^{t+1} > 0 \quad (7)$$

$$u'_o(c_o^{t+1}) > \delta W'_y(\bar{c}_y^{t+1}) \quad \text{and} \quad b^{t+1} = 0 \quad (8)$$

Proposition 1: *Suppose that bequests and savings are positive. If the quality of education, θ_t , increases, then the equilibrium level of child labor, l_c^t , decreases.*

When bequests and savings are positive, condition (6) becomes $\theta_t h'(1-l_c^t) = A_c$ and proposition 1 is satisfied. In the case that either bequests or savings are zero it can be shown by the implicit function theorem that

$$\frac{\partial l_c^t}{\partial \theta_t} = \frac{h'(1-l_c^t)(\delta W'_y(\bar{c}_y^{t+1}) + \delta W''_y(\bar{c}_y^{t+1})\theta_t h(1-l_c^t))}{\delta W'_y(\bar{c}_y^{t+1})\theta_t h''(1-l_c^t) + \delta W''_y(\bar{c}_y^{t+1})\theta_t^2 h'(1-l_c^t)^2 + A_c^2 u''_y(\bar{c}_y^t)}$$

The denominator is strictly negative but the sign of the numerator is not defined. When θ_t increases there are two effects to be considered: the opportunity cost of child labor increases (substitution effect) when the quality of education increases – child labor decreases; and for any level of child labor young adults will have higher income (income effect) – child labor increases. Which effect is stronger depends on how parents care about the future utility of their children when they become young adults, and on the quality of education, θ_t . Notice, however, that the term in parentheses in the numerator is close to a first order Taylor approximation of the function $w'_y(\cdot)$ around the consumption level $\bar{c}_y^{t+1} = A_c l_c^{t+1} - s^{t+1} + b^{t+1}$. Since $w'_y(\cdot) > 0$, this implies that, in general, the incidence of child labor is negatively related to the quality of the education system. In order to see this, consider the limiting case when θ goes to zero.⁷ Then,

$$\lim_{\theta_t \rightarrow 0} \frac{\partial l_c^t}{\partial \theta_t} = \frac{h'(1-l_c^t)\delta W'_y(\bar{c}_y^{t+1})}{A_c^2 u''_y(c_y^t)} < 0$$

The results above suggest that, since schooling and child labor are the main competing claims of a child's time, *ceteris-paribus*, the incidence of child labor will be lower in countries and regions with a strong public education system. This is rather intuitive and is in accordance with the empirical evidences for Brazil and Korea (Doepke, 1999).

⁷However, when θ is sufficiently high the second term in the numerator will dominate and an increase in the quality of schooling might increase the equilibrium level of child labor.

Now I turn to the issue of how the labor market conditions for children, A_c , affect the equilibrium level of child labor.

Proposition 2: *Suppose that bequests and savings are positive. If the child's wage (productivity), A_c , increases, then the equilibrium level of child labor, l_c^t , increases.*

This result follows directly from (6). When either savings or bequests are at the corner, we have that

$$\frac{\partial l_c^t}{\partial A_c} = - \frac{u'_y(\bar{c}_y^t) + A_c u''_y(\bar{c}_y^t) l_c^t}{\delta W'_y(\bar{c}_y^{t+1}) \theta_t h''(1 - l_c^t) + \delta W''_y(\bar{c}_y^{t+1}) \theta_t^2 h'(1 - l_c^t)^2 + A_c^2 u''_y(\bar{c}_y^t)}$$

As before, since the sign of the numerator is not well defined, it is not possible to determine the sign of the above expression. When child wage increases there are two effects on the equilibrium level of child labor: the opportunity cost of sending the child to school increases (substitution effect) and therefore child labor increases; the family income increases (income effect) and child labor decreases. Empirical evidences for Brazil (Duryea and Arends-Kuenning, 2001) suggest that the substitution effect might dominate. Duryea and Arends-Kuenning found that as labor market opportunities for children improve (e.g., the wages of low productivity jobs increase), *ceteris-paribus*, not only the employment rates for 14-16 year old boys and girls increase, but also the probability of children to drop out the school increases.

Propositions 1 and 2 imply that the child labor problem *might be more* severe in regions with better educational system and market opportunities for children, than in regions with poor labor market conditions and school quality. Barros and Mendonça (1991), for instance, found, after controlling for many variables, that the incidence of child labor (14-16 year old children) is higher in the richest metropolitan region of Brazil, São Paulo, than in some poor metropolitan regions of the Brazilian Northeast (e.g., Fortaleza), despite the better education system in São Paulo. Their explanation for this fact is based on better labor market conditions for children in São Paulo than in Fortaleza. However, as discussed previously, the model suggests that, given the labor market conditions for children, improvements in the educational system in one region (e.g., São Paulo) imply, in general, a lower incidence of child labor there.

