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Child labor and the law: Notes on possible pathologies

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Abstract

The paper demonstrates that the standard policy for controlling child labor by imposing a fine on firms caught employing children can cause child labor to rise. This 'pathological' reaction is, however, reversed as the size of the fine increases.

Keywords: Child labor; Law; Labor standards; India

JEL classification: J 20; K 31; D10

1. The problem

Beginning a little over two hundred years ago–from the time of Robert Peel's Factories Act of 1802 in Britain–there have been repeated attempts to use legislative action to bring an end to child labor. And one of the more curious features of this phenomenon is how often it has beaten the law and persisted or even got worse (Nardinelli, 1990). While child labor did, eventually, come to a virtual end in industrialized nations, it continues to be widespread in developing countries,[1] despite a plethora of legal

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[1] According to latest ILO (2002) estimates there are 186 million child laborers in the world.

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checks. The purpose of this essay is to show that this is one area where seemingly reasonable policy interventions can backfire and there are good theoretical reasons why that may be so.

The policy with which I shall here illustrate the risk of pathological reaction is the standard one where a firm is fined a certain amount if it is found employing children. India's Child Labor (Prohibition and Regulation) Act, 1986, for instance, has precisely such a clause. Section 14 of this Act requires the government to charge a fine between Rs. 10,000 and Rs. 20,000 from a person or firm found employing children in contravention of the provisions of the Act (Government of India, 1986). What will be shown here is that a small dose of an intervention of this kind can actually exacerbate the problem of child labor. If the fine for employing children is raised, child labor could increase for a while before declining. In other words, the response to the policy could be inverse-U shaped. Hence, developing countries like India, trying to legislate against child labor, have to be careful in their design of the law and in the choice of the size of the punishment. Otherwise the law could have the effect opposite to what is intended.

This is a purely theoretical paper. The reader may thus wonder if its warning needs to be heeded, given that it is not empirically proved. My response to that is to observe that (1) there is plenty of empirical support for the main axiom on which the analysis here is founded and (2) the *negation* of the hypothesis put forward here has not been empirically demonstrated, either. In other words, the claim that an increase in the fine for child labor will cause child labor to decline has not been empirically proved. It is simply taken for granted. The paper demonstrates that there is *no* reason for this presumption. The paper recommends empirical research to investigate the effects of anti-child labor legislation, and, until that happens, caution about the laws commonly used.

2. Theory

The reason why child labor policy turns out to be intricate is because of the somewhat unusual factors that cause child labor in the first place. Child labor is intricately linked to poverty. Virtually all the worlds laboring children are located in poor countries. In the same developing country, where lots of children work, one would rarely find the child of a doctor, lawyer, or professor working. The evidence is overwhelming that poverty is a major cause of child labor and, typically, parents send children to work in order to achieve some minimal level of consumption (see Grootaert and Patrinos, 1999; Edmonds, 2005; Edmonds and Pavcnik, 2005).[2] The counter-intuitive result derived in this paper is a consequence of this assumption.[3]

Consider a labor market in which there are several, identical households with each household consisting of one adult and m children. Each child produces a fraction γ of the labor that an adult can produce. In other words, full time work by one child is equivalent to γ units of an adult's full-time work. I shall assume that the adult always supplies labor perfectly inelastically, whereas children work only to the extent that this is necessary to achieve a critical subsistence level of consumption for the household. Let s be that critical amount of consumption.

[2] It must be clarified that to say that poverty causes child labor is not to deny that child labor can have other causes, such as, lack of schooling opportunity or credit, parental illiteracy (see, e.g., Baland and Robinson, 2000; Emerson and Souza, 2003; Bhalotra and Heady, 2003).

[3] Natural though this assumption is it is at the root of other unexpected results in this area (see Basu, 2000; Singh, 2003; Rogers and Swinnerton, 2004).

From these assumptions it immediately follows that children will work only when adult wage is below s. Let w be the adult wage. If w exceeds s, subsistence consumption is achieved without requiring the children work. Note that, given the above assumptions, whenever adults and children are found working, it must be the case that, if adult wage is w, the wage rate for a child laborer, w^c, will be γw. Otherwise, all firms would employ only children or only adults.

