

# Relative Affluence and Child Labor—Explaining a Paradox

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## Abstract

Some micro level empirical studies found child labor incidence increasing even with improvement in the economic conditions of the poor. This paper provides a possible explanation as to why increase in absolute income may not be sufficient to solve the problem of child labor. We argue that people in general are not just concerned about their own consumption; they are very much affected by the consumption of their peers. While taking decisions regarding the time allocation of their children between work and leisure, parents do keep an eye on their relative position in the society. We develop a theoretical model of household decision making to show that child labor supply from a poor family can increase even with improvements in its economic conditions, if the family's relative position in the society deteriorates and if the relative status effect is sufficiently strong.

## 1. Introduction

In the conventional literature, it is believed that the root cause behind the widespread existence of child labor in the developing world is abject poverty and therefore policies should focus on economic development and increasing income. Empirical evidence given by Bonnet (1993), Krueger (1996), Grootaert (1999), Cartwright and Patrinos (1999), Wahba (2000), Grootaert and Patrinos (2002), Nagaraj (2002) and Edmonds (2005) support the poverty hypothesis that states that children are sent to the job market to supplement low family income.

The findings of some micro level empirical studies, based on household survey data, however, are not always supportive of the poverty hypothesis. Some empirical studies using micro level data, failed to demonstrate a strong positive relationship between household poverty and child labor. Patrinos and Psacharopoulos (1997) in their study on Peru have found that none of the potential measures of household assets or income appear to play a significant role. Ray (2000a,b) finds similar results for Peru and Pakistan. Canagarajah and Coulombe (1997) analyzed 1991–92 data on child labor in Ghana. Their findings contradict the traditional claim of poverty being the main determinant of child labor.

Despite many of the developing economies achieving high growth rates during last few decades, the incidence of child labor has not decreased at the expected rate and in many of the transition economies the problem has been on the rise. At the micro level there is evidence of even an increase in child labor incidence associated with significant income growth. Bhalotra and Heady (2003) have argued, using data

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from Pakistan and Ghana, that children in land-rich households are often more likely to be in work than the children of land-poor households. Since a larger land holding typically means greater wealth, this seems to suggest that greater poverty does not lead to more child labor. Edmonds and Turk (2002) also found something similar in Vietnam. Edmonds and Turk (2002) found that households in new businesses appear to rely on family labor and therefore are more likely to engage their children in both traditional and household work. These findings, however, can be explained by what is known as “wealth paradox.” As explained in Basu et al. (2010), in developing economies, poor households want to send their children to work to supplement their low family income but are unable to do so because they have no access to labor markets (imperfect labor markets) close to their home. In this situation households with some wealth, in the form of land or a small business, will be more able to engage their children in work because they can now do what they earlier wished to do.

There are, however, other findings that cannot be explained in terms of the so called “wealth paradox.”<sup>1</sup> For example, Duryea and Arends-Kuenning (2003) found that child labor was higher when average wages increased in Brazil. Kruger (2007) finds that temporary improvement in economic conditions because of a coffee boom in Brazil resulted in increased incidence of child labor. They have argued that in the case of temporary fluctuations in income the substitution effects of temporary income changes are greater than income effects and therefore temporary improvements in economic conditions may increase children’s employment. Empirical findings of a study conducted by Swaminathan (1998) in a city in Gujarat, India reveal some counter intuitive results in this regard. She has found that the incidence of child labor has increased significantly in the city of Bhavnagar despite high economic growth. Using data from a nationally representative household survey (National Sample Survey Organisation, NSSO), Nandi (2015) finds that a household’s work in the employment guarantee scheme reduces the probability of school attendance of 14–17 year-old boys by 14%. The study clearly suggests that school attendance can fall even with an increase in income opportunities. Some of these findings cannot be explained in terms of the “wealth paradox” or strength of substitution effect over income effect in the event of temporary improvement in economic conditions.

The dispute over whether economic prosperity plays the central role in eradicating child labor deserves earnest scrutiny as it has serious policy implications. A pertinent question is, therefore, why growth in income in some cases has failed to lessen the gravity of the problem of child labor while in some other situations increase in income was associated with lower child labor incidence. This paper aims at giving another possible explanation to reconcile these apparently contradictory findings.

