The Economics of Child Labor: Another Comment

Jorge Soares*
Department of Economics
George Washington University
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1. Introduction

In Basu and Van (1998) (BV henceforth) the authors set up an environment where parents care about their children and have to decide if they send them to work. This decision depends on whether adult income is below or above some subsistence level. The authors show that under some conditions there are two possible equilibria: a “bad equilibrium” where wages are low and all parents send their children to work which then maintains wages at a low level, and a “good equilibrium” where wages are high inducing parents not to send their children to work. Because in this latter equilibrium agents are better off, banning children from the labor market can be welfare improving. The ban raises adult wages and creates an environment where they do not want to send their children to work, effectively not restricting the choices of agents in equilibrium.

Swinnerton and Rogers (1999) (SR henceforth) show that, in BV’s economy, workers receiving dividends from firms never choose to send their children to work. Thus, if all workers in the economy receive dividends, the “bad equilibrium” where children work does not exist. Hence, they propose a policy that redistributes dividends across workers as way of eliminating the “bad equilibrium”.

In this paper, I show that the existence of a “bad equilibrium” depends on the assumptions that are made about entry and exit of firms from the market. While it is true that in a “bad equilibrium” wages are low, it is also true that profits are higher. Once entry and exit are endogenized, this might induce new firms to enter the market. The new firms compete with the incumbents for the existing supply of labor increasing the wages and moving the economy towards the “good equilibrium.”

More importantly, I also show that, in BV’s environment, a “bad equilibrium” might actually be optimal. In BV’s model total welfare is an increasing function of output. Because, more labor is supplied in the “bad equilibrium” more output is produced and a higher level of welfare can therefore be achieved.

*Correspondence to Jorge Soares, 2201 G St. NW, Department of Economics, George Washington University, Washington, DC, 20052, jsoares@gwu.edu.
2. The BV model with entry and exit

In this section, I extend the BV model to allow for endogenous changes in the number of identical firms in the economy. The profits of an incumbent firm are

\[ \pi = f\left(\frac{A}{F} + \gamma \frac{C}{F}\right) - w\frac{A}{F} - w\gamma \frac{C}{F}, \]

where \( f(.) \) is a production function such that \( f'(.) > 0 \) and \( f''(.) < 0 \). \( A \) and \( C \) are respectively the number of adults and children employed and, \( F \) is the number of firms in the economy. A unit of child labor is equivalent to \( \gamma \) (\( \gamma < 1 \)) units of adult labor.

There are \( N \) households in the economy, each consisting of an adult and a child. The adult member always works and the child’s supply of labor is described by:

\[ e(w) = \begin{cases} 
0 & \text{if } w \geq 2s \\
1 & \text{if } w < 2s.
\end{cases} \]

where \( w \) is the real wage rate, and \( s \) a subsistence consumption level. The effective labor supply is therefore given by:

\[ S(w) = \begin{cases} 
N & \text{if } w \geq 2s \\
N + \gamma N & \text{if } w < 2s.
\end{cases} \]

2.1. The BV model with fixed operating costs

To maintain the static setting of BV, I assume that firms can decide to enter or exit the market in each period. The sunk cost of entry is \( E \).

I show that, if the entry cost is such that the “good equilibrium” exists, then in a “bad equilibrium” the profits of the incumbents would always be such that new firms would want to enter the market.

**Proposition 1.** If for a given fixed cost of operating a “good equilibrium” exists then there is no equilibrium in which households send their children to work.

**Proof:**

An incumbents’ profits is a function of labor, \( n \),

\[ \pi(n) = f(n) - f'(n)n. \]

As \( \frac{\partial \pi(n)}{\partial n} = -f''(n)n > 0 \) the profits of the incumbents are strictly increasing with the amount of labor employed per firm. Therefore, there is at most one equilibrium level of \( n \). That is, there is at most one \( n \) such that \( \pi(n) = E \).

If a “good equilibrium” exists then \( \frac{N}{F} \) is the only equilibrium level of \( n \). Suppose that there is also a “bad equilibrium” and the total effective labor supply is \((1 + \gamma)N\). Then, from what we just showed, the number of firms in the economy needs to be \((1 + \gamma)F\) and the wage rate is \( f'(\frac{N}{F}) \), the “good equilibrium” wage rate. Because, by assumption, under this wage rate households choose not to make their children work, a “bad equilibrium” is not possible. Therefore if there is a “good equilibrium” there cannot be an “bad equilibrium”.

Therefore, unless the number of firms is fixed, there are never multiple equilibria in this economy. Hence, the discussion should focus around the conditions that restrict the entry of new firms in the economy. Also, if we consider that other endogenous factors, like capital, can be considered to be complements to labor, accounting for a response from these factors’ supply might also eliminate the multiplicity of equilibria.

2.2. The BV model with a fixed entry cost

Suppose now that a firm can operate forever. Assume that the entry cost is a once and for all cost, \( E \), and entrepreneurs care about the present discounted value of firms. For incumbents \( E \) is a sunk cost they incurred and they stay in operation if the present value of profits is positive.

**Proposition 2.** If for a given entry cost a “good equilibrium” exists, then an equilibrium in which households send their children to work might also exist.

**Proof:**

Assume that there is a “good equilibrium”, an equilibrium in which households do not send their children to work. This means that, \( F \) is such that

\[
\frac{\pi(N_F)}{r} \geq 0.
\]

Where \( r \) is the rate at which entrepreneurs discount future dividends.