Let us now bring government into the picture. Suppose government announces that each time a firm is found employing a child the firm will be fined D rupees. For every child employed by a firm, let p be the probability of the firm being caught. In that case for every child employed, the firm has an expected punishment cost of pD. Hence, unless child wage is less than γw by pD, it does not make sense for a firm to employ children. It follows that the relation between child and adult wage will be:

$$w^c = \gamma w - pD. \tag{1}$$

I refer to the variables p and D as the 'governmental variables,' since these are chosen by government.[4]

Next, if w falls short of s, the household will send the children out to work. Let $e \in [1, m]$ be the number of children that the household sends to work. Since households send children to work only so as to be able to reach subsistence, it must be the case that:

$$ew^c = s - w$$

Or, equivalently,

$$e = (s - w)/(\gamma w - pD) \tag{2}$$

It follows that as adult wage drops, the household will send more children to work. Of course, this cannot go on endlessly since after some time the household will run out of children. Then onwards, as w drops there will be no further increase in the supply of child labor. Labor supply of each household is, therefore, $\min\{(s-w)/(\gamma w-pD), m\}$.

One more condition has to be kept in mind. As w falls, w^c will decline as well (see Eq. (1)); and beyond a point w^c, will cross zero and be negative. This happens when $0 \geq \gamma w - pD$. Clearly, when w^c reaches this critical level, parents will stop sending their children to work. Working for a zero wage is not much help achieving minimal consumption targets.

Gathering these pieces, we can now describe the household's child-labor supply as a function of adult wage and the governmental variables:

$$e = 0, \quad \text{if} \quad w \geq s \quad \text{or} \quad 0 \geq \gamma w - pD \ \min\{(s - w)/(\gamma w - pD), m\}, \quad \text{otherwise.} \tag{3}$$

These facts can be captured pictorially, as shown in Fig. 1, where the vertical axis represents w (adult wage) and the horizontal axis represents labor, measured in adult labor equivalence units. If w is above s, then only the adult will work. Hence, the labor supply curve will be vertical as shown by the segment AB. As w drops below s, children go out to work, chasing the subsistence target. Hence, the backward bending segment BC. As w keeps falling, there will be a point beyond which there will be no more labor to supply. This explains the CF segment. Finally, as w keeps falling, $\gamma w - pD$ will eventually reach zero, and e will then fall back to zero and only the adult will be working. Hence, the supply curve of labor

[4] In a political economy model, these would be the outcome of some political process (see, for instance, Doepke and Zilibotti, 2004), but I shall treat these here as exogenous.

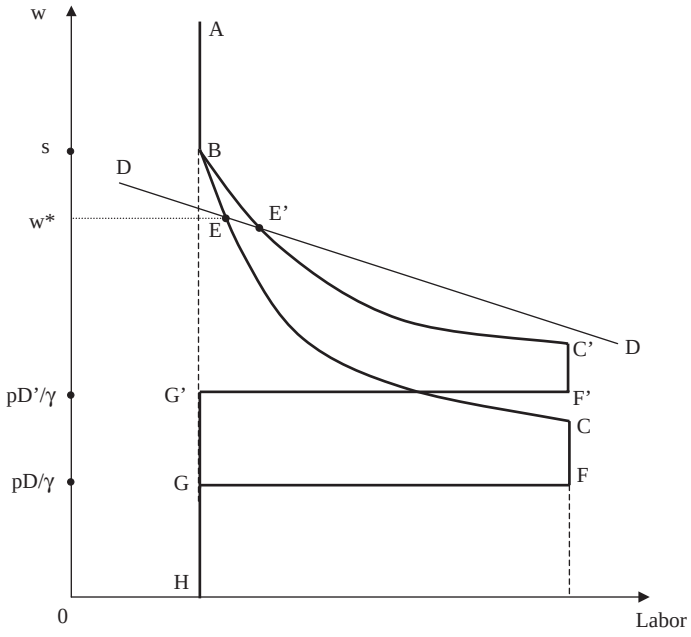

Fig. 1. Child labor: legislative penalty and incidence.

now reverts back to the GH segment. The full labor supply curve of labor is therefore given by ABCFGH. The sharp corners and angularity of the labor supply curve are caused by the simplifying assumptions. With more general assumptions the curve would smoothen out. But the main point is that it will have this basic feature of bulging out and then shrinking back as the adult wage rate falls.

The aggregate supply curve of labor will look the same as this curve, but for a horizontal magnification. I shall, therefore, without loss of generality, assume that this same curve is the aggregate supply curve of labor.

Many of the peculiarities of the child labor market with which the literature has been concerned, such as the possibility of multiple equilibria (Basu and Van, 1998; Swinnerton and Rogers, 1999; Jafarey and Lahiri, 2002) can be constructed by using this kind of supply characterization. But that is not the direction I wish to pursue here. To stay away from that, let me consider the case where the demand curve is sufficiently elastic so that there is only one equilibrium. This is illustrated by the demand curve for labor DD. The market equilibrium is given by the point E, where adult wage, w^*, is below subsistence and there is a small incidence of child labor.