This paper aims at giving a possible explanation as to why economic prosperity is not sufficient to solve the problem of child labor, at least in some cases. We argue that people in general are not just concerned about their own consumption; they are very much affected by the consumption of their peers. While taking decisions regarding the time allocation of their children between work and leisure, parents do keep an eye on their relative position in society. We may have a situation where the absolute income of the poor, who are the potential suppliers of child labor, is increasing but their relative position is deteriorating and this may lead to an increase in child work.

The concept of relative income concern or relative happiness is well documented in economics. Starting from Veblen (1899), other authors, notably Duesenberry (1949),

Leibenstein (1950), Galbraith (1958), Easterlin (1974, 1995) and Frank (1985) have argued that individuals are quite sensitive to their relative status in society and always feel pressure to “keep up with the Joneses.” There could be several explanations such as envy, aversion to inequality, relative deprivation, etc. More recently Sivanathan and Pettit (2010), relying on both field and experimental studies on a sample of US consumers, demonstrated that individuals consume status-infused products for their reparative effects on the ego. They have found that “individuals under self-threat sought ownership of high-status goods to nurse their psychological wounds.” Mujcic and Frijters (2013) have explicitly demonstrated a method for measuring the willingness to pay to move up the status ladder. Their study, based on an experiment on Australian university students, finds that income rank matters independently of absolute income. In their experiment they find very strong relative status effect, so much so that rank-sensitive individuals require as much as a 200% increase in income to be compensated for going from the top to the bottom of the income distribution. These studies, with other experiments, confirm the importance of social influence on individual consumption behavior. Marjit et al. (2015), using NSSO consumption data from India, examined the impact of relative status on the consumption behavior of the poor who might feel relatively deprived in a society with highly unequal income distribution. Results of the paper confirm that inequality influences consumption patterns via status effect. Some people tend to argue that poor people are not concerned about their relative position in the society,<sup>2</sup> but this perhaps is not true. There is evidence of the fact that even the underprivileged do care about relative consumption. Using data from a household survey in Nepal, Fafchamps and Shilpi (2008) have tested whether the poor care less about relative consumption than the non-poor. In their study there is no evidence that poor households care less about relative consumption than more fortunate ones. In fact they found that the relative consumption effect is very strong, so much so that in some cases people care only about relative consumption. This is perhaps not surprising in this age of increasing influence of advertising and media.

The objective of this paper is to highlight the implications of relative consumption hypothesis for household preference and analyze how it may affect the household decision making regarding children's economic activity. We formalize this idea in terms of a model of household decision making in the presence of status concern or concern for relative position in society. We assume that all the relevant decisions regarding children's time allocation are taken by their parents. We know from the relative consumption literature that people in general compare their consumption standards but not leisure with the reference group (not necessarily their neighbors, but someone richer than them). In our set-up the less-well-off in society try to emulate the relatively well-off class and in this way we capture the influence of the consumption of the well-to-do on the consumption of the less-well-off. The desire to catch up with the consumption standard of the reference class affects the individual's decision regarding allocation of children's time between labor and leisure. In this set-up we have analyzed situations where economic prosperity is not sufficient to solve the child labor problem, at least in some cases. We can think of a policy environment where income of the poorer section of the society is increasing but at the same time income of the relatively well-to-do is increasing at a faster rate and therefore increasing the degree of income inequality. This will have two opposing effects on children's time allocation. As the income of the poor household is increasing it will put downward pressure on child labor incidence through positive income effect. At the same time, as the

relative position of the poor is deteriorating, this may lead to an increase in children's engagement in economic activities as the parents try to emulate the consumption standard of the reference group. If we accept the fact that poor households try to catch up with the consumption standard of its reference group, then this adverse effect, owing to an increase in inequality, may outweigh the positive income effect and as a result can raise the overall child labor incidence.

