

# Social Conformity and Child Labor

Shirit Katav-Herz

Department of Economics, Bar-Ilan University

52900 Ramat Gan, Israel

e-mail: [cataves@mail.biu.ac.il](mailto:cataves@mail.biu.ac.il)

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## Abstract

This paper investigates the phenomenon of child labor. I consider a society that in principle values education. Parents derive utility from social conformity, and "good" and "bad" equilibria can arise where the majority of children respectively do and do not go to school. In a "bad" equilibrium, social conformity sustains child labor, and I consider policies to change the equilibrium. Taxes on income from child labor may not be a feasible enforcement task for the tax administration. Incentive payments financed by domestic taxation can be provided to parents who send children to school, and can, but need not, discourage child labor. Also, again the domestic tax base may not be available. The effective and assured means of changing social norms to end child labor is externally financed incentive payments. Such payments can require extensive foreign assistance. However, when social norms underlie the phenomenon of child labor, the external assistance need only be temporary since the change in social norms is a case of hysteresis. After a period of time the incentive payments to parents can be removed, and an equilibrium where children go to school rather than work is sustained.

JEL classification: J24, K31, O15, D60

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# 1 Introduction

In the developed countries of the world, child labor is an illegal and marginal phenomenon. Laws dating back to the 19th century abolished child labor, and the strict enforcement of truancy laws have established a tradition or social norm that children go to school and not to work.

Yet, according to ILO estimates, at the beginning of the 21st century, some 250 million children between the ages of 5 and 14 were sent to work in developing countries, with about half, or some 120 million working full time and the others combining work and schooling. Some 50-60 million children between the ages of 5 and 11 were working in circumstances that were hazardous given their age and vulnerability.

While always present in these countries, child labor has attracted attention as a consequence of the process of globalization in the last decades of the 20th century. The decline of trade barriers has exposed industries in richer countries to competition from countries where child labor is prominent. Labor standards, in particular, issues having to do with child labor, have arisen in debates over the use of trade sanctions to influence domestic policies in poorer countries. At the same time, more open access to information has increased awareness in richer countries of the plight of children who are denied a basic education, or indeed denied a childhood, because of child labor.

There are social benefits from an end to child labor. The benefits are to the children themselves, and to the society in which they live. There are also benefits in the richer countries from elimination of a basis for protectionism provided by child labor. In this paper I consider how child labor can be brought to end in a society where child labor is persistent.

Seeking an end to child labor requires first establishing why child labor exists. It is often claimed that poverty is the main reason for child labor (Grootaert and Kanbur 1995, Basu and van 1998, Basu 2000). However, empirical research has found that income tends not to significantly influence participation of children in the labor force (Ray 2000, Bhatta 1998, Canagarajha and Coulmbe 1997). In some poor societies, children go to work to supplement family incomes even if education is free (see Kanbargi 1988). There is also evidence that, in some poorer societies, families with higher incomes continue to send their children to work (see Ray 2000).

Poverty therefore does not seem to be a sufficient condition for extensive child labor, and

nor is high parental income (in the standards of the developing world) a sufficient condition for children to go to school. There is therefore a question why in some poor societies child labor is prominent and in other not.

In this paper I set out a model that addresses this question. The model also explains why child labor is not responsive to intra-family differences within a population.

The model builds on literature that has looked at how social customs affect individual behavior through status, respect, popularity, and esteem (see George Akerlof 1980, Douglas Bernheim 1994, and also Lindbeck, Nyberg and Weibull 1996, 1999). Through social norms, individuals adapt their behavior to the behavior of people around them, because of the disutility from not conforming to the behavior of others. That is, people remain a part of their reference group by following social norms<sup>1</sup>.

Social norms affect personal behavior, through an inclination to conform and to copy the behavior of the majority, since deviating from the norm can result in a feeling of no longer belonging to the group that provides the core of social interactions. People are therefore willing to suppress their individuality to follow social norms (see Sugden, 1998). For example, children in poor families often preserve their parents' way of life in their own adulthood. Children of poor people can choose to replicate their parents' way of life by marrying young and bearing children rather than first investing in education. The same decision not to invest in their education was made by their parents, and the children imitate the behavior of their parents, notwithstanding options of alternative behavior that offer better outcomes<sup>2</sup>.

Child labor is likewise influenced by social norms. When the decision is made whether to send a child to school or to work, the disutility from acting contrary to social norms sustains conformity with the norm of the group.

The conformity of child labor can be sustained even through parents recognize the superior utility from sending child to school. There is a problem in choosing to behave individually, because of the disutility of departure from the social norm. There is evidence in the empirical

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<sup>1</sup>For a survey on the direct influence of status on individual behavior, see Douglas Bernheim (1994).

<sup>2</sup>Borjas and Sueyoshi (1997) show that growing up in an ethnic environment characterized by welfare dependency has a significant effect on both the incidence and duration of welfare spells. Where about 80 percent of the difference in welfare participation rates between two ethnic groups in the parental generation is transmitted to the children.

literature that social norms and culture influence child labor<sup>3</sup>.

The model that I set out can yield a unique equilibrium with or without child labor. Outcomes are also possible with two equilibria, where either most parents send children to school or most parents send children to work. After showing how the different equilibria can arise, I consider different policies that might allow a society where child labor is the social norm to escape the ‘bad equilibrium’, to an equilibrium where education of children becomes the social norm.

When social norms determine behavior, collective and not independent individual decisions need to be changed. Some policies are effective in this regard and some not. Taxes can be imposed on income from child labor and tax financed incentive payments can be provided to parents sending children to school. The last policy can, but need not, discourage child labor since income taxes reduce available incomes, which increases child labor. In the conditions in countries where child labor is prominent, tax administration and tax compliance are not well-developed, and domestic taxes are difficult to enforce. An alternative to domestic taxation to finance income incentives to parents is external assistance. Incentive payments that are sufficiently large can change the equilibrium from one with a social norm of child labor to an equilibrium with a social norm of sending children to school.

