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Is product boycott a good idea for controlling child labor? A theoretical investigation

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ABSTRACT

A popular form of action to curb child labor and uphold international labor standards in general is a 'product boycott' by consumers. There are labeling agencies that inform us if, for instance, a carpet or a hand-stitched soccer ball is free of child labor. The presence of a consumer boycott will typically mean that products tainted by child labor will command a lower price on the market than ones certified to be untainted. It is popularly presumed that such consumer activism is desirable. The paper formally investigates this presumption and shows that consumer product boycotts can, in a wide class of situations, have an adverse reaction that causes child labor to rise rather than fall. This happens under weak and plausible assumptions. Hence, there has to be much greater caution in the use of consumer activism, and one has to have much more detailed information about the context where child labor occurs, before using a boycott.

1. Motivation

The use of product boycotts by consumers is one of the more enduring actions that have been contemplated and used to control child labor and the violation of other minimal labor standards in developing countries. Such action has become particularly popular because it does not involve the heavy hand of government. It seems as if ordinary consumers, going about their regular chores, can influence the world in certain desirable ways. While in the popular mind this is virtually an axiom, there is very little by way of serious analytical examination of it. The aim of this paper is to do precisely that.

It has been pointed out how children can get hurt by the very sanctions meant to help them if the sanctions are not complemented with alternative opportunities for the children (Edmonds, 2003). This is a natural conclusion if it is the case that children work because of poverty and a lack of alternatives, such as decent schooling (Basu and Van, 1998; Swinnerton and Rogers, 1999; Dessy and Pallage, 2005). It has also been argued that child labor labels can hurt the overall welfare of developing nations where child labor exists (Baland and Duprez, 2007). Our formal analysis goes further. It shows that, paradoxically, the boycott of child labor-tainted products can cause the incidence of child labor to increase.[1] We refer to this as the 'adverse reaction proposition.'

To understand the intuition behind the main result, we should first note that by a 'boycott' we mean consumers are willing to pay a price to avoid using products tainted by child labor. If consumers decide to boycott products that are produced by child labor, then firms will realize that the use of child labor will lower the price of their product. Hence, the existence of a boycott will make child labor a less attractive input than it would have been otherwise. This will cause child wage to drop. In case children were working so as to avert extreme poverty for themselves and their families, then the lower wage will mean that they will have to work harder.

Our analysis relates to the classical idea of a backward-bending supply curve of labor in an interesting and somewhat unusual way, via a 'shift' in the household's aggregate supply of labor in response to a heightened product boycott. Our analysis is predicated on an implicit backward-bending supply curve of labor: a decline in the wage rate of child labor prompts a greater supply of child labor since the household now struggles harder to stave off poverty. Edmonds and Pavcnik (2005) provide an extensive survey of evidence–both across and within countries–of the link between poverty and child labor, and Kambhampati and Rajan

[1] Baland and Duprez (2007) get the result that the use of labels could cause a 'displacement effect,' whereby children simply move over to activities where there is no boycott. For other recent writings on this see Davis, 2005; Basu, Chau and Grote, 2006; Grossmann and Michaelis, 2007; Baland and Duprez, 2007.

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(2005) explicitly find a strong negative effect of parental wages on child-labor supply using data from nearly 100,000 Indian children. Now, when there is a new boycott (or a stepping up of an existing boycott) against products that are made with child labor, firms will naturally try to avoid using child labor and this will cause a decline in child wage rate. Hence, a household's aggregate supply of labor as a function of adult wage will shift outwards. It is this shift of the aggregate labor supply as a function of adult wage that gives us our main result.

Child labor is one area where, we know from past research, pathological reactions to policy interventions abound (Ranjan, 2001, Jafarey and Lahiri, 2002; Lopez-Calva, 2003; Krueger and Donohue, 2005; Basu 2005; Das and Deb, 2006; Dinopoulos and Zhao, 2007). This can explain why child labor has been such a stubborn problem in history that has resisted effort to eradicate it. It is of course arguable that the policies that have been pursued are themselves endogenous (Doepke and Zilibotti, 2005). But it is also possible that policy choices were caused by misinformation about the impact of those choices. The present paper is meant to be a small contribution to shed further light on the impact of a widely-used intervention, namely, consumer activism.