## 2. Household Behavior

In this section we analyze decision making regarding allocation of children's time between labor and leisure. We assume that all the decisions regarding children's time allocation are taken by their parents. In our model economy we have two types of families: one headed by adult labor engaged in the low skill sector and earning a low wage; another headed by skilled or semi-skilled labor earning a relatively higher wage. The initial distribution of income/wealth in the society is given. We then consider an optimizing problem of the representative working family consisting of one adult member (the guardian) and a child. We assume that the guardian derives utility from her/his family consumption relative to the consumption of the reference group (the reference group in this case is the relatively richer section of the population with higher wage income) and child's leisure. The guardian then chooses the level of child work and leisure to maximize utility. There are many ways to incorporate relative standing into the utility function. We can incorporate this using an additive comparison utility function<sup>3</sup> such as  $U = U(C - v\bar{C}, (1 - l_C))$  where  $C$  is the individual's income (or consumption vector of different goods) and  $\bar{C}$  is that of the reference group and  $v$  (known as the Veblen coefficient) measure the intensity of relative concern. Another way of capturing relative concern in a utility function can be in terms of ratio comparison utility function like  $U = U(\frac{C}{\bar{C}}, (1 - l_C))$ . Clearly, relative concern increases the marginal utility of consumption. We assume that total child time is 1, a part of which ( $l_C$ ) is sent out to work at the wage rate  $W_C$  and therefore  $Z = (1 - l_C)$  captures child's leisure. We have already assumed that people compare consumption but not leisure, and that they refer upwards rather than seeking social distance from lower income groups. In our model a low skill adult worker tries to emulate the consumption standard of the high wage earners while choosing her/his child's time allocation between work and leisure. We further assume that the relatively well-off families do not send their children to the workplace as they earn sufficiently higher incomes (well above the critical income level as mentioned in Basu and Van (1998)). Furthermore, in our model the high wage earners are the richest class and therefore they have no reference group to look up to.

The supply function of child labor is derived from the utility maximizing behavior of a representative poor working household. We now assume that wage income is the only source of income and people do not save, so the family consumption  $C$  consists of wage income of the guardian  $W$  and child wage from the working time of the child,  $l_C W_C$ . Consumption of the reference group  $\bar{C}$  equals wage income of the adult member of the reference family  $W_R$ . The price of the consumption good is normalized to unity and therefore the budget constraint can be written as:

$$C = W + l_C W_C. \quad (1)$$

We propose a utility function that incorporates status effect wherein inequality hurts and at the same time inequality increases the marginal valuation of the status

good compared with the non-status good. Two specific axioms capture this relative concern effect in a utility function:

*Axiom 1: Inequality hurts*

This implies that having below average income in a society reduces individual utility. Our assumption will be that being above average does not matter as people normally refer upwards rather than seeking social distance from lower income groups. This asymmetry is deliberate to highlight the implications of belonging to the downside of inequality.

*Axiom 2: Inequality increases marginal utility of status good*

Having lower than average income increases the marginal utility of status good, here in our case consumption. In other words, we assume that people compare their consumption standards but not leisure with the reference group. This increases the marginal utility of consumption if an individual's consumption falls below the target consumption.

We can think of the following general form of utility function that captures the above mentioned axioms.

$$\left. \begin{aligned} U &= U[C, Z, I] \\ \text{with } U_C, U_Z &> 0; U_{CC}, U_{ZZ} < 0; U_{CZ}, U_{ZC} \geq 0 \\ \text{and } U_I &< 0 \text{ and } U_{CI} > 0 \text{ and } U_{ZI} \leq 0 \end{aligned} \right\} \quad (2)$$

where  $I$  captures inequality and is determined by the movement of  $(W_R/W)$  and subscripts attached to the function  $U$  denote the partial derivatives with respect to the respective variables.

The representative guardian chooses consumption  $C$  and child's leisure ( $Z = 1 - l_C$ ) to maximize his/her utility.<sup>4</sup>

Note that *Axiom 1* implies  $U_I < 0$  and *Axiom 2* is captured in terms of the assumptions that  $U_{CI} > 0$  and  $U_{ZI} \leq 0$ .