Suppose that for this same number of firms there is also a “bad equilibrium”, an equilibrium in which children work. The profits of an incumbent firm are then

\[
\pi\left(\frac{(1 + \gamma)N}{F}\right) = f\left(\frac{(1 + \gamma)N}{F}\right) - f'\left(\frac{(1 + \gamma)N}{F}\right) \cdot \frac{(1 + \gamma)N}{F}.
\]

Because the production function is concave we have

\[
\frac{\pi\left(\frac{1+\gamma)N}{F}\right)}{r} > \frac{\pi(N_f)}{r}.
\]

But now this condition does not imply that the present value of the profit of a new entrant covers the entry cost. It might not be optimal for new firms to enter the market. Because \( f'\left(\frac{(1+\gamma)N}{F}\right) < f'\left(\frac{N}{F}\right) \) a “bad equilibrium” might exist with the same number of firms.

However, this result does not hold if the economic environment did not change from the time when the incumbents incurred the entry cost. In this case, a “good equilibrium” would imply that \( F \) is such that \( \frac{\pi(N_f)}{r} = E \) and the results from the previous section apply.

2.3. Pareto improving policies

Because profits increase with the supply of labor, it is better for entrepreneurs to be in the “bad equilibrium.” So entrepreneurs prefer a “bad equilibrium” while workers prefer a “good equilibrium”. In order to determine the optimal equilibrium, we need to evaluate the utility of all agents in the economy for each equilibrium.

Using the same momentary utility as in BV, assuming that children do not consume \( (\beta = 0) \) and discounting future utility at the rate \( r \), we can write the utility levels for each agent in the economy and the total welfare levels:
Utility Levels

<table>
<thead>
<tr>
<th></th>
<th>Bad equilibrium</th>
<th>Good equilibrium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entrepreneurs:</td>
<td>( F \cdot \frac{(1 + \gamma)N}{\gamma c} )</td>
<td>( \frac{F \cdot \sigma}{\gamma c} )</td>
</tr>
<tr>
<td></td>
<td>( \frac{r}{(1 + \gamma) + \frac{1 + \gamma}{F}} - s )</td>
<td>( \frac{r}{F} - s )</td>
</tr>
<tr>
<td>Workers:</td>
<td>( \frac{Ne}{F} \cdot \frac{(1 + \gamma)f'(1 + \gamma)N}{r} - s )</td>
<td>( \frac{Ne}{F} \cdot \frac{f'(N)}{r} - s )</td>
</tr>
<tr>
<td>Total Utility:</td>
<td>( \frac{\pi(1 + \gamma)N}{r} F + \frac{(1 + \gamma)f'(1 + \gamma)N}{r} - s ) N</td>
<td>( \frac{\pi(N)}{r} F + \frac{f'(N)}{r} - s ) N</td>
</tr>
</tbody>
</table>

As

\[
\frac{\pi(1 + \gamma)N}{r} F + \frac{(1 + \gamma)f'(1 + \gamma)N}{r} - s \text{N} > \frac{\pi(N)}{r} F + \frac{f'(N)}{r} - s \text{N} \iff \\
\left[ f\left(\frac{1 + \gamma)N}{F}\right) - f\left(\frac{N}{F}\right) \right] F > 0,
\]

the “bad equilibrium” is better than the “good equilibrium” and there are no welfare gains from banning children from the labor market. There are actually welfare gains from inducing parents to send their children to work, when both equilibria are possible. According to the results in BV and SR maintaining low levels of wages and not allowing workers to get dividends from firms achieves this result. So the model, in its current form, suggests that subsidizing child labor can be welfare improving.

Furthermore, because in this economy welfare is a function of total output, a social planner would want to choose the number of firms in order to maximize output.

\[
\max_{F} W = \frac{f\left(\frac{(1 + \gamma)N}{F}\right) F - sN}{r} - EF.
\]

\[
\frac{\partial W}{\partial F} = \frac{\pi(1 + \gamma)N > 0}{r} - \frac{\sigma(1 + \gamma)N}{F} \frac{\pi(1 + \gamma)N}{(1 + \gamma)N} \frac{\pi(1 + \gamma)N}{F} \frac{(1 + \gamma)N}{F} - rE
\]

So the optimality condition for the number of firms, is the same as the equilibrium condition when there is endogenous entry.

Because

\[
\frac{\partial \pi(1 + \gamma)N}{\partial F} = f''\left(\frac{(1 + \gamma)N}{F}\right) \left(\frac{(1 + \gamma)N}{F^2}\right) < 0,
\]

if \( \lim_{F \to 0} f\left(\frac{(1 + \gamma)N}{F}\right) - f'\left(\frac{(1 + \gamma)N}{F}\right) \frac{(1 + \gamma)N}{F} > rE \) then there is a finite positive optimal number of firms determined by the optimality condition

\[
f\left(\frac{(1 + \gamma)N}{F}\right) - f'\left(\frac{(1 + \gamma)N}{F}\right) \frac{(1 + \gamma)N}{F} = rE.
\]
It is easy to show that the optimal number of firms also increases with the labor supply. Interestingly, if we ban child labor, the total level of welfare is lower because of the decrease in labor supply but also because the number of firms entering the market is lower.

3. Final Comments

Basu and Van (1998) used a simple model economy to generate multiple equilibria where a “bad equilibrium” is one where parents send their children to work. The authors, and then Swinnerton and Rogers, (1999) suggest possible policies to eliminate the possibility of converging to the “bad equilibrium”. BV suggest banning child labor in environments where the bad equilibrium might occur, while SR suggest distributing the dividends generated in the economy across workers. I show that endogeneizing the number of firms in the economy can make the question moot, automatically eliminating the possibility of a multiplicity of equilibria. Furthermore, I show that in BV’s economy the “bad equilibrium” is optimal.

References