2. Model

The exogenous variable, the effect of which on various parameters is the focus of our study, is the boycott of products by consumers. Since our main concern is child labor, let us assume that what consumers may or may not wish to boycott is a commodity that has been produced using child labor. For example, consider the product of interest to be hand-knotted carpets or rugs. Very simply, we will assume that if p is the price of carpets that are free of child labor, then, given a consumer boycott of child labor, the price of carpets that have been produced using any positive amount of child labor will be a proportion α of p, where $\alpha<1$. An increased boycott of child labor is thus equated with a drop in α. It is easy to derive this from utility maximizing behavior. In the formal exercise, we shall treat $\alpha\in[0,1]$. If $\alpha=1$, it means that there is no product boycott.

Let us turn to the labor market. There are N identical worker households and each household has one adult and m children, and each child has the productive capacity of a fraction γ of one adult. We assume that adults supply labor inelastically, and children supply labor in order for the household to reach a minimal acceptable level of consumption, s. In other words, child labor is caused by the urge to avoid extreme poverty. This implies that child labor is only supplied if the adult wage, w_A, is less than s. Children face wages w_C, and it will turn out to be that $w_C<w_A$. We shall also make the reasonable assumption that if $w_C\leq 0$, then the child labor supply is zero.

If x is the household's consumption and r the amount of leisure enjoyed by the children, then the labor-household's utility function is being assumed to be:

$$v(x,r)=\begin{cases} r, & \text{if } x\geq s \\ x-s, & \text{if } x<s \end{cases}. \tag{1}$$

Since it is assumed that the adult always works, the labor-household maximizes the above utility function, subject to the budget constraint: $qx=w_A+w_C(m-r)$, where q is the price of the good that the worker household consumes. This is assumed to be constant. The good that the worker households consume is assumed to be different from the good produced by the workers. This latter good is the one consumed by rich consumers (maybe in another country) and the subject of possible product boycott. This is a very special utility function. We use it purely to keep the analysis simple. The essential idea is that households are driven by some minimal consumption target.

Firms take labor as the only input; the resultant production function for a firm hiring A adults and C children is given by $F(A+\gamma C)$. In other words, each firm has a production function, $X=F(L)$, where X is the total output produced by the firm, and L is the 'effective' amount of labor, that is, labor measured in adult labor units, used by the firm. The main result in this paper holds for a very general class of production functions, namely, any with the following properties: $F(0)=0$ and for all $L\geq 0$, $F'(L)>0$ and $F''(L)\leq 0$. Purely for reasons of expositional ease we shall however assume from here on that the production function is linear[2]. That is, there exists $b>0$, such that $F(L)=bL$.

Suppose now a consumer boycott is started, so that a firm hiring any children will experience reduced demand for its product. Therefore, while a firm that hires no children faces price p for its output, a firm hiring any children faces a price αp, where $\alpha\in[0,1)$. From here on, we will normalize prices such that $p=1$. Hence, the profit, Π, earned by a firm that employs A adults and C children is given by:

$$\Pi(A,C)=\begin{cases} F(A)-w_A A & \text{if } C=0 \\ \alpha F(A+\gamma C)-w_A A-w_C C & \text{if } C>0 \end{cases}.$$

We can now establish a useful 'separation result.' Whenever $\alpha<1$, there will be separation between firms that employ adults and firms that employ children. The intuition is straightforward. Once a firm employs children, its product is tainted, and the price is lower; and so it may as well go all the way. Surprisingly, the separation occurs no matter what the wages are for child and adult laborers. Of course, in reality, the production function is more complex, and children and adults are not entirely substitutable. Therefore, in reality, we do find adult labor in firms that employ children. For one, in a more complex model we would make the realistic assumption that some supervisory adult labor is needed in every firm. But the simplicity here is harmless.