To make the model analytically tractable we use the following specific form of utility function.<sup>5</sup>

$$U = f\left(\frac{W_R}{W}\right) \left[ \Phi\left(\frac{W_R}{W}\right) \ln C + \ln Z \right] \quad \text{with } C, Z > 0 \quad (3)$$

where,

$$\left. \begin{aligned} f\left(\frac{W_R}{W}\right) &< 1 \quad (\text{as } W < W_R) \\ &= 1 \text{ otherwise} \\ \text{and } f' &< 0 \end{aligned} \right\} \quad (3.1)$$

and

$$\left. \begin{aligned} \Phi\left(\frac{W_R}{W}\right) &> 1 \quad (\text{as } W < W_R) \\ &= 1 \text{ otherwise} \\ \text{and } \Phi' &> 0. \end{aligned} \right\} \quad (3.2)$$

Condition (3.1) implies that having income below the reference group reduces individual utility.<sup>7</sup> We are assuming that people do not derive utility from social

distancing from the lower income groups so being above average (reference) does not matter. However, if inequality truly hurts we will have the following.

$$f\left(\frac{W_R}{W}\right)\left[\Phi\left(\frac{W_R}{W}\right)\ln\tilde{C} + \ln\tilde{Z}\right] < \left[\Phi\left(\frac{W_R}{W}\right)\ln C_O + \ln Z_O\right] \quad (4)$$

where  $(\tilde{C}, \tilde{Z})$  are optimal consumption and leisure levels for  $W < W_R$  and the same are denoted by  $(C_O, Z_O)$  for the benchmark case with  $W = W_R$ .

Invoking the envelope property it is straightforward to interpret  $U$  as

$$\frac{dU}{dW} = f'\left(-\frac{W_R}{W^2}\right)\left[\Phi\left(\frac{W_R}{W}\right)\ln\tilde{C} + \ln\tilde{Z}\right] + f(\cdot)\Phi'\left(-\frac{W_R}{W^2}\right)\ln\tilde{C} > 0$$

or

$$\begin{aligned} & -f'\frac{W_R}{W^2}\ln\tilde{Z} - \frac{W_R}{W^2}\ln\tilde{C}\{f'\Phi(\cdot) + f(\cdot)\Phi'\} > 0 \\ & (-) \quad (+) \quad (+) \end{aligned}$$

with  $f' < 0$  and  $\Phi' > 0$ , the above condition holds under the sufficient condition

$$\{f'\Phi(\cdot) + f(\cdot)\Phi'\} \leq 0. \quad (5)$$

Note that if  $W$  drops from  $W_R$ ,  $(W_R/W)$  increases and so  $f(\cdot)$  goes down to a value less than unity, but  $\Phi(\cdot)$  increases, and the net effect has to be negative if inequality has to hurt in equilibrium.

The assumption expressed in (3.2) implies that people in general compare their consumption standards but not leisure with the reference group. This increases the marginal utility of consumption if an individual's consumption falls below the target consumption (consumption of the reference group in this case). This captures Axiom 2 as described above. This follows in spirit the utility function used in Marjit et al. (2015) and Marjit and Yang (2015) to discuss impact of status on measures of poverty, malnutrition and growth.

The representative guardian maximizes his utility (equation (3)) choosing consumption  $C$  and child's leisure ( $Z = 1 - l_C$ ) subject to the budget constraint (equation (1)).

Maximization gives the following solutions.

$$C^* = \frac{\Phi(\cdot)}{1 + \Phi(\cdot)}(W + W_C) \quad (6)$$

$$l_C^* = \left[ \frac{\Phi(\cdot)}{1 + \Phi(\cdot)} - \frac{W}{\{1 + \Phi(\cdot)\}W_C} \right]. \quad (7)$$

Equation (7) is the child labor supply function of a representative poor household. We now analyze its properties. It can be easily checked from (7) that as  $W$  increases, *ceteris paribus*, it produces a positive income effect on child's leisure and so  $l_C$  falls. As  $W_C$  increases, *ceteris paribus*, it produces a negative substitution

effect (net of income effect) on child's leisure and therefore  $l_C$  increases. Increase in the income of the reference group  $W_R$ , other things remaining equal, increases the marginal utility of consumption and therefore the guardian decides to reduce the child's leisure.