Since collective behavior has to be changed, large expenditures are required to change a social norm and to end child labor. The large expenditures do not have to be endlessly repeated for the beneficial policy effect of ending child labor. Once an equilibrium without child labor is attained, ending incentive payments does not lead to a return to an equilibrium with child labor. That is, there is policy hysteresis. Changes persist, after the policy stimulus that initiated the changes is taken away.

Previous theoretical studies of the phenomenon of child labor have not looked at the role of social norms. Child labor is explained for instance by Basu and Van (1998) as a phenomenon that arises when parents cannot provide a subsistence level of consumption for their families. Ranjan

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<sup>3</sup>For instance, religion and region of residence are found to be important explanatory variables for child labor in Ghana (see Canagarajha and Coulmbe 1997). In Peru and Pakistan, culture also affects child labor, but in a dissimilar way. In Peru children from minority ethnic groups were more likely to work, while in Pakistan the exact reverse was indicated (Ray Ranjan 2000). Moreover, Margo and Finegan (1993) claim that a change in social norms was responsible for the reduction in the participation of black teenagers in the labor force between 1950-1970 in the American south.

(1999) describes child labor to be the consequence of poverty combined with credit constraints. The conclusions from the model in this paper stress the social dimension of personal decisions about child labor, and show how changing behavior to end child labor requires a change in social norms. That is, the model demonstrates how asking about how to end child labor entails asking how social norms can be changed.

## 2 The model

I shall consider a society where individual behavior is influenced by social conformity with regard to whether children work or go to school. There is an absolute standard in the society that views education as meritorious. Individuals suffer disutility when behaving contrary to this absolute standard.

This disutility is however determined relative to the collective behavior, meaning, relative to the proportion of others who behave according to this standard. The disutility from personal behavior that contradicts the absolute standard increases with the proportion of the population whose behavior follows the absolute standard<sup>4</sup>.

Each family in the population has a given number of children. I do not consider the decision regarding the number of children parents choose to have. There is a distribution of children per parent for the population. Below, I consider two distributions, a uniform distribution and a Weibull distribution.

Parents make decisions for their children. The choices are binary: either the children go to school or work. There is no leisure option for the child<sup>5</sup>. If children go to school, the parent has emotional utility from educated children, and loses utility due to expenses of education. If the children work, the parent gains utility from consumption, through increased income provided by child labor.

Parental utility from sending children to work is

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<sup>4</sup>See also Akerlof (1980) and Lindbeck, Nyberg and Weibull (1999).

<sup>5</sup>For support for the view that child labor and school are substitutes, see Psacharopoulos (1997).

$$u_w = u(c) - R(\mu) \quad (1)$$

That is, the utility of a parent who sends children to work depends on the utility from consumption  $c$  through  $u'(c) > 0$  and  $u''(c) < 0$ , and on the utility from conformity  $R$ , which depends on the proportion  $\mu$  of parents in the society who send their children to school, through  $R'(\mu) > 0$ .

Parental utility from consumption, in turn, depends on family income:

$$u(c) = u(w_a + nw_c - nz). \quad (2)$$

Family income in (2) consists of the parent's income  $w_a$  (parents are treated as one unit), the income of children  $nw_c$ , minus the cost of raising children  $nz$ .  $n$  is the number of children in the family.

Although the number of children is discrete, for simplicity I treat the number of children as a continuous variable<sup>6</sup>.

Substituting equation (2) into (1), we have parental utility from sending children to work as

$$u_w = u(w_a + nw_c - nz) - R(\mu) \quad (3)$$

Parental utility from sending the children to school is

$$u_s = u(w_a - nz - nT) + v \quad (4)$$

A parent who sends her children to school loses the income of child labor and incurs additional costs  $nT$  because of the investment in education. The parent has no gain from future income of the child. The contribution to parental utility from educated children is given in (4) by  $v$ ,

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<sup>6</sup>If I want  $n$  to indicate an integer, I write  $\tilde{n}$  which denotes the largest natural number smaller than  $n$ .

which is subjective benefit to parents, that arises from the feeling that they are doing the right thing in educating children. The emotional benefit provides the incentive for the parent to pay the costs of education.

The condition for indifference between child labor and education ( $u_w = u_s$ ) follows from (3) and (4) as

$$u(w_a + nw_c - nz) - R(\mu) = u(w_a - nz - nT) + v \quad (5)$$

We can use this condition to derive the critical number  $n^*$  of children in a family that makes parents indifferent between child labor and education. That is, if the number of children is  $n^*$  or smaller, the children go to school, if the number of children is larger than  $n^*$ , they are sent to work.

Since the distribution of children per parent is given, higher  $n^*$  indicates that more parents send their children to school (since the proportion of parents who have more than  $n^*$  children is smaller, the greater is  $n^*$ ).

We see from (5) that  $n^*$  is influenced by (1) the income  $w_a$  of parents, (2) the income  $w_c$  earned by children, (3) the proportion  $\mu$  of parents who send children to school, (4) the cost  $T$  of education, (5) the cost  $z$  of raising children, and (6) parental utility  $v$  from having educated children.

We expect a positive relation between  $n^*$  and parental income. Parental consumption when parents send children to school is lower than consumption when children go to work. Therefore, higher parental income increases the utility from sending children to school more than it increases the utility from child labor (because of decreasing marginal utility of parental consumption). As a result, when parental income increases, more parents than before will send children to school, and the newly indifferent parents will have more children than previously. This is confirmed by

$$\frac{\partial n^*}{\partial w_a} = -\frac{u'(a) - u'(b)}{z(u'(b) - u'(a)) + u'(a)w_c + u'(b)T} > 0 \quad (6)$$

where  $a = w_a + n^*w_c - n^*z$  is the available income of a parent with working children, and

$b = w_a - n^*z - n^*T$  is the available income of a parent who schools his children,  $a > b$  and  $u'(a) < u'(b)$  because of decreasing marginal utility from consumption.