To prove the separation result, suppose a firm maximizes profits by hiring $A^*>0$ adults and $C^*>0$ children. Then its profits are given by $\Pi(A^*, C^*)=\alpha F(A^*+\gamma C^*)-w_A A^*-w_C C^*$. Consider now the profits that this firm would earn if it employed the same amount of effective labor but by employing (i) only adult labor and (ii) only child labor. These are given by, respectively,

$$\Pi\left(\hat{A},0\right)=\alpha F\left(\hat{A}\right)-w_A\hat{A}, \text{ and } \Pi\left(0,\hat{C}\right)=\alpha F\left(\gamma\hat{C}\right)-w_C\hat{C}$$

where $\hat{A}=A^*+\gamma C^*$ and $\hat{C}=\frac{A^*+\gamma C^*}{\gamma}$. From the definition of A^* and C^*, we know that

$$\Pi\left(A^*,C^*\right)\geq\Pi\left(0,\hat{C}\right), \tag{2}$$

and

$$\Pi\left(A^*,C^*\right)\geq\Pi\left(\hat{A},0\right). \tag{3}$$

It is easy to verify that Eq. (2), along with the fact that $\gamma\leq 0$ implies that

$$w_C\geq\gamma w_A. \tag{4}$$

But Eq. (4), along with the fact that $\alpha<0$, implies that Eq. (3) must be false. This is a contradiction that establishes the separation result.

3. Equilibrium and the adverse reaction proposition

To fully describe the labor market equilibrium, we must first characterize the aggregate labor supply functions. Let us suppose that there are N worker households. From what was stated above in words, each household's labor supply is given by:

$$l(w_A,w_C)=\begin{cases} 1, & \text{if } w_A\geq s \text{ or } w_C\leq 0 \\ 1+\gamma\min\left\{m,\dfrac{s-w_A}{w_C}\right\}, & \text{otherwise} \end{cases}. \tag{5}$$

The household's labor supply, measured in adult labor units, is denoted by l. If $w_A\geq s$, children do not work because adult work

[2] A proof of the result in the general case is available on request from the authors.

guarantees the household reaches the threshold tolerable income, s. Also, if $w_C \leq 0$, then children do not work, as it would be pointless. Hence, the household labor supply is equal to the amount of adult labor in each household, namely one unit. In all other cases, that is when $w_A < s$ and $w_C > 0$, children work enough to help the household reach an income level of s. By this logic, the household should supply x units of child labor, where $w_C x = s - w_A$. But the maximum child labor the household possesses is m. Hence it supplies $\min\left\{\frac{s-w_A}{w_C}, m\right\}$. Converting this into adult labor units requires us to multiply this term by γ. This explains Eq. (5).

The aggregate labor supply, S, is therefore given by

$$S = Nl(w_A, w_C).$$

We shall describe the labor market as being in *equilibrium* if the adult and child wages are such that demand for labor equals supply of labor. It is easy to see that in equilibrium, adult wage must be equal to b. Since we know from the separation result that each firm will employ only adults or only children, the demand for adult labor comes from adults-only firms. It follows that, if $w_A > b$, there will be no demand for adult labor and if $w_A < b$, then demand for adult labor is infinite. Since supply of adult labor is always finite and positive, it must be that $w_A = b$. Using a similar reasoning on children-only firms it is obvious that when children work $w_C = \alpha\gamma b$.

Now we are ready to state and prove the main theorem.

Theorem 1. *There exists a class of parameters under which, whenever α declines, the incidence of equilibrium child labor increases.*

Proof. The class of parameters under which the adverse reaction occurs can be described in two ways: In the initial equilibrium there is a positive amount of child labor but not all children work or, equivalently,

$$s > b > \frac{s}{1 + m\alpha\gamma}. \tag{6}$$

Suppose condition (6) is true. As we have already seen, in equilibrium, $w_A = b$ and $w_C = \alpha\gamma b$. At these wages, all firms will be earning zero profits and be prepared to employ any amount of labor. This is obvious given the linearity of the production function and keeping in mind that in equilibrium each firm employs only adults or only children. Hence, the amount of labor employed in equilibrium will be determined entirely by the supply function.