My concern here is with policy interventions. Consider the case where the government, starting from the case illustrated in Fig. 1, raises the fine for employing children (we could, also, think of a switch from no fine to some positive fine). Let the new fine be D' and, we are assuming that D' exceeds D. The effect of this on the supply curve of labor is easy to work out. It is obvious that the segment BC will move up, to BC′ , as shown. To understand this, suppose adult wage is fixed at w^*. As the fine for child labor is raised, child wage will drop. Hence, each household will be forced to supply more children to the labor market in order to reach the subsistence target s.

Keeping in mind that e cannot exceed the total available child labor and e will be zero if w is less than pD'/γ, it is evident that the new supply curve of labor is given by ABC′ F′ G′ H in Fig. 1.

The important property is that for some wage levels, namely, between s and pD'/γ, the higher penalty for child labor increases the supply of child labor. And this leads to the pathological reaction that I discussed earlier, to wit, that child labor will increase as a consequence of a higher penalty for employing children:

To trace the full range of possibilities, continue to raise D. Clearly, child labor will rise, and then fall, eventually reaching zero. If, for instance, D is so high that pD/γ exceeds s, then the supply curve of labor becomes a vertical line through point H and so child labor must be zero in equilibrium.

3. Three remarks

The household's behavior described in the model can be deduced from the more standard formulation of an optimizing household. To see this, let X be the set of all triples, (c, K, L), such that $c \in [0, \infty)$, $1-e \equiv K \in [0, 1]$, and $1-E \equiv L \in [0, 1]$, where c is (as before) total household consumption, K is the leisure enjoyed by the children of the household, and L is the leisure enjoyed by the adult, with E being the work done by the adult. Each household has a binary preference ordering on X and the household's aim is to maximize the preference by choosing (c, K, L) such that the triple belongs to its budget set defined by $c=(1-K)w^c+(1-L)w$.

I shall now define a preference ordering that will generate the behavior described in the previous section. Let each household's preference ordering, $\succcurlyeq$, be described as follows.[5] For all (c, K, L) and (c', K', L'), if $c \geq s$ and $s > c'$, or $c \geq s$, $c' \geq s$ and $K > K'$, or $s \geq c > c'$, then $(c, K, L) \succ (c', K', L')$. If none of the above conditions is true, then $(c', K', L') \succcurlyeq (c, K, L)$.

It is easy to check that maximizing the above preference will lead to adults working as long as adult wage is non-negative and child labor supply responding to changes in w precisely as described in Fig. 1.

Since the child labor problem is made worse by the imposition of a fine for employing children, it is natural to wonder if it would not be the case that the problem of child labor can be mitigated by subsidizing firms for employing children. The answer is no. A subsidy does not work like the reverse of a tax or a penalty.

To see this we must understand what was implicit in the previous section. Suppose that a firm decides to use C units of child labor. Clearly it can do this by employing different numbers of children. It can, for instance, employ $2C$ children with each child doing half-time work or C children with each child working full time. In most models of economics, it does not matter how the total is broken up. In the above model, with a penalty for every child that is found working in the firm, a firm will have a preference for employing as few children as possible. So if the firm decides to have C units of child labor and gets this from n children, then the cost (wage bill plus expected penalty) is given by w^cC+npD. Clearly, it will try to make n as small as possible; hence, n will be C.[6]

The trouble with a *subsidy* for employing children is that this implicit assumption (which is valid when there is a *fine* associated with child labor) in the above model breaks down. In the presence of a *subsidy* for each child employed it will be in the interest of the firms to get the same volume of labor

[5] I use $\succ$ and $\sim$ to denote the asymmetric and symmetric counterpart of $\succcurlyeq$.

[6] I am assuming that a child's probability of getting caught depends simply on whether or not a child works and not on how much she works. The analysis would go through with a less extreme assumption.

from many children and take these children to the local government office as proof of child labor and collect the subsidy.

Finally, it is worth emphasizing, as I have cautioned elsewhere, that a decline in child labor need not *always* coincide with a rise in child welfare. Hence, if one is trying to maximize welfare, one may choose not to punish child labor. That is however not the point that was being made in this paper. Here we were not concerned with welfare, but simply the incidence of child labor and what was demonstrated was that, even from the point of view of this limited objective, certain obvious policy deterrents may not be worth using.

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