We expect a negative relation between  $n^*$  and a child's income. Increased income earned by children increases parental utility from child labor, and more parents find it more worthwhile to send children to work. The new indifferent parents will then have fewer children than before. This is confirmed by

$$\frac{\partial n^*}{\partial w_c} = -\frac{u'(a)n}{u'(a)(w_c-z)+u'(b)(T+z)} < 0 \quad (7)$$

There is a positive relation between  $n^*$  and the proportion of parents  $\mu$  who send their children to school, since a greater proportion of parents sending children to school increases the personal cost of deviating from a absolute standard of educating children. This confirmed by

$$\frac{\partial n^*}{\partial \mu} = -\frac{-R'(\mu)}{u'(a)(w_c-z)+u'(b)(T+z)} > 0 . \quad (8)$$

We also expect a negative relation between  $n^*$  and the costs of education  $T$ . Higher costs of education reduce the attractiveness of sending children to school, and we correspondingly see that

$$\frac{\partial n^*}{\partial T} = -\frac{-u'(b)(-n)}{u'(a)(w_c-z)+u'(b)(T+z)} < 0 . \quad (9)$$

There is a negative relation between  $n^*$  and the cost of raising children. This cost decreases parental utility from child labor, and also decreases parental utility from sending children to school. The effect on parental utility from educating children  $u_s$  is however greater than on parental utility from sending children to work  $u_w$ , because of decreasing marginal utility of consumption. Parental consumption when children go to school is lower than when children work. We see correspondingly that



$$\frac{\partial n^*}{\partial z} = \frac{n(u'(a)-u'(b))}{u'(a)(w_c-z)+u'(b)(T+z)} < 0 . \quad (10)$$

We expect a positive relation between  $n^*$  and parental utility from educating children  $v$ . Greater  $v$  indicates greater parental subjective utility from education for children. Thus, when  $v$  increases, the newly indifferent parents will have higher  $n^*$ . This is confirmed by

$$\frac{\partial n^*}{\partial v} = -\frac{-1}{u'(a)(w_c-z)+u'(b)(T+z)} > 0 . \quad (11)$$

As I have indicated, parental utility depends on the behavior of other parents via  $R(\mu)$ . Parents have expectations about the proportion of parents who plan to educate their children. In equilibrium, expectations are fulfilled and the expected proportion  $\mu^e$  is equal to actual proportion  $\mu$ . Therefore, in equilibrium, the proportion of parents who send children to school must be identical to the proportion of parents who have not more than  $n^*$  children. In equilibrium,

$$\mu = \Phi(n^*(\mu)) \quad (12)$$

where  $\Phi$  is the exogenous cumulative distribution of the number of children per parent in the population. The convergence to equilibrium may follow a dynamic process of the following type:

$$\frac{\partial \mu^e}{\partial t} = \gamma(\mu - \mu^e) .$$

If the true value of  $\mu$  exceeds  $\mu^e$ , the social disutility from sending children to work is higher than expected. Therefore, few parents who planned to send their children to work change their behavior and send their children to school, and if conversely,  $\mu$  is smaller than expected, more parents send their children to work than planned to, since the true loss of utility from not conforming is lower than expected.

### 3 Social equilibria

We now consider of the social equilibria that can emerge. Whether the social equilibrium is unique or whether there are multiple equilibria depends on the utility function for parental consumption and on distribution of children per parent. A unique equilibrium occurs, for example, when the distribution of the number of children per family is uniform and the utility function for parental consumption is logarithmic.

Let us denote the maximal number of children per parent in the population by  $\bar{n}$ . The density of the number of children  $n$  where  $0 \leq n \leq \bar{n}$  then equals  $1/\bar{n}$ . The cumulative density of the number of children is  $n/\bar{n}$ . Therefore, in equilibrium,

$$\mu = \Phi(n^*(\mu)) = \frac{n^*}{\bar{n}} \quad (13)$$

and

$$\begin{aligned} u_w &= \log(w_a + n(w_c - z)) - R(\mu) \\ u_s &= \log(w_a - n(T + z)) + v \end{aligned}$$

Using (5), the threshold number of children that determines whether a parent sends children to school or to work is

$$n^* = \frac{w_a (e^{v+R(\mu)} - 1)}{w_c + T e^{v+R(\mu)} + z (e^{v+R(\mu)} - 1)} \quad (14)$$

and, from (13),

$$\mu = \frac{w_a (e^{v+R(\mu)} - 1)}{(w_c + T e^{v+R(\mu)} + z (e^{v+R(\mu)} - 1)) \bar{n}} \quad (15)$$

Figure 1 illustrates this equilibrium.

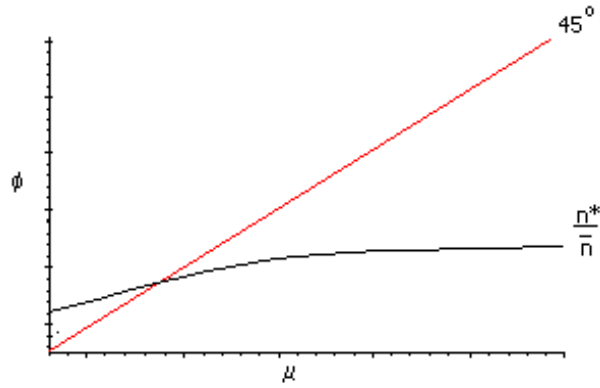


Figure 1

In figure 1, the equilibrium is at the intersection between the  $45^\circ$  line and the cumulative distribution of children. This intersection is the only point that satisfies the equilibrium condition (15)<sup>7</sup>. A numerical example that satisfies this equilibrium, is set out in appendix 1.

Multiple equilibria are also possible and arise, for example, when the number of children per parent is a Weibull distribution<sup>8</sup>. With logarithmic utility from consumption, three equilibria can occur, as shown in figure 2.