We are now considering a situation where income of the reference group  $W_R$  is increasing at a faster rate than the income of our representative household  $W$ , i.e. the distribution is worsening when  $W$  is increasing. To capture this we differentiate equation (7) with respect to  $W$  and allow  $W_R$  to change. This gives the following expression.

$$\frac{dl_C^*}{dW} = \left[ \frac{\Phi'(W + W_C) - (1 + \Phi(\cdot))}{(1 + \Phi(\cdot))^2 W_C} \right] \cdot (8)$$

It is easy to check that  $\frac{dl_C^*}{dW} > 0$  iff  $\Phi' > \frac{1+\Phi}{(W+W_C)}$ , or, if

$$\frac{\partial \Phi}{\partial \left(\frac{W_R}{W}\right)} \cdot \frac{\partial \left(\frac{W_R}{W}\right)}{\partial W} > \frac{1 + \Phi}{(W + W_C)}$$

or,

$$\left\{ \frac{\partial \Phi}{\partial \left(\frac{W_R}{W}\right)} \cdot \frac{\left(\frac{W_R}{W}\right)}{\Phi} \right\} \cdot \left\{ \frac{W}{\left(\frac{W_R}{W}\right)} \frac{\partial \left(\frac{W_R}{W}\right)}{\partial W} \right\} > \frac{1 + \Phi}{\Phi} \frac{W}{(W + W_C)}.$$

Thus, we can write:

$$\frac{dl_C^*}{dW} > 0 \text{ iff } \varepsilon \rho > \frac{1 + \Phi}{\Phi} \frac{W}{(W + W_C)} \quad (9)$$

where  $\varepsilon = \left\{ \frac{\partial \Phi}{\partial \left(\frac{W_R}{W}\right)} \cdot \frac{\left(\frac{W_R}{W}\right)}{\Phi} \right\}$  captures the strength of relative concern effect and  $\rho = \left\{ \frac{\partial \left(\frac{W_R}{W}\right)}{\partial W} \cdot \frac{W}{\left(\frac{W_R}{W}\right)} \right\}$  is the elasticity of income distribution, which captures how income distribution changes with change in  $W$ .

This leads us to the following proposition.

**PROPOSITION 1:** *Child labor supply by a representative household can increase even with increase in wage income if the degree of relative/status concern effect  $\varepsilon$  and/or the elasticity of income distribution  $\rho$  are sufficiently high.*

We now explain this in economic terms. As the wage income of the household increases, it produces a positive income effect on child's leisure and so  $l_C$  falls. In the absence any relative concern effect child labor incidence unambiguously falls. In the presence of status/relative concern effect, what will happen to family child labor supply will be determined by the movement of income inequality and on the strength of relative concern effect. In a situation where wage income of the poor household is increasing at a slower rate than his/her reference group, income inequality will increase and this will induce a relative concern effect by increasing marginal utility of consumption relative to child's leisure. This in turn will produce an upward pressure on child labor supply. The net effect on child labor supply will be determined by the relative strengths of these two opposing forces. Expression (9) suggests that child labor incidence can increase even with an

increase in wage income if the degree of relative/status concern effect (captured in terms of  $\varepsilon$ ) and/or the elasticity of income distribution (captured in terms of  $\rho$ ) are sufficiently high, which leads to  $\varepsilon\rho > \frac{1+\Phi}{\Phi} \frac{W}{(W+W_C)}$ . We should mention here that this is only a possibility. The impact of an increase in wage income on child labor incidence will be determined by the strength of the status effect and the degree of change in income inequality.

### 3. Possible Policy Environments

From (7) one can easily see that what will be the family child labor supply in a particular environment will be determined by how the adult wage rate, child wage rate and income distribution is reacting to any policy environment. We consider two separate policy environments and examine their impact on family child labor supply.