Since adults supply their labor inelastically, it follows that N adults will be employed in equilibrium. The amount of child labor in equilibrium is given by $\frac{s-b}{\alpha\gamma b}$. This is derived by inserting the equilibrium values of adult and child wages into the child labor component of Eq. (5). Since, by Eq. (6), $\frac{s-b}{\alpha\gamma b} < m$, and $s - b > 0$, any fall in α will cause equilibrium child labor to rise.

One corollary that gets lost with the assumption of linear production function is that a sufficiently low α, can cause child labor to decline. This happens with a production function exhibiting diminishing marginal productivity. We can also derive this result in our model by introducing an additional assumption. Let us modify the worker household utility function a little to suppose that there is a sufficiently low but positive number, ζ, such that if w_C drops below this then children do not work, even if this means that the household's consumption remains below s. This is not an unrealistic assumption, given that work is a strenuous activity. This will mean that, as α keeps declining, the incidence of child labor keeps increasing, as suggested by the above theorem. Also, child wage, $\alpha\gamma b$, keeps declining. As this continues, $\alpha\gamma b$ will eventually hit ζ. When this happens, child labor will decline, as workers will basically give up the struggle for their target s. What we have is an inverted-U: As α declines, child labor increases; after (and if) child labor reaches Nm, it remains steady, since there is no scope for further rise; and as α continues to fall, as just seen, child labor suddenly declines. The 'suddenness' of changes can be smoothed out with a more sophisticated utility function, but the basic idea is the same. We can have an adverse reaction to child labor boycotts, though severe enough boycotts can eradicate child labor.

This does not mean that setting α so low that it eliminates child labor will be beneficial for children. It can be if the model has multiple equilibria, as in Basu and Van (1998). Then a strong boycott, like a ban, can deflect the economy from an equilibrium with a high incidence of child labor to another equilibrium with no child labor; as was shown in Basu and Van (1998) (see, also, Emerson and Knabb, in press), in that case, child welfare rises as child labor is eliminated, and the boycott is worthwhile both because it removes child labor and raises child welfare. There are also models with imperfect capital markets where a ban on child labor results in a Pareto improvement (e.g., Baland and Robinson, 2000). If the demand for labor is very elastic, for instance, infinitely so, then the multiple equilibria result of Basu and Van (1998) cannot occur (Dixit, 2000). But the adverse reaction result can nevertheless happen in such a situation.

Finally, note that, since we set p equal to one, effectively the price of the untainted good was treated as constant. A more general way to proceed would be to allow for the fact that a boycott could cause the price of the clean product to rise. We would then have to write the price of the clean product as $p(\alpha)$, and the price of the tainted product as $\alpha p(\alpha)$, and assume that, as α declines, $p(\alpha)$ rises and $\alpha p(\alpha)$ declines. This more general model would simply mean that the adverse reaction proposition would apply in a smaller class of contexts. To see this let us use the production function that was used in the proof of Theorem 1. The adult wage will then be $p(\alpha)b$. Child labor occurs when the adult earning is not sufficient to meet the household's subsistence needs. Hence, if we use τ to denote the amount of child labor supplied by a household, it must be the case that

$$s - p(\alpha)b = \tau\alpha\gamma p(\alpha)b \quad \text{or} \quad s = p(\alpha)b + \tau\gamma b\alpha p(\alpha).$$

It is immediately clear that, as α falls, even if $p(\alpha)$ rises, there are parameters for which τ will have to rise for the above equation to hold, which establishes the adverse reaction result. If $p'(\alpha) = 0$, we are of course back to our original assumption.

We believe that a boycott is unlikely to have a substantial effect on adult wage. Suppose that, as a consequence of a boycott in the U.S. of carpets produced in Pakistan by children, the demand for 'clean' carpets rises, and so does the demand for adult labor rises. But since adult labor in Pakistan works in all sectors across the economy an increased demand for adult labor in the few sectors where children work, is unlikely to have a significant effect on adult wages. But, admittedly, this is an empirical matter.

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