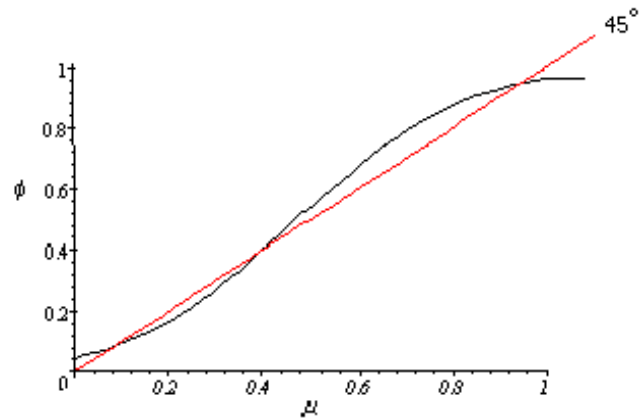


Figure 2

<sup>7</sup>The concavity of the cumulative uniform distribution is a sufficient condition for a unique equilibrium, but it is not necessary. The condition for concavity is:  $(T + z)e^{v+R(\mu)} + z > w_c$

<sup>8</sup>See appendix 2.

In figure 2 the disutility from non-conformity increases rapidly, from a low to an high level, at some intermediate value of the proportion of parents sending children to school ( $\mu$ ) because there are many families which switch if  $\mu$  change a bit. Therefore, multiple equilibria occur. The first and third equilibria in figure 2 are dynamically stable (for a numerical example, see appendix 2). The intuition for this multiplicity of equilibria is that, when the proportion of parents sending children to school is high, the disutility from sending children to work is high, and therefore few and very poor parents send their children to work. On the other hand, when the proportion of parents sending children to school is low, the disutility is low, and therefore many parents, even if they are relatively rich, will send their children to work. As a consequence, two societies may be identical in all aspects other than the proportion of parents sending children to school.

We define the social objective as minimal child labor.

A question now is, in this case, how does a society come to be in one equilibrium rather than another? In a rational expectation framework, Schelling (1968) has suggested a focal point that individuals use to coordinate with others. When history determines the equilibrium (see for example Desgupta 1993), individuals base their expectations on the average action in the previous period, and from period to period only marginal change can take place.

Different distributions of children among parents in a population can therefore lead societies to different patterns of equilibria. However, when distributions of children among parents are identical, due to the multiplicity of equilibria, different outcomes for child labor are also possible. This is consistent with the empirical observations noted in the introduction that similar societies are observed to exhibit different behavior toward child labor.

## 4 Changes in the distribution of children over time

Over time, the distribution of children among parents can change. We now consider how such change affects the prevalence of child labor.

To answer this question, we look at a society in which children are initially uniformly distributed across parents, but the distribution changes to become more concentrated over time, with some parents having fewer children and some having more. To illustrate such change, we can consider a distribution of children among families in the population given by a weighted

average of the uniform distribution  $\Phi_1$ , and the Weibull distribution  $\Phi_2$  with respective weights for the two distributions of  $\gamma$  and  $(1 - \gamma)$

$$\Psi(n^*) = \gamma(\Phi_1(n^*)) + (1 - \gamma)(\Phi_2(n^*)) \quad (16)$$

That is, when  $\gamma = 0$ , we have the uniform distribution, which has a unique equilibrium. If  $\gamma$  increases, two equilibria will eventually emerge.

Figure 3 describes how the density function changes as  $\gamma$  changes. We see that the greater the weight given to the Weibull distribution, the greater the concentration of the density distribution.

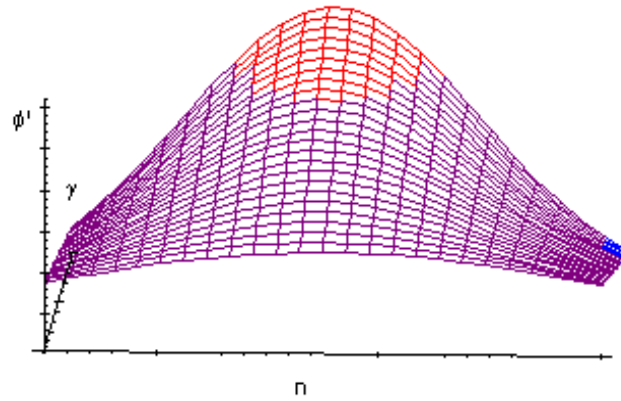


Figure 3

Figure 4 shows the corresponding change in the cumulative distribution, which becomes more s-shaped, the greater the weight  $\gamma$  given to the Weibull distribution,

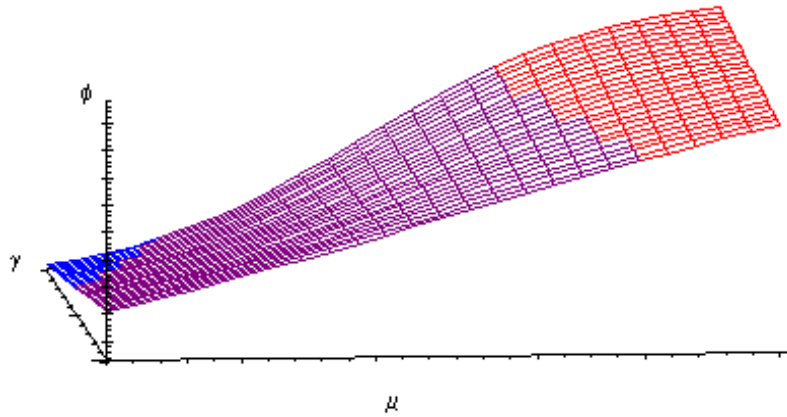


Figure 4

Figure 5 shows simulated outcomes under which  $\mu = \Psi(n^*(\mu), \gamma)$  *i.e.*  $\mu = k(\gamma)$ . For low weights for the Weibull distribution,  $\gamma < \hat{\gamma}$  only one equilibrium exists. As long as there is only one equilibrium, the greater the weight on the Weibull distribution, the better the equilibrium becomes through reduced child labor. With sufficient weight given to the Weibull distribution,  $\gamma > \hat{\gamma}$  the case of three equilibria however emerges. The greater the weight of the Weibull distribution, the better the ‘good stable equilibrium’ and the worse the ‘bad’ one in terms of child labor<sup>9</sup>