#### *Case 1: Adult Wage and Child Wage Move in the Same Direction*

We can assume that adult and child labor are perfect substitutes and child wage is just a fraction of adult wage, i.e.  $W_C = \beta W$ ,  $\beta < 1$ . In this case  $W$  and  $W_C$  move in the same direction. We can think of a policy environment where  $W_R$  is increasing at a faster rate than  $W$ , i.e. the distribution is worsening when  $W$  (with  $W_C$ ) is increasing. Here in this case there are three effects on child labor supply. As  $W$  increases it produces a positive income effect and therefore  $Z$  increases and  $l_C$  falls. As  $W_C$  is also increasing this increases the opportunity cost of leisure and so  $Z$  falls ( $l_C$  increases). Here if the substitution effect of increase in  $W_C$  is weaker than the income effect of increase in  $W$  then the child labor incidence would fall,<sup>8</sup> but if we now introduce relative concern in our model then this can change our result. As  $W_R$  increasing with  $W$  can lead to a situation where  $l_C$  increases with  $W$  if  $\varepsilon\rho > \frac{1+\Phi}{\Phi} \frac{W}{(W+W_C)}$  (but in this case it is not a necessary condition—it is only a sufficient condition). In our case, as we have taken a specific form of utility function and here the income effect of change in  $W$  and the substitution effect of change in  $W_C$  will cancel out (clear from equation (7)) and only the relative concern effect (owing to change in  $W_R/W$ ) will determine the effect on  $l_C$ . As we are talking about an environment where  $W_R/W$  is increasing this will lead to an unambiguous increase in child labor incidence.

#### *Case 2: Adult and Child Labor are not Perfect Substitutes (Adult Wage and Child Wage can Move in the Opposite Direction)*

We now assume that adult labor and child labor are not perfect substitutes and therefore their wages can move in opposite directions. Here again we are thinking of an environment where  $W_R$  is increasing at a faster rate than  $W$  but  $W_C$  is falling. In this case as  $W$  increases it produces a positive income effect and therefore  $Z$  increases and  $l_C$  falls. As  $W_C$  is falling (so the opportunity cost of leisure),  $l_C$  would fall. Here, in the absence of relative concern effect, child labor incidence would fall unambiguously with increase in income. Now as we bring relative concern into our model this would increase the marginal utility of consumption (as  $W_R/W$  increases,  $\Phi$  increases, given  $\Phi' > 0$ ) and the guardians will substitute leisure with consumption. If this relative concern effect is sufficiently strong, this can outweigh the favorable income and substitution effects of change in  $W$  and  $W_C$ , and eventually child labor incidence might increase. Here in this case  $\varepsilon\rho > \frac{1+\Phi}{\Phi} \frac{W}{(W+W_C)}$  is



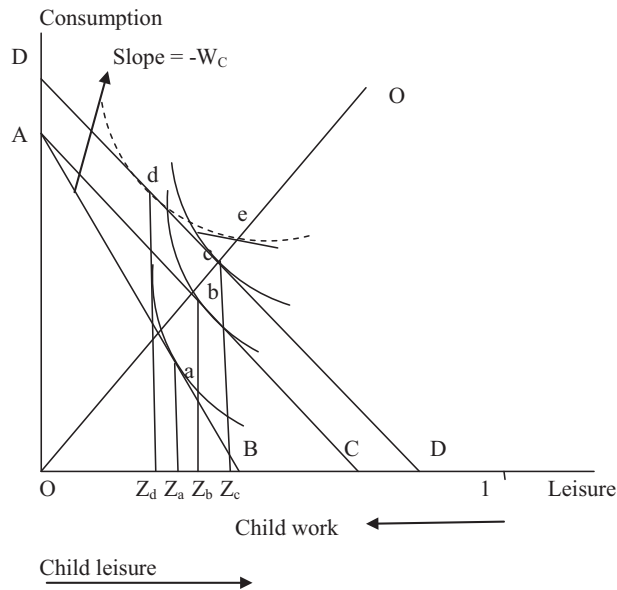


Figure 1. Labor-leisure choice

a necessary condition but not sufficient to produce the counterproductive result. We explain this situation in terms of the following diagram (Figure 1).