A benevolent planner will choose a level of child labor such that the marginal benefit of going to school is equal to its opportunity cost. This implies that the social efficient level of child labor, l_c^* , is given by

$$\theta_t h'(1 - l_c^{t,*}) = A_c \quad (9)$$

Child labor is inefficiently high when $\theta_t h'(1 - l_c) > A_c$, which implies that $l_c > l_c^*$. It is straightforward to show that when savings and bequests are positive, the market equilibrium level of child labor is socially efficient, $l_c = l_c^*$. However, when either bequests or savings (or both) are at a corner, the market level of child labor is inefficiently high, $l_c > l_c^*$. The main intuition behind this result is that there is no contract between children and parents, such that parents could be compensated for putting their children in school. Those are the basic findings of Baland and Robinson.

Now, assume that the access to education is limited, i.e., $1 - l_c \leq \bar{l}_e \in [0, 1]$. This captures the fact that in some developing countries the public education system is limited and schools are not available for all children (e.g., problems of overcrowding or distance). In this case, the allocation of child labor depends also on the availability of schools in the area. Considering this additional constraint, it can be shown that the social efficient level of child labor is now given by one of these two conditions

$$\theta_t h'(1 - l_c^{t,*}) = A_c \quad \text{and} \quad 1 - l_c^t < \bar{l}_e \quad (10)$$

$$\theta_t h'(1 - l_c^{t,*}) > A_c \quad \text{and} \quad 1 - l_c^t = \bar{l}_e \quad (11)$$

In this case, the market equilibrium equations are (4) and (5), (7) and (8), and

$$\delta W'_y(\bar{c}_y^{t+1}) \theta_t h'(1 - l_c^t) = A_c u'_y(\bar{c}_y^t) \quad \text{and} \quad 1 - l_c < \bar{l}_e \quad (12)$$

$$\delta W'_y(\bar{c}_y^{t+1}) \theta_t h'(1 - l_c^t) > A_c u'_y(\bar{c}_y^t) \quad \text{and} \quad 1 - l_c = \bar{l}_e \quad (13)$$

The following result arises.

Proposition 3: *If the level of education is binding, i.e., $1 - l_c = \bar{l}_e$, then the market equilibrium level of child labor is socially efficient.*

This is easy to see. Mathematically, it follows that when the level of education is at a corner, the social efficient level of child labor is given by (11), and condition (13) is satisfied in the *laissez-faire* equilibrium. Since $u'_y(\bar{c}_y^t) / \delta W'_y(\bar{c}_y^{t+1}) \geq 1$ (see equations (4) and (5), and (7) and (8)), this implies that $\theta_t h'(1 - l_c) > A_c$, and the market equilibrium level of child labor is efficient, regardless of whether or

not bequests and savings are at a corner. The intuition is also simple: If despite the fact that children are working they are getting all the educational services available, there is no reason to eradicate child labor,⁸ unless the ban on child labor is followed by improvements on the availability of schooling. When the level of education is not at a corner, the results of Baland and Robinson are satisfied and child labor is socially inefficient when either savings or bequests are binding. Thus, besides poverty and capital market imperfections, school policies and labor market conditions are also crucial to explain the high labor force participation rate of children in developing countries.

3. Extensions

In order to derive the main results of the last section, the model was kept at a very simple level. However, it is hard to make any inference about the effects of government policies (e.g., child labor restrictions and educational policies) on child labor and welfare in a simple model, as the one presented here. It is the family who decides whether or not to send a child to school, which in turn depends on government policies (the relative price of education). To draw a more rich analysis, it is crucial to consider an environment with endogenous fertility, heterogeneous agents and a government sector that raises revenues through distortionary taxes to finance public policies. This would follow the lines of Knowles (1999). In this case, improvements in the public educational system would be only possible through increases in distortionary taxes. Given the complexity of the model, however, inferences would only be possible with the help of a computer. Such a model would be important to evaluate quantitatively the impact of government programs (e.g., Bolsa-Escola⁹ in Brazil) on the incidence of child labor, welfare and income distribution.