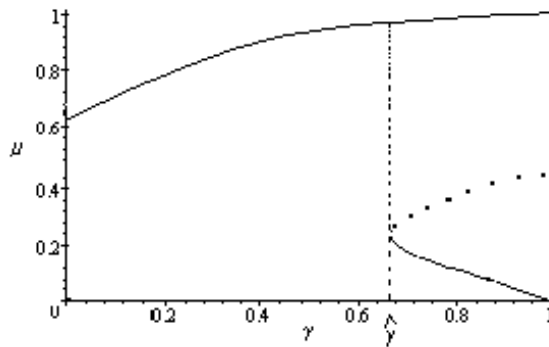


Figure 5

Since the greater the concentration of the distribution of number of children per parent, the more likely are multiple equilibria, therefore similar societies will then be consistent with different child labor equilibria.

<sup>9</sup>For the computations underlying figure 5, see the numerical examples in appendices 1 and 2.

Continuous changes over time in the distribution of children per parent can lead to discrete jumps in the proportion  $\mu$  of parents sending children to school. We can consider continuous changes of  $\gamma$  from  $\gamma_0$  to a lower value of  $\gamma_1$  and vice versa. In figure 6 we see how discrete jumps can emerge. Beginning from  $\gamma = \gamma_0$ , a society converges to the ‘bad equilibrium’  $A$  (out of the two possibilities  $A$  and  $E$ ). As  $\gamma$  falls, the proportion of parents who send their children to school in equilibrium increases continuously, until  $\gamma$  decreases below  $\hat{\gamma}$ . Then, the proportion of parents sending children to school jumps from  $B$  to  $C$ . That is, we have a ”catastrophe”. The lower is  $\gamma$  relative to  $\hat{\gamma}$ , the smaller the proportion of parents sending children to school, but the equilibrium is better than the initial one.

Now, suppose that  $\gamma$  changes direction and increases toward  $\gamma_0$ . In this case a continuous increase from point  $D$  to point  $E$  in the proportion of parents sending children to school can occur due to the effect of hysteresis.

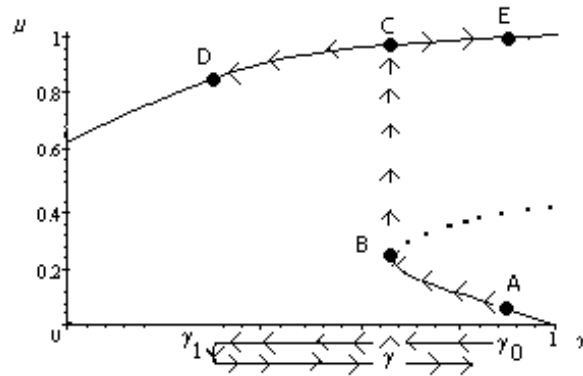


Figure 6

Figure 7 summarizes the process of change from the ‘bad equilibrium’ to the ‘good equilibrium’ through time as a result of a change in the distribution of children per parent. The lower curve represented the weight  $\gamma$  given to the Weibull distribution in the weighted average, which changes continuously a long the time between  $\gamma_0$  and  $\gamma_1$  and vis versa. The upper curve represents the

corresponding changes in the proportion  $\mu$  of parents sending children to school.

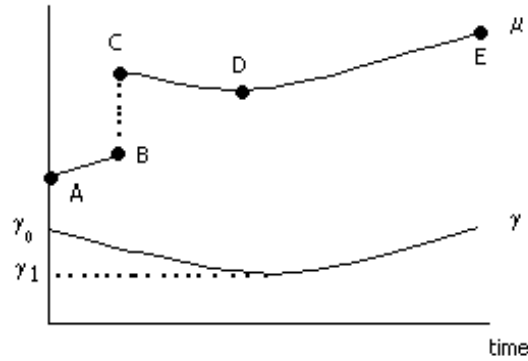


Figure 7

Figures 6 and 7 indicate how continuous changes in the distribution of children per parent can cause discrete jumps in the proportion of parents sending children to school and can therefore affect dramatically the prevalence of child labor.

## 5 Policies to end child labor

We now consider policies to reduce or end child labor.

### 5.1 Taxation of income from child labor

Let us begin with a policy of imposing a tax on income from child labor. The tax reduces parental benefit from sending children to work. Only the utility of parents sending their children to work is affected. With  $t$  as a proportional rate of taxation on income from child labor,

$$u_w = u(w_a + nw_c(1 - t) - nz) - R(\mu) \quad (17)$$

As we expect, the tax increases<sup>10</sup> the proportion of parents who send children to school,

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<sup>10</sup>For elaboration see appendix 3



$$\frac{\partial \mu}{\partial t} = -\frac{-\Phi'(n^*) \frac{\partial n^*}{\partial t}}{1 - \frac{\partial \Phi}{\partial \mu}} > 0 \quad (18)$$

Although taxation of child labor is a simple solution, such taxes may be difficult to enforce. The tax administration is often not sufficiently developed to allow effective enforcement of a tax on income from child labor. If taxation is possible, then one could also prohibit child labor.

## 5.2 Incentive payments to parents

A policy that is more likely to be feasible than a tax on child labor income, is to offer parents an incentive payments if they send their children to school. Suppose that such incentive payments are domestically financed, through taxes on the incomes of parents, (but not of children). Post-tax parental utility is then

$$u_w = u(w_a(1-t) + nw_c - nz) - R(\mu) \quad (19)$$

or

$$u_s = u(w_a(1-t) - n(T+z-s)) + v \quad (20)$$

where  $s$  is the incentive payments per child and  $t$  is the tax rate on parents' income, through  $0 \leq t \leq 1$ .