We start with a situation with no status effect. Initial equilibrium is at “a” with child leisure at  $Z_a$ . We are considering a policy environment where  $W_R$  is increasing at a faster rate than  $W$ , but  $W_C$  is falling. If we can establish our result with falling  $W_C$ , the result will hold for a rising  $W_C$  (as increase in  $W_C$  increases child work). As  $W_C$  falls, budget line swings to A–C. New equilibrium is at “b” with increased child leisure at  $Z_b$  (this is due to a substitution effect of a fall in  $W_C$ ). As  $W$  has increased budget line shifts to D–D with new equilibrium at “c” and child leisure at  $Z_c$  (income effect). If we now introduce status effect, this will increase marginal utility of consumption and so the slope of the indifference curve along the ray O–O will fall. Slope of the new indifference curve (with status effect) at “e” is lower than that of I–C at “c”. As the shape of the I–C has changed (dotted I–C) the new equilibrium will be somewhere left to “c”. If the status effect is significantly strong then the new equilibrium can even be at “d”, which is to the left of “a”. Here, because of the status effect, child leisure has fallen (and so child work has increased) from  $Z_a$  to  $Z_d$  even with an increase in  $W$ .

Note that if we can establish our result in case 2, the result will hold automatically in case 1, because in case 1 there is an additional unfavorable effect of increase in  $W_C$  on child labor incidence that will make the counter intuitive result even more robust.

We should mention here that in this paper we provide a possible explanation as to why increase in absolute income may not reduce child labor at least in some cases. Conventionally it is argued that an increase in adult wage will necessarily reduce family child labor through positive income effect. We argue that if inequality increases along with poor’s income, this may lead to a situation where child labor incidence from a family may not fall at an expected rate. In fact, if the increase in inequality is very sharp and the status effect is very strong this may even raise the child labor supply from a family even with an increase in the adult’s income. This has some

interesting implications in the context of increasing globalization of the world society. If we accept the fact that the relative concern effect will be stronger with increasing integration of the world economy and society, we would expect a weaker response of globalization on child labor incidence than otherwise. We, however, do not claim that the strengthening of the relative concern effect, owing to globalization, will necessarily raise child labor incidence. What is however certain is that the favorable effect of globalization (if any) will be weaker in a model if we consider the presence of a relative concern effect. We should keep in mind that globalization is a complex process with many facets. Some aspects of globalization may create difficulties for households with children, while there could be some other that may help in reducing the child labor incidence. To capture the overall effect of the impact of globalization on child labor one should use multi-sector general equilibrium models.

#### 4. Conclusion

Some recent micro level empirical studies questioned the validity of the poverty hypothesis of child labor, which suggests that the root cause behind the widespread existence of child labor in the developing world is abject poverty. At the micro level there is even evidence of increase in child labor incidence associated with income growth. This paper provides a possible explanation as to why increase in absolute income may not be sufficient to solve the problem of child labor, at least in some cases. We argue that people in general are not just concerned about their own consumption; they are very much affected by the consumption of their peers. While taking decisions regarding the time allocation of their children between work and leisure, parents do keep an eye on their relative position in society. We may have a situation where the absolute income of the poor is increasing but their relative position in the society is deteriorating and this may lead to an increase in child work. Our theoretical model of household decision making shows that child labor supply from a poor family can increase even with improvements in its economic conditions if the relative concern effect is sufficiently strong.

#### Appendix

##### *A Different Form of Utility Function*

We consider a different form of utility function that does not rule out a corner solution where  $Z = 0$  ( $l_C = 1$ ).

$$U = f\left(\frac{W_R}{W}\right) \left[ \Phi\left(\frac{W_R}{W}\right) C^\alpha + Z^\alpha \right] \text{ with } 0 < \alpha < 1, \quad (\text{A1})$$

with the usual properties as defined in (3.1) and (3.2).

Maximization gives the following child labor supply function.

$$l_C^* = \left[ \frac{1 - W\{W_C\Phi(\cdot)\}^{1/(\alpha-1)}}{1 + W_C^{\alpha/(\alpha-1)}\{\Phi(\cdot)\}^{1/(\alpha-1)}} \right]. \quad (\text{A2})$$

Equation (A2) is the child labor supply function of a representative poor household and follows all the properties of the child labor supply function presented in (7).