I also abstract from economic development. However, fertility, school policies, child labor restrictions, and economic development are linked. Doepke (1999)

⁸This result is robust even in the presence of leisure. The introduction of leisure would certainly change quantitatively the welfare impact of a ban on child labor, but *proposition 3* would remain the same. In the presence of leisure, if parents want to send their children to school but there is no school available, a ban on child labor would increase the time children spend at leisure without any increase in children future income. However, parents could have chosen this same leisure previously, when they were sending their children to work. So this is a more constrained choice and therefore a ban on child labor cannot be Pareto superior.

⁹Bolsa-Escola is a public program implemented in some states and cities in Brazil, which provides income support (often the monthly minimum wage) for poor parents who send their children to school, in order to compensate them for the forgone earnings of children.

developed a model of economic development that accounts for the stylized facts concerning the behavior of economic growth and fertility in the long run. He used the model to evaluate the impact of government policies, such as child labor restrictions and public education policies, on fertility and income distribution. The model is calibrated to match the empirical observations of Brazil and Korea. The results show that while Korea with a strong public educational system, had a fast demographic transition, consistently low inequality and low incidence of child labor, the demographic transition was slow in Brazil, the income distribution was unequal and child labor is still a problem in the country.

Though both extensions are crucial to understand the incidence of child labor across countries and over time, they are beyond the objective of this essay and are certainly fertile grounds for future work.

4. Policy Issues and Concluding Remarks

Child labor is often viewed as a form of child abuse and across the world there has been a growing movement to eradicate it. Some examples are: The Hacking Bill (Child Labor Deterrence Act of 1997) in the United States, which seeks to disallow the import of goods that have used child labor as an input (Basu and Van, 1998); some policies proposed by international organizations, such as the WTO and ILO, to impose minimum conditions (“international labor standards”) for labor, which all countries are expected to satisfy; and the lobby of developed countries to label products that use child labor so that consumers can boycott them (Basu, 1999).¹⁰

Do these interventions improve welfare in economies where the incidence of child labor is very high? The model of Baland and Robinson (2000) suggests that, since child labor is inefficient, policies that strictly enforce children to be out of the labor force would improve welfare.¹¹ In their model, however, those children out of the labor force are, by assumption, acquiring human capital through schooling and therefore increasing their future labor productivity. Education in their model is readily available in terms of access, affordability and quality. Then, the important question in their model is why parents do not send their children to school when the

¹⁰For more information, see the webpage of the International Labour Organization (ILO) on the elimination of child labor: <http://www.ilo.org/public/english/standards/ipec/index.htm>.

¹¹The idea is that, when either savings or bequests are zero, a ban on child labor has a second-order effect on parental utility and a first-order impact on child welfare. Since parents are altruistic this implies that a ban on child labor leads to a Pareto improvement. Child labor arises in equilibrium because credit markets are incomplete and children cannot compensate their parents for foregoing income.

returns on education are higher than the returns on physical capital for all regions of the world (Psacharopoulos, 1994). By focusing only on this issue, they neglect a basic problem related to child labor in most developing countries: schooling is not available for all children and where schools are available the quality of education is often poor, such that parents see no value in education.¹² This paper shows that when this problem is taken into account, child labor is socially efficient. The model suggests that poverty *might not* be the main factor explaining the existence of child labor across countries. Barros et al. (1996), for example, found that poverty alone cannot explain the high participation rate of children in the Brazilian labor market. According to the results, presented here, a general ban on child labor *per se* will not improve welfare in developing countries. In order to be welfare enhancing, policies must be what Basu (1999:1115) calls *collaborative interventions*. They are public interventions that “alter the economic environment such that parents of their own accord prefer to withdraw the children from the labor force.” Examples are the provision of good schools with free meals and policies that link income support for poor parents to child schooling (Bolsa-Escola). In this case, a ban on child labor may become redundant, and statements such as the one of the Brazilian Constitution cited in the introduction will have a useful meaning. Though this might not be surprising, it has been neglected in the theoretical literature.¹³

Then, the next question is why do not countries adopt such *collaborative interventions*? Economically some of these policies are not feasible. Countries might not have enough resources to improve the public education system and to transfer income for poor parents. Finally, such interventions would require tax changes or reallocation of public resources. Politically, changes on tax rates and reallocation of public resources are costly to be implemented, and vested interest groups would block such changes, resulting in an equilibrium with a high level of child labor and ineffective public education system. I leave this for future investigations.

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¹²See Barro and Lee (1993) for a comparative analysis of educational attainments across countries.

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