With the government budget balanced, tax revenue equals the total value of the incentive payments,

$$N_s^c \cdot s = N^p \cdot w_a \cdot t \quad (21)$$

where  $N_s^c$  is the number of children going to school, and  $N^p$  is the number of parents.

We can express the number of children going to school as

$$N_s^c = N^p \sum_{n=1}^{n^*} n \cdot \Phi'(n) \quad (22)$$

where  $\Phi(n)$  is the cumulative distribution of children among parents and  $\Phi'(n)$  is the corresponding density function.

Substituting (22) into (21), the tax rate that balances the budget is consequently

$$t = \frac{s \sum_{n=1}^{n^*} n \cdot \Phi'(n)}{w_a} \quad (23)$$

The equilibrium proportion  $\mu = \Phi(n^*(\mu, s, t))$  of parents sending children to school is now influenced by two effects:

$$\frac{d\mu}{ds} = \frac{\partial\mu}{\partial s} + \frac{\partial\mu}{\partial t} \frac{dt}{ds}.$$

There is a positive effect on sending children to school, due to the incentive payments to parents (see (6)). The taxes that are required to finance the incentive payments, however, encourage child labor because taxes reduce the parent's net income. Parents sending children to school pay taxes and receive incentive payments. The tax rate increases with the number of children going to school in the entire population. Consequently, the more children going to school, the higher the tax rate. The incentive payments per parent increases with the number of children. A parent sending children to work only pays taxes. The outcome therefore depends on the difference between the effects of the tax and the incentive payments on utilities with and without child labor.

The relation between the incentive payment  $s$  and the proportion  $\mu$  of parents sending children to school is ambiguous<sup>11</sup>. This is because, although for the parent sending children to work, there is always a loss of utility, for a parent sending children to school, the change of utility can be either positive or negative.

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<sup>11</sup>For proof see appendix 4.

A tax-financed incentive payments to parents sending children to school will therefore not always discourage child labor.

We have also previously noted that taxing income from child labor can be expected to be administratively difficult. If the tax administration cannot effectively enforce a tax on the income of parents, external financing of incentive payments to parents is the remaining resort.

### 5.3 Externally financed incentive payments to parents

When incentive payments to parents sending children to school are externally financed, the utility of parents sending children to school

$$u_s = u(w_a - nz - nT + sn) + v, \quad (24)$$

where  $s$  is the incentive payments per child. In equilibrium, the number of children in the family indifferent between child labor and school is

$$\mu = \Phi(n^*(\mu, s)) \quad (25)$$

As we expect, the incentive payment increases the proportion of parents sending children to school:

$$\frac{\partial \mu}{\partial s} = -\frac{-\Phi' \frac{\partial n^*}{\partial s}}{1 - \frac{\partial \Phi}{\partial \mu}} > 0 \quad (26)$$

**Proof.** We know that,

$$\Phi' > 0, \quad 1 - \frac{\partial \Phi}{\partial \mu} > 0.$$

Define

$$a = w_a + w_c n - z n$$

$$b = w_a - n(T + s + z)$$

Because of decreasing marginal utility from consumption, we have

$$a > b \text{ and } u'(a) < u'(b)$$

Therefore,

$$\frac{\partial n^*}{\partial s} = -\frac{\partial n^*}{\partial T} = \frac{-u'(b)(-n)}{u'(a)(w_c - z) + u'(b)(T + z - s)} > 0 \quad \blacksquare$$

Although (26) indicates that an incentive payment reduces child labor, a small incentive payments may not have much of an effect. When there are multiple equilibria, the transfer has to be sufficiently large to allow an escape from a ‘bad equilibrium’, so that economic incentives of the incentive payments override the incentives of conformity to the social norm.

The effects of different incentive payments are shown in figure 8, where a higher curve indicates a greater incentive payments. We see in figure 8 that in low levels of incentive payment, a unique ‘bad equilibrium’ exist. In higher level of payment two equilibria exist. Those multiple equilibria are improved the greater the payment. But, in purpose to end child labor by allowing a unique good equilibrium, we need a sufficiently large incentive payment.

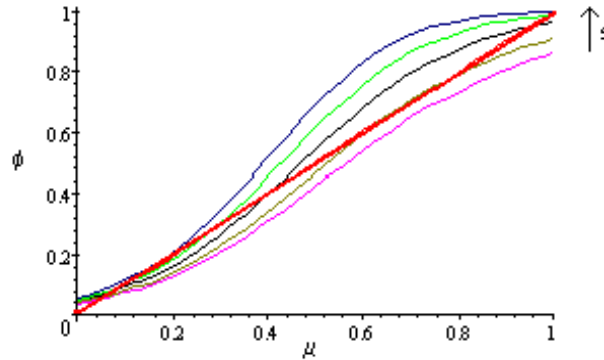


Figure 8

In figure 9, where there are two equilibria, greater incentive payments increases the both proportions of parents sending children to school, but does not necessarily end child labor. Only an incentive payment that exceeds the striped vertical line can end child labor . With such an incentive payment, there is a unique equilibrium where the social norm becomes to send children to school.

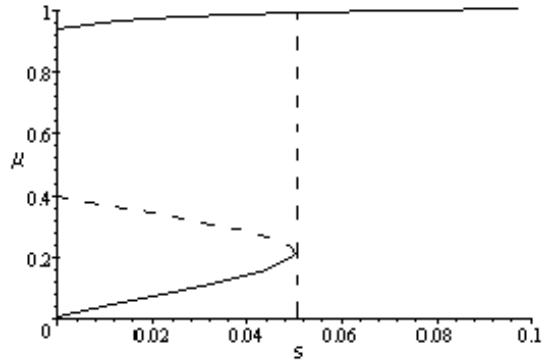


Figure 9

We can expect the cost of incentive payment to be high in a society where child labor is the social norm. The purpose of the incentive payment is however to move the society from one equilibrium to another. The cost is therefore temporary.