To capture the effect of increase  $W$  (with  $W_R$  increasing at a faster rate), we differentiate equation (A2) with respect to  $W$  and allow  $W_R$  to change. This gives the following expression:

$$\frac{dl_C^*}{dW} = \left[ \frac{(W_C \Phi)^{\frac{1}{x-1}} \left\{ \frac{1}{(1-x)} \Phi^{\frac{1-x}{x-1}} (W + W_C) \Phi' - \left( 1 + W_C^{\frac{x}{x-1}} \Phi^{\frac{1}{x-1}} \right) \right\}}{\left[ 1 + W_C^{\frac{x}{x-1}} \Phi^{\frac{1}{x-1}} \right]^2} \right]. \quad (\text{A3})$$

It is easy to check that  $\frac{dl_C^*}{dW} > 0$  iff  $\Phi' > D$ , where  $D = \frac{(1-x)(1+W_C^{\frac{x}{x-1}} \Phi^{\frac{1}{x-1}})}{\Phi^{\frac{1-x}{x-1}} (W + W_C)} > 0$ , or if

$$\frac{\partial \Phi}{\partial \left( \frac{W_R}{W} \right)} \cdot \frac{\partial \left( \frac{W_R}{W} \right)}{\partial W} > D.$$

Simplifying the above expression we can write,

$$\frac{dl_C^*}{dW} > 0 \text{ iff } \varepsilon \rho > \frac{W}{\Phi} D, \quad (\text{A4})$$

with  $\varepsilon$  and  $\rho$  as defined earlier.

Note that the primary result of the model holds under a different parametric condition.

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## Notes

1. Another possible explanation given was in terms of demand–pull forces. Chaudhuri and Dwibedi (2007) have given an explanation as to why growth with globalization is not sufficient to solve the problem of child labor. They have shown that higher economic growth may sufficiently raise the demand for commodities/services that use child labor thereby worsening the problem. For some other important explanations, see Chaudhuri and Dwibedi (2006), Gupta (2002), Jafarey and Lahiri (2002), Chaudhuri (2004, 2010) and Dwibedi and Chaudhuri (2010, 2014).
2. See, e.g. Lokshin and Ravallion (2005)
3. For a similar treatment, see Akerlof (1997) and Bowles and Park (2005).
4. From maximization of (2) subject to (1) one can easily derive the child labor supply function  $l_C^* = l_C^*(W, W_C, I)$ . Now totally differentiating the first order condition ( $U_C W_C - U_Z = 0$ ), one can easily show that  $\frac{dl_C^*}{dW} = \frac{(-U_{CC}W_C + U_{ZC})}{H} < 0$  and  $\frac{dl_C^*}{dI} = \frac{(-U_{CI}W_C + U_{ZI})}{H} > 0$ , where  $H = (U_{CC}W_C^2 - U_{CZ}W_C - U_{ZC}W_C + U_{ZZ}) < 0$  from the second order condition. This establishes the basic results of our model.
5. It should be mentioned here that any utility function that follows the properties as described in equation (2) will establish the qualitative results of our model.
6. Being a log linear utility function, it rules out the corner solution where  $Z = 0$  ( $l_C = 1$ ). It is, however, possible to consider other forms of utility functions that allow corner solutions as well. Appendix 1 analyzes one such utility function with the same qualitative results.
7. The qualitative results of our model, however, also hold without this assumption. This assumption is however more realistic. Without the  $f(\cdot)$  function,  $U(\cdot)$  becomes increasing in  $W_R/W$  (as  $\Phi' > 0$ ). If we accept the fact that in reality inequality hurts, we need the  $f(\cdot)$  function and some restrictions on  $f(\cdot)$  and  $\Phi(\cdot)$  to make Axiom 1 true.
8. There is however a possibility that the substitution effect is stronger than the income effect and so this can increase the child labor incidence. This is particularly possible if the wage movements are temporary in nature. Kruger (2007) has already discussed this possibility. Here we are assuming that this is not the case and trying to argue that even if the substitution effect is weaker than the income effect, there are other forces that can generate this counter intuitive result of increase in child labor incidence with increase in income. If the substitution effect is stronger than the income effect the counterproductive result will be stronger.