With multiple equilibria, consider a society in a ‘bad equilibrium’ where the social norm is child labor (for example, because of history, see Granovetter and Soong 1983). A sufficiently great incentive payment can reduce the number of equilibrium to a single possibility, where children are sent to school. When the incentive payments end, there are again two equilibria. Now, however, the society moves to the ‘good equilibrium’. There is thus hysteresis. After the policy (the externally financed incentive payments for sending children to school) is ended, the society does not return to the original equilibrium with child labor. Figure 10 illustrates the process of hysteresis

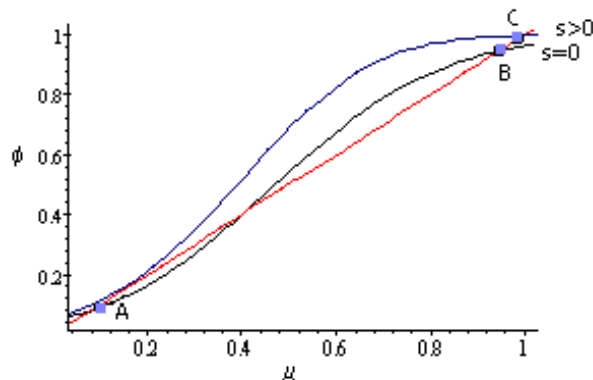


Figure 10

In figure 10, when  $s = 0$  (that is, when there are no incentive payments to parents for sending children to school), the possible equilibria are at the points  $A$  and  $B$ . Suppose the society is initially at  $A$ . With a sufficiently large incentive payment for sending children to school, the equilibrium moves to  $C$ . Returning to  $s = 0$  results in a move to  $B$ , where education of children is the social norm.

## 6 Conclusions

My purpose in this paper has been to provide a new perspective on the phenomenon of child labor based on conformity and social norms. This perspective is new because previous studies have focussed on other effects including the consequences of poverty (see Grootaert and Kanbur 1995, Basu and Van, 1998) and credit markets (see Ranjan 1998). The model has shown how ‘good’ and ‘bad’ equilibria can emerge. I have investigated the attributes of the different types of equilibria, and I have considered how the nature of the equilibrium in which a society finds itself responds to policies that a government can undertake.

I have not considered legal prohibition of child labor as a means of ending child labor in a society. With no change in incentives, legal prohibition requires coercion. In general, the evidence is that merely legislating prohibition of child labor is not sufficient to end child labor or to change an equilibrium with high participation of child labor. In both the U.S and England,

laws prohibiting child labor appear to have followed changes in social norms (see Landes and Solomon 1972, Moehling 1999).

When there are two equilibria, beneficial change can also take place if parents change their expectations about each others' decisions. This requires a program of information that leads parents to believe that others intend to send their children to school. The government might for example advertise that "everyone is now sending their children to school." I have not considered policies that attempt to affect expectations through such information provision. The problem with such policies is to convince large parts of a population to believe in a way contrary to the way people see others are behaving, that is, to have expectations that contradict existing social norms.

The policies of taxation of child income and tax-financed incentive payments that I have considered can encourage education and reduce child labor, but these policies can confront fiscal restraints. Externally-financed incentive payments to parents who send their children to school solve the problem of domestic fiscal constraints, and only temporary policies are required to affect parents' incentives.

## A Appendix 1

**Numerical example behind figure 1.**

$$R(\mu) = \alpha\mu$$

$$z = 0$$

$$v = 1$$

$$\alpha = 2$$

$$w_c = 1.6$$

$$T = 0.3$$

$$w_a = 3$$

$$\bar{n} = 12$$

$$n^* = \frac{w_a(e^{(v+\alpha\mu)} - 1)}{(w_c - z) + (T+z)e^{(v+\alpha\mu)}}$$

$$\Phi(n^*) = \frac{n^*}{\bar{n}} = 2.5 \frac{e^{1.0+2.0\mu} - 1.0}{15.0 + 2.0e^{1.0+2.0\mu}}$$

## B Appendix 2

**Weibull distribution** A random variable  $X$  is Weibull distributed if for all  $x \geq 0$

$$\Pr(X \leq x) = \Phi(x) = 1 - \exp \left[ - \left( \frac{(x-a)}{b} \right)^c \right]$$

where  $a$  is the lower value of the distribution,  $b$  is the scale of the distribution, and  $c$  is the concentration of the distribution.

**The numerical example behind figure 2** The logarithmic function is similar to the one in appendix 1.

The Weibull distribution includes  $a = 0$ ,  $b = 7$ , and  $c = 3$ . Hence,

$$\Phi(n^*) = 1 - e^{-\left(\frac{n^*}{7}\right)^3}$$

substituting  $n^*$  we get:

$$\Phi(n^*) = 1.0 - \exp \left( -78.717 \frac{(e^{1.0+2.0\mu} - 1.0)^3}{(15.0 + 2.0e^{1.0+2.0\mu})^3} \right)$$

## C Appendix 3



**The relation between tax imposed on child income and the proportion of parents sending children to school**

$$F = \mu - \Phi(n^*(\mu, t)) = 0$$

$$\frac{\partial \mu}{\partial t} = -\frac{\frac{\partial F}{\partial t}}{\frac{\partial F}{\partial \mu}} = -\frac{-\Phi'(n^*) \frac{\partial n^*}{\partial t}}{1 - \frac{\partial \Phi}{\partial \mu}} > 0$$

We know that  $\Phi' > 0$  since the cumulative distribution is increasing in  $n$ . Further more it is obvious that  $1 - \frac{\partial \Phi}{\partial \mu} > 0$ . Therefore, the sign of  $\frac{\partial \mu}{\partial t}$  depends on the sign of

$$\frac{\partial n^*}{\partial t}$$

Defining function  $G$ ,

$$G = u(w_a + (1-t)nw_c - zn) - R(\mu) - u(w_a - n(T+z)) + v = 0$$

where

$$a = w_a + (1-t)w_cn - zn$$

$$b = w_a - n(T+z)$$

Because of decreasing marginal utility of consumption, since  $a > b$ , therefore

$$u'(b) > u'(a)$$

and therefore,

$$\frac{\partial n^*}{\partial t} = -\frac{\frac{\partial G}{\partial t}}{\frac{\partial G}{\partial n}} = -\frac{u'(a)(-nw_c)}{u'(a)[(1-t)w_c - z] + u'(b)(T+z)} = -\frac{u'(a)(-nw_c)}{z[u'(b) - u'(a)] + u'(a)(1-t)w_c + u'(b)T} > 0$$

As a result,

$$\frac{\partial \mu}{\partial t} > 0$$

## D Appendix 4

**The connection between tax-finances incentive payment  $s$  and the proportion  $\mu$  of parents sending children to school.** Defining function  $F$  that satisfies the condition for social equilibria

$$F = \mu - \Phi(n^*(\mu, s, t)) = 0$$

Thus,

$$\frac{d\mu}{ds} = \frac{\partial \mu}{\partial s} + \frac{\partial \mu}{\partial t} \frac{dt}{ds} = -\frac{F_s}{F_\mu} - \frac{F_t}{F_\mu} \cdot \frac{dt}{ds} = -\frac{1}{F_\mu} \left[ F_s + F_t \frac{dt}{ds} \right]$$

where

$$F_\mu = \frac{\partial F}{\partial \mu} = 1 - \frac{\partial \Phi}{\partial \mu} > 0$$

$$F_s = \frac{\partial F}{\partial s} = -\Phi'(n^*) \frac{\partial n^*}{\partial s}$$

$$F_t = \frac{\partial F}{\partial t} = -\Phi'(n^*) \frac{\partial n^*}{\partial t}$$

Therefore,

$$\frac{d\mu}{ds} = \frac{\Phi'(n^*)}{F_\mu} \left[ \frac{\partial n^*}{\partial s} + \frac{\partial n^*}{\partial t} \frac{dt}{ds} \right]$$

Defining function  $G$  that satisfies  $u_w = u_s$ ,

$$G = u(w_a(1-t) + nw_c - nz) - R(\mu) - u(w_a(1-t) - n(T+z-s)) - v = 0$$

Therefore,

$$\frac{\partial n^*}{\partial s} = -\frac{G_s}{G_{n^*}}$$

and

$$\frac{\partial n^*}{\partial t} = -\frac{G_t}{G_{n^*}}$$

where

$$G_i = \frac{\partial G}{\partial i}$$

As a consequence,

$$\frac{d\mu}{ds} = -\frac{\Phi'(n^*)}{F_\mu G_{n^*}} \left[ \frac{\partial G}{\partial s} + \frac{\partial G}{\partial t} \frac{dt}{ds} \right]$$

In equilibria function  $H$  satisfies

$$H = t - \frac{s \sum_{n=1}^{n^*} n \Phi'(n)}{w_a} = 0$$

Let

$$I(n^*(s, t)) = \sum_{n=1}^{n^*} n \Phi'(n)$$

The derivative of the tax rate according to change of the incentive payments is positive,

$$0 < \frac{dt}{ds} = \frac{\frac{I}{w_a} + I_{n^*} \frac{\partial n^*}{\partial s}}{1 - I_{n^*} \frac{\partial n^*}{\partial t}}$$

**Proof.**  $\frac{dt}{ds} > 0$  since  $I_s > 0$  and  $I_{n^*} > 0$ ,  $\frac{\partial n^*}{\partial s} > 0$  and  $\frac{\partial n^*}{\partial t} < 0$ . ■

Therefore the relation between the incentive payments offered to parents sending children to school and the proportion of parents sending children to school is

$$\frac{\partial \mu}{\partial s} = \frac{\Phi'(n^*)}{F_\mu G_{n^*}} \left[ u'(b) \left[ n^* - \frac{dt}{ds} w_a \right] + u'(a) \frac{dt}{ds} w_a \right]$$

where  $a = w_a(1-t) + nw_c - zn$  and  $b = w_a(1-t) - n(T+z) + ns$

We know  $\Phi'(n^*) > 0$  and  $G_{n^*} > 0$  and  $F_\mu > 0$ .

After offering the incentive payment  $s$  to the parents sending children to school  $a < b$  can occur. Under this condition we have  $\frac{\partial \mu}{\partial s} > 0$ . But, it is more plausible that  $a > b$ . In this case, the disutility caused by the tax is greater for the parent who send children to school, due to decreasing marginal utility from consumption. However, the parent who send children to school receives the incentive payment per child. Therefore, the total effect of  $s$  on the proportion  $\mu$  of parents sending children to school depends on the relative marginal utilities of the both types of parent due to this policy.

Therefore the effect of  $s$  on  $\mu$  is ambiguous.

If  $\frac{dt}{ds} w_a \leq n^*$  than  $\frac{\partial \mu}{\partial s} > 0$  meaning the parent sending children to school had a positive

marginal utility from the increase of the incentive payment, while the parent sending children to work always suffers disutility.

But if  $\frac{dt}{ds}w_a > n^*$  the parent sending children to school had also a negative marginal utility from the increasing of  $s$  (the tax caused more damage than the benefit from the incentive payment).

Therefore, as long as the negative marginal utility of the parent sending children to school is smaller than the negative marginal utility of the parent sending children to work  $\frac{\partial \mu}{\partial s} > 0$ .

As a consequence the negative relation between  $\mu$  and  $s$  can't be excluded.

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